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Disclosure Quality of U.S. Listed Chinese Companies: A Direct Comparison With U.S. Domestic Companies

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Abstract: This paper tests whether there is a discrepancy between the disclosure quality of U.S. listed Chinese companies and that of U.S. based companies. In order to numerically measure disclosure quality, six indices are applied to 40 sample companies, including 20 U.S. listed Chinese companies and 20 U.S. domestic companies, and each index is followed by a paired sample t-test or a Chi-square test to quantify if there is a significant difference between the disclosure qualities of the two groups of companies. Based on our sample companies, there is no significant discrepancy between the two sets of companies' financial reporting qualities. This work contributes to the literature of cross-listed Chinese companies by focusing on the fundamental question whether these companies' reporting is truthful.

Keywords: U.S. listed Chinese companies, Disclosure quality, Overseas listing

1. Introduction

On April 2, 2020, Luckin Coffee, a China-based coffee brand listed on the Nasdaq Stock Market, acknowledged financial fraud that involved 2.2 billion RMB [1]. There had not been many signs of the fraud before the exposure, as the only formal sign was the short selling research firm Muddy Waters' publishing an anonymous report on January 31, which claimed that Luckin inflated sales [2]. This abrupt event not only severely hurt Luckin's stock price, but also raised doubts about the disclosure quality of U.S. listed Chinese companies again. Less than a decade ago in 2012, an-other accounting scandal involved more than one-third of the U.S. listed Chinese firms back then [3]. Some specific examples included: China Sky One Medical Inc. (CSKI) falsely reported that it had entered into a distribution agreement with a Malaysian company and produced phony sales of $1 million per month [4]; SinoTech Energy Limited overstated its primary operating assets; an AutoChina senior executive fraudulently traded the company's stock to raise the daily trading volume [5]; etc. Both the 2012 financial scandal and the 2020 Luckin fraud have reduced the U.S. market's confidence in the quality and integrity of cross-listed Chinese firms.

This paper examines whether U.S. listed Chinese firms and U.S. based firms have different disclosure qualities. In theory, since China-based companies are required to follow the same financial reporting rules as those for U.S. based companies, they should have the same disclosure quality. However, due to various cultural settings, local guidelines, oversight, etc., managers in the two

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countries can use accounting discretion differently and affect their disclosure quality. It is important to note here that this work is analyzing "disclosure quality," and that a "lower disclosure quality" does not necessarily mean "fraud."

To test whether there is a discrepancy between the disclosure quality of China-based companies and that of U.S. domestic companies, six indices are used to reflect their disclosure quality — Standard Deviation of Earnings Divided by Standard Deviation of Cash Flow, Accrual Ratio, Earnings Persistence, Size of Annual SEC Filings, Press Releases, and Restatements. During sample selection, we compare the measures of U.S. listed Chinese companies to their U.S. equivalents (similar sizes and same industries), so that their comparable sizes can help mitigate the concern that a potential difference between their disclosure qualities arises from their different sizes and backgrounds. In total, we collect data from 40 companies (20 China-based companies and 20 U.S. based companies) over the period 2016-2018 for the first four indices, and over the period 2010-2021 for the other two indices, Press Releases and Restatements. After determining the six indices for all the 40 companies, we then conduct the paired sample t-test and Chi-square test to draw the final conclusion whether there exists a significant difference between the disclosure quality of U.S. listed Chinese firms and that of U.S. based firms.

2. Literature Review

This paper contributes to the growing literature examining the effects of a lack of oversight of U.S. listed Chinese companies' financial reporting. Prior studies on the disclosure quality of U.S. listed Chinese companies generally focus on the characteristics of fraudulent cross-listed Chinese firms that enable them to commit fraud or the implications of their fraud. Ang et al. [3] analyzed the factors that distinguish U.S. listed Chinese firms that commit fraud from those that do not, identifying factors such as low regional social trust in the home country, political connections, and listing via reverse merger. For the same research purpose, An [6] identified a different set of characteristics of fraudulent companies — weak corporate governance, suspicious transactions, and inconsistent numbers between SEC filings and filings in China. Carcello et al. [7] specifically focused on audit firm oversight of U.S. listed Chinese companies, arguing that "US-listed Chinese companies were more likely than US-listed companies from other countries to avoid hiring high quality annually-inspected US audit firms." On the other hand, other studies have delved into the implications of the China-based companies' fraud. For instance, Feng and Chen [1] estimated Luckin's possibility of bankruptcy by using the Z-Score model.

This paper, rather than focusing on the characteristics of fraudulent China-based companies or the implications of their fraud, extends the literature by returning to the fundamental question whether U.S. listed Chinese firms and U.S. based firms have different disclosure qualities.

3. Hypothesis Development

We hypothesize that there is a significant difference between the disclosure quality of U.S. listed Chinese companies and that of U.S. based companies. Specifically, we speculate that the disclosure quality of U.S. listed Chinese companies is lower than that of U.S. domestic firms.

Due to information asymmetry, it is very costly for U.S. analysts and investors to acquire information about cross-listed Chinese firms. The difficulty arises not only from language barrier and geographical distance, but also from different modes of information transmission [3]. Although U.S. listed Chinese companies need to comply with the rules of the U.S. Securities and Exchange Commission (SEC), it is hard for SEC to enforce guidelines when the firms under oversight are not physically in the country. Such information asymmetry allows cross-listed firms to more flexibly use

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accounting discretion, and thus there is a greater chance that U.S. listed Chinese companies may have incomplete or deceptive disclosures [8].

4. Research Design

4.1. Sample Selection

Our sample selection begins with identifying 20 U.S. listed Chinese companies from various industries with various sizes that are registered with SEC. Then, each of these 20 cross-listed companies is paired with a U.S. based company that operates in the same industry and has a similar size. To ensure that each pair of companies have similar sizes, we record and compare the average total assets, total revenues, numbers of employees, and market capitalization of the two matched companies over a three-year period (2016-2018) side by side. The specific data for comparison are found in Table 1 below. Up-to-date data from 2019-2021 are avoided to be incorporated due to consideration of the COVID-19 pandemic: since Coronavirus already started spreading in China in December 2019 and has not ended even now, acquiring 2019-2021 data would prevent us from accurately determining the functioning of the firms. In Table 1, Total Assets and Total Revenues are taken from the firms' official filings on SEC or their own company websites, and Number of Employees and Market Capitalization are taken from Macrotrends, a research platform for long-term investors.

