

# IPO Underpricing and Short-Term Performance Under the Influence of Covid-19 Fear in Thailand Stock Exchange

Anbalagan Krishnan<sup>1</sup>, Kim Tai Chow<sup>2</sup> and Franco Gandolfi<sup>3\*</sup>

<sup>1</sup>PhD, School of Business and Administration, Wawasan Open University, Malaysia

<sup>2</sup>DBA, MBA (Finance), School of Business and Administration, Wawasan Open University, Malaysia

<sup>3</sup>DBA, Georgetown University, Washington DC, USA, and California Institute of Advanced Management

## \*Corresponding Author

Franco Gandolfi (DBA) - Georgetown University, Washington DC, USA

Submitted: 2023, Aug 04; Accepted: 2023, Nov 06; Published: 2024, May 07

**Citation:** Krishnan, A., Chow, K. T., Gandolfi, F. (2024). IPO Underpricing and Short-Term Performance Under the Influence of Covid-19 Fear in Thailand Stock Exchange. *J Eco Res & Rev*, 4(1), 01-07.

## Abstract

### Theoretical Benchmark

Past researchers concluded that IPO stocks are significantly more under-priced when the listing occurred during the time when the capital market experienced shocks such as Asian Financial Crisis 1997, the Global Financial Crisis 2007, and the Covid-19 pandemic. IPO short-term performance was also negatively affected when the market is under shocks.

### Method

This study examines IPO under-pricing and short-term performance in Thailand's capital market under the influence of the Covid-19 pandemic fear. A total of 168 IPO stocks in Thailand from the period 2017 to 2022 were used in this research.

### Results and Conclusion

The covid-19 pandemic significantly affected the under-pricing and short-term performance of Thailand IPO stocks.

### Research Implications

Present understanding of how IPO returns in Thailand behave when market faces significant market shocks, therefore, providing useful insight for investors and corporations when investing or issuing IPO stocks in future market shocks.

### Originality/value

No research has been conducted to-date on the impact of Covid-19 pandemic on the IPO stocks of Thailand capital market.

**Keywords:** Covid-19 Pandemic, IPO Under-pricing, IPO Short-Term Performance Fear Factors of the Covid-19 Pandemic

## 1. Introduction

Many companies will seek market listing or flotation once their sizes or values reach the minimum listing requirement of the stock exchange. Upon listing, these companies will make their first public issues of shares to investors via the stock exchange, called the Initial Public Offerings (IPO). IPO has attracted many research works. IPO stock performance is generally divided into initial return and short-term performance.

At the dawn of 2020, the world experienced a health crisis at an unprecedented level ever had before. The Covid-19 pandemic has forced governments worldwide to implement lockdowns, movement controls and shut international borders. This unprecedented pandemic has changed the world in many aspects, from healthcare to workforce mobility and income level businesses operations, education system financial markets and financial reporting to quote some [1-3].

Researchers found that underwriters tend to set higher discounted prices for IPO issues after significant financial crises to boost the demand for IPO stocks. Song and Lee evidenced that East Asian firms' IPO stocks are issued at higher discounted prices post Asian Financial Crisis 1997. Similar results are also concluded by Li, et al in the study of IPO stocks in China post-2008 Global Financial crisis. The increased uncertainty in the market post-financial crisis explained the phenomenon [4,5].

Some researchers have conducted a study of Covid-19 impacts on financial markets as well as on IPO markets Baker, et. al. Most of these studies concluded that the uncertainty of the pandemic coupled with the government responses to lockdowns adversely impacted the quality of IPOs and market performance [6-10].

Most of the study of Covid-19's impact on IPOs focuses on Western developed countries' markets and China. Limited research was conducted on developing countries such as South

---

East Asia. This research, therefore, attempts to investigate the under-pricing phenomenon and short-term performance of IPO stocks in Thailand to find out whether the conclusions drawn on the above studies in Western markets and China are also observed in Thailand.

This research attempts to achieve the following objectives:

- To evaluate whether the significant market shock of the Covid-19 pandemic increases the under-pricing of IPOs in Thailand Stock Exchange.
- To evaluate whether the significant market shock of the Covid-19 pandemic adversely affects the short-term performance of IPOs in Thailand Stock Exchange.
- To examine the view that IPO under-pricing is sensitive to overall fear due to the COVID-19 pandemic.
- To examine the view that IPO short-term performance is sensitive to fear of the pandemic.

