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The Impact of COVID-19 Pandemic on Emerging Country Stock Markets: Evidence of the Value Effect

Yang Yang[a], Lingyi Li[a], and Jialing Jiang[b]

[a]School of Finance, Capital University of Economics and Business, Beijing, China; [b]School of Management, Beijing Union University, Beijing, China

ABSTRACT

We examine the impact of the COVID-19 pandemic on seven emerging stock markets by focusing on the value effect. Our results show that there are significant differences in the value premia before and during the pandemic. Furthermore, the traditional value proxies are no longer good predictors of future stock returns. To further capture the impact the pandemic's progress on stock returns, we estimate Fama-MacBeth regressions by introducing proxies of the pandemic. We uncover heterogeneous responses of emerging markets to the pandemic. These findings provide a wealth of insights on the presence and driving force relevant to the value effect.

KEYWORDS

COVID-19 pandemic; value premium; emerging stock markets

JEL

G11; G12; G15

1. Introduction

The coronavirus (COVID-19) outbreak, also referred to as the COVID-19 pandemic, has heavily impacted society (Dowd et al. 2020) and decimated economies. Stock markets around the world have experienced unprecedented declines and extreme uncertainty (Phan and Narayan 2020). This structural break offers a unique quasi-natural experiment to explore the persistence of market anomaly and examine how investors' behavior influences stock returns (Ashraf 2020; Ren and Li 2021), rather than through the conventional fundamental information channel (Gao, Wen, and Yu 2021). As emerging stock markets have recently grown significantly both in volume and in numbers, investors seeking international diversification of their assets can invest with relative ease in these markets. Hence, it is undoubtedly important to examine the reaction of these markets to the COVID-19 pandemic.

The value premium, which is the market anomaly that arises from buying low-valued stocks and selling high-valued equities, has been one of the long-standing and most popular strategies in portfolio construction. Following the seminal work by Fama and French (1998, 2012), value premium is deemed as prevalent around the world as an important source of returns supplementing the premium of systematic risk, to which an extensive body of empirical research can be identified (see, e.g., Chan, Hamao, and Lakonishok 1991; Davis, Fama, and French 2000; Dimson, Nagel, and Quigley 2003; Fama and French 2017, 2021; Groot, Pang, and Swinkels 2012). There is a topical and controversial debate about the source of the value premium (Daniel, Hirshleifer, and Subrahmanyam 2001; Zhang 2005). Furthermore, whether the value premium exist at all has been one of the contentious issues in finance research (Linnainmaa and Roberts 2018; Schwert 2003). While finance research has highlighted interesting value effects for the US and other developed stock markets, few studies have investigated whether such findings are corroborated in emerging markets.

Since the value effect is less explored for emerging markets, and since these markets have experienced unprecedented high volatility during pandemic, this phenomenon provoked our interest. Our study fills this research gap by examining the profound impact of the COVID-19 pandemic on emerging stock markets from the value premium perspective. To the best of our knowledge, we are the

CONTACT Jialing Jiang 302935729@qq.com School of Management, Beijing Union University, Beijing, China

first to investigate this issue. Specifically, we address the following questions: (a) Is there a significant difference in the value effects before and during the pandemic in emerging markets? (b) If there is, how does the stage of pandemic impacts on the value premia? (c) What is the potential driving force? By addressing these questions, we present detailed emerging-market evidence and rich insights from the value premium perspective. Our application is to a new grouping of seven large emerging markets, namely China, Russia, South Africa, Indonesia, Thailand, Malaysia, and the Philippines. Each of these economies is representative and has achieved remarkable growth since the early 2000s, which implies there are many firms endowed with plentiful growth options.

Our analysis spans the years 2000 to 2021. The breakpoint is the beginning month of the COVID-19 outbreak in each country (e.g., The breakpoint for China is January 2020). Based on the sample of stock markets and COVID-19 confirmed case and death data of these emerging countries, we find that there are significant variations in the value premium before and during the pandemic, the value premium displays different characteristics within these emerging countries, posing a challenge to assessing the likelihood of internationally diversified portfolio returns from value investing. In addition, the value effect depends on the stage of pandemic in most emerging markets. The spread of pandemic drives the reversal of the value premium, because an increase in confirmed cases is positively associated with the predictive ability of value factors. This is an addition to our knowledge about the value effect during the COVID-19 pandemic from a global perspective.

Firstly, we conduct the portfolio analysis based on the value strategy. Besides the well-known proxy "book-to-market ratio (B/M)" for the value effect, we also study four proxies, namely the dividend-to-price ratio (D/P), earning before interests, taxes, depreciation and amortization over firm's total value of equity (EBITDA/EV), earning per share (E/P), and free cashflow over total value of equity (FCF/P). On the first day of each month, for each market, all stocks are sorted in descending order based on five value proxies with breakpoints of 20, 40, 60, and 80 quantiles, divided into five portfolios. Portfolio Q1 represents the top 20% of stocks and portfolio Q5 represents the bottom 20% of stocks. We go long portfolio Q1, short portfolio Q5, and rebalance our position once a month. The equal-weighted and value-weighted (i.e., market capitalization-weighted) returns are calculated separately. The results indicate that there are significant variations in the value premium before and during pandemic. More specifically, for the Chinese and Russian markets, the equal-weighted value premium is significantly positive before the pandemic (China is 0.97% and Russia is 0.9%) compared with negative values (China is −1.73% and Russia is −0.32%) during the pandemic based on B/M factor. In addition, our results indicate that the value premium displays different characteristics across these countries, making it challenging to assess the likelihood of the cross-country portfolio return from value investing.

