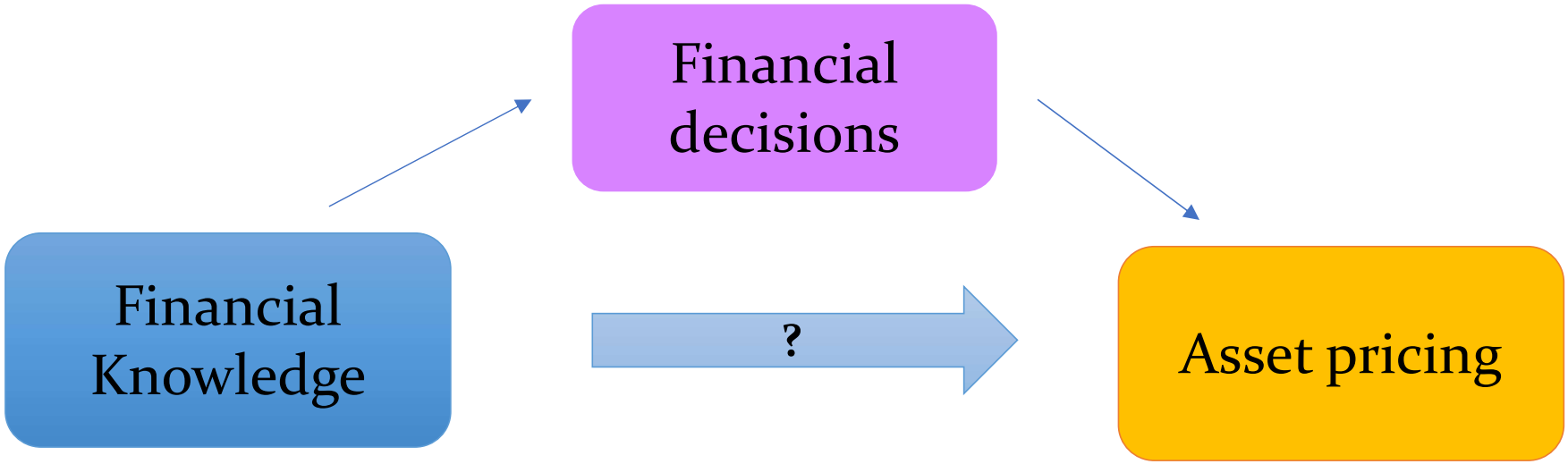
Knowledge is Power: A Field Experiment in the Chinese and US Stock Markets

Sonia Man-Lai Wong, Yuan Xue, Bohui Zhang, and Xiaofeng Zhao

ABFER 9th Annual Conference
23-26 May, 2022

Motivation

- Literature:
  - Financial knowledge affects individuals' financial decision-making
  - Financial decisions affect asset prices
- No one knows the **effect of financial knowledge on asset prices**

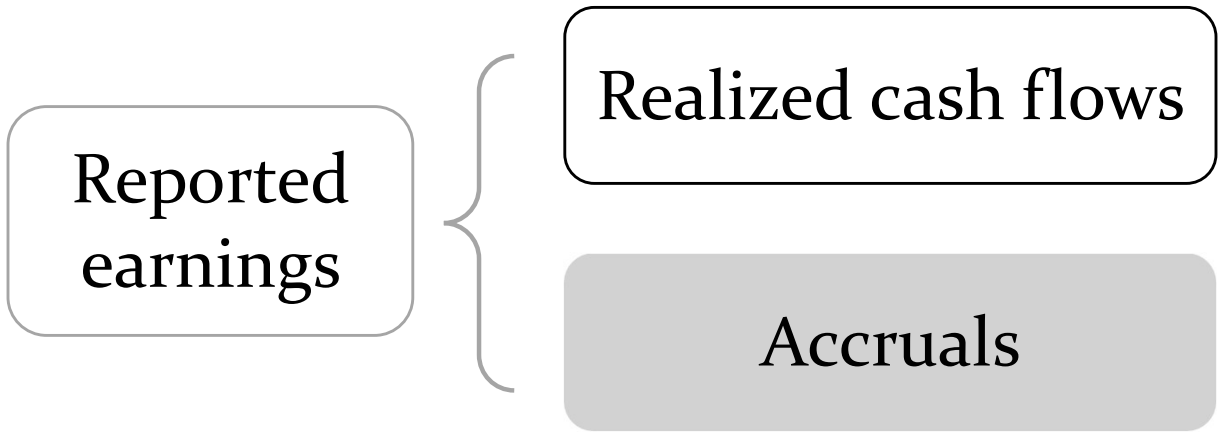


- Research questions:
  1. Does the **provision of financial knowledge** via investor education affect **stock price efficiency**?
  2. If yes, does such a pricing impact influence companies' **reporting behaviors**?

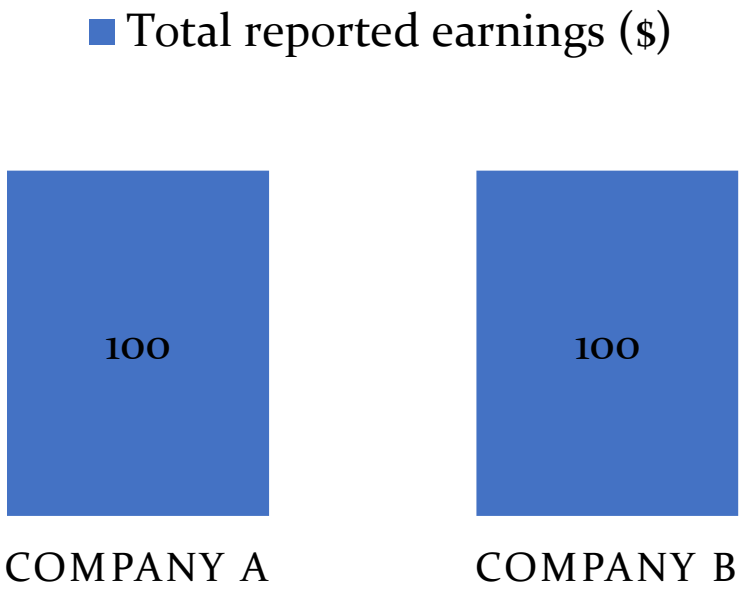
This study

- A field experiment
  - provides investors with a concrete type of financial knowledge: **accounting accruals**
  - test whether this treatment reduces accrual mispricing