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Table 1: Sample Selection: Comparison of 20 Pairs of Companies.

Industry	Firm Name	Firm Type	Average Total Assets (M)	Average Total Revenues (M)	Average Number of Employees	Market Capitalization (B)
Technology	Baidu	U.S. listed Chinese firm	$36,060	$12,690	42,107	$64.58
	Alphabet (Google)	U.S. based firm	$199,195	$112,649	83,645	$664.02
Health Care	BeiGene	U.S. listed Chinese firm	$1,234	$79,852	1,097	$4.66
	BioMarin	U.S. based firm	$4,361	$1,307	2,574	$15.02
Travel Services	Trip.com	U.S. listed Chinese firm	$24,245	$3,840	17,218	$18.80
	Booking Holdings	U.S. based firm	$22,659	$12,650	21,800	$78.56
Express Delivery	ZTO Express	U.S. listed Chinese firm	$4,371	$1,992	56,214	$10.89
	FedEx	U.S. based firm	$48,947	$58,711	188,000	$52.86
Air Transportation	China Eastern Airlines	U.S. listed Chinese firm	$33,564	$15,593	74,422	$12.39
	Delta Air Lines	U.S. based firm	$54,940	$39,173	86,521	$36.69
Insurance	China Life Insurance	U.S. listed Chinese firm	$435,640	$89,329	101,618	$96.52
	Prudential Financial Inc.	U.S. based firm	$810,464	$3,314	49,979	$42.33
Video Streaming	iQIYI	U.S. listed Chinese firm	$3,861	$2,643	7,359	$8.84
	Netflix	U.S. based firm	$19,524	$12,106	5,767	$84.34

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Table 1: (continued).

Industry	Firm Name	Firm Type	Average Total Assets (M)	Average Total Revenues (M)	Average Number of Employees	Market Capitalization (B)
Energy	SINOPEC Shanghai Petrochemical	U.S. listed Chinese firm	$48,795	$147,478	148,331	$33.48
	Chevron	U.S. based firm	$255,916	$140,844	51,900	$222.32
Hospitality	Huazhu Group	U.S. listed Chinese firm	$2,536	$1,226	14,925	$7.30
	Hyatt Hotels	U.S. based firm	$7,688	$4,523	48,000	$7.74
E-Commerce	JD.com	U.S. listed Chinese firm	$27,270	$53,451	152,460	$41.97
	Amazon	U.S. based firm	$125,787	$182,247	518,300	$552.43
Game	NetEase	U.S. listed Chinese firm	$10,641	$7,861	20,008	$34.56
	Activision Blizzard	U.S. based firm	$17,985	$7,042	9,767	$36.75
Electric Car	NIO Inc.	U.S. listed Chinese firm	$1,337	$720	9,834	$6.69
	Tesla	U.S. based firm	$27,020	$13,407	34,714	$48.13
Fast Food	Yum China	U.S. listed Chinese firm	$4,208	$7,645	440,000	$12.69
	McDonald's	U.S. based firm	$32,546	$22,822	273,333	$124.83
Social Media	Weibo	U.S. listed Chinese firm	$2,321	$1,175	3,591	$14.96
	Twitter	U.S. based firm	$8,151	$2,672	3,625	$19.30

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Table 1: (continued).

Industry	Firm Name	Firm Type	Average Total Assets (M)	Average Total Revenues (M)	Average Number of Employees	Market Capitalization (B)
Online Shopping	Vipshop	U.S. listed Chinese firm	$5,263	$10,550	53,881	$5.93
	Target	U.S. based firm	$39,661	$73,137	336,333	$36.84
Car Service	Autohome	U.S. listed Chinese firm	$9,177	$955	4,061	$6.42
	AutoNation	U.S. based firm	$10,455	$21,519	26,000	$4.27
Social Media	Hello Group Inc.	U.S. listed Chinese firm	$899	$1,274	1,438	$4.44
	Snapchat	U.S. based firm	$2,620	$803	2,604	$8.28
Hospitality	GreenTree Hospitality Group	U.S. listed Chinese firm	$299	$117	2,565	$1.31
	Best Western	U.S. based firm	$274	$199	1,254	$1.24
Air Transportation	China Southern Airline	U.S. listed Chinese firm	$35,100	$19,307	96,732	$12.19
	American Airlines	U.S. based firm	$54,950	$42,435	119,700	$21.29
IT Service Management	GDS Holdings Ltd.	U.S. listed Chinese firm	$2,080	$269	735	$1.96
	Digital Realty Trust	U.S. based firm	$19,121	$2,702	1,437	$19.63

Note: For clarity and concision, the four values listed above — Average Total Assets, Average Total Revenues, Average Number of Employees, and Market Capitalization — are average values of a firm's 2016 – 2018 data.

4.2. Indices to Determine Disclosure Quality

Six indices are used to help determine the 40 companies' disclosure qualities. To calculate values of the six indices for each firm, we collect 2016-2018 data for the first four indices — Standard Deviation (SD) of Earnings Divided by Standard Deviation (SD) of Cash Flow from Operations

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(OCF), Accrual Ratio, Earnings Persistence, and Size of Annual SEC Filings. For the other two indices — Press Releases and Restatements—we collect data from 2010-2021. Because Press Releases and Restatements are unlike the other four indices that have annual data, gathering data from a wider time frame for these two indices can more accurately reflect a firm's condition in terms of its press releases and issuance of restatements.
Next, the six indices are listed and specified, as well as their data and calculations.

