The effect of international media news on the global stock market

Xuejun Jin [a], Cheng Chen [a], Xiaolan Yang [b,*]

[a] *College of Economics, Zhejiang University, Hangzhou, China*
[b] *Key Laboratory of Brain-Machine Intelligence for Information Behavior (Ministry of Education and Shanghai), School of Business and Management, Shanghai International Studies University, Shanghai, China*

ARTICLE INFO

ABSTRACT

This study examines the effect of international news sentiment on global stock market returns. Using a comprehensive sample of international news across 35 countries, we find that higher international news sentiment will lead to higher stock market returns. The effect of international news sentiment is mitigated in countries with a greater level of financial development and is amplified with the increase in access to international media news. Moreover, we find that the effect of international news sentiment is stronger in countries with a higher level of openness. Besides, the effect of international news sentiment has been affected by some important events including 2008 financial crisis,the deglobalization trend advocated by the U.S and the global COVID-19 pandemic.

1. Introduction

What is media news, and how does it affect stock market returns? This is a fundamental and worthy question in research on the stock market and has been discussed for several decades starting in the last century (Fama et al., 1969; Roll, 1984). Recently, due to the development of the internet and data analysis technology, economists have applied new tools to analyze this question. Several studies have discussed the relationship between individual stock returns or the stock market index, with various works coming from newspapers or other internet news sources (Tetlock, 2007, 2010, 2011; Tetlock et al., 2008; Garcia, 2013; Siganos et al., 2014; Manela & Moreira, 2017; Calomiris & Mamaysky, 2019; Glasserman & Mamaysky, 2019). Early studies on the stock market indicated a positive relationship between the sentiment expressed in public documents and stock market returns; positive sentiment in news articles increases stock market returns, and negative sentiment in news articles depresses stock market returns (Tetlock, 2007, Schmeling, 2009). Further studies examine the link between firm-specific news articles and individual stock returns and find that the above relationship between sentiment from media news articles and stock returns also holds at the company level (Tetlock et al., 2008; Garcia-Appendini & Montoriol-Garriga, 2013).

Recently, with the emergence of natural language technology and the extreme advances in big data analysis, it has become possible for scholars to deeply analyze extensive news content published on the internet and explore the potential effect mechanism of news articles on asset pricing. The effect of media news sentiment (such as newspapers, economic reviews or Google search news) or social media sentiment (such as Facebook or Twitter) on asset pricing has received a great deal of attention. There is a large body of literature indicating that news sentiment has explanatory power for asset returns. However, research on the effect of news media on the financial market is predominantly U.S.-centric (Griffin et al., 2011; Stulz & Williamson, 2003;Doidge et al., 2013;Da et al., 2011; Gao et al.,

---

2013; Manela & Moreira, 2017; Glasserman & Mamaysky, 2019). Calomiris and Mamaysky(2019) develop a classification methodology for the context and content of news articles to predict risk and return in stock markets in 51 developed and emerging economies.

However, all the studies reviewed here remain narrow in focus dealing only with the effect of domestic media news sentiment on the stock markets, ignoring the role of international media sentiment. In general, international and domestic media may cover the same event differently and reflect different sentiment. For example, Gabore and Xiujun(2018) find that national and international media cover the same disaster from different perspectives—national media promote national interest whereas international media emphasizes conflict. In this paper, our focus differs from previous studies in exploring the effect of international media news sentiment, rather than domestic media, on the stock markets.

The international media news data we used in our analysis are from the Global Database of Events Language and Tone (GDELT) database, which was established by Kalev H. Leetaru in 2013 and has received technological support from Google. It is an open-source, real-time news and event database that contains approximately 350 million event data from January 1, 1979 to the present and is updated every 15 min. The news is shared in more than 100 languages. There have been some studies based on this database in the sociological field in the past few years (Yonamine, 2013; Keertipati et al., 2014; Elshendy & Fronzetti Colladon, 2017; Qiao et al., 2017; Li & Meng, 2019). Therefore, using the GDELT database to construct media news variables in academic research is legitimate. Using a sample of 35 countries' stock market data from 2006 to 2020, we find that positive international media news sentiment is associated with higher stock market returns. This finding is in line with the effect of domestic media news sentiment on stock market returns identified in previous studies. This documented effect of international media news sentiment is robust in subsample regressions (developed market and emerging market).

We then seek to further explore the mechanism, and the specific factors, through which international media news sentiment influences the stock market. The literature on behavior finance indicates that investors' irrational behavior will be depressed with the improvement of investors' financial literacy and the effectiveness of the financial market (Baker and Wurgler, 2006; Baker et al., 2012; Dang et al., 2019). If our arguments are valid, the effect of international news sentiment on stock market returns should be mitigated in countries where stock markets perform better. The results are in line with our hypothesis, and we find that with the development of the financial market, the effect of international news sentiment on stock market returns is mitigated.

Next, we examine the impact of investors' access to international media news on the relationship between international news sentiment and stock market returns. Prior studies indicate that the effect of media news on investors will be amplified if investors are more accessible to media news (Klabunde, 2002;Zingales, 2000; Dyck & Zingales, 2004; Dyck et al., 2008;Shadmehr & Bernhardt, 2015; Liu et al., 2017). Our findings, that the effect of international news sentiment on stock market returns is amplified with the increase in investors' accessibilities to international media news, are consistent with these studies.

Moreover, we further explore the impact of country openness on the effect of international news sentiment on the stock market. The existing literature indicates that more open countries are more susceptible to international factors (Stulz & Williamson, 2003; Huang et al., 2015; Kim & Pyun, 2018; Kim, 2019; Tan et al.,2019). Our results are in line with this literature; we find that the effect of international media news on stock market returns is more significant in countries with greater openness.

In addition, we discuss the role of the financial crisis on the effect of international media news sentiment on the stock market. Prior studies have indicated that the 2008 financial crisis seriously affected the global economy and finance, and great changes had taken place in the global market, in both the U.S., where the crisis originated, and in other countries. (Erkens et al.,2012; Mollick & Assefa, 2013; Tsai, 2015; Bird et al., 2017; Shehzad et al., 2020). Our findings also indicate this influence of the financial crisis. We find that the effect of international news sentiment becomes stronger after the financial crisis and that the influence of the financial crisis on the effect of international media news sentiment is stronger in emerging markets.

Furthermore, we are also interested in the influence of deglobalization and COVID-19 on the effect of international news sentiment on stock market returns. During the term of the previous U.S. President Trump, the United States advocated the deglobalization of the economy and trade, which deeply eroded the economic and trade relations of countries around the world. This deglobalization trend in the economy and trade proposed by the U.S. mitigated global economic and commercial relations, and also weakened the impact of international factors on the domestic market (James, 2018; Rehbein, 2019; Farndale et al., 2021; Abdal & Ferreira, 2021). Our findings also show that the effect of international news sentiment on stock market returns is lessened after the deglobalization trend in economic ties and trade. The global COVID-19 pandemic has destroyed the relationships between countries around the world in many aspects, including economic and trade. Normal global economic and financial activities and signed trade agreements were terminated due to the COVID-19 pandemic. During the pandemic, normal economic and financial relations between countries were practically severed (Murray, 2020; Ajam, 2020; Borio, 2020; Mezghani et al.,2021; Pan et al.,2021). Therefore, the impact of international factors on domestic markets has been weakened during the global pandemic. Our findings show that the effect of international news sentiment on the stock market is also mitigated during the global pandemic period.

Finally, we perform some further regressions to confirm that our conclusion from the baseline regression is robust and discuss the potential endogeneity in the relationship between international news sentiment and stock market returns. All the results from the robust regression show that the conclusion of our baseline regression is valid, confirming that international news sentiment has a positive effect on global market returns.

In summary, we make three key contributions to the literature. Our first contribution is that we examine the impact of international media news sentiment on stock market returns. To date, this strand of literature has been predominantly focused on the effect of local news sentiment instead of international news sentiment, offering limited insight regarding the role of international media news in the financial market. We advance this literature by exploring the positive effect of international news sentiment on stock market returns. Second, the current literature on media news and financial markets is largely U.S.-centric, ignoring the importance of the global financial market. In this context, our study investigates the effect of international media news on the global stock market to provide

comprehensive evidence based on global stock market data. Third, we further explore factors which would influence this effect of international media news sentiment. Our study contributes to the literature by discussing the role of financial market development and international news availability on the effect of international news sentiment on the stock market. Moreover, we further discuss the influence of country openness and financial crises on the effect of international news sentiment and stock markets. We also discuss the impact of deglobalization and COVID-19 on the effect of international news sentiment on the stock market. All of these findings suggest that the documented effect of international news sentiment on the stock market can be influenced by some international or domestic factors, suggesting a direction for further research.

2. Hypotheses development

In this section, we will introduce the relevant literature and hypotheses of our study.

Following Baker and Wurgler's (2006) work, a large body of research has focused on the relationship between investor sentiment and financial markets(Lemmon & Portniaguina, 2006; Baker & Wurgler, 2007; Schmeling, 2009; Su et al., 2012; Dougal et al., 2012; Huang et al., 2015). In stock markets, investors usually receive information from media news are affected by the media sentiment contained in media news. Recent developments in natural language analysis and machine learning have introduced techniques that make the task of analyzing a large number of media news possible. Researchers proposed many different approaches in constructing media news sentiment index using a large sample of media news texts or even photos (Tetlock, 2007; Tetlock et al., 2008; Loughran & Mcdonald, 2011; Jegadeesh & Wu, 2013; Da et al., 2015). Numerous studies document that media sentiment could play a role in understanding and predicting market returns over time. In most of the previous studies, news sentiment are mainly based on national or local news media.

In recent decades, an increasing number of investors has begun to pay attention to international media news, as international and domestic media may cover the same event differently On the one hand, international investors will pay more attention to the international media rather than the domestic media. On the other hand, with the development of Internet Communication Technology, local investors more easily access international media news. Therefore, international and domestic news sentiment may have a similar effect on the stock market respectively. That is, when sentiment is high (low), irrational investors will increase (decrease) their demand for stocks driving up (down) prices away from fundamental values. Due to limits to arbitrage, the mispricing might not be corrected immediately. Then, we propose the following hypothesis.

Hypothesis 1. International news sentiment has a positive effect on stock market returns.

To further gauge the mechanism driving our findings and explore the potential factors that might affect the influence of international news sentiment, we supplement our analysis with additional sets of research. The literature on behavioral finance indicates that the effect of sentiment on asset prices is due to investors' irrationality, and investors' feelings and emotions influence their decisions regarding asset prices (Baker & Wurgler, 2006; Tetlock, 2007). Existing studies indicate that the effect of sentiment on the stock market is amplified in countries where investors are more irrational and have lower financial literacy, whereas the effect of sentiment on the stock market is mitigated in countries where financial development is higher and the financial market is more effective (Baker & Wurgler, 2006; Baker et al., 2012; Garcia-Appendini & Montoriol-Garriga, 2013; Siganos et al., 2014; Manela & Moreira, 2017; Dang et al., 2019). Therefore, the effect of international news sentiment on the stock market is also attributed to investors' irrationality and that the effect of international news sentiment on stock market returns will be mitigated with the improvement of financial development. Therefore, we propose the following hypothesis.