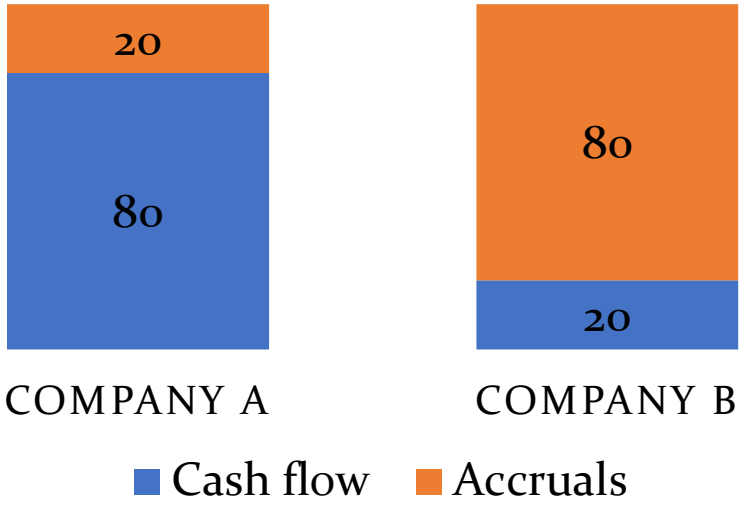
- Accruals
  - Firms' estimates of future benefits and obligations
  - The difference between a firm's reported earnings and its underlying cash flows



Do we really understand accruals?



Companies A and B have the same level of reported earnings in the current year.



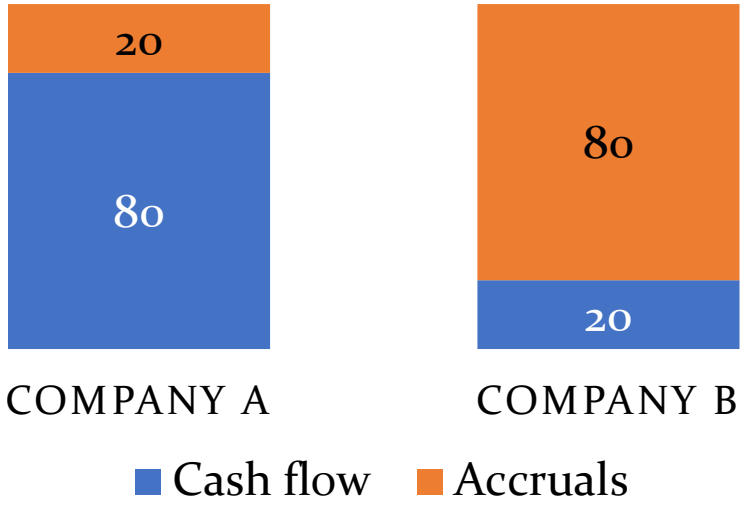
Which company is more likely to have higher earnings in the next year?

Do we really understand accruals?

- Accruals have lower earnings persistence than cash flows.
  - Measurement errors in accruals (e.g., inventories are written down if they are obsolete).
  - Greater errors when management faithfulness is low and the valuation of assets and transactions is highly subjective (Richardson et al., 2005; Chan et al., 2006).

- Many investors do not understand the low persistence of accruals relative to cash flows and consequently **fixate on the reported earnings** (Sloan, 1996; Xie, 2001).

Accrual mispricing



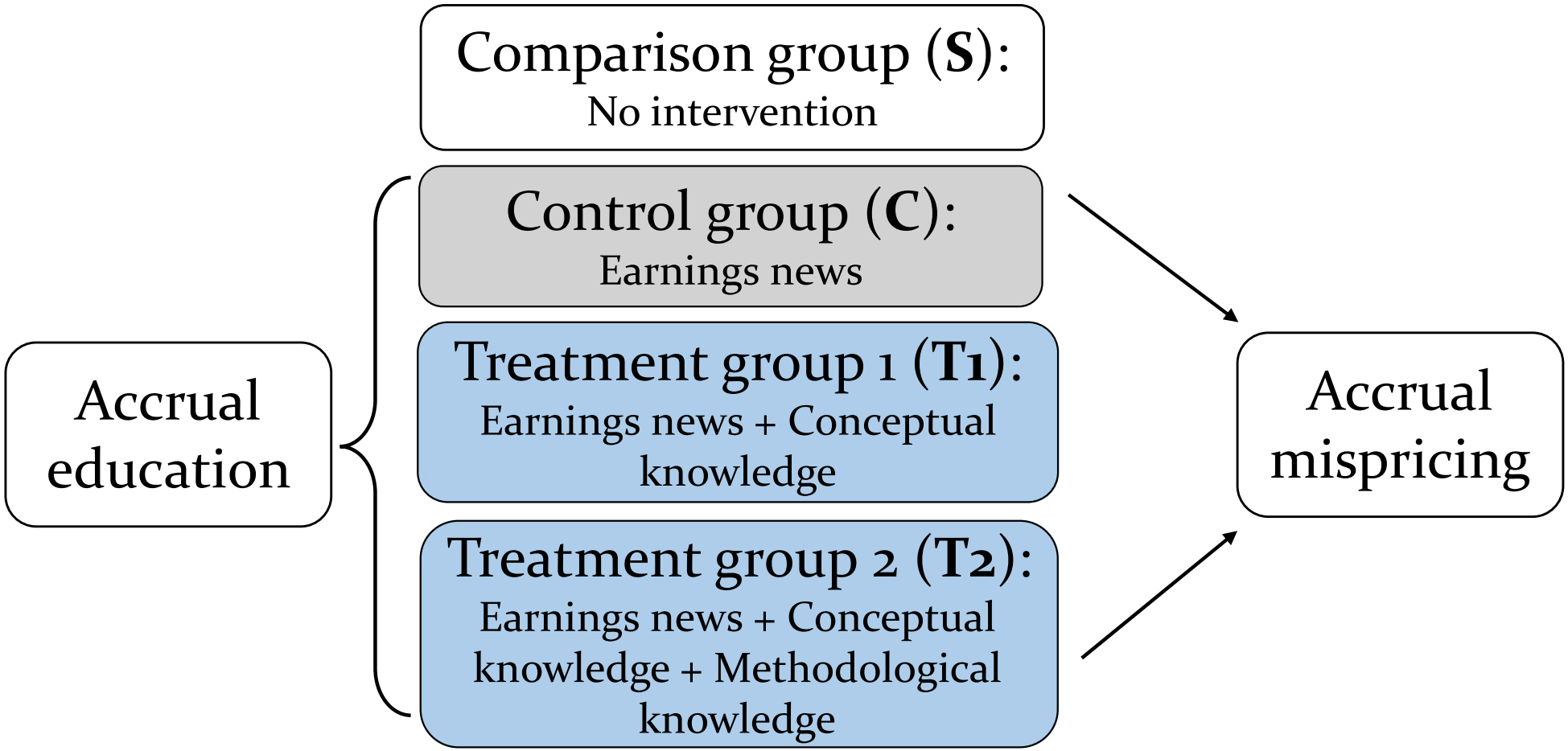
If A and B are priced based on the reported earnings ($100), B is essentially **overpriced** relative to A

There is a negative relationship between the level of accruals and future stock returns--**accrual mispricing**.

