## THE REAL EFFECTS OF ACCOUNTING STANDARDS TRANSITION: A NEW METHOD BASED ON GU'S (2007) PES

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ABSTRACT. This paper aims to investigate the real effects on accounting quality of the firms shifted from lower quality accounting standards to higher one, that is International Financial Reporting Standards (IFRS). The accounting quality is affected by accounting standards and other factors such as legal and political systems, incentives of financial reporting at the same time. This paper adopts Gu's (2007) PEs and the sample of Chinese firms that issue both A-share and H-share to control the effect of factors other than accounting standards. The results imply the adoption of IFRS-convergent New CAS diminished the value relevance of accounting information.

**Keywords:** Accounting quality, Gu's (2007) PEs, Accounting standards transition, IFRS, Chinese firms

1. Introduction. IFRS are developed by the International Accounting Standards Committee (IASC) and the subsequent International Accounting Standards Board (IASB). As of April 3, 2019, more than 150 jurisdictions (countries or regions) have already adopted IFRS, which accounts for 95% of the total 166 jurisdictions sample [1]. The studies related to the effects of IFRS adoption are based on the hypothesis that IFRS produce positive economic consequences because of the high-quality and the comparability through accounting standards uniformity. The economic consequences are indirectly affected by IFRS adoption through the effects on the accounting quality. Therefore, the studies pertaining to the effects on accounting quality can be considered as the basis of the studies on effects. However, the empirical studies provide inconsistent results.

The inconsistency owes not only to the limitations of methodology or data but also to the ignorance of potential effects not attributable to accounting standards. For example, the changes of the enforcement regimes, the various legal system and reporting incentives could also have impacts on the economic consequences [2-5]. The ignorance may overstate the effects of IFRS adoption.

[6] depicts a schematic framework describing determinants of accounting quality. It shows that accounting quality is affected not only by accounting standards but also by legal and political systems, and incentives of financial reporting. The accounting standards are a complementary component of the country's overall institutional system and are determined by country's institutional setting and firms' incentives for financial reporting [6,7]. Therefore, for the study on the effect of accounting standards adoption, controlling for the above mentioned country and firm-level factors becomes an important task in the empirical research design.

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The A- and H-share in Chinese stock market provide an excellent opportunity to investigate the effects of accounting standards. Table 1 summarizes the capital markets and accounting standards of A- and H-share. From 2002, the segmentation of A- and H-share markets is loosened owing to the QFII scheme. The segmentation is furthermore relaxed by the SHSC stated in 2014 and the SZHSC stated in 2016. This thesis makes use of samples of firms that issue both the A- and H-share after 2002 to test the impact of New CAS while excluding the effect of factors other than accounting standards.

TABLE 1. Comparisons between trading and disclosure regulations for Aand H-share

Sharo	Stock Currence		Share	Market value		In	Accounting standards			Disclosure		
Share	exchange	Currency	number	(Billion RMB)	Pre-2001	Post-2002	Post-2014	Post-2016	Pre-2006	Post-2007	Post-2010	
	SHSE	BMB	1.405	22 200	Domostia	Domostia	SHSC (A-H share)		CAS	New CAS		Financial
Α	511512	TUMD	1,405	55,500	Chinese	Chinese			UAD			reports
	SZSE	BMB	2.004	7 713	Chinese	+OFII		SZHSC				
	SZSE	TUMB	2,004	1,110		1 621 11		(A-H share)				
Н	HKEX	HK dollar	256	5,547	Chinese institutional investors, foreigners		SHSC (A-H share)	SZHSC (A-H share)	HKFRS/IFRS IFRS/		Financial reports	
		L	<u> </u>		and overs	ea Unifiese	1				CAS	

Source: SHSE, SZSE and HKEX's web data, accessed on March 4, 2021.

This paper is organized as follows. Section 2 introduces the outline of the Chinese capital market related to H-share and then develops testable hypotheses based on an overview of related research. Section 3 presents the study's research methods with model specifications. Section 4 discusses the sample and data. Section 5 presents empirical findings and explores plausible explanations for these findings. Section 6 concludes the study and provides avenues for future research.