Hypothesis 2. The effect of international news sentiment on the stock market will be mitigated with the development of finance.

Next, we examine the impact of access to international media news on the relationship between international news sentiment and stock market returns. Media penetration facilitates the dissemination of news through media channels among investors, which means that investors more easily receive media news and are thus influenced by media news sentiment (Zingales, 2000; Dyck & Zingales, 2004; Dyck et al., 2008; Shadmehr & Bernhardt, 2015; Qiao et al., 2017). Therefore, investors are more susceptible to media news sentiment if they have more access to media news. The effect of international news sentiment will be stronger in countries where international media news is more accessible to investors. Therefore, we propose the following hypothesis.

Hypothesis 3. The effect of international news sentiment will be amplified with the increase in the accessibility of international media news.

We further explore the impact of country openness on the effect of international news sentiment on the stock market. Prior studies suggest that country-specific patterns have a great influence on the domestic economy and finance (Bhattacharya et al., 2003; Loughran & Ritter, 2004; Baker et al., 2012; Beetsma et al., 2013; Siganos et al.,2014; Das, 2016). Country openness may also influence the effect of international news sentiment on the stock market for the following reasons. With the improvement of country openness, domestic economic and financial markets are more easily exposed to international shocks and influenced by international factors. Moreover, domestic investors will pay more attention to international media news and focus on international shocks, which may influence domestic economic and financial markets. Therefore, investors in countries with a high degree of openness are more easily exposed to international shocks and pay more attention to international media news. They are, therefore, more susceptible to international news sentiment, and the effect of international news sentiment on stock market returns is more significant in countries with a high level of openness. Based on this consideration, we propose the following hypothesis.

Table 1

Principal component analysis of international news tone.

Variable	1	2	3	4	5
$tone_{USA}$	0.4626	−0.0845	−0.2167	−0.2683	−0.8124
$tone_{UK}$	0.4555	−0.1443	−0.2984	−0.6113	0.5558
$tone_{Japan}$	0.4265	0.8855	0.0992	0.1332	0.0802
$tone_{France}$	0.4477	−0.2950	−0.3943	0.7313	0.1492
$tone_{Germany}$	0.4430	−0.3177	0.8359	0.0414	0.0487
Proportion	0.8684	0.0524	0.0346	0.0293	0.0153
Cumulative	0.8684	0.9209	0.9554	0.9847	1
Eigenvalue	4.3421	0.2621	0.1728	0.1463	0.0764

This table presents the results of principal component analysis of international news tone.

Hypothesis 4. The effect of international news sentiment is more significant in countries with a high level of openness.

Next, we seek to explore the influence of the financial crisis on how international news sentiment affects stock market returns. A large body of research has indicated that the 2008 financial crisis had a great impact on the global economic and financial market (Schularick & Taylor, 2012; Ben-David et al., 2012; Lins et al., 2013; Garcia-Appendini & Montoriol-Garriga, 2013; Dagher & Kazimov, 2015; Shehzad et al., 2020). Their studies suggest that the 2008 financial crisis seriously shocked the global stock market, with a large number of investors panicking due to the global financial crisis. In such a situation, investors are more irrational and easier to be swayed by emotion and feelings. Furthermore, the financial crisis broke out in the U.S. and then rapidly spread worldwide, leading investors to realize that international factors can severely impact domestic markets and thus to pay more attention to international factors. Therefore, investors are more susceptible to international news sentiment after a financial crisis. Moreover, the financial literacy of investors and the impact of the financial crisis on the domestic market vary significantly between developed and emerging markets. Therefore, investors in emerging markets are more irrational and more likely to be influenced by international news sentiment than those in developed markets. The influence of the financial crisis on the effect of international news sentiment on stock market returns is more pronounced in emerging markets. Based on this consideration, we propose the following hypotheses.

Hypothesis 5.1. The effect of international news sentiment on stock market returns is stronger in post-crisis periods.

Hypothesis 5.2. The effect of international news sentiment on stock market returns is stronger in emerging markets than in developed markets in post-crisis periods.

Finally, we seek to explore the influence of deglobalization and COVID-19 on the effect of international news sentiment on the stock market. During the administration of President Trump, the United States advocated for deglobalization of the economy and trade, which deeply mitigated the connection of countries around the world in economy and trade. This deglobalization trend in the economy and trade proposed by the U.S. has weakened economic and commercial relations between countries around the world, and the impact of international factors on domestic markets has also been mitigated (James, 2018; Rehbein, 2019; Farndale et al., 2021; Abdal & Ferreira, 2021). Therefore, the effect of international news sentiment on the stock market is mitigated after the deglobalization trend. The global COVID-19 pandemic deeply affected the relationships of many countries around the world in all aspects, including economic and trade. Many routine global economic and financial activities and signed trade agreements were terminated due to the pandemic, and normal economic and financial relations between countries were nearly cut off (Murray, 2020; Ajam, 2020; Borio, 2020). The impact of international factors on the domestic market has been severely mitigated during the global pandemic. Therefore, the effect of international news sentiment on the stock market is also mitigated in the pandemic. Based on these considerations, we propose the following hypotheses.

Hypothesis 6. The effect of international news sentiment on the stock market is mitigated after the deglobalization trend advocated by the U.S.

Hypothesis 7. The effect of international news sentiment on the stock market is mitigated during the COVID-19 global pandemic.

2.1. International news sentiment variable construction

The international media news data used in our paper come from the Global Database of Events Language and Tone (GDELT) database. The GDELT database collects all news media based on a particular event, analyzes the positive and negative words in each news item using natural language analysis technology based on the Harvard emotional dictionary, and calculates the average tone of each international media news item. The news average tone score (AvgTone) ranges from −100 (extremely negative) to +100 (extremely positive). Generally, the news average tone falls between −10 and + 10, with 0 meaning neutral. The GDELT database also provides indicators such as the number of articles that mention the event as a reflection of importance of the news event reported. Therefore, we calculate news tone (tone) weighted by the number of articles that mention the event to consider the importance of the new event reported. Prior studies have suggested that when investors receive information repeatedly, it is more likely to catch their attention and to strengthen their feelings and emotions (You & Wu, 2012). Then, we select representative countries' media news to reflect international news sentiment, considering the influence of global media news and the number of news articles. Finally, we select

Table 2
Country list and summary statistic.

Panel A: Country List and Main Stock Market Index			
Argentina (Merval Index)	Austria (Vienna Stock Exchange Index)	Belgium (Brussels Bel 20 Index)	Brazil (IBOVESPA index)
Canada (Toronto Stock Exchange 300 Index)	Chile (IPSA Index)	China (Shanghai Stock Exchange Index)	Denmark (Copenhagen Stock Exchange Index)
Finland (Hex General Index)	France (CAC 40 Index)	Germany (DAX Composite Index)	Greece (Athens Stock Exchange Index)
India (BSE Sensex Index)	Indonesia (Jakarta Stock Exchange Index)	Ireland (Irish Stock Exchange General Index)	Italy (MSCI - Italy Index)
Japan (Nikkei Index)	Malaysia (KLSE Composite Index)	Mexico (HSBC Mexico)	New Zealand (NZSE40)
Norway (Oslo Stock Exchange General Index)	Philippines (Philippines SE Composite Index)	Poland (WIG20)	Portugal (Banco Totta & Acores Index)
Russian (Moscow Stock Exchange Index)	Singapore (MSCI - Singapore Index)	South Africa (Johannesburg Stock Exchange Index)	Korea (KSE Composite Index)
Spain (Madrid Stock Exchange Index)	Sweden (Affarsvarlden General Index)	Switzerland (Swiss Market Index)	Thailand (SECS Exchange of Thailand Index)
Turkey (Istanbul Stock Exchange Index)	United Kingdom (FTSE All-Share Index)	United States (S&P 500 Composite Index)	

Panel B: Summary Statistic			
Variables	Mean	Standard Deviation	Observation
return	0.4031	7.2841	6300
exchange rate	385.229	1937.46	6300
credit	213100.5	815521	6300
M1	50011.07	191142.7	6300
M2	189360.7	734931.9	6300
lend	7.2115	8.0787	6300
deposit	3.4768	4.5126	6300
moneymarket	3.5362	5.5338	6300
longterm	4.0094	3.2252	6300
GDP	336130.3	1421676	6300
growth	2.0769	4.0136	6300
CPI	114.8296	100.0992	6300
PPI	108.9682	64.9155	6300
unemployment	5.0692	5.0437	6300
sentiment	5.1283	7.0299	6300
ICT export	8.1175	10.0788	6300
ICT import	10.2079	6.4353	6300
internet&mobile	0.09704	0.1507	6300
financialdevelop	0.6533	0.1702	6300
financialaccess	0.5979	0.2519	6300
financialinstitution	0.6737	0.1784	6300
financialminex	0.6081	0.1872	6300

This table presents the selected 35 countries and their main stock market index we used in our study (Panel A) and the summary statistic of variables in our study (Panel B).

media news from five countries (the United States, the United Kingdom, Germany, France and Japan) to represent international news according to prior studies (Bukovina, 2016; Maria Caporale et al., 2020). Several studies have indicated that news from the United States and the European Union nearly dominate international media opinion (Bastedo & Bowman, 2010; Jones et al.,2013; Bukovina, 2016; Maria Caporale et al., 2020), with coverage of these countries accounting for nearly 50% of the total global media news. Therefore, we selecte five countries' media news to reflect international media news is appropriate. Then, we calculate international news tone based on the principal component analysis. The results of the principal component analysis are shown in Table 1.

Table 1 shows the principal component analysis results of the international news tone of the five representative countries. Generally, the researcher may select components whose eigenvalue is more than 1 and the cumulative contribution rate is more than 80% according to the results of principal component analysis. We find that Component 1's cumulative contribution is 86.84%, and its eigenvalue is 4.3421. Therefore, selecting component 1 could reflect the main characteristic of international news tone. Thus, the international news tone is calculated as follows:

$$International\ news\ tone_i = 0.4626 \times tone_{USA_i} + 0.4555 \times tone_{UK_i} + 0.4265 \times tone_{Japan_i} + 0.4477 \times tone_{France_i} + 0.4430 \times tone_{Germany_i}$$

$$(1)$$

where *International news tone$_i$* means the international media news tone to country i, *tone$_{USA_i}$* means the U.S. media news tone to country i, and so on.

Equation (1) shows the calculation of international news tone. These results also suggest that media news from the United States has a greater influence on international media news, which is consistent with prior studies. Several researchers have indicated that U.S. news plays a leading role in global media news (Bukovina, 2016; Maria Caporale et al., 2020). We then use the international news tone

to construct an international news sentiment variable. Prior studies indicate that the influence of sentiment may be observed at long horizons (Su et al., 2012; Huang et al.,2015; Sibley et al., 2016). Moreover, the sociobiology literature suggests that media news subtly affects humans' feelings and emotions and that long-term media news may influence humans' decision-making (Ajzen, 1991; Wetherell et al., 2002; He, 2008; Su et al., 2012; Cagé & Rouzet, 2015; Li & Meng, 2019). Therefore, we select a six-month observation window of international media news tone to construct international news sentiment considering the long-horizon influence of media news. We use a six-month international news tone weighted by time and give more weight to recent international news to construct an international news sentiment variable. The calculation equation is as follows:

$$Sentiment_{i,t-1} = \frac{\sum_{m=1}^{6} International\ news\ tone_{i,t+m-7} \times m}{\sum_{m=1}^{6} m} \tag{2}$$

$sentiment_{i,t-1}$ where means the international news sentiment to country i in t-1 month.