- One of the most robust anomalies documented to date.
- Traditional explanations such as risk and arbitrage costs are only partial.

Can educating investors about the implications and measurement of accruals mitigate accrual mispricing?

Experimental design: groups and sample



All non-financial stocks that were publicly listed in China and the U.S. by the end of 2018.

Panel A: Chinese markets					
Treatment groups	S	C	T_1	T_2	Total
Randomly assign the sample into four groups	577	577	577	577	2,308
Panel B: US markets					
Treatment groups	S	C	T_1	T_2	Total
Randomly assign the sample into four groups	636	637	637	637	2,547

Experimental design: educational materials

- Earnings news
  - A reminder of earnings announcement date (i.e., to broadcast the earnings announcement event)

- Conceptual knowledge
  - basic concept of accruals and the pricing implications of accruals for the firm's future performance

- Methodological knowledge
  - the methods used for estimating accruals, including models, key variables, and data sources

- Post the knowledge on a stock's tag page of social media
  - China: Weibo, Xueqiu, and Guba EastMoney
  - US: Twitter and StockTwits

Experimental design: social media

- A stock's tag page
  - A "cashtag" with a stock ticker symbol that allows users to link their message to a particular company
  - e.g., $AAPL is linked to the page of Apple Inc.

Experimental design: website

- We established a website, http://www.financial-education-hub.com

- Created a webpage for each stock under the domain.
  - The full contents of conceptual knowledge (**type 1** link page).
  - The full contents of methodological knowledge (**type 2** link page)

- We wrote a short essay by rephrasing the full contents of the two sets of accruals knowledge and included **hyperlinks** that link to the full page of accrual information

Experimental design: website

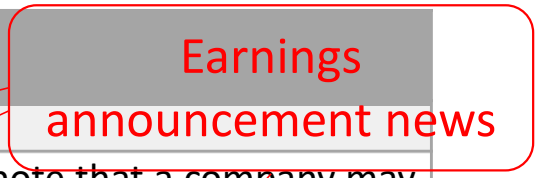
- Stocks in group T2
  - e.g., Coca-Cola (COKE)
    - type 1 page: http://www.financial-education-hub.com/1/COKE.
    - type 2 page: http://www.financial-education-hub.com/2/COKE.
  - e.g., Shanghai New World Co. (新世界) (600628)
    - type 1 page: http://www.financial-education-hub.com/1/600628.
    - type 2 page: http://www.financial-education-hub.com/2/600628.
- Stocks in group T1
  - e.g., Google (GOOG)
    - only type 1 page: http://www.financial-education-hub.com/1/GOOG.
  - e.g., Jiangsu Hengrui Pharmaceuticals Co Ltd (恒瑞医药) (600276)
    - only type 1 page: http://www.financial-education-hub.com/1/600276.
- Stocks in group C and S
  - No linked pages

Samples of initial posts

Groups	Sample
C	$Ticker will announce its 2019 annual performance on March 15, 2020.
T_1	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the firm's current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals would be more likely to feature lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker.
T_2	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may thus misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals is more likely to report lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker. If you want to estimate the quality of $Ticker's earnings that are released, you can calculate the accruals level, and the portion that may not be realized in cash flows. For details on this method, please see: http://www.financial-education-hub.com/2/$Ticker.

Samples of initial posts

Groups	Sample
C	$Ticker will announce its 2019 annual performance on March 15, 2020.
T_1	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the firm's current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals would be more likely to feature lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker.
T_2	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may thus misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals is more likely to report lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker. If you want to estimate the quality of $Ticker's earnings that are released, you can calculate the accruals level, and the portion that may not be realized in cash flows. For details on this method, please see: http://www.financial-education-hub.com/2/$Ticker.



Samples of initial posts

Groups	Sample
C	$Ticker will announce its 2019 annual performance on March 15, 2020.
T_1	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the firm's current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals would be more likely to feature lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker.
T_2	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may thus misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals is more likely to report lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker. If you want to estimate the quality of $Ticker's earnings that are released, you can calculate the accruals level, and the portion that may not be realized in cash flows. For details on this method, please see: http://www.financial-education-hub.com/2/$Ticker.

Conceptual knowledge

Type 1 link

Sample of initial posts

Groups	Sample
C	$Ticker will announce its 2019 annual performance on March 15, 2020.
T_1	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the firm's current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals would be more likely to feature lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker.
T_2	$Ticker will announce its 2019 annual performance on March 15, 2020. Please note that a company may report high earnings but actually have low cash flows. This difference is called " accruals", which often refers to revenues or expenses that do not involve cash flows, but are included in the current earnings. Accruals are estimated by the company, which may involve estimation errors. Some companies may even use accruals to manipulate earnings. As a result, high accruals may not result in high subsequent cash flows. Investors focusing on bottom-line earnings as reported by the company, but ignoring the quality of the earnings, may thus misunderstand the company's true performance. For example, if two companies report the same level of earnings, the one with high accruals is more likely to report lower profitability in the following year. For more knowledge on the nature and effects of accruals, please see: http://www.financial-education-hub.com/1/$Ticker. If you want to estimate the quality of $Ticker's earnings that are released, you can calculate the accruals level, and the portion that may not be realized in cash flows. For details on this method, please see: http://www.financial-education-hub.com/2/$Ticker.