Secondly, to further capture the impact of the pandemic's progress on the value effect variation, we estimate Fama-MacBeth regressions using the monthly stock returns over the period from January 2016 to April 2021. Before the outbreak, we use the monthly returns as the explained variable and the one period lagged value factors as the main explanatory variables for these regressions. After the outbreak, we add the new variables, namely the natural logarithm of new monthly death cases or confirmed cases, to represent the pandemic's progress, an interaction term between these pandemic variables and the value factor, in our regression models. We control for variables, such as market value of equity (ME) and twelve-month momentum (MOM).

The coefficients of the interaction terms uncover the heterogeneous responses of the seven stock markets to the pandemic. We find that for the Chinese, the Philippines and South African stock markets, the coefficients of the interaction terms between newly confirmed cases and some value factors are significantly positive, indicating that, as the number of confirmed cases increased, the value factor will contribute more positively to stock returns. However, for the Thailand and Indonesian stock markets, we observe significantly negative interaction effects for certain value factors. The results for the Russian and Malaysian stock markets have no statistical significance, indicating that the interaction terms have no impact on the returns. These results suggest that the value effect depends on the stage of COVID-19 pandemic in most emerging markets. The apparent difference among countries is also an addition to our knowledge about the heterogeneous responses of the value effect from a global perspective.

Our contributions are threefold. Firstly, we provide an updated evidence on the existence of value effects in emerging markets and a new evidence that the choice of a good proxy of the value premium is country specific. Secondly, we contribute to the emerging literature, which examines the impact of COVID-19 on financial markets, thereby enhancing our understanding regarding the in-depth impact of pandemics on stock markets in emerging countries. This has far reaching implications for financial modeling and for the success of investment strategies from a global perspective. Thirdly, we identify that the spread of the pandemic drives the reversal of the value premium. Given that fundamental value is unlikely to change in accordance with real-time market variation, the significant interaction between the value premium and the pandemic is likely driven by the pandemic's severity, which investors believe will harm the firm fundamentally. This suggests that time-varying risk acts as the major source of stock return predictability.

The rest of the paper is organized as follows. The data and variables are explained in Section 2. Methodology is set forth in Section 3. Empirical results are reported and interpreted in Section 4 and Section 5 concludes.

2. Data and Variables

We use all listed stocks on the main boards from China, Indonesia, Thailand, Malaysia, Russian, South Africa, and the Philippines that are available from Standard & Poor's Capital IQ, a leading financial data vender. These are the emerging markets with complete set of value premium proxies on Capital IQ during the same sampling period. The sample information (including the date when the first COVID-19 case was confirmed) in each country are reported in Table 1.

Following Rizvi et al. (2020), Sha (2020), and Van Hoang and Syed (2021), we obtain stocks' monthly returns (RET), firms' book-to-market ratio (B/M), dividend-to-price ratio (D/P), earning per share (E/P), earning before interest, taxes, depreciation and amortization over firms' total value of equity (EBITDA/EV), free cashflow over total value of equity (FCF/P), the natural log form of market value of equity (ln ME), and the cumulative returns from *t-12* to *t-2* (MOM12), from Capital IQ. All explanatory variables are lagged in order to avoid look-ahead bias and winsorized at the 1% level. Table 2 details the descriptive statistics of these variables.

The pandemic data are obtained from the European Center for Disease Prevention and Control, which is available at "Our World in Data (OWID)" project on GitHub.com. We obtain the newly confirmed cases (new case), the newly confirmed deaths (new death) from this database and apply the natural logarithmic transformation to them to mitigate the potential concern of non-stationarity of the time-series data. The sampling period for the entire dataset is from January 2016 to April 2021, a total number of 64 months. To estimate the effect of the COVID-19 pandemic on the stock markets, we constructed a subsample ranging from the first month of the pandemic in each country to April 2021 and is compared with the before-pandemic period sample.

Table 1. Sample information.

Country	Stock exchange	Number of stocks	The day when 1st case was confirmed
China	Shanghai Stock Exchange& Shenzhen Stock Exchange	3942	2020.1.22
Thailand	The Stock Exchange of Thailand	770	2020.1.22
Malaysia	Kuala Lumpur Stock Exchange	911	2020.1.25
The Philippines	Philippines Stock Exchange	318	2020.1.30
Russia	Moscow Exchange	287	2020.1.31
Indonesia	Indonesia Stock Exchange	717	2020.3.2
South Africa	Johannesburg Stock Exchange	266	2020.3.5

This table reports the countries we studied, the stock market index data we used for a country, the date when first COVID-19 case was confirmed in each country.

Table 2. Descriptive statistics, 2016–2021.