4.2.1. Standard Deviation (SD) of Earnings Divided by Standard Deviation (SD) of Cash Flow from Operations (OCF).

The first index used to help reflect disclosure quality is Standard Deviation (SD) of Earnings Divided by Standard Deviation (SD) of Cash Flow of Operations (OCF). According to Leuz et al. [9], this index focuses on "insiders' reporting choices" and "captures the degree to which insiders 'smooth,' i.e., reduce the variability of reported earnings by altering the accounting component of earnings." A low value of this index suggests that managers use discretion of smooth earnings, while a high value implies that reported earnings are more reflective of the firm's true performance. We collect earnings (net income) and cash flow from operations for all the 40 sample companies over the period 2016-2018. After calculating the square root of variance, we obtain the SD of earnings and SD of OCF and then divide the SD of earnings by the SD of OCF to arrive at the final value of the index. Table 2 below shows the values of SD of Earnings Divided by SD of OCF for the 20 U.S. listed Chinese companies and the 20 U.S. based companies which are matched in pairs. There are four companies whose data for net income or OCF are missing — the index's results for both these companies and their equivalents are omitted in later calculations, so that the numbers of observations for U.S. listed Chinese companies and for U.S. based companies are still the same and comparable.

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Table 2: SD of Earnings Divided by SD of OCF for 20 Pairs of Companies.

Firm Name	SD of Earnings	SD of OCF	SD of Earnings / SD of OCF
Baidu	677.4	915.7	0.7398
Alphabet (Google)	15293.6	15233.9	1.0039
BeiGene	208.1	48194.0	0.0043
BioMarin	283.9	105405.2	0.0027
Trip.com	156374.5	367.9	425.0462
Booking Holdings	1463.8	1536.9	0.9524
ZTO Express	141.5	1569.9	0.0901
FedEx	1171.1	1414.4	0.8280
China Eastern Airlines	1755.7	530.8	3.3076
Delta Air Lines	1469.0	1561.1	0.9410
China Life Insurance	8309.9	8756.8	0.9490
Prudential Financial Inc.	1759.1	4683.9	0.4000
iQIYI	408.5	12327.4	0.0331
Netflix	423.3	1152.5	0.3673
SINOPEC Shanghai Petrochemical	1327.7	9680.7	0.1371
Chevron	6317.2	7470.2	0.8457
Huazhu Group	37.5	10058.2	0.0037
Hyatt Hotels	256.2	119.0	2.1529
JD.com	221.9	1395.8	0.1590
Amazon	3485.2	11054.5	0.3153
NetEase	349.5	168.8	2.0705
Activision Blizzard	629.7	187.2	3.3638
NIO Inc.	-	-	-
Tesla	634.7	1032.7	~~0.6146~~
Yum China	129.2	216.0	0.5981
McDonald's	508.0	585.6	0.8675

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Table 2: (continued).

Firm Name	SD of Earnings	SD of OCF	SD of Earnings / SD of OCF
Weibo	190.7	132.4	1.4403
Twitter	715.8	257.3	2.7820
Vipshop	10.2	282.5	0.0361
Target	90.8	625.1	0.1453
Autohome	98.6	91.0	1.0835
AutoNation	17.3	12.7	1.3622
Hello Group Inc.	52.4	120.5	0.4349
Snapchat	1244.1	51.0	24.3941
GreenTree Hospitality Group	-	-	-
Best Western	-	-	-
China Southern Airline	-	-	-
American Airlines	628.7	2356.4	~~0.2668~~
GDS Holdings Ltd.	9.4	10.8	0.8718
Digital Realty Trust	71.9	202.2	0.3553

Note: There are two final values of SD of Earnings Divided by SD of OCF that are crossed out — these companies' equivalents have missing data on net income or OCF, so the companies' own data have to be omitted in order to ensure the equal number of observations on both the cross-listed firms' side and the domestic firms' side.

4.2.2. Accrual Ratio

The second index adopted to determine disclosure quality is Accrual Ratio. It is calculated using the formula below:

$$ccrual\ Ratio = \frac{Net\ Income\ 12m - Cash\ from\ Operations\ 12m - Cash\ from\ Investing\ 12m}{(Total\ Assets\ Q1 \times 0.5) + (Total\ Assets\ Q5 \times 0.5)} \times 100 \quad (1)$$

$Q1$ indicates the most recent quarter, and $Q5$ indicates the same quarter one year prior.

Rotblut [10] proposed that accruals could be interpreted as forecasts of future economic performances, but the forecasts could potentially be too optimistic and future earnings would actually be lower than the expectations. To test whether a company is overly aggressive with its use of accruals, the *Accrual Ratio* discussed by John Bajkowski [10] can be helpful. For this index, we collect a company's net income reported in a 12-month period, cash flow from operations and cash flow from investing within the same period, total assets from the most recent quarter (2018 Q4, 2017 Q4, and 2016 Q4 based on our research period), and total assets from the same quarter one year prior (2017 Q4, 2016 Q4, and 2015 Q4). If the *Accrual Ratio* for a company is a positive value, it means that there is a great chance of a write-down for the earnings and earnings are less sustainable. On the other hand, a negative value indicates that there is a small chance that earnings would be reduced in the

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next couple of years [10]. We calculate the ratios for each of the three years (2016-2018) for each sample company and then obtain every company's average *Accrual Ratio* over the three-year period, as shown in Table 3 below. There are 11 companies that have missing data; thus, after omitting the data for these companies and their equivalents, 11 pairs of companies have complete values for this index.

Table 3: Accrual Ratios for 20 Pairs of Companies.

Firm Name	Accrual Ratio (%)			Average Accrual Ratio (%)
	2016	2017	2018	
Baidu	14.82	29.52	7.48	17.28
Alphabet (Google)	9.28	3.82	5.24	6.11
BeiGene	34269.98	-1720.25	31.01	10860.25
BioMarin	5873.39	206.68	-7.97	2024.03
Trip.com	9.51	1458.78	4.52	490.93
Booking Holdings	7.97	8.31	-14.77	0.50
ZTO Express	3.87	32.77	38.38	25.01
FedEx	13.48	3.67	7.76	8.30
China Eastern Airlines	-	-	-	-
Delta Air Lines	-1.30	7.07	2.31	~~2.70~~
China Life Insurance	1.32	0.25	3.26	~~1.61~~
Prudential Financial inc.	-	-	-	-
iQIYI	-	-	-	-
Netflix	-	-	-	-
SINOPEC Shanghai Petrochemical	-	-	-	-
Chevron	1.18	-1.14	-1.37	~~-0.44~~
Huazhu Group	-15.83	41.03	18.97	~~14.72~~
Hyatt Hotels	-	-	-	-
JD.com	28.37	-1.94	1.19	9.20
Amazon	-7.24	10.88	-5.63	-0.66
NetEase	-34.65	19.47	8.19	-2.33
Activision Blizzard	21.65	-9.60	1.39	4.48
NIO Inc.	-	-	-	-

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Table 3: (continued).