3. Empirical results and discussion

3.1. Data

We collect country-level data, including stock market returns and other country-level control variables, from the Bureau van Dijk Editions Electroniques SA (BvD) database. The international media news data are obtained from the Global Database of Events Language and Tone (GDELT). The financial development index and Internet development data are separately obtained from IMF Financial Development Reports and Word Bank Internet Development Reports. According to prior studies (Chen et al., 2020; Calomiris & Mamaysky, 2019), we selected 35 influential stock markets from the global stock market to study the effect of international news sentiment on the stock markets. Our full sample consists of 35 countries, including developed markets and emerging markets around the world, spanning the period from January 2006 to December 2020. The country list and the main stock market index of each are shown in Table 2 panel A, and the summary statistic of the full sample are shown in Table 2 Panel B. The detailed variable definitions are shown in Appendix Table 1.

3.2. Baseline regression model

In this section, we will introduce the main regression model in this paper. First, we explore the effect of international news sentiment on stock market returns. Therefore, we regress the following equation to examine Hypothesis 1.

$$Return_{i,t} = c_0 + \beta_1 Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \tag{3}$$

where $Return_{i,t}$ is the return of the stock market index for country i at time t, and $sentiment_{i,t-1}$ is the international news sentiment to country i at t-1 month. Prior studies have indicated that both economic variables and financial variables may influence stock market returns. Calomiris and Mamaysky(2019) selected the exchange rate to U.S. dollars, interest rate, domestic credit, bond return, GDP and growth of GDP as control variables in their studies. Tetlock(2007) used GDP, growth of GDP, exchange rate, interest rate, long-term bond yield and unemployment rate as control variables in their studies. Finally, based on these prior studies, our *ControlVariables* includes *FinancialControlVariables*, which contains the exchange rate to U.S. dollars, stock of domestic credit, supply of M1&M2, lending interest rate, deposit interest rate, money market interest rate, and long-term bond yield, and *EconomicControlVariables*, which contain the GDP, growth of GDP, consumer price index, producer price index, and recorded unemployment (Yang & Chen, 2000; Baker & Wurgler, 2006; Tetlock, 2007; Schmeling, 2009; Birz & Lott, 2011; Bollen et al., 2011; Siganos et al., 2014; Qiao et al., 2017; Dang et al., 2019; Chen et al., 2020).

In this model, we examine the effect of international news sentiment on stock market returns. The results of the regression can be interpreted as follows: if the coefficient $\beta_1 > 0$, then international news sentiment has a positive effect on stock market returns, and higher international news sentiment will lead to higher stock market returns. Otherwise, if the coefficient $\beta_1 = 0\ or\ \beta_1 < 0$, then international news sentiment has no effect or a negative effect on stock market returns. According to the prior literature about the relationship between news sentiment and the stock market, our expected result is that the coefficient $\beta_1 > 0$ and international news sentiment have a positive effect on stock market returns.

Then, we seek to further explore the influence of financial development on the effect of international news sentiment on stock market returns. We regress the following equation to examine Hypothesis 2. We add the cross-term of international news sentiment and financial development to equation (3). The variables we use to measure the financial development of a country include the Financial Development Index, Financial Market Index, Financial Institution Index and Financial Institution Access Index, which come from the IMF Financial Development Reports. If the coefficient of $\beta_2 < 0$, then the effect of international news sentiment on stock market returns will be mitigated with the improvement of financial development, which is our expected result and consistent with the prior literature.

$$Return_{i,t} = c_0 + \beta_1 sentiment_{i,t-1} + \beta_2 sentiment_{i,t-1} \times FinancialDevelopment_{i,t-1} + \beta_3 FinancialDevelopment_{i,t-1} + \beta_4 ControlVariables + \varepsilon_{i,t} \tag{4}$$

Table 3
The effect of international media news sentiment on stock market returns.

Variable	All Country	Developed	Emerging
	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.1735***	0.1625***	0.1691***
	(0.002)	(0.009)	(0.01)
$exchange_{i,t-1}$	0.7509***	2.319	0.9189***
	(0.001)	(0.13)	(0.002)
$Credit_{i,t-1}$	−1.1265**	− 0.7001	−1.6135***
	(0.017)	(0.282)	(0.001)
$M1_{i,t-1}$	0.4803***	0.4971***	0.5913**
	(0.001)	(0.001)	(0.02)
$M2_{i,t-1}$	0.4644	0.0176	0.4131
	(0.18)	(0.98)	(0.205)
$Lend_{i,t-1}$	0.1465*	0.1317	0.3074
	(0.086)	(0.220)	(0.447)
$Deposit_{i,t-1}$	− 0.0428	− 0.0645	− 0.0264
	(0.192)	(0.162)	(0.923)
$Moneymarket_{i,t-1}$	− 0.0641	− 0.0271	− 0.1231
	(0.371)	(0.821)	(0.335)
$LongtermBond_{i,t-1}$	0.0033	0.0213	− 0.0335
	(0.878)	(0.411)	(0.494)
$GDP_{i,t-1}$	− 0.2801	−0.5681*	0.3916**
	(0.241)	(0.083)	(0.033)
$growth_{i,t-1}$	0.0114	0.0341*	− 0.0817
	(0.696)	(0.10)	(0.388)
$CPI_{i,t-1}$	0.1169	0.6813	0.6301
	(0.415)	(0.726)	(0.228)
$PPI_{i,t-1}$	− 0.1208	− 0.07969	− 0.1625
	(0.365)	(0.656)	(0.576)
$Unemployment_{i,t-1}$	0.0941***	0.0837***	0.6473*
	(0.001)	(0.004)	(0.10)
Constant	0.2673***	0.4824**	0.5819
	(0.001)	(0.05)	(0.145)
Fix effect	YES	YES	YES
observation	6016	4641	1375
R^2	0.1018	0.099	0.1239

This table presents the regression results of equation (3). p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

Next, we seek to discuss the impact of access to international news on the relation between international news sentiment and stock market returns. Therefore, we regress the following equation to examine Hypothesis 3. We add the cross-term international news sentiment and news accessibility to equation (3). Prior studies suggest that media penetration facilitates the dissemination of news through media channels among investors and strengthens the influence of media news on investors (Zingales, 2000; Dyck & Zingales, 2004; Dyck et al., 2008; Gao et al.,2018; Chen et al., 2020). However, it is difficult to directly measure international media news penetration among investors rather than domestic media news penetration. Therefore, we use the following variables to indirectly reflect international media news penetration among investors. Investors receive international media news predominantly through Internet services. Therefore, investors more easily access international media news with the improvement of Internet service and technology. Finally, we use variables including Internet Communication Technology (ICT) goods and service exports, ICT goods and service imports and news subscribing users to the Internet and mobile phones from Word Bank Internet Development Reports to reflect investors' access to international media news. More users subscribe to the Internet and mobile phones, and the higher development of Internet technology will make it easier for investors to access international media news and thus be influenced by international news sentiment. Therefore, our expected result is that the coefficient of $\beta_3 > 0$, which means that the documented effect of international news sentiment on the stock market is amplified if investors more easily access international media news.

$$Return_{i,t} = c_0 + \beta_1 sentiment_{i,t-1} + \beta_2 sentiment_{i,t-1} \times NewsAccessibility_{i,t-1} + \beta_3 NewsAccessibility_{i,t-1} + \beta_4 ControlVariables + \varepsilon_{i,t} \quad (5)$$

We further explore the influence of country openness on the effect of international news sentiment on stock market returns. We regress the following regressions to examine Hypothesis 4. First, we divide the full sample into two groups (High-openness group and Low-openness group) according to the KAOOPEN index, which reflects the degree of openness of the country. Second, we regress the following equation and compare the two groups' coefficients of β_1. Our expected result is that the coefficient of β_1 in the high-openness group is more significant than that in the low-openness group, which suggests that the effect of international news sentiment is more significant in countries with a high level of openness.

$$Return\_High_{i,t} = c_0 + \beta_1^{high} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \quad (6)$$

Table 4

The influence of financial development on the effect of international media news sentiment on stock market returns.

Variable	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.1785***	0.1788***	0.1954***	0.1842***
	(0.001)	(0.001)	(0.001)	(0.001)
$sentiment_{i,t-1} \times$ Finacial Development index	−0.0321**			
	(0.014)			
$sentiment_{i,t-1} \times$ Finacial Institutions index		−0.0398***		
		(0.001)		
$sentiment_{i,t-1} \times$ Finacial Institutions Access index			-0.0416***	
			(0.001)	
$sentiment_{i,t-1} \times$ Finacial Markets index				− 0.0205
				(0.138)
Finacial Development index$_{i,t-1}$	−0.1074**			
	(0.030)			
Finacial Institutions index$_{i,t-1}$		− 0.0081		
		(0.865)		
Finacial Institutions Access index$_{i,t-1}$			− 0.0558	
			(0.102)	
Finacial Markets index$_{i,t-1}$				− 0.0679
				(0.103)
$exchange_{i,t-1}$	0.7676***	0.7601***	0.7367***	0.7803***
	(0.001)	(0.001)	(0.001)	(0.001)
$Credit_{i,t-1}$	−1.101**	−1.109**	−1.043**	−1.651**
	(0.019)	(0.026)	(0.028)	(0.013)
$M1_{i,t-1}$	0.4476***	0.4733***	0.4535***	0.4444***
	(0.001)	(0.001)	(0.001)	(0.001)
$M2_{i,t-1}$	0.4385	0.3830	0.3877	0.5287
	(0.155)	(0.239)	(0.253)	(0.111)
$Lend_{i,t-1}$	0.1373*	0.1329*	0.1359*	0.1517**
	(0.081)	(0.10)	(0.092)	(0.05)
$Deposit_{i,t-1}$	− 0.0651	− 0.0481	− 0.0468	− 0.0661
	(0.137)	(0.210)	(0.247)	(0.107)
$Moneymarket_{i,t-1}$	− 0.0391	− 0.049	− 0.0525	− 0.0504
	(0.581)	(0.509)	(0.469)	(0.470)
$LongtermBond_{i,t-1}$	0.0107	0.0112	0.0203	0.0051
	(0.647)	(0.624)	(0.353)	(0.823)
$GDP_{i,t-1}$	− 0.1828	− 0.1353	− 0.1645	− 0.2692
	(0.365)	(0.458)	(0.344)	(0.253)
$growth_{i,t-1}$	0.0031	0.0043	0.0011	0.0104
	(0.911)	(0.875)	(0.970)	(0.720)
$CPI_{i,t-1}$	0.1442	0.1484	0.1871	0.1318
	(0.271)	(0.267)	(0.165)	(0.327)
$PPI_{i,t-1}$	− 0.1388	− 0.1426	− 0.1851	− 0.1296
	(0.234)	(0.227)	(0.122)	(0.293)
$Unemployment_{i,t-1}$	0.0896***	0.0964***	0.0805***	0.0933***
	(0.004)	(0.002)	(0.009)	(0.002)
Constant	0.2599***	0.2656***	0.2378***	0.2581***
	(0.001)	(0.001)	(0.001)	(0.001)
Fix effect	YES	YES	YES	YES
observation	6016	6016	6016	6016
R^2	0.1030	0.1029	0.1034	0.1024

This table presents the regression results of equation (4). p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

$$Return\_Low_{i,t} = c_0 + \beta_1^{low} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \qquad (7)$$

Next, we seek to explore the impact of the financial crisis on the effect of international news sentiment on the stock market. We regress the following regressions to examine Hypotheses 5.1 and 5.2. According to prior studies on the impact of the financial crisis on the financial market, the effect of international news sentiment on the stock market is more significant in the post-crisis period. Moreover, the influence of the financial crisis is greater for investors in emerging markets, so the effect of international news sentiment on the stock market is stronger in emerging markets after the financial crisis. If our consideration is valid, the results are that the coefficient of β_1 is more significant in the post-crisis group. Moreover, if the coefficient $\beta_1^{emerg} > \beta_1^{develop}$, then it means that the effect of international news sentiment on stock market returns is stronger in emerging markets than in developed markets after financial crises.

$$Return\_precrisis_{i,t} = c_0 + \beta_1^{pre} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \qquad (8)$$

$$Return\_postcrisis_{i,t} = c_0 + \beta_1^{post} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \qquad (9)$$

Table 5
The influence of news accessibility on the effect of international media news sentiment on stock market returns.

