Bulletin of Applied Economics, 2022, 9(2), 79-100
https://doi.org/10.47260/bae/925

Do COVID-19 Incidence and Government Intervention Influence Media Indices?

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Abstract

The COVID-19 pandemic continues to batter the world economy, strain the limited global health resources and dominate the world media. Even with the emergence of vaccines, there is still a substantial level of uncertainty. The study analyses the effects of COVID-19 incidence, government intervention and level of development on media coverage, and investor sentiments. The study uses daily data from the Ravenpack finance for the period January 2020 to November 2020 for 75 countries. The results show that NPIs increase the media attention, increase panic and depress market sentiment. Furthermore, higher number of COVID-19 cases and deaths affect promote panic and depress sentiment. We also show that a higher human development index increases media coverage, and depresses the sentiment, while a higher level of digital adoption reduces panic and depresses the market sentiment.

Keywords: COVID-19, Ravenpack Indices, Media Attention, Stringency Index

JEL Classification: G40, G41

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Article Info: Received: June 21, 2022. Revised: July 10, 2022. Published online: July 20, 2022.

1 Introduction

The COVID-19 pandemic continues to batter the world economy, with adverse consequences on industrial production (Apergis and Apergis, 2021; Gunay et al., 2021; Khan et al., 2021). Even government control measures such as social distancing measures directly negatively impact markets, and produce a positive impact on markets only indirectly through its effect in reducing COVID-19 cases (Ashraf, 2021). Such has been the impact that some scholars have called for a rethinking of the approaches to development to emphasis anticipation of major shocks and resilience to them as the core problematic of development studies and practice (Leach et al., 2021). While the discovery of COVID-19 vaccines provides hope for the future, the emergence of new variants indicates the challenge that the world communities still face before the virus can be brought under control. A rapidly increasing volume of literature continues to unravel the magnitude of COVID-19's impact on the global markets. For example, using an event study approach, Singh and Shaikh (2021) analyze the short-term effects of six WHO announcements related to the pandemic on five different sectors (pharma, healthcare, information technology, hotel and airline) to show a significant effect of COVID-19 on global financial markets. While generally the markets have been adversely impacted, not all sectors have been negatively affected. Some studies (Kapar et al., 2021b; Alam et al., 2021; Mack et al., 2021; Khan et al., 2021) have undertaken sectoral analysis to highlight sectors, such as transportation, particularly adversely affected by the pandemic.

Uncertainty has been the hallmark of COVID-19. COVID-19 has increased financial market volatility (Uddin et al., 2021; Hoshikawa and Yoshimi, 2021; Jawadi et al., 2021; Baek and Kwan, 2021; Baek et al., 2020). Furthermore, spillover across markets rose dramatically during the COVID-19 pandemic in the first quarter of 2020 (Manel et al., 2021; Kapar et al., 2021a). Keane and Neal (2021) use Google search data to construct an index of consumer panic for a wide range of countries. Their index shows a widespread consumer panic mainly in March 2020 suggesting COVID-19 transmission contribute to consumer panic. Papadamou et al. (2020) investigate the effect of google seach data on the implied volatility of thirteen major stock markets covering Europe, Asia,USA and Australia regions by using panel data analysis. They find out that increase in search queries for COVID-19 not only surge implied volatility but also indirectly a significant drop on stock market strangthens implied volatility more in a contagion environment of a pandemic. These effects are more prominent in Europe than the rest of the world. Simulations by Caggiano et al. (2020) suggest

COVID-19 related uncertainty has had a negative impact on world industrial production of about 14% cumulative over one year, while Pellegrino et al.(2021) estimate about 9.2% for Euro area. Subramaniam and Chakraborty (2021) find strong negative association between the fear of COVID-19 and stock returns. Dai et al. (2021) investigate the impact of economic policy uncertainty (EPU) on the crash risk of US stock market, measured by daily skewness during the COVID -19 pandemic. They reveal that the significant negative correlation between EPU an stock market crash risk indicating the aggravation of EPU increase the crash risk.