## 2. Theoretical Framework

Baig and Chen analyzed IPO stock performance during the Covid-19 pandemic. Using 421 IPOs in the US market from January 2018 to December 2020, they studied IPO performance in the period before and during the pandemic [6]. They concluded that average IPO firms experience larger underpricing and more post-IPO return volatility during the pandemic. They also found that increased severity in government responses through lockdowns and border control increased the volatility of post-IPO returns. Fedorova, et. al. (2022), on the other hand, concluded that strict government anti-Covid-19 measures indeed contribute to the reduction of the IPO underpricing.

Tutuncu studied IPO performance under the Covid-10 influence in the Turkish Stock Exchange and found that the pandemic IPOs provide significantly larger short-term returns than pre-pandemic IPOs measured up to one month [11]. Underpricing during the pandemic is not significantly greater due to 10% daily price limit, which leads to a gradual release of retail investor appetite and improved short-term performance of the IPO stocks. The research also found a shift in the demographic of investors in the IPO market during the pandemic with an increase of retail investors to 66% of the market during the pandemic against 35% before the pandemic while foreign institutional investors market share declined significantly from 53% before the pandemic to only 6% during the pandemic.

Salisu and Akanni provided justification for the need to construct a global fear index for the Covid-19 pandemic [12]. Policymakers such as government authorities and healthcare agencies are faced with an uphill decision of balancing public health crisis and economic disruption as the pandemic worsened. Information about the public panic on the pandemic will offer good insights into the extent of sacrifice the government and its people can endure economic suffering and mobility restriction imposed by lockdowns and movement controls. They also argued that the pandemic fear will influence companies' decision in issuing securities in financial markets and individuals, as well as corporations' decision to participate in financial markets. They recommended using number of reported cases and number

of reported deaths daily to measure the public fear level of Covid-19 as both sets of data are widely reported in media globally, therefore, directly influencing the public perception of the seriousness of the pandemic. Analysing the effect of fear on stock market performance during significant market shocks has also been used by many researchers before this [13,14].

Another study by Mazumder and Saha looked into the fear of the Covid-19 pandemic on IPO performance using samples from US IPO stocks from January 2019 to June 2020 [15]. The study concluded that although the market-adjusted initial returns of the IPO in the year 2020 were higher than that of the last four decades, thus, evidence of greater underpricing during the pandemic period, it decreases with the increased fear of the pandemic [12,16]. The severity of pandemic fear was measured by an equally weighted index of daily cases and daily death in the US. This measurement was also used by Salisu and Akanni and Salisu, et. al.

Yu conducted a similar study on European IPO stocks from the period of January 2020 to March 2021 [7]. The study was based on IPO stocks in the top eight European IPO markets by capital raised in 2020 namely Norway, United Kingdom, Sweden, France, Netherlands, Germany, Poland, and Italy. The research found that the average first-day returns of Norwegian IPOs reached 20.5% in the year 2020 and 16.2% in the first quarter of 2021, compared to around 2% in the previous 3 years.

Xiong, et. al analyzed the impact of Covid-19 on the stocks' performance of Chinese A-share listed firms using 3518 firm samples [9]. The study concluded that firms in vulnerable industries recorded significantly lower cumulative average returns (CAR) around the outbreak of Covid-19. These negative impact industries include transportation, food and beverage retail, hotel and tourism, real estate, video entertainment, and construction industry [17].

## 3. Methodology

### 3.1. Research Design

The dependent variables for this research are:

- **IPO under-pricing**

- This assesses by how much the IPO stock is undervalued, the level by which the issue price is fixed below the fair value of the stock. IPO under-pricing is assessed by the initial return percentage of the IPO stock on the day of listing. The initial return percentage is measured by the difference between the first-day trading closing price and the issue price of the IPO stock, divided by the issue price. A higher percentage of initial return implies a higher degree of underpricing in the IPO stock.

- **Short-term IPO performance**

- o Short-term IPO performance refers to the share price movements of the IPO stocks over approximately 30 days since the day of listing. The cumulative average return (CAR) of IPO stocks on day 30 post-listing date will be used to assess the short-term performance of the IPO stocks. The day 30 return is measured by the difference of the trading price on day 30 post-issue date to the issue price of the IPO dividend by the issue price.