Variable	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.1753***	0.1765***	0.1742***
	(0.001)	(0.001)	(0.001)
$sentiment_{i,t-1} \times ICTexport$	0.0376***		
	(0.002)		
$sentiment_{i,t-1} \times ICTimport$		0.0358***	
		(0.002)	
$sentiment_{i,t-1} \times internet\&moblie$			0.0184*
			(0.078)
$ICTexport_{i,t-1}$	−0.0889**		
	(0.023)		
$ICTimport_{i,t-1}$		− 0.0167	
		(0.605)	
$internet\&mobile_{i,t-1}$			0.0121
			(0.403)
$exchange_{i,t-1}$	0.7072***	0.7172***	0.7622***
	(0.001)	(0.001)	(0.001)
$Credit_{i,t-1}$	−0.9776*	−0.9861**	−1.177**
	(0.066)	(0.063)	(0.011)
$M1_{i,t-1}$	0.5706***	0.4736***	0.4581***
	(0.001)	(0.001)	(0.001)
$M2_{i,t-1}$	0.2576	0.3721	0.5413
	(0.523)	(0.342)	(0.115)
$Lend_{i,t-1}$	0.1332*	0.1351*	0.1388*
	(0.086)	(0.085)	(0.099)
$Deposit_{i,t-1}$	− 0.0411	− 0.0399	− 0.0394
	(0.268)	(0.279)	(0.249)
$Moneymarket_{i,t-1}$	− 0.0514	− 0.0544	− 0.0525
	(0.424)	(0.413)	(0.469)
$LongtermBond_{i,t-1}$	0.0151	0.0152	0.0057
	(0.498)	(0.502)	(0.798)
$GDP_{i,t-1}$	− 0.2941	− 0.3323	− 0.2678
	(0.183)	(0.174)	(0.344)
$growth_{i,t-1}$	0.1002	0.0086	0.0062
	(0.721)	(0.765)	(0.831)
$CPI_{i,t-1}$	0.2045	0.1773	0.1286
	(0.207)	(0.239)	(0.360)
$PPI_{i,t-1}$	− 0.2228	− 0.1911	− 0.1306
	(0.146)	(0.172)	(0.311)
$Unemployment_{i,t-1}$	0.0893***	0.0884***	0.0943***
	(0.001)	(0.002)	(0.001)
Constant	0.2655***	0.2491***	0.2481***
	(0.001)	(0.001)	(0.001)
Fix effect	YES	YES	YES
observation	6016	6016	6016
R^2	0.1031	0.1027	0.1022

This table presents the regression results of equation (5). p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

$$Return\_post\_devlop_{i,t} = c_0 + \beta_1^{devlop} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \qquad (10)$$

$$Return\_post\_emerg_{i,t} = c_0 + \beta_1^{emerg} Sentiment_{i,t-1} + \beta_2 ControlVariables_{i,t-1} + \varepsilon_{i,t} \qquad (11)$$

Finally, we seek to determine the influence of deglobalization and COVID-19 on the effect of international news sentiment on stock market returns. Therefore, we regress the following equations to examine Hypothesis 6 and Hypothesis 7. We add cross-term international news sentiment and the dummy variable *Dummy_Trump* (equal to 1 when U.S. President Trump is in office) and *Dummy_COVID* (equal to 1 in the global pandemic of the COVID-19 period) to equation (3). According to the discussion in section 2, the deglobalization advocated by the U.S. and the global COVID-19 pandemic will lessen the impact of international factors on domestic markets. Therefore, the effect of international news sentiment on the stock market is mitigated after the deglobalization trend and the global COVID-19 pandemic. Therefore, our expected results are that the coefficient of $\beta_2 < 0$, which means that deglobalization and COVID-19 will mitigate the effect of international news sentiment on the stock market.

$$Return_{i,t} = c_0 + \beta_1 sentiment_{i,t-1} + \beta_2 sentiment_{i,t-1} \times Dummy\_Trump_{i,t-1} + \beta_3 Dummy\_Trump_{i,t-1} + \beta_4 ControlVariables + \varepsilon_{i,t} \qquad (12)$$

$$Return_{i,t} = c_0 + \beta_1 sentiment_{i,t-1} + \beta_2 sentiment_{i,t-1} \times Dummy\_COVID_{i,t-1} + \beta_3 Dummy\_COVID_{i,t-1} + \beta_4 ControlVariables + \varepsilon_{i,t} \qquad (13)$$

Thus far, we have examined all the hypotheses we proposed in section 2. Next, we will perform a series of robust regressions to

Table 6
The influence of country openness on the effect of international media news sentiment on stock market returns.

Variable	High − openess	Low − openess
	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.1858***	0.2164**
	(0.001)	(0.015)
$exchange_{i,t-1}$	7.911*	0.6422***
	(0.075)	(0.004)
$Credit_{i,t-1}$	−1.395**	−1.079*
	(0.05)	(0.097)
$M1_{i,t-1}$	2.559***	0.2714
	(0.001)	(0.133)
$M2_{i,t-1}$	−3.148***	0.7433**
	(0.001)	(0.044)
$Lend_{i,t-1}$	0.2545*	0.1206*
	(0.094)	(0.092)
$Deposit_{i,t-1}$	−0.3247*	0.0197
	(0.087)	(0.783)
$Moneymarket_{i,t-1}$	0.1131	−0.1148***
	(0.710)	(0.008)
$LongtermBond_{i,t-1}$	0.0156	0.0283
	(0.598)	(0.411)
$GDP_{i,t-1}$	9.075***	− 0.4034
	(0.001)	(0.176)
$growth_{i,t-1}$	0.0533***	− 0.0804
	(0.003)	(0.132)
$CPI_{i,t-1}$	0.7207	0.0524
	(0.002)	(0.670)
$PPI_{i,t-1}$	−0.6545***	0.0036
	(0.001)	(0.972)
$Unemployment_{i,t-1}$	0.0998**	0.0931
	(0.031)	(0.13)
Constant	3.089**	0.3804**
	(0.001)	(0.014)
Fix effect	YES	YES
observation	3541	2475
R^2	0.114	0.1107

This table presents the regression results of equations (6) and (7). p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

confirm that our conclusions are valid. We use different methods to calculate the stock market returns and international news sentiment. Moreover, we discuss the potential endogeneity in international news sentiment and the stock market. We use exogenous shock and instrument variables to examine our findings.

3.3. Empirical regression results

In this section, we will show the empirical regression results of this paper. First, we examine the effect of international news sentiment on stock market returns. The baseline regression results for equation (3) are shown in Table 3. Our independent variable of interest is international news sentiment (sentiment). The regression results of all country samples are shown in Table 3 column 1. We find that the coefficient of sentiment is positive and highly significant at the 1% level. Moreover, we divide the full sample into a developed market group and an emerging market group. The regression results of the subsample (developed market and emerging market) are shown in Table 3 columns 2–3, and we find that the coefficient of sentiment is still positive and highly significant at the 1% level. Based on these regression results, we examine Hypothesis 1 and find that international news sentiment has a positive effect on stock market returns and that higher international news sentiment will lead to higher stock market returns.

Second, we seek to further examine the influence of financial development on the effect on stock market returns. The regression results for equation (4) are shown in Table 4. We add the cross-term of international news sentiment and financial development to the baseline regression. Our independent variables of interest are the interactions between international news sentiment and financial development. The regression results of Table 4 column 1 show that the coefficient of interaction between international news sentiment and the financial development index is significantly negative, as expected, which means that the effect of international news sentiment on the stock market is less with the improvement of financial development. Then, we further explore the impact of financial institution development, financial institution accessibility and financial market development on the effect of international news sentiment on the stock market. These regression results are shown in Table 4 columns 2–4. We find that the coefficient of the interaction between international news sentiment and the financial institution index is negative and highly significant at the 1% level, which means that the effect of international news sentiment on the stock market is mitigated with the development of financial institutions. This

Table 7
The influence of financial crisis on the effect of international media news sentiment on stock market returns.

Variable	$Pre-crisis$	$Post-crisis$	$Post-crisis$	$Post-crisis$
	$Return_{i,t}$	$Return_{i,t}$	Developed	Emerging
			$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.2072	0.1903***	0.1716***	0.2628***
	(0.263)	(0.001)	(0.006)	(0.006)
$exchange_{i,t-1}$	4.6318***	0.8076***	1.592*	0.6625***
	(0.001)	(0.001)	(0.087)	(0.003)
$Credit_{i,t-1}$	− 3.0428	−0.9911***	− 0.8878	− 0.6073
	(0.590)	(0.001)	(0.120)	(0.204)
$M1_{i,t-1}$	−2.4419***	0.6678***	1.169***	0.9982***
	(0.004)	(0.001)	(0.001)	(0.002)
$M2_{i,t-1}$	1.2197	0.0011	− 0.9072	− 0.7131
	(0.859)	(0.98)	(0.195)	(0.157)
$Lend_{i,t-1}$	0.4501	0.1719***	0.1658**	0.0161
	(0.458)	(0.005)	(0.029)	(0.943)
$Deposit_{i,t-1}$	− 0.5617	−0.1379**	−0.1623**	0.0362
	(0.347)	(0.0162)	(0.023)	(0.872)
$Moneymarket_{i,t-1}$	− 0.3776*	− 0.0075	0.0223	− 0.0152
	(0.093)	(0.921)	(0.845)	(0.885)
$LongtermBond_{i,t-1}$	− 0.0778	0.0546*	0.1036**	0.0053
	(0.505)	(0.095)	(0.027)	(0.920)
$GDP_{i,t-1}$	3.3669	− 0.2045	−1.085***	− 0.1036
	(0.131)	(0.595)	(0.01)	(0.721)
$growth_{i,t-1}$	− 0.2271	0.0254	0.0461**	− 0.0619
	(0.113)	(0.287)	(0.023)	(0.490)
$CPI_{i,t-1}$	−4.827**	0.0447	− 0.4361	0.5399
	(0.05)	(0.767)	(0.826)	(0.356)
$PPI_{i,t-1}$	−3.5401***	− 0.0592	0.0252	− 0.0072
	(0.001)	(0.691)	(0.896)	(0.981)
$Unemployment_{i,t-1}$	− 0.0321	0.1355***	0.1083***	0.9057**
	(0.920)	(0.001)	(0.001)	(0.032)
Constant	−2.371***	0.2886***	0.2991	0.7243*
	(0.001)	(0.001)	(0.136)	(0.081)
Fix effect	YES	YES	YES	YES
observation	1050	4966	3831	1315
R^2	0.2967	0.061	0.061	0.082