Methodological knowledge

Type 2 link

Sample of initial posts (Chinese)

Groups	Sample
C	$Ticker将于2020年3月15日公布2019全年业绩。
T_1	$Ticker将于2020年3月15日公布2019全年业绩。请注意，有些公司公布的账面利润可能很高但实际的现金流却很少。这个差额叫做“应计项目”，通常是指那些不直接形成当前现金流却计入当前损益的收入或费用。“应计项目”需要通过公司的估计得出，通常会出现估算错误。一些公司甚至利用“应计项目”来操纵盈利。因此，公告利润的“应计项目”部分在未来未必能兑现成实际的现金流。为此，投资者只关注公司所公布的利润而忽视其质量，可能会误读公司业绩。比如，两家当前利润一样的公司，“应计项目”高的那家公司下一年的盈利可能会更低。关于这方面的具体的知识：http://www.financial-education-hub.com/1/$Ticker.
T_2	$Ticker将于2020年3月15日公布2019全年业绩。请注意，有些公司公布的账面利润可能很高但实际的现金流却很少。这个差额叫做“应计项目”，通常是指那些不直接形成当前现金流却计入当前损益的收入或费用。“应计项目”需要通过公司的估计得出，通常会出现估算错误。一些公司甚至利用“应计项目”来操纵盈利。因此，公告利润的“应计项目”部分在未来未必能兑现成实际的现金流。为此，投资者只关注公司所公布的利润而忽视其质量，可能会误读公司业绩。比如，两家当前利润一样的公司，“应计项目”高的那家公司下一年的盈利可能会更低。关于这方面的具体的知识：http://www.financial-education-hub.com/1/$Ticker. 如想估算$Ticker所公布利润的质量，可以计算其“应计项目”的具体水平，以及不能兑现成现金流的部分，具体方法：http://www.financial-education-hub.com/2/$Ticker.

Type 1 link

Type 2 link

Experimental execution

- Sent social media posts to investors in designated groups during a 19-day window around firms' announcement of annual earnings.

Day	**-9**	**-8**	**-7**	**-6**	**-5**	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Is there a tweet? (Y if yes)	Y		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y
Tweet No.	1		2		3	4	5	6	7	8	9	10	11	12	13		14		15

Note: Day 0 is the earnings announcement day

- Experimental period
  - China: from January to May 2020, during which Chinese firms' annual financial reports for 2019 were released.
  - US: from January to December 2020, during which US firms' annual performance for the fiscal year of 2019 (2020) was announced, if the firms' fiscal year ended during January to May (June to December).

Experimental execution

- Use accounts with fictional names on each platform.
- Each post is unique by rephrasing the full contents of the two sets of accruals knowledge.
- Collected the number of reads and other response indicators on the next day of each post.

Panel A: The Chinese market

Total volume per firm

	(1)	(2)	(3)	(4)	(5)	(6)
Group	Posts	Reads	Comments	Retweets	Likes	Saves
C	32.49	15,767	6.12	4.74	0.53	0.17
T_1	31.67	16,152	8.97	6.73	0.50	0.23
T_2	31.08	14,776	7.64	12.38	0.37	0.29

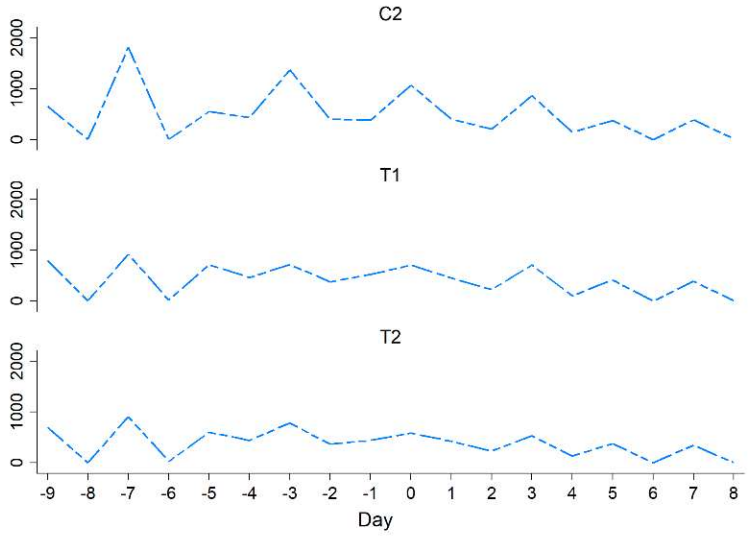
Panel A: The US market

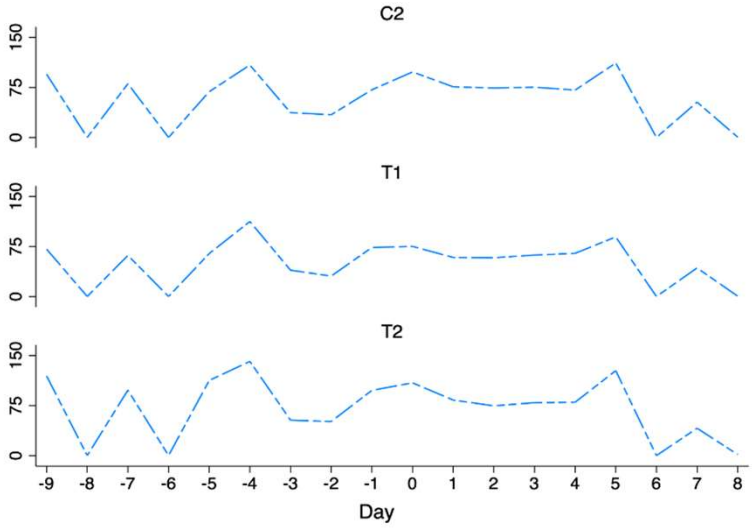
Total volume per firm

	(1)	(2)	(3)	(4)	(5)
Group	Posts	Reads (Twitter)	Comments/replies	Retweets/Reshares	Likes
C	14.61	1,743	1.39	1.85	2.04
T_1	15.01	1,485	1.68	1.04	2.27
T_2	15	2,105	1.16	0.75	1.88