• The independent variables used to study the impact of the above dependent variables are:

• **Covid-19 Pandemic**

The research attempts to study the impact of the Covid-19 pandemic on IPO returns by comparing the IPO returns of the pre and post-pandemic period. As such, the pandemic period is one of the independent variables used in this research.

• **Fear factors of the Covid-19 pandemic**

The number of daily new cases of Covid-19 and the number of daily deaths in a country are used to assess the level of fear factor in the pandemic [12,16]. An equally weighted index of daily cases and daily death in a country will be used to measure this fear factor as used by Salisu and Akanni and Salisu, et. al.

The hypotheses developed for this study are as follows:

H1: Covid-19 pandemic increases the level of under-pricing of IPO stocks in the Thailand Stock Exchange

H2: Covid-19 pandemic adversely affecting the short-term performance of IPO stocks in the Thailand Stock Exchange

H3: The higher the fear index of Covid-19, the lower the initial returns of IPO stocks

H4: The higher the fear index of Covid-19, the lower the subsequent daily returns of IPO stocks

The research focuses on studying the IPO performance of companies newly listed on the Thailand Stock Exchange. A total of 168 IPO stocks from the year 2017 to 2022 were analyzed. IPO stock prices and Thailand stock exchange indices are collected on the first day of listing and the 30th trading day post-listing date. The IPO stocks returns and adjusted returns are then computed. Hypotheses are tested using multiple regression analysis and the SPSS software package and conclusions are made [6]. Control variables will be used in the regression analysis to test the hypotheses based on the mechanism used by Baig and Chen, Mazunder and Saha and Li, et. al. The control variables used in the regression analysis are the number of staff, net assets value per share, IPO price, Price-earnings ratio, Price-book value ratio, and equity beta [5,15]. These control variables are used to control the effect of firm size and value on the findings. All the data were obtained from Refinitiv (Thompson Reuters) data stream.

**3.2. Data Collection Methodology**

Following conventional IPO studies, initial returns and subsequent post-listing trading days cumulative average returns (CAR) of the 168 IPO stocks are computed.

Initial returns are calculated based on:

$$IR = (CPI - OPI) / OPI$$

where

- IR is the initial return on the first day of trading
- CPI is the closing stock price on the first day of trading
- OPI is the offer price of the IPO

The market returns on the first trading day of the IPO are also computed for Thailand Stock Exchange:

$$MRi = (CMIi - OMIi) / OMIi$$

where

- MRi is the market return on the first day of trading
  - CMIi is the closing market index on the first day of trading
  - OMIi is the opening market index on the first day of trading.
- The adjusted initial returns (Adj IR) are then computed for the IPO stocks:

$$Adj IR = IR - MRi$$

The Adj IR is used to assess the level of under-pricing in IPO. To assess the short-term performance of IPO, CAR based on 30 day holding period post IPO trading is computed.

$$CARt = (CPT - OPI) / OPI$$

where

- CARt is the cumulative average return of IPO stock at time t (with t being day 30 after the IPO listing date)
- CPT is the closing stock price at time t (with t being day 30 after the IPO listing date)
- OPI is the offer price of the IPO

Similarly, market returns for 30 days holding period post-IPO period are calculated:

$$MRt = (CMIt - OMIi) / OMIi$$

where

- MRt is the market return at time t (with t being day 30 after the IPO listing date)
- CMIi is the closing market index at time t (with t being day 30 after the IPO listing date)
- OMIi is the opening market index on the first day of trading.

Adjusting the market returns on day 30 post-IPO period, the adjusted CAR for the IPO stocks on day 30 post listing are calculated:

$$Adj CARt = CARt - MRt$$

where

- Adj CARt is the adjusted cumulative average return at time t (with t being day 30 after the IPO listing date)
- MRt is the market return at time t (with t being day 30 after the IPO listing date)

The fear index is computed using the methodology engaged by Salisu and Akanni and Salisu et. al. Two indices are first computed, namely, the reported case index (RCI) and the reported death index (RDI) [12,16].

RCI measures the degree of change in society's expectation of the spread of the Covid-19 pandemic by comparing the present-day reported cases to the sum of the present-day and previous 14-day incubation period reported cases. This indicates as to whether the virus spread has intensified or become milder, thus affecting the level of fear in society. The 14-day incubation period is based on the WHO announcement of the scientifically supported period between catching the virus and the emergence of symptoms of the disease.