This table presents the regression results of equations 8–11. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

phenomenon may be attributed to institutional investors being more rational than retail investors and less affected by sentiment and emotion. Moreover, the coefficient of the interaction between international news sentiment and the financial institution access index is also positive and highly significant at the 1% level, which suggests that the effect of international news sentiment is weakened with greater access to financial institutions. This may be attributed to the financial institution access index reflecting investors' access to financial institutional services, and investors may make more rational decisions if they more easily receive advisory services from professional financial institutions. Therefore, they will be less affected by irrational factors such as sentiment or emotion. However, the regression results of Table 4 column 4 show that the coefficient of the interaction between international news sentiment and the financial market index is negative but not significant ($p = 0.138$), which means that the development of financial institutions has a more important influence on reducing the effect of news sentiment. In summary, we examine Hypothesis 2 and find that the effect of international news sentiment on the stock market will be mitigated with financial development.

Third, we explore the impact of access to international news on the relationship between international news sentiment and stock market returns. We regress equation (5) to examine Hypothesis 3. We add the interactions of international news sentiment and news accessibility to the baseline regression. In section 2, we discussed that it is difficult to measure international media news penetration among local investors directly. Therefore, we select Internet communication technology (ICT) goods and service exports, ICT goods and service imports and subscribe users to the Internet and mobile phones from Word Bank Internet Development Reports as proxy variables to reflect international news accessibility. In general, investors receive international media news predominantly through Internet services on computers or mobile phones. Therefore, with the development of Internet technology and the increase in Internet and mobile phone usage, investors more easily access international media news and are influenced by international news sentiment. The regression results are shown in Table 5. We find that the coefficients of interactions are all positive and significant, which suggests that the effect of international news sentiment on the stock market is stronger if investors more easily access international media news. In summary, we examine Hypothesis 3 and find that the effect of international news sentiment will be amplified if it is easier for investors to access international media news.

Next, we seek to explore the influence of country openness on the effect of international news sentiment on stock market returns. We regress equations (6) and (7) to examine Hypothesis 4. We divide the full sample into two groups, the High-openness group and

Table 8
The influence of deglobalization and COVID on the effect of international news sentiment on the stock market.

Variable	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.2711***	0.2101***
	(0.001)	(0.001)
$sentiment_{i,t-1} \times Dummy\_Trump_{i,t-1}$	−0.4764***	
	(0.001)	
$sentiment_{i,t-1} \times Dummy\_COVID_{i,t-1}$		−0.8342***
		(0.003)
$Dummy\_Trump_{i,t-1}$	−0.7857***	
	(0.001)	
$Dummy\_COVID_{i,t-1}$		− 0.8502**
		(0.012)
$exchange_{i,t-1}$	0.7409***	0.7505***
	(0.001)	(0.001)
$Credit_{i,t-1}$	−1.031*	−1.188**
	(0.06)	(0.014)
$M1_{i,t-1}$	0.4821***	0.4825***
	(0.005)	(0.001)
$M2_{i,t-1}$	0.3968	0.5521
	(0.303)	(0.121)
$Lend_{i,t-1}$	0.1639**	0.1533*
	(0.05)	(0.076)
$Deposit_{i,t-1}$	− 0.0571*	− 0.0436
	(0.077)	(0.152)
$Moneymarket_{i,t-1}$	− 0.0631	− 0.0584
	(0.353)	(0.387)
$LongtermBond_{i,t-1}$	0.0116	0.0126
	(0.564)	(0.531)
$GDP_{i,t-1}$	− 0.2823	− 0.3112
	(0.312)	(0.164)
$growth_{i,t-1}$	0.0179	0.0241
	(0.529)	(0.432)
$CPI_{i,t-1}$	0.1741	0.1323
	(0.236)	(0.354)
$PPI_{i,t-1}$	− 0.1827	− 0.1427
	(0.191)	(0.289)
$Unemployment_{i,t-1}$	0.0994***	0.0917***
	(0.001)	(0.001)
Constant	0.1721***	0.2191***
	(0.009)	(0.001)
Fix effect	YES	YES
observation	6016	6016
R^2	0.1039	0.1034

This table presents the regression results of equation 12 and 13. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.
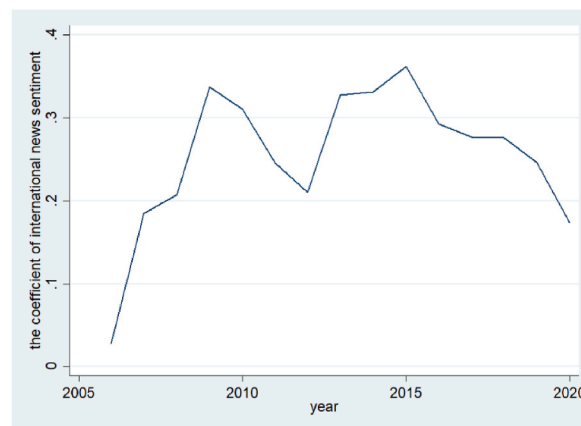

Fig. 1. The change of documented effect of international news sentiment on the stock market returns.

Table 9
The robustness check of the effect of international media news sentiment on stock market returns.

Variable	Non − adjust	Average weight	3 − Months	9 − Months	Fama − Macbeth
	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-1}$	0.2587***	0.1662***	0.1412***	0.1362***	0.1361*
	(0.001)	(0.008)	(0.006)	(0.01)	(0.075)
$exchange_{i,t-1}$	0.5027***	0.7541***	0.7307***	0.7704***	0.2071
	(0.001)	(0.001)	(0.001)	(0.001)	(0.176)
$Credit_{i,t-1}$	−0.8695**	−1.121**	−1.038**	−1.147**	− 0.1796
	(0.028)	(0.021)	(0.044)	(0.018)	(0.662)
$M1_{i,t-1}$	0.4049***	0.4798***	0.4812***	0.5158***	−3.435**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.019)
$M2_{i,t-1}$	0.2193	0.4598	0.3641	0.4145	3.693***
	(0.496)	(0.190)	(0.259)	(0.261)	(0.010)
$Lend_{i,t-1}$	0.0813	0.1463*	0.1439*	0.1559*	0.0211
	(0.376)	(0.087)	(0.10)	(0.063)	(0.376)
$Deposit_{i,t-1}$	− 0.0201	− 0.0433	− 0.0488	− 0.0433	− 0.0092
	(0.661)	(0.196)	(0.195)	(0.177)	(0.84)
$Moneymarket_{i,t-1}$	− 0.0626	− 0.0642	− 0.0574	− 0.0723	− 0.0428
	(0.290)	(0.370)	(0.416)	(0.354)	(0.505)
$LongtermBond_{i,t-1}$	− 0.0018	0.0049	0.0026	0.0015	0.0112
	(0.940)	(0.823)	(0.901)	(0.944)	(0.599)
$GDP_{i,t-1}$	− 0.0009	− 0.2768	− 0.2409	− 0.2231	− 0.0931
	(0.994)	(0.242)	(0.229)	(0.362)	(0.481)
$growth_{i,t-1}$	0.0176	0.0117	0.0122	0.0107	0.0499**
	(0.587)	(0.689)	(0.670)	(0.715)	(0.028)
$CPI_{i,t-1}$	0.1718	0.1165	0.1118	0.1273	0.3606
	(0.166)	(0.415)	(0.409)	(0.378)	(0.203)
$PPI_{i,t-1}$	− 0.1508	− 0.1199	− 0.1136	− 0.1304	− 0.1958
	(0.202)	(0.366)	(0.360)	(0.330)	(0.278)
$Unemployment_{i,t-1}$	0.1116***	0.0934***	0.0899***	0.0997***	− 0.0239
	(0.001)	(0.001)	(0.002)	(0.001)	(0.154)
Constant	0.2086***	0.2772***	0.0916*	0.3689***	− 0.0511
	(0.001)	(0.001)	(0.082)	(0.001)	(0.61)
Fix effect	YES	YES	YES	YES	YES
observation	6016	6016	6121	5946	6016
R^2	0.1135	0.1017	0.095	0.1010	0.194

This table presents the robust check regression results of equation (3). p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

Low-openness group, according to the KAOOPEN index, which reflects the degree of openness of a country. The KAOPEN index is an index measuring a country's degree of financial openness. It was initially introduced by Chinn and Ito (Journal of Development Economics, 2006). KAOPEN index is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. This index is widely used in the research of international finance (Das, 2016; Kim, 2019;Kim & Pyun, 2018; Mahraddika, 2020). The subsample regression results are shown in Table 6. We found that the coefficient of sentiment in the high openness group (p = 0.002) was more significant than that in the low openness group (p = 0.015). This result suggests that the effect of international news sentiment is more significant in countries with a high level of openness. Therefore, we find that Hypothesis 4 is correct.

We next seek to evaluate the impact of the financial crisis on the effect of international news sentiment on the stock market. We regress equations 8–11 to examine Hypothesis 5.1 and Hypothesis 5.2. The subsample regression results in the precrisis and post-crisis periods are shown in Table 7 columns 1–2. We find that the coefficient of sentiment is more significant in the post-crisis period than in the precrisis period. This result suggests that investors are more easily influenced by international news sentiment after a financial crisis. Moreover, we further regress the subsample of developed markets and emerging markets in the post-crisis period, and the results are shown in Table 7, columns 3–4. We find that the coefficients of sentiment for the emerging market group and the developed market group in post-crisis period are at the same significance level (p = 0.006), whereas the coefficient of sentiment in the emerging market group ($\beta_1 = 0.2628$) is much larger than that in the developed market group (($\beta_1 = 0.1716$) and the coefficient of sentiment in the full-period sample shown in Table 3 columns 2–3, suggesting there is no difference between developed markets and emerging markets. This result suggests that the effect of international news sentiment on the stock market is stronger in emerging markets in post-crisis periods. Therefore, we find that Hypothesis 5.1 and Hypothesis 5.2 are correct.