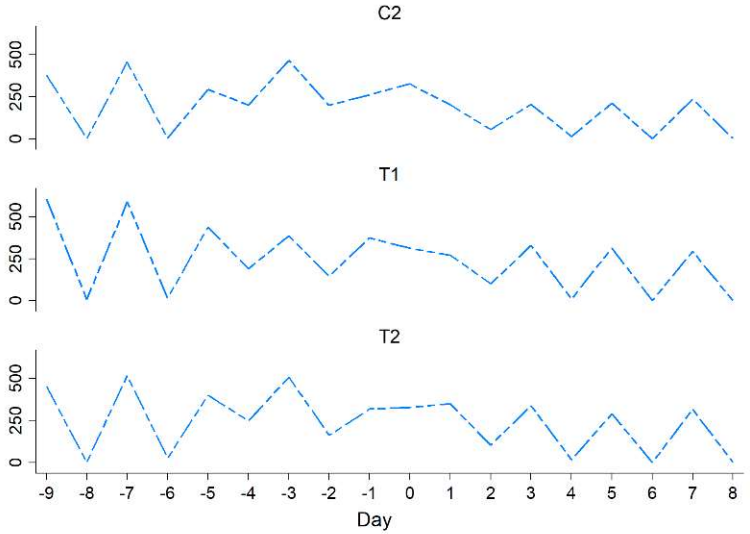
Experimental execution

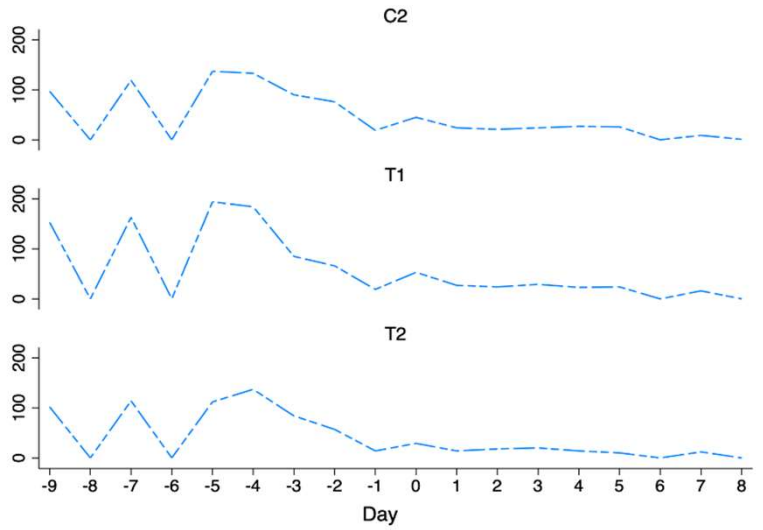
The number of reads (in thousand) (left: China, right: U.S.)





The number of comments (left: China, right: U.S.)





Samples of real posts

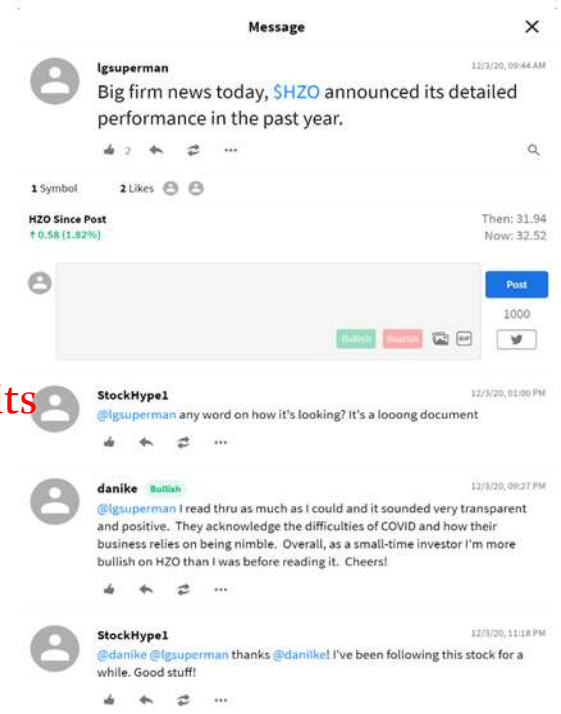
C

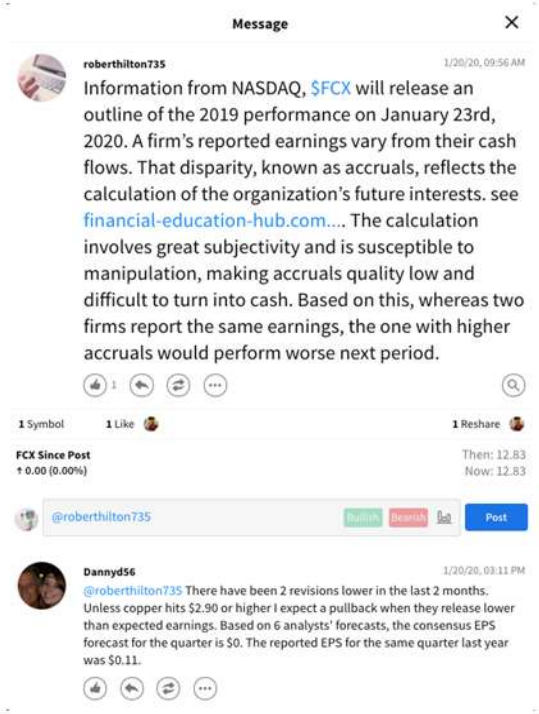
T1

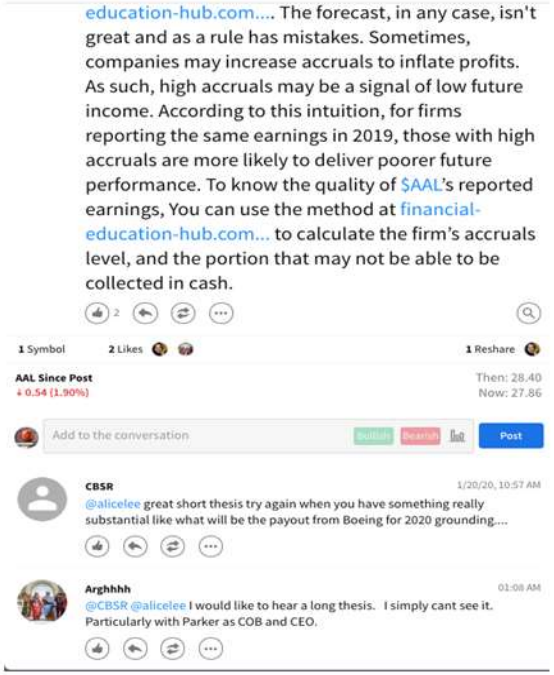
T2

Twitter

StockTwits







Samples of real posts (Chinese)

C

T1

T2

Guba

XueQiu

Ex-ante firm characteristics of control and treatment firms

Panel A: The Chinese markets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	S	C	T_1	T_2	$T_1 - C$		$T_2 - C$		$T_2 - T_1$	
Variable	Ave.				Dif.	P-value	Dif.	P-value	Dif.	P-value
MV	15.63	15.69	15.63	15.68	-0.06	(0.35)	-0.01	(0.85)	0.05	(0.44)
Leverage	0.46	0.47	0.45	0.45	-0.01	(0.30)	-0.02	(0.22)	-0.00	(0.84)
MB	2.83	2.83	2.88	2.86	0.05	(0.80)	0.03	(0.90)	-0.03	(0.89)
ROA	-0.00	0.00	-0.00	0.00	-0.01	(0.46)	-0.00	(0.68)	0.00	(0.76)
CashFlows	0.05	0.05	0.05	0.05	-0.00	(0.73)	0.00	(1.00)	0.00	(0.73)
Cash	0.16	0.16	0.16	0.17	-0.00	(0.70)	0.00	(0.71)	0.01	(0.43)
WorkingCapital	-0.01	-0.00	0.00	-0.00	0.00	(0.52)	-0.00	(0.78)	-0.01	(0.36)
Accruals	-0.03	-0.03	-0.02	-0.02	0.00	(0.72)	0.00	(0.75)	-0.00	(0.96)
$Accruals_{DD}$	-0.02	-0.01	-0.02	-0.01	-0.01	(0.15)	-0.00	(0.63)	0.00	(0.37)
$Accruals_{KLW}$	-0.00	-0.00	0.00	0.00	0.00	(0.54)	0.00	(0.79)	-0.00	(0.73)