RCI is computed as follows:

$$RCI = \frac{\text{Reported cases}}{\text{Reported cases} + \text{Reported cases at the start of the incubation period}}$$

The index is measured in percentage points, with higher values representing greater fear of the virus spreading in the community.

RDI measures the change in the expectation of the degree of seriousness of the disease based on the number of reported deaths of the present day to the total number of deaths of the present day and the number of deaths 14 days before, defined as the incubation period. This assesses the mortality rate of the pandemic which could be an indication of whether the virus has become more dangerous, the health system is breaking down due to over-demand, or both. Measured as a percentage point, a higher value also indicates a higher level of fear in society over the pandemic.

RDI is computed as follows:

$$RDI = \frac{\text{Reported deaths}}{\text{Reported deaths} + \text{Reported deaths 14 days ago}}$$

The fear index is then computed by assigning equal weight to both indices. The higher the fear index, the greater the fear of the pandemic.

To study the impact of IPO under-pricing and short-term performance before and during the covid-19 pandemic, we have chosen March 2020 as the relevant cut-off the time when the world started its unprecedented nationwide lockdowns [6,15]. The variable, from March 2020 onwards is dummy coded as 1 and 0 otherwise.

The empirical analysis of hypothesis 1 will be done using the following regression equation:

$$\text{IPO under-pricing} = \alpha + \beta_1 \text{POST}_i + \beta_2 \text{NOS}_i + \beta_3 \text{NVPS}_i + \beta_4 \text{IPOP}_i + \beta_5 \text{PER}_i + \beta_6 \text{PER}_i + \beta_7 \text{Beta}_i + \epsilon_i \dots \text{model 1}$$

where:

POST = time indicator of the Covid-19 pandemic period

NOS = number of staff

NVPS = net assets value per share

IPOP = IPO price

PER = Price earnings ratio

PBV = Price book value ratio

Beta = share's beta

Short-term abnormal returns of IPO stocks, based on 30 day holding period after IPO listing, will then be analyzed using the regression formula below to test hypothesis 2 for the Covid-19 pandemic impact on IPO short-term performance:

$$\text{Short-term abnormal return} = \alpha + \beta_1 \text{POST}_i + \beta_2 \text{NOS}_i + \beta_3 \text{NVPS}_i + \beta_4 \text{IPOP}_i + \beta_5 \text{PER}_i + \beta_6 \text{PER}_i + \beta_7 \text{Beta}_i + \epsilon_i \dots \text{model 2}$$

The next stage of the research is to study the impact of fear factors on behavioral decision-making and IPO returns. The initial returns (IR) of the IPO stocks during the pandemic, covering the period from March 2020 to June 2020, are regressed against the fear factor and control variables identified above using the following equation:

$$IR_i = \alpha + \beta_1 \text{HighFear}_{i-1} + \beta_2 \text{NOS}_i + \beta_3 \text{NVPS}_i + \beta_4 \text{IPOP}_i + \beta_5 \text{PER}_i + \beta_6 \text{PER}_i + \beta_7 \text{Beta}_i + \epsilon_i \dots \text{model 3}$$

where:

HighFear i-1 = fear index

HighFear<sub>i-1</sub> is a dummy variable 1 if the fear index is more than the median value one day before the IPO's first trading day and 0 otherwise. This will test hypothesis 3.

Finally, we extend our analysis of the fear factor to examine how the fear factor of Covid-19 affects the short-term performance of IPO firms. IPO returns (CAR) on day 30 following the listing day are used for this purpose. Below equation is used to test hypothesis 4.

$$\text{CAR}_i = \alpha + \beta_1 \text{HighFear}_{i-1} + \beta_2 \text{NOS}_i + \beta_3 \text{NVPS}_i + \beta_4 \text{IPOP}_i + \beta_5 \text{PER}_i + \beta_6 \text{PER}_i + \beta_7 \text{Beta}_i + \epsilon_i \dots \text{model 4}$$

#### 4. Results and Discussion

Statistical analysis of Thailand IPO stocks under-pricing with the Covid-19 pandemic Table 1 shows the model fit and reliability of the multiple regression models used to test all the hypotheses in this research. R squared between 10% and 50% is acceptable for social science research (Ozili, 2022). The adjusted R squared for all the models was acceptable. The p-value of <0.001 indicates all the models are significant in predicting under-pricing and short-term IPO performance at 1% significant level.