While information would, in normal situations, mitigate the uncertainty as predicted by the uncertainty reduction theory, this is not necessarily the case in rapidly changing conditions such as in a pandemic. Yoon et al. (2021) for example provide evidence that 'consuming news information during crisis – which tends to be distressing, constantly evolving, and inconsistent is positively related to uncertainty'. Others (e.g. Tetlock, 2007) show that media pessimism depresses the markets. Unsurprisingly, changes in COVID-19 news also strongly influence stock market volatility (Ambrose et al., 2021), while media coverage and fake news negatively influence stock returns in the middle quantile (Cepoi, 2020). This creates a dilemma. COVID-19 has dominated media news headlines around the world. On the one hand media coverage provides information about the virus that help individuals keep themselves safe, as well as governments efforts to control and mitigate its effects. On the other hand, the constantly changing environment feeds uncertainty, negatively affects the markets, and facilitates the transmission of contagion (Akhtaruzzman, et al., 2021). Several studies (Baker and Wurgler, 2007; Allen et al., 2019; Chundakkadan and Nedumparambil, 2021; Griffith et al., 2020, Biktimirov et al., 2021) have shown that investor sentiment affects stock returns. Li and Yang (2017) show that individual stock sentiment is mostly felt for small-firm stock prices and particularly during a downturn than during an expansion. For investors, ability to predict stock markets accurately is crucial. Studies show inclusion of investor sentiment improves model prediction of markets. Li et al. (2020) conducts an experiment using more than five years of Hong

Kong exchange data to show that models that incorporate both prices and sentiments do better at predicting the market than models that use either technical indicators or news sentiment only. Similarly, using logistic regression model, Jia-Yen, and Liu (2020) show that integrating sentiment scores can improve the accuracy of stock prediction. These are clearly important developments for investors.

Clearly, there are numerous studies that assess the effect of government interventions such as lockdowns and distancing measures (Ashraf, 2020; Baig et al., 2021; Alexakis et al., 2021) on the stock markets. A lot of effort also has been expended to understand the role of media and investor sentiment on markets, especially during the COVID-19 environment. These studies mostly presume a link from COVID-19 to market sentiment. The present study while building on this strand of research takes a different approach. We focus on the key channels through which COVID-19 and government responses have influenced media coverage and investor sentiment. The literature on this is still limiting. To fill this gap, the aim of the present study is to assess how the COVID-19 incidence, government intervention and level of development influence media coverage, and investor sentiments. Keane and Neal (2021) have modelled panic buying as a function of government policy announcements and COVID-19 transmission. Our study extends this work to model not only panic index but also media coverage and sentiment index. Furthermore, unlike Keane and Neal (2021) who construct an index of panic using google search, we use the Ravenpack indices. While google search data measures panic by searching keywords through Google search engine, Ravenpack media indices measure panic by searching keywords through 22,000 global new sources and social media. In that sense, Ravenpack panic index is more comprehensive than panic index measured through Google searches which mainly is used to measure investor attention.

The rest of the paper is organized as follows. In Section 2, we present the data, while the methodology is explained in Section 3. In Section 4, we discuss our preliminary and main empirical results. Finally, Section 5 provides the conclusion.

2 Data

To measure the panic and sentiment of the investors, as well as the general media coverage about COVID-19, we use the Ravenpack Finance Panic Index, Sentiment Index and Media Coverage Index. The RavenPack Finance analytics tool accumulates real-time news from global news sources such as Dow Jones Newswire, Wallstreet Journal, or StockTwits, among others. Overall, RavenPack curates and accumulates real-time news from a large (more than 22,000) set of global news sources. To account for different government responses, we utilize stringency index and economic support index. To control for different institutional characteristics between countries, we use the Press Freedom Index, Digital Adoption Index and Human Development Index. To control for the evolution of COVID-19, we consider daily COVID-19 confirmed cases, deaths, and recoveries per 100,000 population. Table 1 provides information about the indices considered in this study as well as the sources of these data. The final sample comprises of 75 countries with the observation period covering January 2nd 2020 to November 12th 2020. The countries considered in the study are listed in the Table 2.