2. Hypothesis Development. The inconsistent conclusions from the prior literature are attributable to not only the sample's periods but also the intrinsic problem of IFRS. To realize the goal of developing a single set of high-quality global accounting standards, IFRS are designed as principles-based standards. The principles-based standards could be a two-edged sword. They may provide accounting information that better reflects a firm's intrinsic value, resulting in improvement of the accounting quality. On the other hand, the principles-based standards could provide more opportunity of discretionary earnings management for firms, resulting in the decrease in accounting quality.

After 2001, IFRS had removed several selections, resulting in fewer discretionary options than before. Limiting alternatives could increase accounting quality because this limits management's discretionary management in determining accounting information [8,9]. This is because, ceteris paribus, limiting opportunistic discretion by managers increases the reliability and the transparency of the accounting information. Thus, post-2001, IFRSbased accounting information would enable higher quality than other based accounting information.

A new set of China Accounting Standards (New CAS) is converged with IFRS by minimizing the differences from IFRS to local GAAP since 2007. IFRS are written standards largely derived from U.K. and U.S. national standards, so IFRS are based on the practices of the English-speaking countries and account for strong equity-outsider markets in which the control of companies is widespread among a large number of outside equity shareholders [10-12]. China has been regarded as a successful example of market transformation from regulated centrally-controlled mechanisms to market self-decided mechanisms [13]. However, the understanding of IFRS may not be perfectly coincident with countries, so whether New CAS could realize the goal of convergence is questionable. Hence, the hypotheses are developed in the null form as follows.

H1: The value relevance of New CAS-based financial information is the same as that of Old CAS-based financial information.

488

489

H2: The value relevance of New CAS-based financial information is the same as that of IFRS-based financial information.

3. Methodology. The association between the market value and accounting information is investigated for testing the effects of accounting standards shift. For the research related to examining the effect of accounting standards shift, two issues should be considered. First, only the association between the market value and accounting information is examined. It should be well considered that how to mitigate or eliminate the effect of factors other than accounting standards in order to investigate the effect of accounting standards shift. A-H share of Chinese listed firms provides an excellent opportunity to overcome this concern. Second, much prior research considered value relevance as accounting information and examined the value relevance measured by explanatory power, namely  $\mathbb{R}^2$ , especially the research related to inter-temporal changes of value relevance [14,15].

The  $R^2$  (or adjusted  $R^2$ ), used as a linear model fitness indicator for regression analysis, could not be compared across different samples. Prior researchers use yearly crosssectional regressions and compare the  $R^2$ s obtained from each regression. Thus, the yearly cross-section comparability of value relevance measured by  $R^2$  should not make sense [16].

Instead of  $\mathbb{R}^2$ , the models' explanatory powers, [16] proposes that the residual dispersion regarded as PEs should be examined for the inter-temporal changes in value relevance of financial information (hereinafter referred to as "Gu's (2007) pricing errors"). The larger the PEs are, the lower the value relevance becomes. Accounting-based linear valuation models like Equation (1) are used with the stock prices or returns regressed on accounting variables. [16] describes this situation as follows: "The residual variances or standard deviations measure the dispersion of components in prices or returns that cannot be explained by the accounting variables. They can be interpreted as measures of the degree of PEs for given samples. Such errors do not by any means indicate market inefficiency. Rather, they are components in prices or returns not captured by accounting variables and serve as indicators of accounting inefficiency or value relevance of accounting information".

$$P_{it} = \beta_0 + \beta_1 B V P S_{it} + \beta_2 E P S_{it} + \varepsilon_{it} \tag{1}$$

where  $P_{it}$  is the stock price of firm I after the fiscal year end of period t;  $BVPS_{it}$  is the book value per share of owners' equity determined under CAS or IFRS/HKFRS for firm i at time t;  $EPS_{it}$  is the net income per share determined under CAS or IFRS/HKFRS for firm i at time t;  $\varepsilon_{it}$  is the nonrandom "other information" distinct from book value and earnings per share determined under CAS or IFRS/HKFRS.