	Model Summary		Annova	
	R squared	Adjusted R squared	F-value	Sig (p-value)
Model 1	0.595	0.544	11.557	<0.001
Model 2	0.556	0.499	9.838	<0.001
Model 3	0.591	0.509	7.210	<0.001
Model 4	0.630	0.556	8.520	<0.001

Model 1 analyzed the dependent variable Adj IR with 7 independent variables, namely, Covid-19 time indicator, IPO price, net asset value per share, no of staff, PER, PBV, and beta. Model 2 analyzed the dependent variable Adj CAR with the same 7 independent variables. Model 3 analyzed the dependent variable Adj IR with 7 independent variables, namely, the fear factor of Covid-19, IPO price, net asset value per share, no of staff, PER, PBV, and beta. Model 4 analyzed the dependent variable Adj CAR with the same 7 independent variables.

(Source: Thompson Reuters Data Stream and SPSS)

**Table 1: Multiple regression analysis of Covid-19 impact on Thailand IPO stocks returns: model summary and Annova**

Table 2 shows the multiple regression beta coefficient values and their significance level for the multiple regression equations used in this research. Model 1 is used to test hypothesis 1. Model 1 shows a positive coefficient beta for the Covid-19-time indicator, the adjusted IR has a positive relationship with the Covid-19-time indicator. This means the adjusted IR for the IPO stocks

was higher during the Covid-19 pandemic period than before the pandemic. Model 1 indicates that the Covid-19 pandemic does have a significant impact on the level of under-pricing in Thailand IPO stocks at 10% significant level as the p-value is 0.087 (t-value 1.744), hypothesis 1 is accepted.

	Model 1: Adjusted IR			Model 2: Adjusted CAR		
	Standardized coefficient beta	t-value	Sig.	Standardized coefficient beta	t-value	Sig.
IPO Price	-0.945	-4.030	<0.001	-1.075	-4.377	<0.001
Net assets value per share	0.792	2.841	0.006	1.105	3.787	<0.001
No of staff	-0.102	-0.735	0.465	-0.268	-1.851	0.069
Covid-19 Pre/Post	0.160	1.744	0.087	0.191	1.990	0.052
PER	0.070	0.778	0.440	0.085	0.900	0.372
PBV	0.760	7.282	<0.001	0.731	6.689	<0.001
Beta	-0.70	-0.805	0.424	0.046	0.507	0.614

Model 1 analyzed the dependent variable Adj IR with 7 independent variables, namely, Covid-19 time indicator, IPO price, net asset value per share, no of staff, PER, PBV, and beta. Model 2 analyzed the dependent variable Adj CAR with the same 7 independent variables

(Source: Thompson Reuters Data Stream and SPSS)

**Table 2: Multiple regression analysis of Covid-19 impact on Thailand IPO stocks returns: Independent variables coefficients.**

Statistical Analysis of Thailand IPO Stocks' short-term performance with the Covid-19 Pandemic Table 2 shows the multiple regression beta coefficient values and their significance level for the multiple regression equations used to test hypothesis 2. Model 2 shows a positive coefficient beta for the Covid-19 time indicator of 0.191, the adjusted CAR has a positive relationship with the Covid-19 time indicator. Model 2 indicates the Covid-19 pandemic significantly affects the short-term performance of Thailand IPO stocks at 10% significant level as the p-value is 0.052 (t-value 1.990). Hypothesis 2 is accepted.

IPO stocks under-pricing Table 3 shows the multiple regression beta coefficient values and their significance level for the multiple regression equations used to test hypothesis 3. Model 3 shows a negative coefficient beta for the fear factor of Covid-19, the adjusted IR has a negative relationship with the fear factor of Covid-19. The higher the level of fear in the market, signaled by the number of reported cases and death of Covid-19 daily, the lower the initial returns of the IPO stocks. The fear factor of the Covid-19 pandemic does have a significant impact on the level of under-pricing in Thailand IPO stocks as the p-value is 0.057 (t-value -2.553), hypothesis 3 is accepted.