Table 1: Definition of the Variables

Variable	Definition	Source of the Data
	Dependant Variable	
Panic Index	It measures the level of news chatter that makes reference to panic or hysteria and coronavirus. Values range between 0 and 100. The higher the index value, the more references to panic found in the media.	Ravenpack Finance
Adjusted Sentiment Index	It measures the level of sentiment across all entities mentioned in the news alongside the coronavirus. Sentiment Index ranges between -100 and 100. To make all values positive, we add 100 to each value and call the new variable "Adjusted Sentiment Index". The adjusted index ranges between 0 (the most negative) and 200 (the most positive) sentiment while 100 is neutral.	Ravenpack Finance
Media Coverage Index	It calculates the percentage of all news sources covering the topic of the novel coronavirus. Values range between 0 and 100.	Ravenpack Finance
	Independant Variable	
Stringency Index	It conveys information about seven different types of non-pharmaceutical interventions targeted to curb the outbreak of the pandemic: school closing, workplace closing, cancelled public events, closed public transport, public information campaigns, restrictions on internal movement, and international travel controls. Values range between 0 and 100(strictest)	Oxford COVID-19 Government response Tracker
Economic Support Index	Economic support index represents the government announcements of income support and debt/contract relief for households. Values range between 0 and 100(the highest support)	Oxford COVID-19 Government response Tracker
Press Freedom Index	It is an annual ranking of countries compiled and published by Reporters Without Borders based upon the organisation's own assessment of the countries' press freedom records in the previous year. It intends to reflect the degree of freedom that journalists, news organisations, and netizens have in each country, and the efforts made by authorities to respect this freedom. Values range between 0 and 100(the least freedom)	RSF-Reporters Without Borders
Digital Adoption Index	It is a worldwide index that measures countries' digital adoption across three dimensions of the economy: people, government, and business represented on a 0-1 scale.	World Development Report
Human Development Index	This index measures life expectancy, education (mean years of schooling completed and expected years of schooling upon entering the education system), and per capita income indicators, which are used to rank countries into four tiers of human development. It is represented on a 0-1 scale.	Human Development Report Office
Cases, Deaths and Recoveries	Daily COVID-19 confirmed cases, deaths and recoveries per 100,000 population of the country	Oxford COVID-19 Government response Tracker

Table 2: List of the Countries considered in this study

Argentina	Australia	Austria	Azerbaijan	Bahrain
Bangladesh	Belgium	Brazil	Bulgaria	Canada
Chad	Chile	China	Colombia	Croatia
Denmark	Egypt	Finland	France	Germany
Ghana	Greece	Hong Kong	Hungary	Iceland
India	Indonesia	Iran	Ireland	Israel
Italy	Japan	Jordan	Kenya	Kuwait
Latvia	Lebanon	Lithuania	Luxembourg	Malaysia
Mexico	Morocco	Namibia	Nepal	Netherlands
New Zealand	Nigeria	Norway	Oman	Pakistan
Peru	Philippines	Poland	Portugal	Qatar
Romania	Russia	Rwanda	Saudi Arabia	Senegal
Serbia	Singapore	Slovenia	South Africa	Spain
Sri Lanka	Switzerland	Turkey	United Arab Emirates	United Kingdom
Ukraine	United States	Venezuela	Zambia	Zimbabwe

Table 3: Descriptive Statistics of the Variables

	Mean	Median	Standard Deviation	Minimum	Maximum
Dependant Variables					
Media Coverage Index	57.96	63.21	21.78	0.06	100
Panic Index	5.77	3.86	6.59	0	90.32
Adjusted Sentiment Index	91.36	95	14.55	2.79	150.87
Independant Variables					
Stringency Index	50.45	56.48	29.76	0	100
Economic Support Index	45.15	50	34.54	0	100
Press Freedom Index	32.49	30.8	15.36	7.82	78.92
Digital Adoption Index	0.63	0.66	0.15	0.23	0.87
Human Development Index	0.80	0.83	0.13	0.40	0.96
Cases per Population	4.23	1.00	11.10	0	314
Deaths per Population	0.04	0	0.26	0	13
Recoveries per Population	2.77	0	15.37	0	1716