Firm Name	Accrual Ratio (%)			Average Accrual Ratio (%)
	2016	2017	2018	
Tesla	2.81	7.86	-2.82	~~2.61~~
Yum China	2.97	1.77	-1.64	1.03
McDonald's	-6.83	0.63	-10.50	-5.57
Weibo	-3.52	33.94	11.44	13.95
Twitter	-9.42	-11.50	21.86	0.31
Vipshop	3.55	9.56	7.36	6.82
Target	-2.91	-2.28	0.95	-1.41
Autohome	1.19	42.06	21.19	21.48
AutoNation	4.16	1.20	1.72	2.36
Hello Group Inc.	32.47	1.35	143.23	~~59.02~~
Snapchat	-	-	-41.07	-
GreenTree Hospitality Group	-	-	-	-
Best Western	-	-	-	-
China Southern Airline	-	-	-	-
American Airlines	3.83	0.33	-12.33	~~-2.72~~
GDS Holdings Ltd.	14.91	18.11	24.79	19.27
Digital Realty Trust	6.98	3.51	8.82	6.44

Note: There are seven final values of Average Accrual Ratio that are crossed out — these companies' equivalents have missing data that prevent us from calculating the annual accrual ratios, so the companies' own data have to be omitted in order to ensure the equal number of observations on both the cross-listed firms' side and the domestic firms' side.

4.2.3. Earnings Persistence

The third index we use is Earnings Persistence. From analysts' perspective, high-quality earnings are sustainable and recurring, so testing how persistent earnings are can reflect the quality of earnings, which is an important part of quality of disclosure overall. To test earnings persistence, the regression model below is applied:

$$Earnings\ (t+1) = \alpha + \beta 1 \bullet Earnings\ (t) + \varepsilon \quad (2)$$

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$Earnings\ (t)$ is net income from a quarter prior to that of $Earnings\ (t+1)$. The closer the coefficient $\beta 1$ is to 1, the more persistent earnings are. We collect the 2016-2018 quarterly net incomes for all the 40 companies. Because there are 8 companies whose quarterly net incomes are not found on SEC or their own company websites, only 13 pairs of companies have available data eventually. Table 4 below shows a summary of the $Earnings\ Persistence$ values, $\beta 1$, for the 40 companies, including missing data.

Table 4: Earnings Persistence (β1) for 20 Pairs of Companies.