[16] proposes three residuals desperations, which can be interpreted as measure of the degree of PEs for given samples using Equation (1): 1) Raw pricing errors calculated as the estimated residuals standard deviation  $\hat{\sigma}_{\varepsilon}$ ; 2) Standardized pricing errors, the estimated residuals standard deviation  $\hat{\sigma}_{\varepsilon}$  divided by  $|\hat{y}|$ , the mean absolute fitted values of  $P_i$  to control for the scale effects; and 3) abnormal pricing errors (APE) controlling for the nonlinear scale effects, which were calculated as follows.

Step 1: Run yearly cross-sectional regressions using Equation (1) and estimate the residual for each observation.

Step 2: Sort all observations into 10 deciles based on the absolute estimated price  $|\hat{P}|$  across years.

Step 3: For each decile, the normal pricing error (benchmark) is calculated as the mean absolute estimated residuals  $|\hat{\varepsilon}|$ .

Step 4: Match the yearly mean of absolute estimated price  $|\hat{P}|$  to the correspondent decile.

Step 5: APE is calculated as the absolute value of the difference between  $|\hat{\varepsilon}|$  and normal pricing errors.

I tested the value relevance effect of the IFRS-convergent New CAS by applying a compound model. We examined the inter-temporal changes of value relevance measured by annual Gu's (2007) pricing errors using Equation (1) and Equation (2).

$$P_{it} = \beta_0 + \beta_1 B V P S_{it} + \beta_2 E P S_{it} + \beta_3 B V P S_{it}^{IFRS-CAS} + \beta_4 E P S_{it}^{IFRS-CAS} + \varepsilon_{it}$$
(2)

Since the segmentation of A- and H-share markets has been dissolved since 2002, Equation (2) added the variables expressing the reconciliation between CAS and IFRS to the Equation (1). Equation (2) could additionally test whether the IFRS reconciliation contains incremental value to the A- and H-share markets after controlling for the reported numbers based on CAS. If the reconciliation of accounting information from CAS to IFRS provides additional information, this "other information" should include the IFRS reconciliation amounts of earnings and book values.

4. Sample and Descriptive Statistics. Chinese firms both issuing A- and H-share with annual financial information and stock price for all periods 2004-2015 were selected for this chapter. The financial and stock price data for A-share are available in the CSMAR, which was developed by the Chinese financial services company GTA, while the financial and stock price data of H-share are easily collected from the annual financial reports published by HKEX. Only the firms that issue both A- and H-share were used. After dropping the firms without earnings and shareholders' equity book value and the firms H-share financial reports under CAS, a total of 493 firm-year observations were obtained from different industries. There is not A-share's firm, which issues A- and H-share, belonging to banking, securities and insurance industries. Table 2 presents the descriptive statistics of the sample variables included in the regression models. All non-dummy variables are winsorized at a 0.5% level.

Variables	Ν	Mean	Std	Min	Max
EPS_A	493	0.400	0.471	-0.360	1.570
EPS_H	493	0.404	0.473	-0.360	1.586
BVPS_A	493	4.156	2.585	0.540	10.552
BVPS_H	493	4.574	2.878	0.540	11.670
P_A	493	9.994	7.913	2.690	32.120
P_H	493	6.419	6.101	1.046	24.091
$BVPS^{IFRS-CAS}$	493	0.380	0.464	-0.077	1.549
$EPS^{IFRS-CAS}$	493	0.003	0.014	-0.020	0.051

TABLE 2. Descriptive statistics

P\_A and P\_H: the A- and H-share stock price of firm i at 6 months after the fiscal year end of period t, respectively; BVPS\_A or BVPS\_H: the book value per share of owners' equity determined under CAS or IFRS/HKFRS for firm i at time t and deflated by the A- and H-share numbers, respectively; EPS\_A or EPS\_H: the net income per share determined under CAS or IFRS/HKFRS for firm i at time t and deflated by the A- and H-share numbers, respectively; BVPS<sup>IFRS-CAS</sup>: the CAS- IFRS/HKFRS reconciliation amounts of book values; EPS<sup>IFRS-CAS</sup>: the CAS- IFRS/HKFRS reconciliation amounts of earnings.