Table 4: Correlation of the Variables

	Media Cov. Ind.	Panic Ind.	Adjusted Senti-ment Ind.	Stringency Ind.	Economic Supp. Ind.	Press Free-dom Ind.	Digital Adop-tion Ind.	Human Devel-opment Ind.	Cases per Pop.	Deaths per Pop.	Recovered per Pop.
Media Coverage Index	1.00										
Panic Index	0.37	1.00									
Adjusted Sentiment Index	-0.24	-0.12	1.00								
Stringency Index	0.65	0.14	-0.17	1.00							
Economic Supp. Index	0.37	0.008	0.003	0.48	1.00						
Press Freedom Index	0.06	0.006	-0.05	0.17	-0.20	1.00					
Digital Adoption Index	-0.003	-0.05	-0.14	-0.12	0.27	-0.42	1.00				
Human Development Index	0.01	-0.03	-0.12	-0.13	0.28	-0.45	0.92	1.00			
Cases per Population	0.07	0.01	-0.05	0.11	0.18	-0.08	0.20	0.17	1.00		
Deaths per Population	0.10	0.06	-0.14	0.11	0.09	-0.08	0.08	0.09	0.34	1.00	
Recovered per Population	0.02	-0.007	-0.009	0.07	0.08	0.01	0.08	0.05	0.34	0.12	1.00

3 Methodology

We estimate the following panel model to analyze the effect of COVID-19 incidence, government interventions and level of development on three Ravenpack media indices:

$$Index_{i,t} = \alpha_i + \beta_{PFI} PFI_i + \beta_{COVID} COVID_{i,t} + \beta_{GVI} GGVI_{i,t} + \beta_{HDI} HDI_i + \beta_{DAI} DAI_i + \beta_{time} D_t + u_{i,t} \quad (1)$$

where $Index_{i,t}$ denotes one of the three different Ravenpack Indices (Panic, Sentiment and Media Coverage Indices) for country i on day t, α_i is the constant term. PFI_i represents Press Freedom Index and $COVID_{i,t}$ is the number of daily cases/deaths/recoveries per 100,000 population for country i on day t. $GVI_{i,t}$ denotes one of the two different indices measuring the government responses: stringency index and economic support index. DAI_i represents Digital Adoption Index, and HDI_i represents Human Development Index in a country. We include daily fixed-effects dummy variables, D_t, in the model to control the effect of the daily events and $u_{i,t}$ is an error term. We use heteroskedastic robust standard errors to estimate the p-values in regressions.

Our baseline regressions are estimated by random-effect model. The motivation is three-fold: a) Random effects differ across countries, whereas fixed effects are constant, b) The random-effects approach does not require estimation of country-specific intercepts, which would reduce the number of degrees of freedom, c) Three of our variables (Digital Adoption Index, Press Freedom Index and Human Development Index), though they vary across countries, are constant over the sample period and random effect is the only model to estimate their effect on the media indices. However, for robustness, we also employ the fixed-effects model and our results are robust to this model as well.

4 Empirical Results and Discussion

The regression results for each of the three dependent variables of interest (country media coverage index, country panic index and country sentiment index) are provided in Tables 5, 6, and 7 in that order. Each table shows the results for 12 models. The Press Freedom Index is included as the basic

explanatory variable in all the models in each of the tables. Other explanatory variables are then carefully introduced, sometimes interchangeably in a bid to control for multicollinearity (see the correlation matrix in Table 3). Given the relationship and correlation between the pair Stringency Index and Economic Support Index, these are introduced interchangeably. The Stringency Index is introduced in the first six models (models 1 - 6) while in models 7 to 12 it is substituted with the Economic Support Index. The Human Development Index is also included in six models (1 – 3 and 7 - 9), alternating with the Digital Adoption Index in the other six models (4 - 6 and 10 – 12) due to the very high correlation of 0.92 (Table 3) between the two variables. COVID-19 Cases, Deaths, and Recoveries are introduced one at a time. In models 1, 4, 7 and 10, we use the number of COVID-19 Cases as an explanatory variable; in models 2,5,8 and 11 the number of COVID-19 Deaths are considered and in models 3,6,9 and 12 the number of COVID-19 Recoveries are considered.