Statistical analysis of the fear factor of Covid-19 on Thailand

	Model 3: Adjusted IR			Model 4: Adjusted CAR		
	Standardized coefficient beta	t-value	Sig.	Standardized coefficient beta	t-value	Sig.
IPO Price	-1.134	-3.145	0.003	-1.248	-3.577	0.001
Net assets value per share	0.966	1.999	0.053	-1.186	2.504	0.017
No of staff	-0.148	-0.597	0.554	-0.289	-1.181	0.246
The fear factor of Covid-19	-0.131	-2.553	0.057	-0.246	-2.187	0.036
PER	0.084	0.737	0.466	0.043	0.400	0.691
PBV	0.792	6.222	<0.001	0.737	5.954	<0.001
Beta	-0.054	-0.482	0.633	0.055	0.517	0.608

Model 3 analyzed the dependent variable Adj IR with 7 independent variables, namely, the fear factor of Covid-19, IPO price, net asset value per share, no of staff, PER, PBV, and beta. Model 4 analyzed the dependent variable Adj CAR with the same 7 independent variables

(Source: Thompson Reuters Data Stream and SPSS)

**Table 3: Multiple regression analysis of the fear factor of Covid-19 impact on Thailand IPO stocks returns: Independent variables coefficients**



4Statistical Analysis of Thailand IPO Stocks Short-term Performance with the fear factor of the Covid-19 Pandemic Table 3 shows the multiple regression beta coefficient values and their significance level for the multiple regression equations used to test hypothesis 4. Model 4 indicates Covid-19 pandemic fear factor does have a significant impact on the short-term performance of Thailand IPO stocks, at 5% significant level, as the p-value is 0.036 (t-value -2.187). Hypothesis 4 is accepted.

## 5. Conclusions & Recommendations

### 5.1. Conclusions

Table 4 summarises the findings of the Covid-19 pandemic on the hypotheses developed in this research. Hypothesis 1 is accepted, the Covid-19 pandemic significantly increases the level of under-pricing in Thailand IPO stocks. This coincides with the findings of Baig and Chen which found that US IPO stocks are on average more under-priced in the pandemic period compared to pre-pandemic period and Yu's observation that Norwegian IPO average first day returns are significantly higher

in year 2020 as compared to previous three years. Hypothesis 2 is accepted, the Covid-19 pandemic is adversely affecting the short-term performance of Thailand IPO stocks [6,7]. This matches Baig and Chen's findings that increased severity in government responses through lockdowns and border control in response to the Covid-19 pandemic adversely affected the post IPO returns. Hypothesis 3 is accepted; the fear index of Covid-19 pandemic does have significant impact on the initial returns of IPO stocks in Thailand. Hypothesis 4 is also accepted; the fear index of the Covid-19 pandemic does have significant adverse impact on the subsequent daily returns of Thailand IPO stocks. This supports Mazumder and Saha's findings that the short-term performance of IPO stocks decreased when the level of fear factor is higher in the market. This also supports the findings of Badshah, et. al. which concluded that there is significant positive relationship between the changes in the fear index and changes in market volatilities for an emerging market. Thailand's financial market is an emerging market. Prospect theory of behavioral finance is supported [14,15].

Hypothesis	Description	Findings
H1	The Covid-19 pandemic increases the level of under-pricing of IPO stocks in Thailand market.	ACCEPTED
H2	The Covid-19 pandemic is adversely affecting the short-term performance of IPO stocks in Thailand market.	ACCEPTED
H3	The higher the fear index of Covid-19, the lower the initial returns of IPO stocks.	ACCEPTED
H4	The higher the fear index of Covid-19, the lower the subsequent daily returns of IPO stocks.	ACCEPTED

**Table 4: Hypothesis Findings on Stock Exchange of Thailand Under Covid-19 Pandemic**

### 5.2 Recommendations

The research focused on just the level of underpricing and short-term performance of the IPO market. Another popular research area in the IPO market is the long-term performance over 2 years or 3 years using the cumulative average returns as a measure of IPO performance. This research assessed the short-term performance of IPO based on 30 days holding periods. Other research on IPO has used 10 days, 20 days, and 30 days holding periods to observe different stages of short-term IPO performance. In many of the multiple regression equations used in this research, many of the control variables are found to be not significant in influencing the IPO under-pricing or short-term performance in the capital market surveyed. Further research can be conducted to explore and test these control variables on their significant relationship with IPO performance.

IPO performance may depend on some macroeconomic and business cycle movements. Some macroeconomic variables such as GDP, interest rate and inflation rate may be included in the multiple regression model as control variables. However, past researches have shown significant relationship between some specific firms' factors, such as PER, Beta and ROA with macroeconomic factors such as GDP, interest rate and inflation rate [18]. Researchers need to be careful of possible multicollinearity problem when regressing them together.