Firm Name	Time	Earnings (M)												β1
		2016Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018Q3	2018Q4	
Baidu	t	$382	$307	$373	$481	$641	$275	$686	$1,235	$1,235	$862	$788	$1,771	0.0710
	t+1	$307	$373	$481	$641	$275	$686	$1,235	$1,235	$862	$788	$1,771	$83	
Alphabet (Google)	t	$4,923	$4,207	$4,877	$5,061	$5,333	$5,426	$3,524	$6,732	-$3,020	$9,401	$3,195	$9,192	-0.4591
	t+1	$4,207	$4,877	$5,061	$5,333	$5,426	$3,524	$6,732	-$3,020	$9,401	$3,195	$9,192	$8,948	
BeiGene	t	-$27	-$22	-$24	-$35	-$38	-$51	-$61	$117	-$99	-$105	-$158	-$144	0.5343
	t+1	-$22	-$24	-$35	-$38	-$51	-$61	$117	-$99	-$105	-$158	-$144	-$267	
Bio Marin	t	$69	-$83	-$419	-$37	-$91	-$16	-$37	-$13	-$51	-$44	-$17	-$12	0.0178
	t+1	-$83	-$419	-$37	-$91	-$16	-$37	-$13	-$51	-$44	-$17	-$12	-$4	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018Q3	2018Q4	
Trip.com	t	$8	-$260	-$89	$4	$93	$12	$48	$185	$77	$170	$360	-$165	0.2709
	t+1	-$260	-$89	$4	$93	$12	$48	$185	$77	$170	$360	-$165	-$176	
Booking Holdings	t	$504	$374	$581	$506	$674	$456	$720	$1,720	-$555	$607	$977	$1,768	-0.1947
	t+1	$374	$581	$506	$674	$456	$720	$1,720	-$555	$607	$977	$1,768	$646	
ZTO Express	t	$109	$53	$66	$85	$115	$78	$112	$112	$190	$87	$226	$165	0.3075
	t+1	$53	$66	$85	$115	$78	$112	$112	$190	$87	$226	$165	$199	
FedEx	t	-$895	$692	$691	$507	-$70	$715	$700	$562	-$1,020	$596	$775	$2,074	0.1349
	t+1	$692	$691	$507	-$70	$715	$700	$562	-$1,020	$596	$775	$2,074	$1,127	
China Eastern Airlines	t	-	-	-	-	-	-	-	-	-	-	-	-	-
	t+1	-	-	-	-	-	-	-	-	-	-	-	-	
Delta Air Lines	t	$980	$946	$1,546	$1,259	$622	$603	$1,224	$1,178	$572	$557	$1,036	$1,322	~~0.1863~~
	t+1	$946	$1,546	$1,259	$622	$603	$1,224	$1,178	$572	$557	$1,036	$1,322	$1,019	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	
China Life Insurance	t	-	$817	-	-	-	$957	-	-	-	$2,156	-	-	-
	t+1	$817	-	-	-	$957	-	-	-	$2,156	-	-	-	
Prudential Financial Inc.	t	$740	$1,369	$925	$1,832	$293	$1,372	$496	$2,241	$3,865	$1,364	$200	$1,675	~~0.0163~~
	t+1	$1,369	$925	$1,832	$293	$1,372	$496	$2,241	$3,865	$1,364	$200	$1,675	$849	
iQIYI	t	-	-	-	-	-	-$174	-	-	-$95	-$63	-$317	-$457	-
	t+1	-	-	-	-	-$174	-	-	-$95	-$63	-$317	-$457	-$506	
Netflix	t	$43	$28	$41	$52	$67	$178	$66	$130	$186	$290	$384	$403	~~0.6602~~
	t+1	$28	$41	$52	$67	$178	$66	$130	$186	$290	$384	$403	$134	
SINOPEC Shanghai Petrochemical	t	-	$178	$304	$161	$284	$300	$101	$229	$314	$283	$265	$177	-0.1225
	t+1	$178	$304	$161	$284	$300	$101	$229	$314	$283	$265	$177	$96	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018Q3	2018Q4	
Chevron	t	-$555	-$707	-$1,463	$1,301	$438	$2,699	$1,466	$1,986	$3,118	$3,659	$3,422	$4,056	0.7593
	t+1	-$707	-$1,463	$1,301	$438	$2,699	$1,466	$1,986	$3,118	$3,659	$3,422	$4,056	$3,723	
Huazhu Group	t	$11	$11	$48	$44	$18	$22	$58	$71	$35	$21	$51	$97	0.3556
	t+1	$11	$48	$44	$18	$22	$58	$71	$35	$21	$51	$97	$61	
Hyatt Hotels	t	$37	$34	$67	$62	$41	$55	$103	$19	$213	$411	$77	$237	0.1203
	t+1	$34	$67	$62	$41	$55	$103	$19	$213	$411	$77	$237	$44	
JD.com	t	-$1,178	-$135	-$20	-$121	-$240	$52	-$56	$147	-$148	$236	-$344	$419	-0.3004
	t+1	-$135	-$20	-$121	-$240	$52	-$56	$147	-$148	$236	-$344	$419	-$709	
Amazon	t	$482	$513	$857	$252	$749	$724	$197	$256	$1,856	$1,629	$2,534	$2,883	0.9391
	t+1	$513	$857	$252	$749	$724	$197	$256	$1,856	$1,629	$2,534	$2,883	$3,027	
NetEase	t	$334	$382	$409	$411	$530	$570	$438	$380	$198	$120	$318	$232	0.6976
	t+1	$382	$409	$411	$530	$570	$438	$380	$198	$120	$318	$232	$247	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	
Activision Blizzard	t	$159	$363	$151	$199	$254	$426	$243	$188	-$584	$500	$402	$260	-0.1537
	t+1	$363	$151	$199	$254	$426	$243	$188	-$584	$500	$402	$260	$650	
NIO Inc.	t	-	-	-	-	-	-	-	-	-	-	-	-$409	-
	t+1	-	-	-	-	-	-	-	-	-	-	-$409	-$510	
Tesla	t	-$320	-$282	-$293	$22	-$121	-$330	-$336	-$619	-$675	-$710	-$718	$312	~~0.4852~~
	t+1	-$282	-$293	$22	-$121	-$330	-$336	-$619	-$675	-$710	-$718	$312	$139	
Yum China	t	-$29	$145	$77	$192	$88	$175	$107	$211	-$90	$288	$143	$203	-0.5531
	t+1	$145	$77	$192	$88	$175	$107	$211	-$90	$288	$143	$203	$74	
McDonald's	t	$1,206	$1,125	$1,093	$1,275	$1,193	$1,215	$1,395	$1,884	$699	$1,375	$1,496	$1,637	-0.1643
	t+1	$1,125	$1,093	$1,275	$1,193	$1,215	$1,395	$1,884	$699	$1,375	$1,496	$1,637	$1,415	
Weibo	t	$19	$7	$26	$32	$43	$47	$74	$101	$131	$99	$141	$165	0.9885
	t+1	$7	$26	$32	$43	$47	$74	$101	$131	$99	$141	$165	$167	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016Q1	2016Q2	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018Q3	2018Q4	
Twitter	t	-$90	-$80	-$107	-$103	-$167	-$62	-$116	-$21	$91	$61	$100	$789	0.4699
	t+1	-$80	-$107	-$103	-$167	-$62	-$116	-$21	$91	$61	$100	$789	$255	
Vipshop	t	$78	$74	$68	$51	$111	$80	$57	$51	$104	$85	$103	$33	-0.3965
	t+1	$74	$68	$51	$111	$80	$57	$51	$104	$85	$103	$33	$100	
Target	t	$1,426	$632	$680	$608	$817	$681	$672	$480	$1,101	$718	$799	$622	-0.2238
	t+1	$632	$680	$608	$817	$681	$672	$480	$1,101	$718	$799	$622	$799	
Autohome	t	$45	$38	$52	$39	$54	$48	$76	$64	$112	$77	$105	$99	0.8435
	t+1	$38	$52	$39	$54	$48	$76	$64	$112	$77	$105	$99	$148	
AutoNation	t	$98	$96	$112	$107	$115	$98	$88	$98	$151	$94	$98	$112	-0.2277
	t+1	$96	$112	$107	$115	$98	$88	$98	$151	$94	$98	$112	$93	
Hello Group Inc.	t	$6	$7	$15	$39	$84	$81	$61	$79	$98	$130	$118	$85	0.7671
	t+1	$7	$15	$39	$84	$81	$61	$79	$98	$130	$118	$85	$96	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	
Snapchat	t	-	-$105	-$116	-$124	-$170	-$2,209	-$443	-$443	-$350	-$386	-$353	-$325	-0.0374
	t+1	-$105	-$116	-$124	-$170	-$2,209	-$443	-$443	-$350	-$386	-$353	-$325	-$192	
GreenTree Hospitality Group	t	-	-	-	-	-	-	-	-	-	$14	$15	$22	-
	t+1	-	-	-	-	-	-	-	-	$14	$15	$22	$8	
Best Western	t	-	-	-	-	-	-	-	-	-	-	-	-	-
	t+1	-	-	-	-	-	-	-	-	-	-	-	-	
China Southern Airline	t	-	-	-	-	-	-	-	-	-	-	-	-	-
	t+1	-	-	-	-	-	-	-	-	-	-	-	-	
American Airlines	t	$3,281	$700	$950	$737	$289	$340	$864	$661	-$583	$159	$556	$372	~~0.1152~~
	t+1	$700	$950	$737	$289	$340	$864	$661	-$583	$159	$556	$372	$325	

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Table 4: (continued).