The results in Table 5 indicate that the media coverage of COVID-19 is inversely related to the Press Freedom Index. (Higher press freedom index indicates less freedom in the country.) This is not so surprising. Major news outlets are in cities/countries (Europe and North America) that have a relatively free press. These media do cover COVID-19 related issues in cities/countries that may have less press freedom. Furthermore, there have been serious COVID-19 outbreaks in countries with relatively less press freedom (Brazil, Iran, India, Turkey, Russia). China is near to top of the list of countries with the least press freedom but is a media favourite as the COVID-19 ground zero. Non-Pharmaceutical Interventions (NPI), represented by the stringency index, are positive and significant in all the six models, suggesting higher levels of NPI in a country lead to higher media coverage. This is not surprising. While NPI's are meant to help restrict the spread of the virus, it does have negative implications on the economy (Ashraf, 2021). But surprisingly, the government's effort to mitigate the negative consequences of NPI's as measured by the Economic Support index does not generate the same interest in the media. The coefficients, though of the predicated negative sign, are not significant. As expected, the Human Development Index has a positive effect on media coverage. This measure combines both education and income factors, so higher index reflects increased capacity and ability to consume news. It is also possible that countries that have higher education and income levels give more importance to inform their residents about the pandemic and the news related to pandemic has more presence on public news outlets.

The digital adoption index is positive but is generally not significant. This might be a pointer that basic, and widely accessible social platforms have played a large role in COVID-19 information transmission. Finally, three variables are used, one at a time, to track the progression of the virus in the community – number of cases, deaths, and recoveries. The media response clearly shows an asymmetric response to bad and good news. As expected, an increase in the number of COVID-19 cases significantly increases the level of media coverage in the country. So does the number of deaths, but to a lesser degree. While the coefficients are positive, this variable is not consistently significant. However, the number of recovered is consistently not significant. This result is in line with the concept of negative news bias (Garz, 2014; Jagiello and Hills, 2018; Avdagic and Savage, 2021).

For the panic index (Table 6), the coefficients on press freedom are not significant. While press reporting seems to follow the hot spots in media coverage it does not influence the panic index. This suggests that panic is more a function of the type of news reporting and its consumption rather than the volume of reporting. Particularly, the misinformation and fake news trigger panic during COVID-19 (Leung et al., 2020). COVID-19 fear index derived from search volume is shown (Subramaniam and Chakraborty, 2021) to negatively affect stock markets. The coefficients on stringency index are positive and significant, suggesting more restrictions in a country (related to school or workplace closure, public events, public transport, public information campaigns, internal movement or international travel controls) increase the level of panic. This can be explained by a higher level of uncertainty that comes with major disruption in public's lifestyle. This is in line with previous research that links lockdown to elevated levels of anxiety (Gan et al., 2021; Hendriksen et al., 2021) and panic buying (Hall et al., 2021; Elek, et al., 2021, Keane and Neal, 2021). The economic support index has negative coefficients as expected but are insignificant unlike Keane and Neal (2021) who found a very short-term positive effect. Though the coefficients are negative as expected, interestingly, human development index is not significant. So, while a higher level of human development index leads to more media coverage, it does not influence the level of panic. The digital adoption index affects the country panic index negatively. This suggests that easier access to

the news results in less panic in the society, possibly because people are more informed. As in the media coverage model, the number of COVID -19 cases as well as the number of deaths, significantly increases the level of panic in the country. However, the number of recovered is consistently not significant. Our results on COVID-19 cases tie with Kean and Neal (2021) who find both domestic and foreign COVID-19 cases do influence the level of panic.

For the sentiment index in table 7 we find that the press freedom, as in the case of panic index, does not significantly impact the country sentiment index. An increase in the stringency index, hence the increase in government restrictions, leads to a less positive sentiment overall supporting the results from several studies (Keane and Neal, 2021; Graffigna et al., 2021). In countries where the human development index is higher, the country sentiment is significantly worse. Similarly, higher digital adoption index significantly decreases the sentiment. First, with higher development index or digital adoption, people have access to more news, exposing them more to higher levels of uncertainty. Secondly, COVID-19 might also be more disruptive to the way of life in a modern society as residents in developed countries tend to travel more for work or holiday purposes. Using the internet as a source of news has increased particularly in the West, and the more developed countries of Asia and Eastern Europe. However, in developing countries, comparatively few people use the internet (Pew Research Center, 2016). Hence, in developing countries accessing to the news is relatively more difficult and low digital adoption makes people uninformed about the current situation. However, in developed countries, people have more exposure to the news, case and death numbers which decrease the sentiment in the society. As in the media and panic models, higher COVID-19 cases and deaths significantly depress sentiment, while the recoveries show no impact. This is in line with results in Buigut and Kapar (2021) which show case numbers affect social mood.