Panel B: The US markets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	S	C	T_1	T_2	$T_1 - C$		$T_2 - C$		$T_2 - T_1$	
Variable	Ave.				Dif.	P-value	Dif.	P-value	Dif.	P-value
MV	20.92	20.81	20.95	21.00	0.14	(0.33)	0.18	(0.20)	0.05	(0.74)
Leverage	0.59	0.57	0.57	0.57	-0.00	(0.80)	-0.00	(0.76)	-0.00	(0.95)
MB	3.22	3.12	3.29	3.20	0.17	(0.58)	0.08	(0.80)	-0.09	(0.77)
ROA	-0.04	-0.05	-0.04	-0.03	0.01	(0.40)	0.02	(0.22)	0.00	(0.69)
CashFlows	0.03	0.03	0.04	0.04	0.00	(0.76)	0.01	(0.56)	0.00	(0.78)
Cash	0.17	0.17	0.18	0.19	0.01	(0.32)	0.02	(0.14)	0.01	(0.63)
WorkingCapital	-0.00	-0.00	0.00	-0.00	0.00	(0.15)	0.00	(0.50)	-0.00	(0.42)
Accruals	-0.04	-0.05	-0.04	-0.04	0.01	(0.14)	0.01	(0.14)	0.00	(1.00)
$Accruals_{DD}$	-0.00	-0.00	-0.00	-0.00	0.00	(0.42)	-0.00	(0.78)	-0.00	(0.26)
$Accruals_{KLW}$	0.00	0.00	0.01	0.00	0.00	(0.48)	0.00	(0.60)	-0.00	(0.86)

Model

- Test the education treatment effect

$$AR_{i,t} = \beta_1 + \beta_2 Treat_i \times Accruals_i(Accruals_{UD,i}) + \beta_3 Treat_i + \beta_2 Accruals_i(Accruals_{UD,i}) + \beta_3 SUE_i + \boldsymbol{J} + \boldsymbol{T} + \varepsilon_{i,t}, \qquad (1)$$

  - $\boldsymbol{AR_{i,t}}$ is the earnings announcement return or future return in the subsequent period for firm i, which announced its 2019 earnings in month t of 2020.
    1. The two-day cumulative abnormal return from day zero (earnings announcement day) to day one (***CAR(0,1)).***
    2. The buy-and-hold return from day 11 to day 251 minus the return of the matched portfolio of 5 × 5 size and book-to-market portfolios in the same window (***CAR(11, 251)***).

  - $\boldsymbol{Treat_i}$ is our treatment indicator. It equals one if firm i is in treatment groups T1 or T2, and zero if it is in control group C.

Model

- Measurement of accruals:
  - Total or normal accruals ($\boldsymbol{Accruals_i}$): the change in current assets minus the change in cash holding minus the change in current liabilities plus the change in short-term debt plus depreciation, scaled by total assets (Richardson et al.,2005; and Chan et al.,2006)
  - Unexpected discretionary accruals ($\boldsymbol{Accruals_{UD,i}}$): the residuals of the model that regresses *Accruals* on the reciprocal of total assets, the change in sales/total assets, net property, plant, and equipment/total assets, and the return on assets in each industry-year (Balsam et al., 2002; Louis et al., 2008).
- Control for
  - Earnings announcement surprise ($\boldsymbol{SUE_i}$): the announced earnings per share minus the consensus analyst forecasts in the past year, scaled by the stock price before the earnings announcement.
  - Industry fixed effects ($\boldsymbol{J}$)
  - fixed effects of the months ($\boldsymbol{T}$) in which firms announced their earnings.

Testing for accruals mispricing

- We estimate Equation (1) based on stocks in the comparison **group S**.

Panel A: The dependent variable is *CAR(0,1)*

	The Chinese market		The US market	
	(1)	(2)	(3)	(4)
Accruals	**0.060*** **		**0.150***	
	(2.73)		**(1.74)**	
$Accruals_{UD}$		**0.031***		**-0.039**
		(1.95)		**(-0.95)**
SUE	0.393**	0.417***	0.383**	0.396**
	(2.53)	(2.68)	(1.98)	(2.05)
Industry and month FEs	Yes	Yes	Yes	Yes
Observations	573	573	595	595
R-squared	0.172	0.167	0.281	0.278

- A one standard deviation increase in *Accruals* is associated with 0.5% (1.1%) increases in *CAR*(0,1), similar for a one standard deviation change in *SUE*, namely 0.4% (1.1%), in the Chinese (U.S.) market.
- Investors do not distinguish between the accrual component and the earnings news component.