Firm Name	Time	Earnings (M)												β1
		2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	
GDS Holdings Ltd.	t	-$4	-	-	-$8	-$10	-$6	-$11	-$14	-$18	-$14	-$15	-$17	-
	t+1	-	-	-$8	-$10	-$6	-$11	-$14	-$18	-$14	-$15	-$17	-$18	
Digital Realty Trust	t	-$17	$62	$51	$222	$96	$85	$80	$12	$80	$110	$88	$90	~~0.0152~~
	t+1	$62	$51	$222	$96	$85	$80	$12	$80	$110	$88	$90	$53	

Note: There are six final values of β1 that are crossed out — these companies' equivalents have missing data on quarterly net incomes, so the companies' own data have to be omitted in order to ensure the equal number of observations on both the cross-listed firms' side and the domestic

4.2.4. Size of Annual SEC Filings

The fourth index used is Size of Annual SEC Filings. As one of the most important properties of financial filings, the amount of information provided by a company is a useful indicator of the depth, or quality, of the company's disclosure. However, it is difficult to describe the amounts of information the companies provide. Hence, we obtain the numerical digital sizes of their filings as an attempt to reflect how much information they disclose. We first record the file sizes for each year within 2016-2018 and then calculate an average value of the file sizes for each company. The sizes of the companies' annual filings are all taken from the SEC website, and the data are demonstrated in Table 5 below. There is 1 company whose annual filings are missing, so values of this index for the other 19 pairs of firms are acquired.

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Table 5: Sizes of Annual SEC Filings for 20 Pairs of Companies.

Firm Name	Size of Annual SEC Filings (MB)			Average Size of Annual SEC Filings (MB)
	2016	2017	2018	
Baidu	16	15	19	16.67
Alphabet (Google)	17	15	15	15.67
BeiGene	15	15	14	14.67
BioMarin	25	22	23	23.33
Trip.com	23	17	18	19.33
Booking Holdings	14	14	16	14.67
ZTO Express	12	14	14	13.33
FedEx	19	40	42	33.67
China Eastern Airlines	4	22	25	17.00
Delta Air Lines	15	18	18	17.00
China Life Insurance	5	23	26	18.00
Prudential Financial Inc.	74	71	71	72.00
iQIYI	-	-	31	31.00
Netflix	-	-	13	13.00
SINOPEC Shanghai Petrochemical	4	17	21	14.00
Chevron	29	27	28	28.00
Huazhu Group	16	19	18	17.67
Hyatt Hotels	38	35	38	37.00
JD.com	25	25	26	25.33
Amazon	12	13	12	12.33
NetEase	14	14	16	14.67
Activision Blizzard	15	14	19	16.00

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Table 5: (continued).

Firm Name	Size of Annual SEC Filings (MB)			Average Size of Annual SEC Filings (MB)
	2016	2017	2018	
NIO Inc.	-	-	18	18.00
Tesla	27	26	31	28.00
Yum China	19	19	23	20.33
McDonald's	15	20	22	19.00
Weibo	15	15	16	15.33
Twitter	17	17	18	17.33
Vipshop	18	19	19	18.67
Target	17	14	13	14.67
Autohome	14	10	11	11.67
AutoNation	14	14	17	15.00
Hello Group Inc.	10	10	14	11.33
Snapchat	-	17	18	17.50
GreenTree Hospitality Group	-	-	21	~~21.00~~
Best Western	-	-	-	-
China Southern Airline	6	24	25	18.33
American Airlines	25	28	31	28.00
GDS Holdings Ltd.	20	29	22	23.67
Digital Realty Trust	40	42	50	44.00

Note: There is one final value of Average Size of Annual SEC Filings that is crossed out — this company's equivalent has missing data on sizes of annual SEC filings, so the company's own data have to be omitted in order to ensure the equal number of observations on both the cross-listed firms' side and the domestic firms' side.

4.2.5. Press Releases.

The fifth index employed is Press Releases. A firm is designated a dummy variable of 1 if it has been: 1) prosecuted by regulatory institutions, including SEC, China's regulatory agency, Interpol, etc., for

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financial fraud or improper disclosure; 2) sued by investors; or 3) suspected of financial fraud by major media over the period of 2010-2021 [3]. A firm is designated a dummy variable of 0 if nothing above has happened to it within the period. While accusations by regulatory institutions and suits brought by investors are more objective, reports by major media can be rather subjective as they are not necessarily based on facts. However, this measure can still demonstrate how a firm's financial reporting is received by the public, indirectly reflecting its disclosure quality. Table 6 below shows a summary of Press Releases for the 40 companies.

Table 6: Press Releases for 20 Pairs of Companies.

Firm Name	Press Release about Financial Fraud (1/0)	Notes
Baidu	1	U.S. law firms sued Baidu in a class action lawsuit in April 2020, claiming that Baidu failed to "disclose to investors that Baidu's feed services were not in compliance with Chinese regulatory standards"
Alphabet (Google)	0	
BeiGene	1	Found by a local securities watchdog in Sept. 2019 that it recorded 29.9 B RMB in cash with false records
BioMarin	1	Sued in a securities class action lawsuit in Sept. 2020 for failing to disclose material information during the class period
Trip.com	0	
Booking Holdings	0	
ZTO Express	1	Sued by a U.S. pension fund in July 2017 for "untrue statements" at IPO
FedEx	0	
China Eastern Airlines	0	
Delta Air Lines	0	
China Life Insurance	1	Accused of insurance fraud by an employee (but not sure if it was true) in Feb. 2021
Prudential Financial Inc.	0	

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Table 6: (continued).