For the Pearson correlation among the selected variables on the A- and H-share samples related to Equation (1), under both A- and H-share, the variables EPS and BVPS have a higher correlation (0.7292 for A-share and 0.7065 for H-share). Under the VIF test, the VIF value is less than 10, which indicates the multicollinearity problem is not critical.

5. **Results.** Figures 1 to 3 depict the RPEs, SPEs and APEs during 2004-2015 calculated by Equation (1) using A- and H-share. [16]'s approach provides the basis for across-sample comparisons, which could not be achieved by adjusted  $R^2$ .

In Figure 1, A-share's RPE is moderately higher than the H-share's one in the pre-New CAS period (until 2006) and swings up and down compared to H-share's RPE in the post-New CAS period. This may imply that the adoption of New CAS affected the value relevance of A-share's firms. If the differences between A-share and H-share's RPEs are statistically significant, we could conclude that the adoption of New CAS has a different effect on the value relevance of A-share's firms compared to Old CAS, which could reject hypothesis H1.



FIGURE 1. Inter-temporal changes of RPE. RPE\_A/RPE\_H are raw pricing errors of A- and H-share, respectively.

Figure 2 shows an adverse change compared to Figure 2. While A-share's SPE swings up and down compared to H-share's SPE in the pre-New CAS period, A-share's SPE becomes lower than H-share's in the post-New CAS period excluding 2015. If the differences between A-share and H-share's SPEs are statistically significant, we could conclude that the adoption of New CAS had a different effect on the value relevance of A-share's firms compared to the Old CAS, which could reject hypothesis H1. The relatively stationary relation (SPE\_A is lower than SPE\_H) in the post-New CAS period could reject hypothesis H2.



FIGURE 2. Inter-temporal changes of SPE. SPE\_A/SPE\_H are standardized pricing errors of A- and H-share, respectively.

Figure 3 depicts that A-share's APE swings up and down compared to H-share's APE during the whole sample period, which makes it difficult to reach a conclusion on the effect of New CAS.



FIGURE 3. Inter-temporal changes of APE. APE\_A/APE\_H are abnormal pricing errors of A- and H-share, respectively.

To examine the statistical significance of the differences between A- and H-share' PEs, we perform the bootstrap analysis by resampling observations randomly with replacement from the A- and H-share's sample 2,000 times for each year. Because A- and H-share's sample is unbalanced, the size of bootstrapped sample varies across sample year.

For each bootstrapped sample, using Equation (1) we calculate  $\{\widehat{PE}_{df_i}\}$ , the differences between A- and H-share's  $\{\widehat{PE}_i\}$ . Thereafter we use the standard errors of the  $\{\widehat{PE}_{df_i}\}$ as the standard errors of  $PE\_df$ .  $PE\_df$  is the differences between A- and H-share's RPE, SPE and APE, respectively, calculated using the original A- and H-share's sample. We use  $\{\widehat{PE}_{df_i}\}$  to obtain bootstrapped percentile confidence intervals for the difference between A- and H-share's PEs.

Table 3 summarizes the bootstrap analysis results of PE\_df for A- and H-share's sample using Equation (1). Column P is the percentile confidence interval of the  $\{\widehat{PE}_{df_i}\}$ 's bootstrap distribution, and Column BC is the bias-corrected percentile confidence interval.

For the RPE\_df, 0 lies outside the 95% confidence interval in 2007 based on P and in 2004, 2006, 2007, 2009 and 2015 based on BC. Therefore, the difference between Ashare and H-share's RPE (Column of observed value) has positive statistical significance (RPE\_A > RPE\_H) in New CAS period (2007, 2009 and 2015). This statistical significance could reject hypothesis H2, implying that the value relevance of CAS-based financial information is lower than that of IFRS-based financial information. However, the difference between Old CAS and New CAS could not be identified.