Variable	Mean	SD	Skew	Kurt	Min	Max	N
Panel A Summary statistics							
Return	0.009	0.230	145.646	586.052	−0.984	80.603	343287
MOM12	0.079	0.422	1.975	9.619	−0.826	42.922	343287
Ln(ME)	8.831	2.449	0.804	4.939	−1.082	20.161	343287
B/M	0.878	1.011	3.344	19.629	0.003	10.744	343287
D/P	0.017	0.038	14.457	389.253	0.000	1.186	343287
E/P	0.195	0.172	−3.739	45.271	−2.120	1.801	343287
FCF/P	0.021	0.213	1.406	20.457	−1.168	2.144	343287
EBITDA/EV	0.069	0.108	1.885	35.308	−1.012	1.619	343287

Variable	Return	MOM12	Ln(ME)	B/M	D/P	E/P	FCF/P	EBITDA/EV
Panel B Correlation matrix								
Return	-	0.010	−0.001	0.048	0.053	0.070	0.035	0.066
MOM12	0.010	-	0.162	−0.189	0.080	0.139	0.057	0.051
Ln(ME)	−0.011	0.120	-	−0.260	0.081	0.129	0.011	0.105
B/M	0.047	−0.146	−0.202	-	0.109	0.252	0.141	0.374
D/P	0.014	0.018	0.052	0.182	-	0.574	0.122	0.433
E/P	0.002	0.127	0.143	−0.083	0.295	-	0.123	0.678
FCF/P	0.021	0.004	−0.008	0.142	0.061	−0.072	-	0.233
EBITDA/EV	0.018	0.031	0.104	0.202	0.242	0.413	0.143	-

This table shows the descriptive statistics of the full sample for regression. In Panel A, the column labeled N represents the number of stocks. To avoid the influence of extreme values, variables are winsorized at the 1% level. Return represents the monthly stock return, MOM12 is the momentum of the past 12 months, Ln(ME) is the natural logarithm of market value, B/M is the book-to-market ratio, D/P is the dividend price ratio, E/P is Earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. In Panel B, elements in the lower triangle represent the Pearson correlation coefficient, and the elements in the upper triangle represent the Spearman correlation coefficient.

3. Research Design

Market anomalies, particularly the value premium, are estimated from models that only include well-documented variables. Following Sha (2020), we use portfolio analysis and cross-sectional regressions to analyze the persistency of the value premium anomaly and its driving factors.

For the portfolio analysis, we formed monthly rebalanced portfolios by sorting stocks based on their characteristics of valuation. At the beginning of every month, we use the latest information to group portfolios by each quintile of the sorting variable spectrum and then hold for one month. We chose five sorting variables, which proxy the value effect and estimate the value premium as the first quintile (highest 20% value effect stocks) minus the fifth quintile (lowest 20% value effect stocks). Portfolio performance is measured by equal-weighted return (r^p_{ew}) as well as value-weighted return (r^p_{vw}) for which weight is re-scaled by stocks' market value of equity as in Equation (1), to mitigate potential bias from size effect.

$$r^p_{ew} = \frac{\sum_i^N r_i}{N} - r_f$$

$$w_i = V_i / \sum Vi$$

$$r^p_{vw} = \sum_i^N w_i r_i - r_f \tag{1}$$

We also calculate the information coefficient (IC) of the value factor, which represents the cross-sectional correlation coefficient between the selected stock's monthly return and its value factors with previous period, which we defined as

$$IC = Corr\left(VALUE_{i,t-1}, r_{i,t}\right) \tag{2}$$

where $r_{i,t}$ is the current monthly return of stock i, $VALUE_{i,t-1}$ is the proxy of value effect of previous month for stock, and *Corr* represents the correlation coefficient. IC can be used to assess the predictive power of the proxy of value effect over stock return. The higher the value of IC, the stronger the predictability. In addition, we also examine the t-statistic of IC to test whether the mean value of IC is equal to zero. If IC is not statistically significant during the holding period, then the proxy has no significant predictive power over the future return of the stock.

We next estimate the Fama and MacBeth (1973) two-stage regression. To do this, we regress a stock's monthly return on one proxy of the value effect, and other firm characteristics that influence stock returns internationally, as in Equation (3).

$$r_{i,t} = \alpha_i + \beta_1 VALUE_{i,t-1} + \beta_2 lnME_{i,t-1} + \beta_3 MOM12_{i,t-1} + \varepsilon_{i,t} \tag{3}$$

To mitigate the potential bias from endogeneity, and, more importantly, to capture the fact that the value premium is the expected return from investors, we use the one-month lagged information on all right-hand side variables. To test whether the COVID-19 pandemic impacted the predictive power of the selected value proxies, we add the pandemic indicator and the interaction term to the regression. The first-stage regression is expressed as follows:

$$\begin{aligned} r_{i,t} = {} & \alpha_i + \beta_1 VALUE_{i,t-1} + \beta_2 Pandemic_{t-1} + \beta_3 VALUE_{i,t-1} \times Pandemic_{t-1} + \beta_3 lnME_{i,t-1} \\ & + \beta_4 MOM12_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{4}$$

In the second stage, based on the factor exposures calculated in the first stage, we estimate the cross-sectional coefficients of the intercept ($\hat{\alpha}$) and the variables ($\hat{\lambda}_n$) by averaging the coefficients from all sampling period as in the following two equations.