Firm Name	Press Release about Financial Fraud (1/0)	Notes
iQIYI	1	Accused of fraud by Wolfpack Research; investigated by SEC in Aug. 2020
Netflix	0	
SINOPEC Shanghai Petrochemical	1	The Interpol issued red notices to three SINOPEC executives who were suspected of fraud linked to a $800 M project in Indonesia
Chevron	0	
Huazhu Group	1	Investigated by Glancy Prongay & Murray LLP for potential violations of the federal securities laws in Sept. 2020
Hyatt Hotels	0	
JD.com	1	Fined 500,000 RMB for "the illegal act of using deceitful or misleading price information to entice customers or other business traders into trading"
Amazon	0	
NetEase	0	
Activision Blizzard	1	Sued by five U.S. law firms in Aug. 2021 for failing to disclose that it was facing investigation from the California Department of Fair Employment and Housing for potential misconduct
NIO Inc.	1	Accused in a class action lawsuit in 2019 of inflating its 2018 IPO price
Tesla	1	Sued by SEC in 2018 when Elon Musk wrote on Twitter that he was considering making Tesla private for $420 per share and had secured funding
Yum China	0	
McDonald's	0	
Weibo	1	Weibo's former Senior Public Relations Director Taotao Mao was detained by police for accepting bribes and committing fraud in Aug. 2021

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Table 6: (continued).

Firm Name	Press Release about Financial Fraud (1/0)	Notes
Twitter	1	Accused by the National Elevator Industry Pension Fund and KBC Asset Management in 2016 of failing to disclose its stagnant user growth and declining user engagement; Twitter paid $809.5 million to settle the lawsuit in Sept. 2021
Vipshop	1	J Capital Research raised allegations in May 2015 about mismatches between Vipshop's U.S. filings and filings in China; Mithra Forensic Research alleged that Vipshop was overstating sales by calling them "gross" rather than "net"
Autohome	1	Investigated by Pomerantz LLP for potential securities fraud and unlawful business practices in Oct. 2017
Target	0	
AutoNation	0	
Hello Group Inc.	1	Accused in a class action lawsuit in June 2019 of failing to disclose that its compliance procedures did not prevent illicit financial reporting activities and that its dating app did not follow Chinese laws
Snapchat	0	
GreenTree Hospitality Group	0	
Best Western	0	
China Southern Airline	0	
American Airlines	0	
GDS Holdings Ltd.	1	J Capital Research published a report in March 2020, claiming that at least 25% of GDS' revenue was fraudulent; investors accused GDS of misleading them with the revenue, but a New York federal district judge shut down the suit
Digital Realty Trust	1	In the case Digital Realty Trust Inc. vs. Somers in 2017, Paul Somers, who had worked as Vice President for the company from 2010 - 2014, claimed that Digital Realty Trust had violated securities law

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4.2.6. Restatements

The sixth index applied is whether a company has issued a Restatement. A firm is designated a dummy variable of 1 if the following conditions are met: 1) The SEC website indicates that the company has filed an amendment to its financial report over the period of 2010-2021; and 2) The amendment involves a restatement of or addition to its original annual filings, and such restatement or addition is related to a significant financial reporting error. By "significant," we suggest that small errors such as typographical errors do not count here. Usually, a company is required to revise the entirety or part of its financial report if the Financial Accounting Standards Board (FASB) has confirmed that there is an error. The more restatements a firm is demanded to issue, the more material issues its financial reports have, which then implies a low and questionable quality of its disclosure. Table 7 below shows a summary of Restatements for the 40 companies.

Table 7: Restatements of 20 Pairs of Companies.

Firm Name	Restatement (1/0)	Notes
Baidu	0	2010 - Filed to correct a clerical error in the 20-F form 2011 - Filed to correct the translation of an entity's name
Alphabet (Google)	0	2019 - Updated the consent to reflect the signature of Ernst & Young LLP, which had been inadvertently omitted
BeiGene	0	
BioMarin	0	
Trip.com	1	2011 - Replaced English translations of the unexecuted forms of relevant agreements with English translations of the executed forms 2016 - Made separate financial statements for unconsolidated subsidiaries and investees accounted for by the equity method to be included in the 20-F form 2017 - Same as 2016 2018 - Same as 2016
Booking Holdings	0	2012 - Corrected a typographical error
ZTO Express	0	
FedEx	1	2019 - Added disclosure under the 10-K Item 9B pursuant to Section 219 of the Iran Threat Reduction and Syria Human Rights Act
China Eastern Airlines	1	2010 - Refiled Exhibit 4.23, which had originally been attached to 20-F 2012 - Refiled Exhibit 4.27, which had originally been attached to 20-F

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Table 7: (continued).

Firm Name	Restatement (1/0)	Notes
Delta Air Lines	1	2013 - Included in the 10-K form the information required to be filed pursuant to Part III of 10-K 2017 - Refiled Exhibit 23.1, the Consent of Independent Registered Public Accounting Firm
China Life Insurance	0	
Prudential Financial Inc.	0	
iQIYI	0	
Netflix	0	2019 - Updated the consent in Exhibit 23.1 to reflect the signature of Ernst & Young LLP
SINOPEC Shanghai Petrochemical	1	2013 - Added additional disclosure to the original report 2016 - Responded to certain comments from the staff of the Commission
Chevron	0	
Huazhu Group	0	
Hyatt Hotels	0	
JD.com	1	2017 - Included the financial statements and related notes of Dada Nexus Limited, Bitauto Holdings Limited, and Tuniu Corporation 2018 - Same as 2017 2019 - Same as 2017
Amazon	0	
NetEase	0	
Activision Blizzard	1	2012 - Removed the inadvertent inclusion of the parenthetical label, and refiled Exhibit 21 in its entirety to clarify the jurisdiction of incorporation for one of its entities
NIO Inc.	0	2019 - Unable to file 20-F timely
Tesla	1	2012 - Furnished detail-tagged footnotes in Exhibit 101 attached to the 10-K form 2019 - Information might be incorporated by reference from the registrant's definitive proxy statement 2020 - Same as 2019
Yum China	0	

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Table 7: (continued).