For the SPE\_df, 0 lies outside the 95% confidence interval in 2008, 2010, 2011, 2012 and 2014 based on BC. This result could reject hypotheses H1 and H2, implying that the value relevance of New CAS-based financial information is different from either that of Old CAS-based or that of IFRS-based financial information. Especially, the value relevance of New CAS-based financial information became higher than that of IFRS-based financial information. The figure (Figure 2) shows increasing trends of SPE\_A after the adoption of New CAS, which indicates New CAS makes the value relevance of New CASbased accounting information lower than that of Old CAS-based accounting information. However, the statistical significance of the inter-temporal changes could not be tested.

For the APE\_df, 0 lies outside the 95% confidence interval in 2006, 2010, 2013 and 2015 based on BC. Furthermore, the difference changes from negative in Old CAS period (2006) to positive in New CAS period (2010, 2013 and 2015). The evidence of APE\_df shows both the difference between New CAS and IFRS, and the differences between Old CAS and New CAS have statistical significance. Therefore, both hypotheses H1 and H2 could be rejected based on APE\_df. In conclusion, the convergence with IFRS by New

TABLE 3. Bootstrap analysis results of PE\_df (A- and H-share's sample)

	$RPE\_df = 0 (rep = 2000)$					$SPE_df = 0 (rep = 2000)$				$APE\_df = 0 \text{ (rep} = 2000)$						
Year N	ear N Observed		Bootstrap	95% conf. interval		Observed	Dieg	Bootstrap	95% co	nf. interval	Observed	Dieg	Bootstrap	95% con	f. interva	al
	value	Dias	Std. Err	Р	BC	value	Dias	Std. Err	Р	BC	value	Dias	Std. Err	Р	BO	3
$2004\ 28$	0.244	-0.161	0.108	-0.108 $0.313$	0.161  0.545	-0.020	0.013	0.020	-0.049 0.025	6 - 0.077  0.000	-0.068	0.074	0.323	-0.620 $0.681$	-0.775	0.483
$2005\ 29$	0.084	-0.031	0.109	-0.187 $0.250$	-0.109 $0.298$	-0.026	0.013	0.028	-0.073 $0.036$	6 - 0.133  0.002	-0.234	0.122	0.290	-0.700 $0.487$	-0.952	0.147
$2006 \ 33$	0.397	-0.164	0.168	-0.091 0.500	0.244  0.776	0.012	-0.002	0.020	-0.029 $0.049$	0 - 0.023  0.053	-0.465	0.369	0.403	-0.854 $0.696$	-1.373	-0.060
$2007\ 42$	1.151	-0.313	0.378	0.011 1.442	0.735  1.812	-0.006	0.006	0.023	-0.049 $0.045$	5 - 0.063  0.030	0.223	-0.021	0.680	-0.975 1.812	-0.827	2.110
$2008\ 48$	0.199	-0.097	0.197	-0.273 0.489	-0.098 $0.689$	-0.057	0.011	0.035	-0.116 $0.020$	-0.134 - 0.002	-0.088	0.144	0.291	-0.523 $0.683$	-0.912	0.286
2009 48	0.558	-0.123	0.300	-0.161 1.013	$0.107 \ 1.187$	-0.030	0.014	0.034	-0.085 $0.047$	-0.126 0.023	0.012	0.149	0.508	-0.744 1.313	-0.949	0.962
2010 $43$	-0.289	0.203	0.271	-0.689 $0.379$	-1.277 $0.022$	-0.076	0.037	0.033	-0.114 $0.017$	-0.181 - 0.043	1.008	-0.562	0.554	-0.549 1.663	0.494	2.594
$2011 \ 41$	-0.529	0.313	0.447	-1.185 0.546	-2.035 $0.036$	-0.176	0.088	0.079	-0.263 0.042	2 - 0.413 - 0.093	-0.204	0.151	0.409	$-0.890 \ 0.775$	-1.276	0.362
2012 $43$	-0.546	0.265	0.508	-1.293 0.629	-1.710 $0.251$	-0.152	0.065	0.086	-0.252 0.063	-0.352 - 0.030	-0.478	0.312	0.426	-1.058 $0.630$	1.656	0.037
2013 $42$	0.295	-0.225	0.519	-0.844 1.162	-0.434 1.563	-0.018	-0.010	0.079	-0.181 0.129	-0.157 $0.145$	0.819	-0.696	0.510	-0.789 1.258	0.312	1.903
2014 $43$	-0.169	0.161	0.314	-0.601 0.621	-0.856 $0.289$	-0.081	0.040	0.041	-0.122 0.039	-0.159 -0.038	0.335	-0.042	0.537	-0.649 1.483	-0.536	1.640
2015 53	2.111	-0.802	0.881	-0.371 2.828	0.983 3.700	0.006	-0.022	0.077	-0.179 0.130	-0.142 $0.161$	1.541	-0.947	0.759	-0.697 2.154	0.862	3.639