$$\hat{\alpha}_i = \frac{\sum_{t=1}^{T} \hat{\alpha}_{i,t}}{T} \tag{5}$$

$$\hat{\lambda}_n = \frac{\sum_{t=1}^{T} \hat{\lambda}_{n,t}}{T} \tag{6}$$

Because t-statistics the Fama and MacBeth regression does not account for potential autocorrelation, when we estimate the variance of the averaged coefficient, as in the two equations below, we apply the Newey-West standard errors (Newey and West 1987) to correct this.

$$Var(\hat{\alpha}_i) = \frac{\sum_{t=1}^{T} \left(\hat{\alpha}_{i,t} - \hat{\alpha}_i\right)^2}{T^2} \tag{7}$$

$$Var\left(\hat{\lambda}_n\right) = \frac{\sum_{t=1}^{T} \left(\hat{\lambda}_{n,t} - \hat{\lambda}_n\right)^2}{T^2} \tag{8}$$

4. Empirical Analysis

4.1. Portfolio Analysis before the Pandemic

As shown in Table 3, among these emerging markets, we find that China and Indonesia's value premia are all positive. The IC of China is the most significant before the pandemic. For Chinese market, the IC of the B/M factor is significant at the 10% level, while the IC of other factors are all significant at the 1% level. The value effect in China is best captured by the E/P factor, i.e., the equal-weighted premium is 1.31%, the value-weighted premium is 0.96%, and the IC is statistically significant at the 1% level. The above results indicate that the value premium exists in China, and that the value factors have significant predictive power

Table 3. Portfolio analysis before pandemic.

Country		China	Russia	The Philippines	Malaysia	South Africa	Thailand	Indonesia
B/M	EW Q1-Q5	0.97	0.90	0.44	−0.18	−0.43	0.44	0.62
	VW Q1-Q5	1.15	0.15	0.66	0.15	−0.58	0.60	0.91
	Avg. IC	0.03*	0.01	0.00	−0.03***	−0.03***	0.02	−0.02
		(1.85)	(0.66)	(−0.08)	(−2.72)	(−2.53)	(1.54)	(−1.09)
D/P	EW Q1-Q5	0.86	0.41	0.08	0.44	0.09	−0.34	1.06
	VW Q1-Q5	0.74	0.38	−0.05	0.35	−0.10	−0.33	0.16
	Avg. IC	0.03***	−0.01	0.00	0.04***	0.01	0.01	0.03*
		(2.97)	(−0.35)	(0.12)	(3.86)	(1.39)	(0.76)	(1.87)
EBITDA/EV	EW Q1-Q5	0.93	1.02	1.06	0.71	0.61	0.52	1.56
	VW Q1-Q5	0.24	0.55	0.52	0.53	0.15	0.28	1.06
	Avg. IC	0.03***	0.03*	0.03**	0.04***	0.01	0.02*	0.03**
		(3.68)	(1.94)	(2.30)	(5.18)	(0.84)	(1.91)	(2.04)
E/P	EW Q1-Q5	1.31	0.27	0.85	0.71	0.41	0.89	1.78
	VW Q1-Q5	0.96	−0.09	0.78	0.30	0.34	0.51	1.69
	Avg. IC	0.05***	0.02**	0.03**	0.04***	0.02***	0.05***	0.07***
		(4.57)	(2.09)	(2.13)	(5.50)	(2.66)	(4.46)	(5.25)
FCF/P	EW Q1-Q5	0.52	1.44	1.35	0.56	0.66	1.00	1.49
	VW Q1-Q5	0.08	1.65	1.70	0.29	0.71	1.12	1.98
	Avg. IC	0.02***	0.05***	0.05***	0.03***	0.04***	0.04***	0.06***
		(3.99)	(3.09)	(3.43)	(4.65)	(5.63)	(3.58)	(4.93)

This table reports the average monthly value premium and information coefficient based on five value factors before pandemic. EW and VW represent the equal-weighted and market capitalization-weighted portfolio. When calculating the portfolio return and information coefficient, the holding period is one month. The portfolio is rebalanced every month. At the beginning of each month, all stocks are sorted in descending by the value factors of the previous day and divided into five portfolios according to the 20, 40, 60, and 80 quantiles. Q1-Q5 is the value premium which is calculated by the first quintile (highest 20% value effect stocks) minus the fifth quintile (lowest 20% value effect stocks). IC represents the information coefficient. B/M is the book-to-market ratio, D/P is the dividend price ratio, and E/P is earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. *t-statistics* are shown below the estimates in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

over subsequent future stock returns before the pandemic. Our conclusion is consistent with the findings of Ebrahim et al. (2014), who studied the value premium of four emerging market countries (namely China, India, Turkey, and Brazil) and confirmed the presence of the value premium in the Chinese market.

For the Russian, the Philippines, and Thailand markets, except for the D/P factor of the Philippines and Thailand, and the E/P factor of Russia, the value premia based on other factors are all positive. Among them, FCF/P factor appears to be the most influential and generates the highest value premium. In these three countries, the IC based on the three factors, namely EBITDA/EV, E/P, and FCF/P, are all significantly positive and have a substantial predictive power over stock returns.

Results for Malaysia and South Africa are a little different from the above countries. The B/M equal-weighted and value-weighted premia in South Africa and B/M equal-weight premium in Malaysia are all negative, as are the ICs. The premia of the remaining value factors (except D/P value-weighted premiums in South Africa) are all positive. The IC coefficients of E/P, and FCF/P factors are significantly positive as they are for the other countries.