Finally, we seek to evaluate the influence of deglobalization and COVID-19 on the documented effect of international news sentiment on stock market returns. We regress equations 12 and 13 to examine Hypotheses 6 and 7. The regression results of equation (12) are shown in Table 8 column 1. We find that the coefficient of the interaction term ($sentiment_{i,t-1} \times Dummy\_Trump_{i,t-1}$) is significantly negative, which means that the effect of international news sentiment is mitigated after the deglobalization trend proposed by the U.S., in line with our expectations. Table 8 column 2 shows the regression results of equation (13). We find that the coefficient of the interaction term ($sentiment_{i,t-1} \times Dummy\_COVID_{i,t-1}$) is also significantly negative, as expected. This result suggests

Table 10
The effect of international media news sentiment on stock market drawdowns.

Variable	$drawdown_{i,t}$
$sentiment_{i,t-1}$	0.2651**
	(0.021)
$exchange_{i,t-1}$	−0.2263***
	(0.010)
$Credit_{i,t-1}$	0.5723
	(0.196)
$M1_{i,t-1}$	0.0403
	(0.712)
$M2_{i,t-1}$	− 0.4823
	(0.278)
$Lend_{i,t-1}$	− 0.0232
	(0.851)
$Deposit_{i,t-1}$	− 0.0871
	(0.252)
$Moneymarket_{i,t-1}$	0.0385
	(0.779)
$LongtermBond_{i,t-1}$	0.0808***
	(0.010)
$GDP_{i,t-1}$	− 0.0086
	(0.966)
$growth_{i,t-1}$	0.01428
	(0.788)
$CPI_{i,t-1}$	0.0981
	(0.963)
$PPI_{i,t-1}$	0.0276
	(0.881)
$Unemployment_{i,t-1}$	− 0.1971***
	(0.010)
Constant	−0.8529***
	(0.001)
Fix effect	YES
observation	6016
R^2	0.373

This table presents the regression results of drawdown and sentiment. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

that the effect of international news sentiment on the stock market is mitigated during the global COVID-19 pandemic.

Moreover, we show the change of documented effect of international news sentiment on the stock market returns in Fig. 1. The vertical axis of this graph represents the coefficient of international news sentiment variables in recursive regression, and the horizontal axis represents the year. We find that the effect of international news sentiment on stock market returns increase in post-crisis period. We also find the effect of international news sentiment is mitigated after the deglobalization trend proposed by the U.S and the COVID-19. This is also consistent with our previous research conclusion. Together these results provide evidence to support all our hypotheses. In the next section, a serial of robust regressions will be adopted to improve the robustness of our conclusions.

3.4. Robust check

In this section, we will further perform a series of robust regressions to confirm that our conclusions in the previous sections are valid and will also discuss the potential endogeneity in our research. First, we consider the influence of calculation methods on stock market returns and international news sentiment in our results. The stock market return variable we use in the previous studies comes from the BvD database and is adjusted by the period-end currency value. Therefore, in Table 9 column 1, we show the relationship between international news sentiment and non-adjusted stock market returns. The results are consistent with our previous results; international news sentiment has a positive effect on non-adjusted stock market returns. Second, in previous studies, we calculate news sentiment weighted by the number of articles that mention an event to consider the importance of the news event reported. Then, we calculate the international news sentiment ignoring the importance of the news event reported and give each news item the same weight. The regression results are shown in Table 9 column 2. This result is also consistent with the previous results; the international news sentiment average weight has a positive effect on the stock market. Third, in previous studies, we use six months of international news reports to construct an international news sentiment variable. Then, we use three months' and nine months' international news reports to construct international news sentiment variables separately, which may suggest that our previous conclusion is not influenced by the period window we selected to calculate the sentiment variable. The regression results are shown in Table 9, columns 3–4, and the results are also consistent with our previous conclusions, suggesting that international news sentiment has a positive effect on stock market returns. Moreover, we use Fama-Macbeth (1973) regression to examine the robustness of our main regression, and the

Table 11
The continuation and reversal of stock market returns caused by international media news sentiment.

Variable	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$	$Return_{i,t}$
$sentiment_{i,t-2}$	0.1991***				
	(0.001)				
$sentiment_{i,t-3}$		0.1269**			
		(0.014)			
$sentiment_{i,t-4}$			0.0491		
			(0.193)		
$sentiment_{i,t-5}$				− 0.0074	
				(0.848)	
$sentiment_{i,t-6}$					−0.085*
					(0.072)
$exchange_{i,t-1}$	0.7681***	0.7749***	0.7781***	0.7987***	0.7985***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Credit_{i,t-1}$	− 1.165**	− 1.161**	− 1.168**	− 1.153**	− 1.155**
	(0.014)	(0.017)	(0.019)	(0.018)	(0.021)
$M1_{i,t-1}$	0.5119***	0.5188***	0.5129***	0.5484***	0.5351***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$M2_{i,t-1}$	0.4422	0.4268	0.4492	0.3639	0.4431
	(0.217)	(0.253)	(0.254)	(0.382)	(0.365)
$Lend_{i,t-1}$	0.1534*	0.1549*	0.1544*	0.1528*	0.1389
	(0.065)	(0.063)	(0.068)	(0.084)	(0.136)
$Deposit_{i,t-1}$	− 0.0461	− 0.0437	− 0.0364	− 0.0341	− 0.0215
	(0.154)	(0.171)	(0.271)	(0.309)	(0.558)
$Moneymarket_{i,t-1}$	− 0.0693	− 0.0717	− 0.0768	− 0.0797	− 0.0756
	(0.345)	(0.354)	(0.349)	(0.351)	(0.387)
$LongtermBond_{i,t-1}$	0.0044	0.0022	0.0009	0.0014	− 0.0004
	(0.841)	(0.919)	(0.964)	(0.951)	(0.984)
$GDP_{i,t-1}$	− 0.2366	− 0.2301	− 0.2341	− 0.1878	− 0.2261
	(0.315)	(0.344)	(0.371)	(0.464)	(0.439)
$growth_{i,t-1}$	0.0114	0.0108	0.0116	0.0104	0.0104
	(0.695)	(0.712)	(0.688)	(0.721)	(0.731)
$CPI_{i,t-1}$	0.1233	0.1285	0.1529	0.1664	0.1682
	(0.395)	(0.377)	(0.294)	(0.257)	(0.253)
$PPI_{i,t-1}$	− 0.1257	− 0.1311	− 0.1564	− 0.1682	− 0.1729
	(0.348)	(0.331)	(0.244)	(0.211)	(0.201)
$Unemployment_{i,t-1}$	0.0921***	0.0995***	0.1072***	0.1091***	0.1138***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Constant$	0.2786***	0.3822***	0.5903***	0.6246***	0.6438***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Fix effect	YES	YES	YES	YES	YES
observation	6016	6016	6016	6016	6016
R^2	0.1022	0.1012	0.1023	0.099	0.097

This table presents the regression results of the continuation and reversal of returns caused by media sentiment. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

results are shown in Table 9, columns 5. The coefficient of sentiment is significant positive which is consistent with our main regression results.

Then, we discuss the relationship between stock market drawdowns and international media news sentiment. The definition of drawdown is that for a $100 initial investment, the maximum loss, potentially 0, experienced in the subsequent N-month period (for 12-month drawdowns, we often omit N). According to previous empirical findings, extreme positive media news sentiment will lead to the overreaction of stock prices, thus giving birth to the irrational bubble in the stock markets. Consequently, there will be a reversal effect in the stock market in the future, which will lead to the expansion of losses. So, we expect that there is a positive relationship between international media news sentiment and drawdowns. Table 10 shows that the coefficient of sentiment is significantly positive which is consistent with our expectation.

Moreover, we explore the continuation and reversal of stock market returns caused by international media news sentiment. We examine the relationship between stock market returns and the second to sixth order lag term of international media news sentiment. The regression results are shown in Table 11. Comparing coefficients of sentiment index with different lag terms, we find that the effect of international media news sentiment on stock market returns is continuous from month 2 to month 3, and then reverse at month 6.

Next, we discuss the potential endogeneity between international news sentiment and stock market returns. A potential concern is that our findings could be driven by some attribute (or attributes) correlated with both international news sentiment and stock market returns. Therefore, we use the exogenous shock method and instrument variable method to examine the robustness of our conclusion. First, we select World Cup Soccer Match as an exogenous shock to examine the relationship between international news sentiment and stock market returns. Prior studies indicate that there is psychological evidence that sports matches have a significant positive effect on sentiment, and international sports matches could be used as exogenous shocks to solve the potential endogeneity between sentiment and financial markets (Hirt et al., 1992; Edmans et al., 2007; Bukovina, 2016; Gao et al., 2018). Therefore, we select World Cup Soccer

Table 12

The effect of international media news sentiment on stock market returns, World Cup Soccer Matches as an exogenous shock.

Panel A: Comparison of World Cup Soccer matches group and nonmatches group				
	$Soccer = 0$	$Soccer = 1$	$t - Stat$	$P - value$
sentiment	4.812	6.098	6.1813	0.001
Panel B: Regression Analysis on the Effect of World Cup Soccer Matches.				
Variable	$Return_{i,t}$			
$Soccer_{i,t-1}$	0.1242***			
	(0.001)			
$exchange_{i,t-1}$	0.7013***			
	(0.001)			
$Credit_{i,t-1}$	− 0.8782			
	(0.117)			
$M1_{i,t-1}$	0.4395***			
	(0.002)			
$M2_{i,t-1}$	0.2844			
	(0.389)			
$Lend_{i,t-1}$	0.1332			
	(0.162)			
$Deposit_{i,t-1}$	− 0.0488			
	(0.270)			
$Moneymarket_{i,t-1}$	− 0.0521			
	(0.473)			
$LongtermBond_{i,t-1}$	0.0012			
	(0.953)			
$GDP_{i,t-1}$	− 0.2892			
	(0.127)			
$growth_{i,t-1}$	0.0078			
	(0.787)			
$CPI_{i,t-1}$	0.1237			
	(0.337)			
$PPI_{i,t-1}$	− 0.1226			
	(0.295)			
$Unemployment_{i,t-1}$	0.0892***			
	(0.003)			
Constant	0.0946*			
	(0.095)			
Fix effect	YES			
observation	6191			
R^2	0.0955			

This table presents the influence of exogenous shock of sports matches. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

Matches as an exogenous shock. We construct the World Cup Soccer Matches dummy (Soccer) equal to 1 if the year has World Cup Soccer Matches and 0 if this year has no matches. According to prior studies (Edmans et al., 2007; Gao et al., 2018), international news sentiment is higher in the World Cup Soccer Matches period, and the *t*-test results (t-statistic value = 6.1813 and p value < 0.001) in Table 12 panel A also supports this finding. Then, we use the dummy variable Soccer to replace the international news sentiment variable to regress equation (3), and the results of the regression are shown in Table 12 panel B. We find that the dummy Soccer has a positive effect on the stock market, as expected. In summary, we use World Cup Soccer Matches as an exogenous shock to international news sentiment and find that international news sentiment is higher in the match period. Further regression results also show that the dummy soccer has a positive effect on the stock market. These findings support the causal effect of international news sentiment on stock market returns, excluding the influence of endogeneity.

Second, we select the international news environment as an instrumental variable to solve the potential endogeneity between international news sentiment and stock market returns. We use the global international news report data, excluding the 35 countries in the sample, to construct the instrumental variable to reflect the international news environment. These news reports are related to the international news sentiment of the 35 countries in the sample; however, there is no direct relation between these news reports and the stock markets of the 35 countries in the sample. Thus, the international news environment variable can be used as the instrumental variable of international news sentiment. The results of 2SLS regression are shown in Table 13, and the results show that the coefficient of international news sentiment is still positive at the 1% significance level. Therefore, these results provide further support that our findings are not driven by endogenous effects.