RPE\_df is the difference between RPE\_A and RPE\_H; SPE\_df is the difference between SPE\_A and SPE\_H; APE\_df is the difference between APE\_A and APE\_H; N is the yearly sample size, based on which the RPE or SPE is calculated; P is percentile confidence interval; BC is bias-corrected confidence interval.

CAS diminished the value relevance of CAS-based financial information. Furthermore, the value relevance of New CAS-based financial information is lower than that of IFRS.

Table 4 shows the RPEs according to the deciles of the absolute estimated price  $|\hat{y}|$  of A- and H-share, respectively. While the A-share's RPE belonging to Decile 10 become about three times bigger than that belonging to Decile 1 (from 1.13 to 3.01), the A-share's SPEs belonging to Decile 1 and Decile 10 are steady. It is also the same as the RPEs and SPEs of H-share. Therefore, Table 4 indicates the non-linearity of the RPE and implies the necessity of scale control. However, the scale-controlled APE of A-share shows more than twice as big belonging to Decile 10 (1.06) as that belonging to Decile 1 (0.46). That implies the results of the APE could not be credible. In summary, the results pertaining to A- and H-share's SPEs could be considered. The test results using Equation (2), which are similar to the results using Equation (1), and the descriptions are omitted.

Decile	$\left \widehat{y^A}\right $	RPE_A	SPE_A	APE_A	$\left \widehat{y^{H}}\right $	RPE_H	SPE_H	APE_H
1	2.10	1.13	0.23	0.46	0.76	1.03	0.26	0.40
2	3.73	0.77	0.19	0.49	1.69	0.80	0.27	0.41
3	4.88	0.89	0.19	0.42	2.40	0.91	0.26	0.42
4	5.76	1.16	0.16	0.46	3.15	1.11	0.23	0.41
5	6.87	1.21	0.20	0.68	4.06	1.04	0.26	0.45
6	8.17	1.67	0.21	0.85	4.96	1.33	0.23	0.47
7	9.88	1.90	0.17	0.89	6.33	1.73	0.24	0.50
8	12.69	2.31	0.20	0.93	8.31	1.59	0.24	0.47
9	18.12	3.97	0.21	0.97	12.48	2.59	0.24	0.53
10	28.07	3.01	0.17	1.06	20.56	2.08	0.24	0.56

TABLE 4. Deciles of estimated residuals standard deviation

RPE\_A/RPE\_H are raw pricing errors of A- and H-share, respectively; SPE\_A/SPE\_H are standard pricing errors of A- and H-share, respectively; APE\_A/APE\_H are abnormal pricing errors of A- and H-share, respectively.

6. Conclusions and Limitations. The examination above was conducted on Chinese listed firms mandated to report through IFRS-convergent accounting standards using A- and H-share. This paper used Equation (1) and Equation (2) to identify changes in value relevance measured by Gu's (2007) PEs. After testing the sample of Chinese firms issuing A- and H-share, hypothesis H1 is rejected based on the results of SPEs, which implies the adoption of IFRS-convergent New CAS diminished the value relevance of accounting information. Hypothesis H2 is also rejected based on the results of SPEs, which implies the value relevance of New CAS-based accounting information becomes higher than that of IFRS-based accounting information.

This paper focused only on changes in value relevance, one aspect of accounting quality. Future research may examine other aspects of accounting quality such as timeliness, smoothing, and predictability affected by the IFRS-convergent New CAS in order to provide more complete evidence for evaluating the effect of IFRS.

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