In general, most countries show a positive value premium based on five value factors. Besides, most of the IC coefficients are significantly positive, indicating that the value factors have significant predictive power over the future returns. Our findings provide updated evidence on the presence of the value effect in these markets, which supports the conclusions of Cakici, Fabozzi, and Tan (2013), who investigate 18 emerging markets, grouping them into three regions, namely Asia, Latin America, and Eastern Europe, and find the presence of the value effect in these regions during the period from 1990 to 2011. Our findings also support the view that the choice of a good proxy of value premium is country specific (Liu, Stambaugh, and Yuan 2019). Identifying a good proxy of value premium is the fundamental requirement for financial engineering to predict asset returns, whereas our findings indicate that there is no free lunch for scholars to copy the conventional formula of value proxy from one country to another.

4.2. Portfolio Analysis during the Pandemic

The value premia and ICs during the pandemic are summarized in Table 4. The table shows that the value effect changes dramatically during the pandemic as compared with the historical periods before the pandemic. After the outbreak, the significance of ICs disappeared in all emerging markets we studied, which indicates that the value factors do not have significant predictive power over future stock returns during the pandemic.

Furthermore, the value premia of China, Russia, and Malaysia all sharply fell to negative values during the pandemic. China's B/M equal-weighted and value-weighted premia fell to −1.73% and −2.13%, respectively, during this period. The same is true for Russia and Malaysia. Russia's D/P equal-weighted and value-weighted premia fell to −1.68% and −1.60%, respectively, and Malaysia's equal-weighted and value-weighted premia fell to −2.08% and −1.36%, respectively.

In the four countries, namely the Philippines, South Africa, Thailand, and Indonesia, the decline in the value premia was slightly moderate, but still some fell into negative values. The Philippines' D/P equal-weighted premium and Indonesia's D/P value-weighted premium fell to −0.22% and −0.47%, respectively. When we sort the portfolios by E/P, South Africa's equal-weighted premium fell to −0.84%, while Thailand's value-weighted premium fell to −0.08% during the pandemic.

As stated above, there are significant differences in the value premia before and after the outbreak for these emerging stock markets. The pandemic has almost reversed the value premia of these countries. In other words, the pandemic has a significant negative impact on the predictive power of the value proxies, since they can no longer predict future stock returns.

Our study of the impact of the epidemic on the value premia is related with the work of Yamani and Swanson (2014), who investigate the changes in the value premia of 13 countries before and during the global financial crises and find that the value premia during the crises are negative, which indicate that value stocks may underperform growth stocks in times of economic recession. From the perspective of

Table 4. Portfolio analysis during the pandemic.

Country		China	Russia	The Philippines	Malaysia	South Africa	Thailand	Indonesia
B/M	EW Q1-Q5	−1.73	−0.32	1.38	−1.10	0.54	−0.52	2.03
	VW Q1-Q5	−2.13	−0.63	1.29	−1.26	1.28	−0.57	2.68
	Avg. IC	−0.03	−0.01	0.04	−0.06	0.00	−0.03	0.03
		(−0.91)	(−0.38)	(0.95)	(−1.03)	(0.04)	(−0.80)	(0.50)
D/P	EW Q1-Q5	−0.90	−1.68	−0.22	−2.08	1.18	−0.10	0.65
	VW Q1-Q5	−1.97	−1.60	0.76	−1.36	0.84	0.40	−0.47
	Avg. IC	0.01	−0.04	−0.01	−0.03	0.01	0.02	0.01
		(0.22)	(−1.26)	(−0.18)	(−0.82)	(0.32)	(0.74)	(0.37)
EBITDA/EV	EW Q1-Q5	−0.03	−1.05	2.14	0.12	0.65	1.02	1.76
	VW Q1-Q5	−3.31	−0.21	0.85	−1.20	0.05	0.33	1.25
	Avg. IC	0.02	−0.04	0.04	0.02	0.01	0.03	0.03
		(0.69)	(−1.39)	(1.88)	(0.50)	(0.32)	(1.09)	(0.92)
E/P	EW Q1-Q5	−0.33	−0.50	−0.04	−0.62	−0.84	0.29	0.07
	VW Q1-Q5	−2.93	−0.63	0.43	−1.78	−2.68	−0.08	0.74
	Avg. IC	0.02	−0.01	0.02	−0.02	−0.03	0.03	0.01
		(0.67)	(−0.33)	(0.81)	(−0.64)	(−1.48)	(1.15)	(0.21)
FCF/P	EW Q1-Q5	0.28	−0.97	0.50	0.02	0.14	1.06	0.76
	VW Q1-Q5	−0.31	−1.90	0.30	−0.01	3.10	−0.27	0.28
	Avg. IC	0.02	−0.04	0.03	−0.01	0.02	0.03	0.04
		(2.10)	(−1.25)	(0.86)	(−0.35)	(1.25)	(1.15)	(1.44)

This table reports the average monthly value premium and information coefficient based on five value factors during pandemic. EW and VW represent the equal-weighted and market capitalization-weighted portfolio. When calculating the portfolio return and information coefficient, the holding period is one month. The portfolio is rebalanced every month. At the beginning of each month, all stocks are sorted in descending by the value factors of the previous day and divided into five portfolios according to the 20, 40, 60, and 80 quantiles. Q1-Q5 is the value premium which is calculated by the first quintile (highest 20% value effect stocks) minus the fifth quintile (lowest 20% value effect stocks). IC represents the information coefficient. B/M is the book-to-market ratio, D/P is the dividend price ratio, and E/P is earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. *t-statistics* are shown below the estimates in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

investor sentiment, Baker and Wurgler (2006) find that when beginning-of-period proxies for market sentiment are low, extreme growth stocks tend to bring relatively higher subsequent returns, which is also consistent with our conclusion.