In summary, we use different methods to calculate stock market returns and international news sentiment. The results of robust regressions are consistent with prior results and suggest that international news sentiment has a positive effect on the stock market. Moreover, we further discuss the potential relationship between international news sentiment and the stock market, and we use the exogenous shock method and instrument variable method to exclude the influence of endogeneity. The results are consistent with our prior conclusion, as expected. This evidence supports that our findings are not driven by endogeneity between international news sentiment and the stock market. Finally, we confirm that our conclusions are valid.

Table 13
The effect of international media news sentiment on stock market returns.: instrument variable regression.

Variable	First stage	Second stage
	sentiment$_{i,t}$	Return$_{i,t}$
sentiment$_{i,t-1}$		0.4581***
		(0.001)
Newsenvironment$_{i,t-1}$	0.8837***	
	(0.001)	
exchange$_{i,t-1}$	0.0848***	0.7446***
	(0.001)	(0.001)
Credit$_{i,t-1}$	0.2403***	−1.211**
	(0.001)	(0.017
M1$_{i,t-1}$	0.0253	0.4899**
	(0.422)	(0.022)
M2$_{i,t-1}$	−0.1928**	0.5109
	(0.031)	(0.398)
Lend$_{i,t-1}$	−0.0475***	0.1645**
	(0.001)	(0.018)
Deposit$_{i,t-1}$	0.0391***	− 0.0578
	(0.001)	(0.438)
Moneymarket$_{i,t-1}$	0.0048	− 0.0674
	(0.649)	(0.351)
LongtermBond$_{i,t-1}$	− 0.0021	0.0061
	(0.621)	(0.826)
GDP$_{i,t-1}$	−0.1339***	− 0.2409
	(0.001)	(0.391)
growth$_{i,t-1}$	0.0007	0.0115
	(0.826)	(0.626)
CPI$_{i,t-1}$	0.1325***	0.0887
	(0.001)	(0.342)
PPI$_{i,t-1}$	−0.1277***	− 0.0923
	(0.001)	(0.315)
Unemployment$_{i,t-1}$	0.0233***	0.0849**
	(0.001)	(0.017)
Constant	0.0155	0.0141
	(0.339)	(0.13)
Fix effect	YES	YES
observation	6016	6016
R^2	0.86	0.098

This table presents the two stage regression results of instrument variable. p value shown in parentheses and ***, **, and * denote significance at 0.01, 0.05, and 0.1, respectively.

4. Conclusion

In this paper, we examine the effect of international news sentiment on stock market returns around the world. We find that greater international news sentiment will lead to higher stock market returns. This effect of international news sentiment is less in countries with higher levels of financial development. The development of financial institutions also has a stronger influence on weakening the effect of international news sentiment. Furthermore, the effect of international news sentiment is amplified with the increase in access to international media news. We also find that the effect of international news sentiment is stronger in countries with a high level of openness. In addition, we find that the effect of international news sentiment is stronger after the 2008 financial crisis and that the documented effect is stronger in emerging markets than in developed markets in the post-crisis period. Furthermore, we ¡find that the effect of international news sentiment on the stock market is mitigated after the deglobalization trend advocated by the U.S. and the global COVID-19 pandemic. Taken together, our findings suggest that international news sentiment has a positive effect on stock market returns around the world, and our additional studies also discuss the factors that will influence the effect of international news sentiment on the stock market.

Then, we perform a series of robust regressions to confirm that our conclusions are valid. We use different methods to estimate international news sentiment and stock market returns. The results of the robust regressions are consistent with prior studies. Next, we discuss the potential endogeneity between international news sentiment and the stock market. We use World Cup Soccer Matches as an exogenous shock and the international news environment as instrument variables to exclude the influence of endogeneity. The results also support our initial conclusion, that international news sentiment has a positive effect on the stock market.

We contribute to the emerging literature that examines the effect of international news sentiment on the stock market. To date, this literature has predominantly focused on the effect of local news sentiment on the stock market instead of international news sentiment, thus ignoring the importance of international media news. We advance this literature by finding a positive effect of international news sentiment on stock market returns. We also contribute to the literature by using global stock market data to examine the effect of international news sentiment on stock market returns. The prior studies are predominantly U.S.- or developed market-centric, thus

offering limited insights into the role of global media news in the stock market. Moreover, we find that several international or domestic economic or noneconomic factors can influence the documented effect of international news sentiment on the stock market, which supports an avenue for further research in this direction.

The limitation of our study is that the sample only consists of 35 countries and the news data is restricted to the GDELT dataset. Another limitation of our study is that the GDELT dataset can only support news data in regional level. Thus, our study is only focused on the market level. A further study could assess the effects with more country samples and with firm level data.

CRediT authorship contribution statement

CC and XJ Conceptualization, Writing - original draft, Writing - review & editing, Formal analysis. XY, CC, Methodology, Software, Validation, Formal analysis, Resources, Data curation, Writing - review & editing.

Funding

Declaration of interest statement

To the best of our knowledge, the named authors have no conflict of interest, financial or otherwise. All authors declare that: (i) no support, financial or otherwise, has been received from any organization that may have an interest in the submitted work; and (ii) there are no other relationships or activities that could appear to have influenced the submitted work.

Data availability statement

Data can be available publicly from required authorized Institutional access. Country data are available from the Bureau van Dijk Editions Electroniques SA (BvD) database (https://osiris.bvdinfo.com/ip) for researchers who meet the criteria for access to data. The international news data are obtained from and freely available at the he Global Database of Events Language and Tone (GDELT) database (www.gdeltproject.org). The other international or domestic data are obtained from The World Bank Development Database (https://databank.worldbank.org/) and IMF reports (www.imf.org). The detailed data source can be founded in Appendix Table 1.

Acknowledgements

Appendix

Table 1
Variable Definition

Variables	Definition	Source
Return	The main stock market index returns of each country adjusted by end-period currency value.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
exchange	The exchange rate to U.S. dollar of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
Credit	Bank lending to public and private sectors of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
M1	Total supply of currency M1 of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
M2	Total supply of currency M2 of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
Lend	Lending interest rate of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
Deposit	Deposit interest rate of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
MoneyMarket	Money market interest rate of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
LongtermBond	Long term Bond yield interest rate of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.

(*continued on next page*)

Table 1 (*continued*)

Variables	Definition	Source
GDP	Gross domestic production of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
growth	The growth of Gross domestic production of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
CPI	Consumer price index of each country (2010 = 100).	The Bureau van Dijk Editions Electroniques SA (BvD) database.
PPI	Producer price index of each country (2010 = 100).	The Bureau van Dijk Editions Electroniques SA (BvD) database.
Unemployment	Recorded unemployment percentage of total labor force of each country.	The Bureau van Dijk Editions Electroniques SA (BvD) database.
drawdown	For a $100 initial investment, the maximum loss, potentially 0, experienced over the subsequent N-month period (for 12-month drawdowns, we often omit N)	The Bureau van Dijk Editions Electroniques SA (BvD) database.
Sentiment	International news sentiment of each country. The calculation method is shown in Section 3.	Global Database of Events Language and Tone (GDELT) database.
ICTexport	Internet Communication Technology goods and service exports of each country.	The World Bank Development Database.
ICTimport	Internet Communication Technology goods and service imports of each country.	The World Bank Development Database.
internet&mobile	The new subscribe users to Internet and mobile phone of each country.	The World Bank Development Database.
financialdevelop	Financial development index of each country.	The IMF Financial Development Reports.
financialinsitution	Financial institution development index of each country.	The IMF Financial Development Reports.
financialaccess	Financial institution access index of each country.	The IMF Financial Development Reports.
financialmarket	Financial market development index of each country.	The IMF Financial Development Reports.
Dummy_Trump	A dummy, which equals to 1 if the Trump is at term, otherwise 0	
Dummy_COVID	Dummy variable of global pandemic of COVID-19, equal to 1 if at pandemic period else to 0.	
Soccer	Dummy of World Cup Soccer Matches, equal to 1 if this year has soccer matches else to 0.	
Newsenvironment	The international news sentiment of global countries except the 35 countries we select in sample.	The GDELT database

This table presents the detail description of variable definition and the available source of data.

References

Abdal, A., & Ferreira, D. M. (2021). Deglobalization, globalization, and the pandemic: Current impasses of the capitalist world-economy. *Journal of World-Systems Research, 27*(1), 202–230.
Ajam, T. (2020). More eyes on COVID-19: Perspectives from economics. The economic costs of the pandemic – and its response. *South African Journal of Science, 116*(8), 3–4.
Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211.
Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance, 61*, 1645–1680.
Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *The Journal of Economic Perspectives, 21*, 129–151.
Baker, M., Wurgler, J., & Yuan, Y. (2012). Global, local, and contagious investor sentiment. *Journal of Financial Economics, 104*, 272–287.
Bastedo, M. N., & Bowman, N. A. U. S. (2010). News & world report college rankings: Modeling institutional effects on organizational reputation. *American Journal of Education, 116*(2), 163–183.
Beetsma, R. M. W. J., Romp, W. E., & Vos, S. J. (2013). Intergenerational risk sharing, pensions, and endogenous labour supply in general equilibrium: Intergenerational risk sharing, pensions, and endogenous labour supply. *The Scandinavian Journal of Economics, 115*(1), 141–154.
Ben-David, I., Franzoni, F., & Moussawi, R. (2012). Hedge fund stock trading in the financial crisis of 2007-2009. *Review of Financial Studies, 25*(1), 1–54.
Bhattacharya, U., Daouk, H., & Welker, M. (2003). *The world price of earnings opacity*. *The Accounting review, 78*, 641–678.
Bird, G., Du, W., Pentecost, E., & Willett, T. (2017). Was it different the second time? An empirical analysis of contagion during the crises in Greece 2009–15. *The World Economy, 40*(12), 2530–2542.
Birz, G., & Lott, J. R. (2011). The effect of macroeconomic news on stock returns: New evidence from newspaper coverage. *Journal of Banking & Finance, 35*, 2791–2800.
Bollen, J., Mao, H., & Zeng, X. (2011). Twitter mood predicts the stock market. *Journal of computational science, 2010*(2), 1–8.
Borio, C. (2020). The covid-19 economic crisis: Dangerously unique. *Business Economics, 55*(4), 181–190.
Bukovina, J. (2016). Social media big data and capital markets—an overview. *Journal of behavioral and experimental finance, 11*, 18–26.
Cagé, J., & Rouzet, D. (2015). Improving "national brands": Reputation for quality and export promotion strategies. *Journal of International Economics, 95*(2), 274–290.
Calomiris, C. W., & Mamaysky, H. (2019). How news and its context drive risk and returns around the world. *Journal of Financial Economics, 133*(2), 299–336.
Chen, Y., Goyal, A., Veeraraghavan, M., & Zolotoy, L. (2020). Media coverage and IPO pricing around the world. *Journal of Financial and Quantitative Analysis, 55*(5), 1515–1553.
Da, Z., Engelberg, J., & Gao, P. (2011). Search of attention. *The Journal of Finance, 66*, 1461–1499.
Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. *Review of Financial Studies, 28*, 1–32.
Dagher, J., & Kazimov, K. (2015). Banks׳ liability structure and mortgage lending during the financial crisis. *Journal of Financial Economics, 116*(3), 565–582.
Dang, T. L., Dang, V. A., Moshirian, F., Nguyen, L., & Zhang, B. (2019). News media coverage and corporate leverage adjustments. *Journal of Banking & Finance, 109*, Article 105666.
Das, D. K. (2016). Determinants of current account imbalance in the global economy: A dynamic panel analysis. *Economic Structures, 5*, 8. https://doi.org/10.1186/s40008-016-0039-6
Doidge, C., Karolyi, G. A., & Stulz, R. M. (2013). The U.S. Left behind? Financial globalization and the rise of IPOs outside the U.S. *Journal of Financial Economics, 110*, 546–573.
Dougal, C., Engelberg, J., García, D., & Parsons, C. A. (2012). Journalists and the stock market. *Review of Financial Studies, 25*, 639–679.
Dyck, A., Volchkova, N., & Zingales, L. (2008). The corporate governance role of the media: Evidence from Russia. *The Journal of Finance, 63*, 1093–1135.
Dyck, A., & Zingales, L. (2004). Private benefits of control: An international comparison. *The Journal of Finance, 59*, 537–600.
Edmans, A., García, D., & Norli, Ø. (2007). Sports sentiment and stock returns. *The Journal of Finance, 62*, 1967–1998.
Elshendy, M., & Fronzetti Colladon, A. (2017). Big data analysis of economic news: Hints to forecast macroeconomic indicators. *International Journal of Engineering Business Management, 9*, 1–12.