## References

1. Wiryawan, I. W. G. (2023). The Impact of the COVID-19

- Pandemic on Layoffs, Income and Social Protection of Workers in Indonesia. *Revista de Gestão Social e Ambiental*, 17(4), e03474-e03474.
- Omotoy, J.F. (2023) Examining college students' self-efficacy in the online learning environment system during the Covid-19 pandemic: Implications for higher education institutions. *Journal of Social and Environment Management*, 17 (5), 1-14.
- Polii, H. R. L., Soewignyo, F., Sumanti, E. R., & Mandagi, D. W. (2023). Predictive Ability of Financial and Non-Financial Performance for Financial Statement Publication Time Frame: Moderating Role of Covid-19 Pandemic. *Revista de Gestao Social E Ambiental*, 17(2), e03346-e03346.
- Song, K. R., & Lee, Y. (2012). Long-term effects of a financial crisis: Evidence from cash holdings of East Asian firms. *Journal of Financial and Quantitative analysis*, 47(3), 617-641.
- Li, R., Liu, W., Liu, Y., & Tsai, S. B. (2018). IPO underpricing after the 2008 financial crisis: A study of the Chinese stock markets. *Sustainability*, 10(8), 2844.
- Baig, A. S., & Chen, M. (2022). Did the COVID-19 pandemic (really) positively impact the IPO Market? An Analysis of information uncertainty. *Finance Research Letters*, 46, 102372.
- Yu, J. (2021). *IPO Activity in Europe under the Covid-19 Pandemic: With a focus on the Norwegian IPO market* (Master's thesis).
- Ashraf, B. N. (2020). Stock markets' reaction to COVID-19:

- 
- Cases or fatalities?. *Research in international business and finance*, 54, 101249.
9. Xiong, H., Wu, Z., Hou, F., & Zhang, J. (2020). Which firm-specific characteristics affect the market reaction of Chinese listed companies to the COVID-19 pandemic?. *Emerging Markets Finance and Trade*, 56(10), 2231-2242.
  10. Zhang, D., Hu, M., & Ji, Q. (2020). Financial markets under the global pandemic of COVID-19. *Finance research letters*, 36, 101528.
  11. Tutuncu, L. (2023). The changing investor demographics of an emerging IPO market during the COVID-19 pandemic. *China finance review international*, 13(3), 342-361.
  12. Salisu, A. A., & Akanni, L. O. (2020). Constructing a global fear index for the COVID-19 pandemic. *Emerging Markets Finance and Trade*, 56(10), 2310-2331.
  13. Narayan, P. K. (2019). Can stale oil price news predict stock returns?. *Energy Economics*, 83, 430-444.
  14. Badshah, I., Bekiros, S., Lucey, B. M., & Uddin, G. S. (2018). Asymmetric linkages among the fear index and emerging market volatility indices. *Emerging Markets Review*, 37, 17-31.
  15. Mazumder, S., & Saha, P. (2021). COVID-19: Fear of pandemic and short-term IPO performance. *Finance research letters*, 43, 101977.
  16. Salisu, A. A., Akanni, L., & Raheem, I. (2020). The COVID-19 global fear index and the predictability of commodity price returns. *Journal of behavioral and experimental finance*, 27, 100383.
  17. Hassan, T. A., Hollander, S., Van Lent, L., Schwedeler, M., & Tahoun, A. (2020). Firm-level exposure to epidemic diseases: Covid-19, SARS, and H1N1 (No. w26971). National Bureau of Economic Research.
  18. Andersson, A. (2015) Smart Beta Investment Based on Macroeconomics Indicators. KTH Royal Institute of Technology.
  19. Baker, E. D., Boulton, T. J., Braga-Alves, M. V., & Morey, M. R. (2021). ESG government risk and international IPO underpricing. *Journal of Corporate Finance*, 67, 101913.
  20. Fedorova, E., Chertsov, P., & Kuzmina, A. (2023). COVID-19: the impact of the pandemic fear on IPO underpricing. *Journal of Financial Reporting and Accounting*, 21(4), 820-846.
  21. Ozili, P. K. (2023). The acceptable R-square in empirical modelling for social science research. In *Social research methodology and publishing results: A guide to non-native english speakers* (pp. 134-143). IGI Global.

**Copyright:** ©2024 Franco Gandolfi, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.