So overall, we find that the stringency index increases attention by the media, increases panic levels and depresses the mood. We also show that a higher development index increases media coverage, depresses the sentiment, but does not affect the level of panic. On the other hand, a higher level of digital adoption while not affecting the level of media coverage, it does worsen the sentiment and reduces panic – as digital adoption increases availability of information both good and bad. More

information reduces the level of panic. However, it might affect the mood negatively due to negative news. Overall, the number of COVID-19 cases and deaths affect media coverage, panic and sentiment index. However, the number of recoveries have no effect on any media index. As mentioned, these results are in line with studies that show support for negative news bias (Vaish, 2008; Rozin and Royzman, 2001; Soroka et al., 2019).

Table 5: Country Media Coverage Index Regressions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Press Freedom Ind.	0.10**	0.10**	0.10**	0.08**	0.08**	0.08**	0.13***	0.13***	0.13***	0.11**	0.11**	0.11**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Stringency Ind.	0.12***	0.13***	0.13***	0.10***	0.11***	0.11***						
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)						
Economic Support Ind.							-0.02	-0.02	-0.02	-0.01	-0.01	-0.01
							(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Human Development Ind.	12.66**	13.74***	13.74***				12.57**	13.83**	13.82**			
	(5.27)	(5.19)	(5.18)				(5.72)	(5.66)	(5.67)			
Digital Adoption Index				6.28	7.40	7.38				5.92	7.23	7.17
				(4.78)	(4.75)	(4.74)				(5.12)	(5.09)	(5.10)
Case per Population	0.07***			0.08***			0.10***			0.10***		
	(0.02)			(0.02)			(0.02)			(0.02)		
Death per Population		0.68			0.72			1.44***			1.36***	0.01
		(0.52)			(0.52)			(0.50)			(0.51)	(0.01)
Recovered per Population			0.01			0.01			0.02			
			(0.01)			(0.01)			(0.01)			
Constant	-21.51***	-22.06***	-22.05***	-13.43**	-13.81***	-13.77***	-22.19***	-22.86***	-22.80***	-14.02**	-14.55**	-14.46**
	(5.79)	(5.66)	(5.66)	(5.24)	(5.09)	(5.09)	(6.53)	(6.43)	(6.45)	(6.28)	(6.21)	(6.25)
R^2	69.89%	69.94%	69.90%	70.20%	70.21%	70.16%	69.01%	69.00%	68.91%	69.56%	69.51%	69.41%

Country Media Coverage Index is the dependant variable. Panel Data Random Effect Regression is applied. Robust standard errors are reported under each coefficient. ***,** indicate 1% and 5% significance, respectively.

Table 6: Country Panic Index Regressions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Press Freedom Ind.	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00	-0.00	-0.00	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Stringency Ind.	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***						
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)						
Economic Support Ind.							-0.01	-0.01	-0.01	-0.00	-0.00	-0.00
							(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Human Development Ind.	-1.18	-1.00	-0.91				-1.04	-0.79	-0.76			
	(1.13)	(1.13)	(1.13)				(1.20)	(1.19)	(1.20)			
Digital Adoption Ind.				-2.14**	-1.94	-1.88				-2.12	-1.85	-1.84
				(1.00)	(0.99)	(1.00)				(1.08)	(1.07)	(1.09)
Case per Population	0.02***			0.02***			0.03***			0.02***		
	(0.01)			(0.01)			(0.01)			(0.01)		
Death per Population		1.01***			1.02***			1.15***			1.13***	
		(0.37)			(0.37)			(0.35)			(0.36)	
Recovered per Population			0.01			0.01			0.01			0.01
			(0.01)			(0.01)			(0.01)			(0.01)
Constant	0.29	0.16	0.19	0.92	0.81	0.89	-0.11	-0.30	-0.23	0.53	0.38	0.44
	(1.10)	(1.08)	(1.09)	(0.89)	(0.87)	(0.88)	(1.18)	(1.15)	(1.17)	(0.93)	(0.91)	(0.93)
R^2	19.83%	20.01%	19.81%	20.24%	20.40%	20.18%	19.81%	20.02%	19.77%	20.26%	20.44%	20.19%

Country Panic Index is the dependant variable. Panel Data Random Effect Regression is applied. Robust standard errors are reported under each coefficient.
***,** indicate 1% and 5% significance, respectively.