4.3. Cross-sectional Regression Analysis before the Pandemic

Table 5 presents the Fama-MacBeth regression results for the monthly return data based on the five value factors in the seven emerging markets before the pandemic.

As can be seen from Table 5, in the context of the Chinese market, the regression coefficients of B/M, D/P and E/P are all significantly positive. The *t*-statistics of the regression coefficients are 5.466, 4.901, and 3.816, respectively. We find similar phenomena in the Indonesian, Malaysian and Thailand markets. All coefficients of the five value factors are significantly positive in the Indonesian market. In addition to the coefficient of E/P in Malaysia, all other value factors are significant at the level of 1% or 5%. For the South African market, the regression coefficient of B/M is 0.009, and the *t*-statistic reaches 4.330. Similarly, E/P and EBITDA/EV are statistically significant at the 5% level in the Philippines market.

In general, most countries have observed significant value effects before the outbreak. These regression results provide solid evidence on significantly positive value premium before the outbreak for these emerging markets, which is also consistent with the conclusion we derived by portfolio analysis in Section 4.1.

4.4. Cross-sectional Regression Analysis during the Pandemic

For the pandemic period, we added two pandemic variables (the number of new deaths and confirmed cases) and the interaction terms to the regression model and report these results in Tables 6 and 7. As shown in these tables, the value effect has disappeared in most countries. However, when we observe coefficients of the interaction terms, we find heterogeneous responses of the seven stock markets to the pandemic, since they are not consistent in direction.

Table 5. Fama–MacBeth regression analysis before pandemic.

Variables	China	Indonesia	Thailand	Malaysia	Russia	South Africa	The Philippines
Panel A: B/M							
Ln(B/M)	0.015***	0.009***	0.006***	0.003**	0.002	0.009***	−0.000
	(5.466)	(4.309)	(4.209)	(2.176)	(0.514)	(4.330)	(−0.141)
R^2	0.026	0.026	0.026	0.023	0.031	0.037	0.025
Panel B: D/P							
D/P	0.498***	0.206***	0.145***	0.148***	0.016	0.017	0.033
	(4.901)	(4.059)	(4.753)	(2.796)	(0.878)	(0.611)	(0.606)
R^2	0.021	0.046	0.027	0.025	0.029	0.032	0.023
Panel C							
EBITDA/EV	0.084**	0.119***	0.059***	0.019***	0.005	−0.008	0.036**
	(2.129)	(4.042)	(3.984)	(2.734)	(0.802)	(−0.347)	(2.124)
R^2	0.022	0.061	0.027	0.024	0.032	0.047	0.024
Panel D: E/P							
E/P	0.187***	0.124***	0.028***	0.006	−0.003	−0.001	0.030**
	(3.816)	(5.359)	(3.525)	(0.891)	(−0.201)	(−0.085)	(2.202)
R^2	0.022	0.049	0.028	0.029	0.028	0.044	0.024
Panel E: FCF/P							
FCF/P	0.004	0.023***	0.011***	0.007**	0.012	0.009	0.006
	(1.017)	(3.052)	(3.285)	(2.277)	(1.594)	(0.816)	(1.595)
R^2	0.016	0.042	0.022	0.022	0.031	0.042	0.021

This table reports the results of Fama–MacBeth regression before pandemic. The sample period is from January 2016 to the month just before the Covid-19 outbreak in each country. Due to the space limitation, the coefficients of the control variables and constant terms have been omitted. B/M is the book-to-market ratio, D/P is the dividend price ratio, and E/P is Earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. *t-statistics* are shown below the estimates in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Table 6. Fama–MacBeth regression analysis during pandemic using the newly confirmed death.