Firm Name	Restatement (1/0)	Notes
McDonald's	0	
Weibo	0	
Twitter	0	
Vipshop	0	
Target	0	
Autohome	0	
AutoNation	0	
Hello Group Inc.	0	
Snapchat	0	
GreenTree Hospitality Group	0	
Best Western	0	
China Southern Airline	1	2011 - Refiled Exhibits 4.3, 4.4, 4.5, and 4.6, which had originally been attached to the 20-F form (each of these amendments supersedes and replaces the corresponding Exhibit filed with 20-F)
American Airlines	1	2012 - Provided the information required pursuant to instruction G(3) to 10-K for Part III, Items 10, 11, 12, 13, and 14 of the original filing, and corrected certain technical and formatting errors in its interactive data file
GDS Holdings Ltd.	0	
Digital Realty Trust	1	2013 - Reflected information that had been inadvertently omitted from or incorrectly stated in the original filing 2015-Same as 2013

4.3. Paired Sample t-Test & Chi-Square Test

After calculating the values of the six indices for each of the 40 companies, we need to compare whether there is a significant difference between the disclosure qual- of the U.S. listed Chinese firms and that of the U.S. domestic firms with respect to the six indices. The paired sample t-test is then applied to the first four numerical indices — SD of Earnings Divided by SD of OCF, Accrual Ratio, Earnings Persis-tence, and Size of Annual SEC Filings. For the other two indices that are based on dummy variables rather than numerical values — Press Releases and Restatements — the Chi-square test is applied. The significance levels for both tests are set at 0.1 (10%). If the result of the test is less than 0.1, it suggests that there is a significant difference between the two groups of companies'

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disclosure qualities in terms of the specific index; if the result of the test is greater than 0.1, there is no significant difference.

5. Results

Table 8 below shows the final P-values received from the paired sample t-test and p-values from the Chi-square test. Only two indices — Size of Annual SEC Filings and Press Releases — return results lower than the significance level 0.1, while the other four indices all return results greater than 0.1. Therefore, based on our sample and calculations, we do not find a significant difference between the disclosure quality of U.S. listed Chinese companies and that of U.S. based companies, contrary to the original hypothesis.

Table 8: Paired Sample t-Test & Chi-Square Test Results for the Six Indices.

Paired Sample t-Test P(T<=t) two-tail	SD of Earnings / SD of OCF	0.3671
	Accrual Ratio	0.3092
	Earnings Persistence	0.3357
	Size of Annual SEC Filings	0.0759
Chi-Square Test p-value	Press Releases	0.0044
	Restatements	0.7233

5.1. What are possible reasons for the different result returned by Size of Annual SEC Filings and Press Releases?

Something important to note about Size of Annual SEC Filings is that, while U.S. based companies file 10-K forms, many U.S. listed Chinese companies file 20-F forms rather than 10-K. The 20-F form can only be filed by foreign companies that have less than 50% of voting shares on the U.S. stock exchange [11]. If a foreign company goes beyond that threshold, it then needs to file 10-K as a U.S. domestic company does. During the research, we have found that many of the U.S. listed Chinese companies from the sample file 20-F, which has a different format from 10-K. For instance, 10-K often has a section for selected quarterly financial data, but 20-F does not. Differences in format like this can lead to a great difference in file size, and the discrepancy of file sizes does not necessarily indicate a difference in disclosure quality, as it might arise mainly from the differences in format.

For Press Releases, as indicated before, accusations by regulatory agencies and suits brought by investors can be more objective, but reports of potential frauds by media are more subjective. Media's reports do not have to contain as many facts. Thus, Press Releases overall is a more subjective measure than the other indices.

5.2. How reliable is the conclusion?

The biggest drawback of the conclusion is the limited amount of our observations. Only 40 sample companies are chosen, and some companies do not have all the data we need for calculating the six indices. If there is more time to enhance the research, we should find a larger sample of paired companies to minimize potential errors of the conclusion.

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Another factor that might weaken the conclusion is the fact that it is impossible for a U.S. listed Chinese company to be perfectly paired with a U.S. domestic company. China and the U.S. have different market sizes, currencies, cultural settings, policies, etc., so we can only try to match equivalent companies as best as we can. For instance, for the two countries' respective markets, Baidu and Google are both the dominant internet search engines. But there is still a huge difference between the two companies' total assets, total revenues, numbers of employees, and market capitalization (Table 1). The numerous unavoidable differences that exist between the paired companies would directly affect their financial reporting, which then keeps us from accurately determining whether the difference between their financial reporting is caused by their different backgrounds or different disclosure qualities.

6. Conclusion

In this paper, we examine whether the disclosure quality of U.S. listed Chinese companies is significantly different from that of U.S. domestic companies. On one hand, both cross-listed Chinese firms and U.S. based firms are required to comply with the same set of financial reporting rules and be under the oversight of SEC. On the other hand, abundant information about cross-listed Chinese companies is not conveniently accessible to the U.S. market, which makes it easy for some Chinese companies to use discretion and report their financial data improperly. Considering this information asymmetry, we hypothesize that the disclosure quality of U.S. listed Chinese companies is lower than that of U.S. domestic companies.

Our results are based on six indices that help reflect disclosure quality, and the results are slightly divided. Four indices indicate that there is no significant difference between the two sets of companies' disclosure qualities, while two other indices suggest that there is. Therefore, based upon our sample, we draw the conclusion that U.S. listed Chinese companies' disclosure quality is not significantly different from that of U.S. based companies. Future research should expand the sample size and obtain more observations to present a more complete picture of cross-listed Chinese firms' financial reporting.

The research in this paper is important because it returns to the crucial question of U.S. listed Chinese firms' disclosure quality. As many related studies now tend to focus on the characteristics that enable some Chinese companies to commit fraud, this paper focuses on the prerequisite condition — whether cross-listed Chinese firms' disclosure quality is generally lower.

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