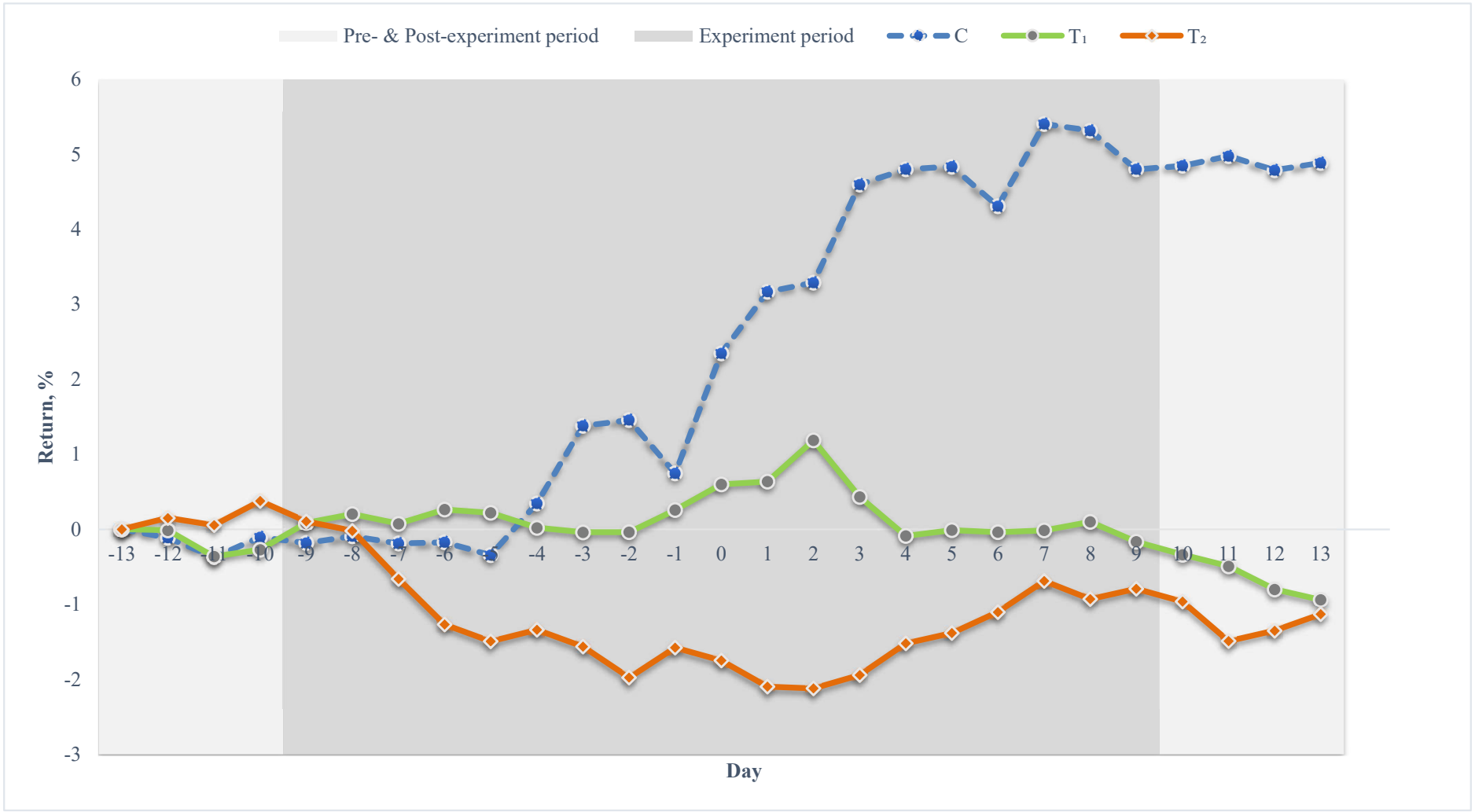
Testing for accruals mispricing

Panel B: The dependent variable is *CAR(11,251)*				
	The Chinese market		The US market	
	(1)	(2)	(3)	(4)
Accruals	**-0.583****		**-0.797****	
	(-2.40)		**(-2.23)**	
$Accruals_{UD}$		**-0.446*****		**-0.253**
		(-2.60)		**(-1.50)**
SUE	-1.909	-1.990	-0.902	-0.960
	(-1.12)	(-1.17)	(-1.13)	(-1.20)
Industry and month FEs	Yes	Yes	Yes	Yes
Observations	573	573	595	595
R-squared	0.193	0.195	0.389	0.385

- Accruals are negatively related to future stock return.

Education treatment and accrual pricing

Accruals announcement returns during the experiment window for stocks with high accruals ($Accruals_{UD}$ in the top tercile) in the **Chinese stock market**



Education treatment and accrual pricing

Accruals announcement returns during the experiment window for stocks with high accruals ($Accruals_{UD}$ in the top tercile) in the **US stock market**

Education treatment and accrual pricing

We estimate Equation (1) based on stocks in the treatment **groups T1** and **T2** and the control **group C**.

The dependent variable is *CAR(0,1)*				
	The Chinese market		The US market	
	(1)	(2)	(3)	(4)
Treat×Accruals	**-0.030*** **		**-0.256*** **	
	(-3.47)		**(-4.06)**	
Accruals	0.020***		-0.008	
	(3.33)		(-0.15)	
$Treat \times Accruals_{UD}$		**-0.058*** **		**-0.058** **
		(-4.00)		**(-1.97)**
$Accruals_{UD}$		0.059***		0.028
		(6.03)		(1.33)
Treat	-0.011***	-0.009***	-0.011**	0.001
	(-5.53)	(-4.12)	(-2.48)	(0.44)
SUE	0.466***	0.446***	0.588***	0.545***
	(4.99)	(4.80)	(5.27)	(4.84)
Industry and month FEs	Yes	Yes	Yes	Yes
Observations	1,711	1,711	1,792	1,792
R-squared	0.095	0.107	0.196	0.179

A ~~discount~~ on accrual pricing.

Education treatment and accrual pricing

The dependent variable is *CAR(11,251)*				
	The Chinese market		The US market	
	(1)	(2)	(3)	(4)
Treat×Accruals	**0.278*** **		**1.374*** **	
	(3.21)		**(4.42)**	
Accruals	-0.347***		-2.075***	
	(-5.74)		(-8.44)	
Treat×Acccruals $_{UD}$		**0.844*** **		**0.689*** **
		(5.77)		**(4.75)**
Accruals $_{UD}$		-0.628***		-0.594***
		(-6.41)		(-5.73)
Treat	-0.073***	-0.094***	-0.007	-0.079***
	(-3.53)	(-4.49)	(-0.35)	(-5.60)
SUE	1.880**	2.095**	1.177**	1.098**
	(2.01)	(2.25)	(2.14)	(1.98)
Industry and month FEs	Yes	Yes	Yes	Yes
Observations	1,711	1,711	1,790	1,790
R-squared	0.136	0.142	0.337	0.316

In the Chinese (U.S.) market, a one standard deviation increase in *Accruals* is associated with a 3.2% (14.6%) reduction in *CAR*(11,251) for control stocks. The decline is reduced to 0.6% (4.9%) for treatment stocks.

Conceptual vs. methodological knowledge

- Test how the mitigation effect on accrual mispricing varies by applying the treatment of different types of accrual knowledge.

- Replace *Treat* with *T1* or *T2* and repeat the estimation of Equation (1).
  - T1: the application of the conceptual knowledge treatment,
  - T2: the application of both conceptual and methodological knowledge treatments.