Variables	China	Indonesia	Thailand	Malaysia	Russia	South Africa	The Philippines
Panel A: B/M							
Ln(B/M)	0.011**	0.075**	0.059	−0.131	0.001	0.007	−0.033
	(2.377)	(2.836)	(1.382)	(−1.676)	(0.206)	(1.632)	(−1.645)
Ln(BM)* Ln(new death)	0.007	−0.008**	−0.048	0.154	−0.000	0.003**	0.005*
	(1.174)	(−2.197)	(−1.200)	(1.287)	(−0.314)	(2.771)	(1.780)
R^2	0.033	0.036	0.056	0.051	0.038	0.045	0.052
Panel B: D/P							
D/P	0.216	15.805	−0.450	−3.305	−0.775	0.024	−7.746**
	(1.395)	(1.182)	(−1.473)	(−1.197)	(−1.281)	(1.027)	(−2.164)
D/P*Ln(new death)	0.232	−1.731	0.402*	2.410	0.093	0.002	1.220**
	(1.044)	(−1.161)	(2.012)	(1.186)	(1.304)	(0.387)	(2.324)
R^2	0.030	0.116	0.058	0.048	0.030	0.036	0.050
Panel C: EBITDA/EV							
EBITDA/EV	0.061	0.112**	0.054	−0.011	−0.019	0.019	0.008
	(1.092)	(2.978)	(1.270)	(−0.318)	(−1.138)	(0.707)	(0.178)
EBITDA/EV* Ln(new death)	0.000	−0.001	0.012	0.000	0.002	−0.002	0.003
	(0.195)	(−0.116)	(1.218)	(0.057)	(1.158)	(−1.634)	(1.023)
R^2	0.031	0.161	0.064	0.045	0.052	0.048	0.054
Panel D: E/P							
E/P	0.011	4.242	0.098	2.418	0.066	−0.013	−0.870*
	(0.099)	(1.185)	(1.520)	(1.410)	(1.223)	(−1.668)	(−1.907)
E/P*Ln(new death)	0.039	−0.467	−0.088	−1.690	−0.006	0.001	0.131*
	(1.396)	(−1.169)	(−1.533)	(−1.293)	(−0.876)	(0.773)	(2.084)
R^2	0.028	0.118	0.053	0.056	0.038	0.047	0.052
Panel E: FCF/P							
FCF/P	0.112*	−1.058	−0.049	−0.380	−0.031	0.002	0.486
	(1.878)	(−1.167)	(−1.100)	(−1.442)	(−0.659)	(0.612)	(1.010)
FCF/P*Ln(new death)	−0.064	0.122	0.050	0.213	0.004	0.003***	−0.072
	(−1.283)	(1.204)	(1.237)	(1.193)	(0.808)	(3.440)	(−1.019)
R^2	0.026	0.119	0.052	0.043	0.032	0.040	0.050

This table reports the results of Fama–MacBeth regression during pandemic using the newly confirmed death. The sample period is from the first confirmed case in the country to April 2021. Due to the space limitation, the coefficients of the control variables and constant terms have been omitted. B/M is the book-to-market ratio, D/P is the dividend price ratio, and E/P is Earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. Ln(new death) is the natural logarithm of the newly confirmed death cases. *t-statistics* with Newey-West adjusted standard error are shown below the estimates in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

In China, the coefficient of interaction terms of D/P with the number of newly confirmed cases are all significantly positive at the 5% level. The interaction term's coefficient is 0.122 with a *t*-statistic of 2.258. The coefficients of interaction terms between B/M, FCF/P and the number of new cases and the number of deaths are all significantly positive in South Africa. In the Philippines, the interaction terms between D/P, E/P and the number of new cases, and between B/M, D/P, E/P and the number of new deaths are also significantly positive.

Unlike the above-mentioned countries, Indonesia and Thailand have observed significantly negative interaction effects. The coefficient of the interaction terms between Indonesia's B/M factor and the newly confirmed cases and newly confirmed deaths are −0.006 and −0.008, respectively. The interaction term between Thailand's B/M and the number of newly confirmed cases is also significantly negative. Interestingly, the interaction of Thailand's D/P and the number of newly confirmed cases shows a positive coefficient, which again indicates the importance of the value proxy selection in this market.

Furthermore, in Russia and Malaysia, we do not observe a significant interaction between the value factors and pandemic variables.

In general, in China, South Africa, and the Philippines, as the pandemic continues to spread, the value factor has a greater impact on the expected future returns. In Indonesia and Thailand, the outbreak and spread of the pandemic show a relatively stronger substitution effect instead – the severity of the pandemic weakens the predictive power of the value factor, which may explain why the value premia in these countries reversed to negative during the pandemic.

Table 7. Fama–MacBeth regression analysis during pandemic using the newly confirmed cases.