Erkens, D. H., Hung, M., & Matos, P. (2012). Corporate governance in the 2007–2008 financial crisis: Evidence from financial institutions worldwide. *Journal of Corporate Finance, 18*(2), 389–411.

Fama, E. F., Fisher, L., Jensen, M. C., & Roll, R. (1969). The adjustment of stock prices to new information. *International Economic Review, 10*(1), 1–21.

Farndale, E., Thite, M., Budhwar, P., & Kwon, B. (2021). Deglobalization and talent sourcing: Cross-national evidence from high-tech firms. *Human Resource Management, 60*(2), 259–272, 2020.

Gabore, S. M., & Xiujun, D. (2018). Do national and international media cover the same event differently? The online media framing of irreecha festival tragedy. *Communicatio, 44*, 55–70.

Gao, Z., Ren, H., & Zhang, B. (2018). Googling investor sentiment around the world. *Journal of Financial and Quantitative Analysis, 55*(2), 1–66, 2020.

Gao, X., Ritter, J. R., & Zhu, Z. (2013). Where have all the IPOs gone? *Journal of Financial and Quantitative Analysis, 48,* 1663–1692.

Garcia, D. (2013). Sentiment during recessions. *The Journal of Finance, 68,* 1267–1300.

Garcia-Appendini, E., & Montoriol-Garriga, J. (2013). Firms as liquidity providers: Evidence from the 2007–2008 financial crisis. *Journal of Financial Economics, 109* (1), 272–291.

Glasserman, P., & Mamaysky, H. (2019). Does unusual news forecast market stress? *Journal of Financial and Quantitative Analysis, 54*(5), 1937–1974.

Griffin, J. M., Hirschey, N. H., & Kelly, P. J. (2011). How important is the financial media in global markets? *Review of Financial Studies, 24*, 3941–3992.

He, P. U. S. (2008). Revisionism towards Japan in U.S.-Japan trade conflicts. *World Economic Studies,* (1), 72–78.

Hirt, E. R., Zillmann, D., Erickson, G. A., & Kennedy, C. (1992). Costs and benefits of allegiance: Changes in fans' self-ascribed competencies after team victory versus defeat. *Journal of Personality and Social Psychology, 63*(5), 724–738.

Huang, D., Jiang, F., Tu, J., & Zhou, G. (2015). Investor sentiment aligned: A powerful predictor of stock returns. *Review of Financial Studies, 28*, 791–837.

James, H. (2018). Deglobalization: The rise of disembedded unilateralism. *Annual review of financial economics, 10*(1), 219–237.

Jegadeesh, N., & Wu, D. (2013). Word power: A new approach for content analysis. *Journal of Financial Economics, 110*, 712–729.

Jones, T. M., Van Aelst, P., & Vliegenthart, R. (2013). Foreign nation visibility in U.S. News coverage: A longitudinal analysis (1950-2006). *Communication Research, 40*(3), 417–436.

Keertipati, S., Savarimuthu, B., Purvis, M., & Purvis, M. (2014). Multi-level analysis of peace and conflict data in GDELT. *ACM International Conference Proceeding Series. ACM, 2*, 33–40.

Kim, J. (2019). The impact of remittances on exchange rate and money supply: Does "openness" matter in developing countries? *Emerging Markets Finance and Trade, 55*(15), 3682–3707.

Kim, K., & Pyun, J. H. (2018). Exchange rate regimes and the international transmission of business cycles: Capital account openness matters. *Journal of International Money and Finance, 87*, 44–61.

Klabunde, R. (2002). Daniel jurafsky/james H. Martin: Speech and language processing. An introduction to natural language processing, computational linguistics, and speech recognition. *Zeitschrift für Sprachwissenschaft, 21*, 134–135.

Lemmon, M., & Portniaguina, E. (2006). Consumer confidence and asset prices: Some empirical evidence. *Review of Financial Studies, 19*, 1499–1529.

Li, G., & Meng, L. (2019). Public opinion and international trade: An example of US import. *The Journal of World Economy, 8*, 147–169.

Lins, K. V., Volpin, P., & Wagner, H. F. (2013). Does family control matter? International evidence from the 2008–2009 financial crisis. *Review of Financial Studies, 26* (10), 2583–2619.

Liu, L. X., Sherman, A. E., & Zhang, Y. (2017). *Attracting attention in an IPO." AFA 2009 san Francisco Meetings paper*.

Loughran, T., & Mcdonald, B. (2011). When is a liability not a liability? Textual analysis, dictionaries, and 10-ks. *The Journal of Finance, 66*, 35–65.

Loughran, T., & Ritter, J. (2004). Why has IPO underpricing changed over time? *Financial Management, 33*, 5–37.

Mahraddika, W. (2020). *Real exchange rate misalignments in developing countries: The role of exchange rate flexibility and capital account openness. International economics (Paris), 163*, 1–24.

Manela, A., & Moreira, A. (2017). News implied volatility and disaster concerns. *Journal of Financial Economics, 123*, 137–162.

Maria Caporale, G., Ali, F. M., Spagnolo, F., & Nicola Spagnolo. (2020). *Cross-border portfolio Flows and news media coverage", economics and finance working paper series* (pp. 1–39), 2002.

Mezghani, T., Boujelbène, M., & Elbayar, M. (2021). Impact of COVID-19 pandemic on risk transmission between googling investor's sentiment, the Chinese stock and bond markets. *China Finance Review International, 11*, 322–348.

Mollick, A. V., & Assefa, T. A. U. S. (2013). Stock returns and oil prices: The tale from daily data and the 2008–2009 financial crisis. *Energy Economics, 36*, 1–18.

Murray, E. J. (2020). Epidemiology's time of need: COVID-19 calls for epidemic-related economics. *The Journal of Economic Perspectives, 34*(4), 105–120.

Pan, W., Wang, X., Wu, G., & Xu, W. (2021). The COVID-19 pandemic and sovereign credit risk. *China Finance Review International, 11*, 287–301.

Qiao, F., Li, P., Zhang, X., Ding, Z., Cheng, J., & Wang, H. (2017). Predicting social unrest events with hidden markov models using GDELT. *Discrete Dynamics in Nature and Society, 2017*, 1–13.

Rehbein, B. (2019). Laos in 2018 deglobalization? *Asian Survey, 59*(1), 193–197.

Roll, R. (1984). Orange juice and weather. *The American Economic Review, 74*(5), 861–880.

Schmeling, M. (2009). Investor sentiment and stock returns: Some international evidence. *Journal of Empirical Finance, 16*, 394–408.

Schularick, M., & Taylor, A. M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870——2008. *The American Economic Review, 102*(2), 1029–1061.

Shadmehr, M., & Bernhardt, D. (2015). *State Censorship. American economic journal. Microeconomics., 7*, 280–307.

Shehzad, K., Xiaoxing, L., & Kazouz, H. (2020). COVID-19's disasters are perilous than global financial crisis: A rumor or fact? *Finance Research Letters, 36*, 1016–1069.

Sibley, S. E., Wang, Y., Xing, Y., & Zhang, X. (2016). The information content of the sentiment index. *Journal of Banking & Finance, 62*, 164–179.

Siganos, A., Vagenas-Nanos, E., & Verwijmeren, P. (2014). Facebook's daily sentiment and international stock markets. *Journal of Economic Behavior & Organization, 107*, 730–743.

Stulz, R. M., & Williamson, R. (2003). Culture, openness, and finance. *Journal of Financial Economics, 70*(3), 313–349.

Su, Y., Rao, L., Li, X., Wang, Y., & Li, S. (2012). From quality to quantity: The role of common features in consumer preference. *Journal of Economic Psychology, 33*(6), 1043–1058.

Tan, N., Wang, W., Yang, J., & Chang, L. (2019). Financial competitiveness, financial openness and bilateral foreign direct investment. *Emerging Markets Finance and Trade, 55*(14), 3349–3369.

Tetlock, P. C. (2007). Giving content to investor sentiment: The role of media in the stock market. *The Journal of Finance, 62*(3), 1139–1168.

Tetlock, P. C. (2010). Does public financial news resolve asymmetric information? *Review of Financial Studies, 23*(9), 3520–3557.

Tetlock, P. C. (2011). All the news that's fit to reprint: Do investors react to stale information? *Review of Financial Studies, 24*(5), 1481–1512.

Tetlock, P. C., Saar-Tsechansky, M., & Macskassy, S. (2008). More than words: Quantifying language to measure firms' fundamentals. *The Journal of Finance, 63*(3), 1437–1467.

Tsai, C. (2015). How do U.S. stock returns respond differently to oil price shocks pre-crisis, within the financial crisis, and post-crisis? *Energy Economics, 50*, 47–62.

Wetherell, J. L., Wetherell, J. L., Reynolds, C. A., Reynolds, C. A., Gatz, M., Gatz, M., et al. (2002). Anxiety, cognitive performance, and cognitive decline in normal aging. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*(3), P246–P255.

Yang, H., & Chen, J. (2000). Chinese capital flight: Estimation and international comparison. *The Journal of World Economy, 1*, 21–29.

Yonamine, J. E. (2013). *Anuanced study of political conflict using the global datasets of events location and tone (GDELT) dataset*. Pennsylvania Stata University working paper.

You, J., & Wu, J. (2012). Spiral of silence: Media sentiment and the asset mispricing. *Economic Research Journal, 7*, 141–152.

Zingales, L. (2000). Search of new foundations. *The Journal of Finance, 55*, 1623–1653.