Conceptual vs. methodological knowledge

Panel B: The dependent variable is *CAR(11, 251)*								
	The Chinese market				The US market			
	Treat = T_1	*Treat* = T_2	*Treat* = T_1	*Treat* = T_2	*Treat* = T_1	*Treat* = T_2	*Treat* = T_1	*Treat* = T_2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat*×*Accruals	**-0.139**	**0.380*****			**0.620***	**1.862*****		
	(-0.94)	**(4.14)**			**(1.69)**	**(4.83)**		
Accruals	-0.372***	-0.319***			-1.729***	-2.115***		
	(-6.10)	(-5.30)			(-6.66)	(-8.63)		
***Treat*×*Accruals*$_{UD}$**			**0.734*****	**1.124*****			**0.598*****	**0.753*****
			(4.09)	**(5.97)**			**(3.27)**	**(4.15)**
Accruals$_{UD}$			-0.655***	-0.601***			-0.563***	-0.545***
			(-6.60)	(-6.21)			(-5.18)	(-5.17)
Treat	-0.021	-0.117***	-0.037	-0.143***	-0.012	-0.007	-0.042**	-0.099***
	(-0.83)	(-4.73)	(-1.47)	(-5.79)	(-0.46)	(-0.29)	(-2.50)	(-6.05)
P-value (dif. b/t T_1 and T_2)	0.0140		0.0915		0.0547		0.3360	

The treatment of methodological knowledge has significant incremental effects relative to conceptual knowledge in the **long-term window**.

Engagement with educational materials

- If our experiment affects the pricing of accruals via the educational process, we should see a stronger education effect when investors read and engage with our educational materials more intensively.

- ***Reads***: equal to one if the total number of posts read on all social media platforms of a country for a stock is above the sample median and zero otherwise.
- ***CSLS***: equal to one if our posts made for a particular stock receive more comments or replies than the sample median or are "retweeted/shared," "liked," or "saved" on any of the platforms, and zero otherwise.
- ***WebView***: equals one if the number of web clicks of both type 1 and type 2 link pages of a stock are on the top quintile of the treatment stocks, and zero otherwise.

The dependent variable is *CAR(0,1)*						
	The Chinese market			The US market		
	(1)	(2)	(3)	(4)	(5)	(6)
$Treat \times Accruals_{UD} \times Reads$	-0.147***			-0.109*		
	(-4.12)			(-1.77)		
$Treat \times Accruals_{UD} \times CSLS$		-0.201***			-0.039	
		(-5.59)			(-0.44)	
Treat ×AccrualsUD			-0.124***			-0.661***
×WebView			(-4.59)			(-4.42)

Retail investors

- Retail investors are the primary users of social media.
- They have less accounting and financial knowledge and a limited understanding of the implications and applications of accruals (Balsam et al., 2002)
- Our education program should be more beneficial to stocks dominated by retail investors.
- ***RI***: 100% minus the number of shares held by institutional investors over the total number of tradable shares.

The dependent variable is *CAR(0,1)*		
	The Chinese market	The US market
	(1)	(2)
$Treat \times Accruals_{UD} \times RI$	**-0.230***	**-0.084**
	(-1.93)	**(-0.86)**

Real effects

- Managers are myopic and have incentives to report high earnings to boost prices.

- This motivates us to ask:
  - Are firms disincentivized to manage accruals when investors see through the trick of earnings management (i.e., when the benefits of overpricing have disappeared)?
  - Empirically, do the discretionary accruals of treatment firms decrease in the post-experiment period relative to control firms?

Real effects

- The DID model:

$$Accruals_{KLW,i,q} = \beta_1 + \beta_2 Treat_i \times Post_q + Post_q + \beta_3 Accruals_{KLW,i,q-1} + \boldsymbol{I} + \boldsymbol{JQ} + \varepsilon_{i,q}, \qquad (2)$$

  - $\boldsymbol{Accruals_{KLW,i,q}}$ is the discretionary accruals for firm or stock i in year-quarter q.
  - $\boldsymbol{Post_q}$ indicates the post-experiment period; it equals one for quarterly earnings announcements after our experiment and zero otherwise.
  - Control for the lag of discretionary accruals ($Accruals_{KLW,i,q-1}$), firm fixed effects (vector $\boldsymbol{I}$), and industry-year-quarter fixed effects (vector $\boldsymbol{JQ}$).
  - Estimate the model using a window from Q1 2018 to Q4 2020.

Real effects

The dependent variable is $Accruals_{KLW}$		
	The Chinese market	The US market
	(1)	**(2)**
Treat×Post	**-0.004****	**-0.002****
	(-2.51)	**(-2.30)**
Post	-0.002	0.015***
	(-0.10)	(3.50)
$Accruals_{KLW,-1}$	-0.187***	-0.202***
	(-25.01)	(-9.42)
Firm FE	Yes	Yes
Year-quarter-industry FE	Yes	Yes
Observations	19,794	21,476
R-squared	0.041	0.179

The DID estimate is 0.004 (0.002) in the Chinese (US) market, which is 8% (5%) of the standard deviation of $Accruals_{KLW}$.

Investor naïveté and institutional discipline

The real effect is stronger when firms have more retail investors and face weaker external intuitional pressure ex-ante.

The dependent variable is $Accruals_{KLW}$				
	The Chinese market		The US market	
	(1)	**(2)**	**(3)**	(4)
Treat×Post×RI	**-0.103***		**-0.004***	
	(-1.88)		**(-1.77)**	
Post×RI	0.068		0.002	
	(1.53)		(0.79)	
Treat×Post×Institution		**0.006****		**0.003****
		(2.48)		**(2.47)**
Post×Institution		-0.004**		-0.003**
		(-2.26)		(-2.36)
Treat×Post	0.096*	-0.009***	-0.000	-0.006**
	(1.80)	(-3.53)	(-0.19)	(-2.82)
Post	-0.068	0.002	0.014***	0.019***
	(-1.47)	(0.14)	(3.27)	(4.17)
$Accruals_{KLW,-1}$	-0.187***	-0.187***	-0.202***	-0.202***
	(-25.03)	(-25.04)	(-9.43)	(-9.47)
Firm FE	Yes	Yes	Yes	Yes
Year-quarter-industry FE	Yes	Yes	Yes	Yes
Observations	19,794	19,794	21,476	21,476
R-squared	0.042	0.042	0.179	0.180

Conclusion

- Conducted a field experiment by providing knowledge about the pricing implications of accounting accruals to investors in **randomized stock groups via social media platforms** in both China and the U.S.

- Treatment stocks experience a **reduction in accrual mispricing** relative to control stocks, and treatment firms experience a **decline in discretionary accruals** in the post-experiment period.

- Our evidence signifies the **power of knowledge** in improving the stock market efficiency and corporate governance.