Table 7: Country Adjusted Sentiment Index Regressions

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Press Freedom Ind.	-0.09	-0.10	-0.09	-0.09	-0.09	-0.09	-0.13	-0.13	-0.13	-0.12	-0.13	-0.12
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Stringency Ind.	-0.12***	-0.12***	-0.13***	-0.12***	-0.12***	-0.13***						
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)						
Economic Support Ind.							-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
							(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Human Development Ind.	-21.42***	-22.13***	-22.53***				-19.46***	-20.50***	-20.65***			
	(6.02)	(6.00)	(6.00)				(0.00)	(0.00)	(0.00)			
Digital Adoption Ind.				-17.76***	-18.55***	-18.85***				-16.13***	-17.26***	-17.34***
				(4.50)	(4.46)	(4.51)				(0.00)	(0.00)	(0.00)
Case per Population	-0.09***			-0.09***			-0.11***			-0.11***		
	(0.03)			(0.03)			(0.00)			(0.00)		
Death per Population		-4.31***			-4.29***			-4.95***			-4.92***	
		(1.22)			(1.21)			(0.00)			(0.00)	
Recovered per Population			-0.02			-0.02			-0.03			-0.03
			(0.01)			(0.01)			(0.00)			(0.00)
Constant	120.33***	121.01***	121.12***	114.27***	114.91***	114.87***	119.79	120.76	120.72	114.30	115.18	115.06
	(6.55)	(6.48)	(6.49)	(4.60)	(4.50)	(4.53)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R^2	16.95%	17.86%	17.01%	17.26%	18.24%	17.31%	14.16%	15.14%	13.93%	14.49%	15.55%	14.22%

Country Adjusted Sentiment Index is the dependant variable. Panel Data Random Effect Regression is applied. Robust standard errors are reported under each coefficient. ***,** indicate 1% and 5% significance, respectively.

5 Conclusion

The COVID-19 pandemic has created an unprecedented level of uncertainty, shaken the global markets and devastated the health and livelihoods of communities. Improvements in therapeutics, and the advent of vaccines bring a glimmer of hope that the pandemic will, with time, be contained. But the enormity of the task – for countries, developing countries particularly, to vaccinate their populations several times over given the emergence of variants, means the pandemic will be with us for some time. In the meantime, the COVID-19 pandemic continues to dominate the world media, and to gobble up global health resources. The aim of the study is to assess the effect of the COVID-19 incidence, government intervention and level of development on media coverage, and investor sentiments using Ravenpack data.

The results show that NPIs increase the media attention, increase panic and depress the mood. Furthermore, higher number of COVID-19 cases and deaths affect promote panic and depress sentiment. So, if the NPIs are successful in lowering the case numbers and deaths as intended, the reduction in COVID-19 cases and deaths will help manage the panic and improve sentiment. Thus, there is need for policy makers to optimize the implementation of the NPIs for the most effect on transmission (reduce COVID-19 cases and deaths) in the shortest time possible. This should be preceded with clear, accurate and consistent public education on objective of NPIs to manage the effect on panic and sentiment in the intervening period before its effects are realized.

We show that improvements in digital adoption reduce panic though it lowers market sentiment. These results show the importance of consistent and accurate information to manage public sentiment. It also indicates the need for government policies supportive of research and development, and globalization. Skare and Soriano (2021) find globalisation positively impacts technology transfer and spillover. At the same time continuing support and investment in education and human capital is needed to enable the capacity for individuals and businesses to adopt and use it efficiently. The role of digital adoption is more than just managing the market panic. Remote work (Work from home) programs helped save jobs and keep economies running in the wake of the pandemic.
This was possible because of uptake of digital adoption.

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