Variables	China	Indonesia	Thailand	Malaysia	Russia	South Africa	The Philippines
Panel A: B/M							
Ln(B/M)	−0.002	0.075**	0.077**	−0.110	0.002	0.007	−0.033
	(−0.145)	(2.836)	(2.176)	(−1.221)	(0.496)	(1.632)	(−1.645)
Ln(B/M)* Ln(new case)	0.003	−0.006*	−0.014*	0.017	−0.000	0.002**	0.003
	(1.393)	(−2.174)	(−1.840)	(1.092)	(−0.674)	(2.563)	(1.745)
R^2	0.033	0.036	0.057	0.052	0.038	0.045	0.052
Panel B: D/P							
D/P	−0.435	15.805	−1.508**	−3.395	−0.778	0.024	−7.746**
	(−1.351)	(1.182)	(−2.646)	(−1.225)	(−1.287)	(1.027)	(−2.164)
D/P*Ln(new case)	0.122**	−1.221	0.284***	0.581	0.065	0.001	0.752**
	(2.258)	(−1.161)	(3.140)	(1.236)	(1.311)	(0.313)	(2.257)
R^2	0.030	0.116	0.059	0.048	0.030	0.036	0.050
Panel C: EBITDA/EV							
EBITDA/EV	0.056	0.112**	0.059	−0.007	−0.020	0.019	0.009
	(1.009)	(2.978)	(1.307)	(−0.221)	(−1.143)	(0.707)	(0.194)
EBITDA/EV* Ln(new case)	0.001	−0.000	0.003	−0.000	0.001	−0.002	0.001
	(1.229)	(−0.080)	(0.843)	(−0.170)	(1.192)	(−1.642)	(0.610)
R^2	0.031	0.161	0.065	0.045	0.052	0.048	0.054
Panel D: E/P							
E/P	0.099	4.242	0.135	2.416	0.066	−0.013	−0.870*
	(0.675)	(1.185)	(1.595)	(1.408)	(1.220)	(−1.668)	(−1.907)
E/P*Ln(new case)	0.003	−0.330	−0.025	−0.397	−0.004	0.001	0.084*
	(0.104)	(−1.169)	(−1.354)	(−1.316)	(−0.847)	(0.883)	(2.011)
R^2	0.028	0.118	0.054	0.056	0.038	0.047	0.052
Panel E: FCF/P							
FCF/P	0.063	−1.058	0.082	−0.389	−0.030	0.002	0.486
	(0.855)	(−1.167)	(1.103)	(−1.499)	(−0.645)	(0.612)	(1.010)
FCF/P*Ln(new case)	0.001	0.086	−0.016	0.064	0.003	0.002***	−0.045
	(0.070)	(1.203)	(−1.055)	(1.454)	(0.782)	(3.473)	(−1.005)
R^2	0.026	0.119	0.053	0.043	0.032	0.040	0.050

This table reports the results of Fama–MacBeth regression before pandemic using the newly confirmed cases. The sample period is from the first confirmed case in the country to April 2021. Due to the space limitation, the coefficients of the control variables and constant terms have been omitted. B/M is the book-to-market ratio, D/P is the dividend price ratio, E/P is Earnings to price ratio, FCF/P is the cash flow price ratio, and EBITDA/EV is the enterprise multiple. Ln(new case) is the natural logarithm of the newly confirmed cases. *t-statistics* with Newey-West adjusted standard error are shown below the estimates in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

Figure 1 plots the cross-sectional coefficients of the B/M factor over time, which we obtained in the second step of the Fama-Macbeth regression. Since the coefficients can be interpreted as the corresponding risk premia at different periods, the figure indicates that returns are affected by investor sentiment with time-varying risk characteristics. During the pandemic the coefficients are more volatile than before the pandemic, which suggests that time-varying risk acts as the major source of stock return predictability.

5. Conclusion

Emerging stock markets are clearly a significant part of the world's portfolio today and therefore more empirical work on the behavior of these markets is needed. Numerous studies have identified important facts about value effects in the U.S. equity market, as well as in other developed equity markets. However, value effects are a lot less explored in emerging markets, which have experienced unprecedented declines and high uncertainty during the COVID-19 pandemic. This paper presents results to fill this research gap by investigating the responses of seven major emerging stock markets to the pandemic. In particulars, it explores the behavior of the value effect before and during the pandemic in these markets.

Our results prove the presence of the value premium and the importance of choice of country-specific proxies of the value effect in emerging markets. By comparing the value premia before and during pandemic, we find significant variation and demonstrate that the variation in value premia is

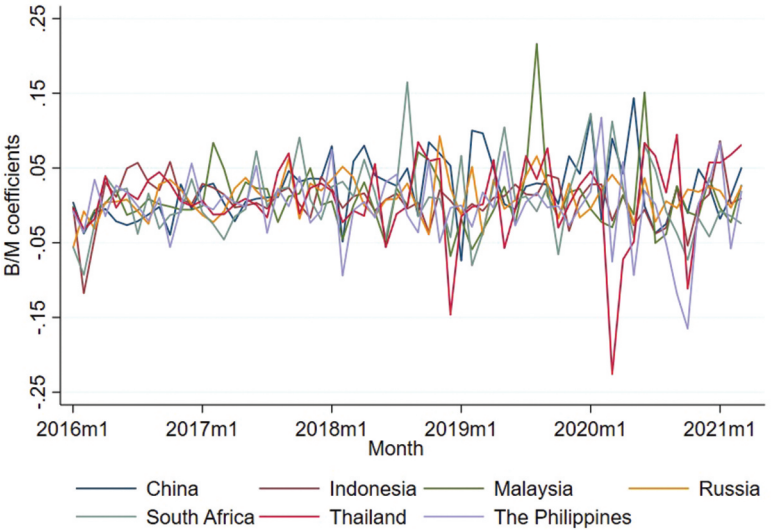

Figure 1. Cross-section coefficients of B/M factor over time (January 2016 to April 2021).

driven by the variation in the value proxies' predictive power during the pandemic. Given that fundamental value is unlikely to change in accordance with real-time market variation, the significant interaction between the value premium and the pandemic is likely driven by investors' believe that the pandemic will harm firms. Our findings therefore suggest that time-varying risk acts as the major source of stock return predictability.

Our conclusions are significant because they provide detailed evidence and further information from the perspective of the value premium. Having a better understanding of risk and return characteristics applicable to value investments may help market participants better understand the investment landscape, particularly in the context of the under-researched emerging markets.

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Disclosure Statement

The data that support the findings of this study are available from Standard and Poor's but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Standard and Poor's.

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