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# Are Malaysian IPO Investors Influenced by Sentiment Factors or Fundamental Factors?

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**Abstract: Research Question:** This study constructs and employs a composite market sentiment index, and a full range of issue, firm, and market characteristics variables to study Initial Public Offering (IPO) markets in Malaysia. **Motivation:** Radical changes in the Malaysian financial environment, particularly changes in Malaysia's capital market structure in the past few decades, may have increased heterogeneity in the composition of participants and impacted investors' risk-taking behavior. This study provides a more comprehensive understanding of the dynamics that shape IPO behavior in Malaysia. **Idea:** The main objective of this study is to study market sentiment and Malaysian IPOs. To determine whether Malaysian IPOs underpriced, and to identify their key determinants from behavioral and fundamental perspectives. **Data:** This study investigates 571 IPOs firms listed on Bursa Malaysia from January 2000 to December 2020. **Method/Tools:** Multiple and binary regression models are employed to examine the determinants of IPO underpricing. Additionally, interaction analysis and marginal probability analysis are used to explain the short-run IPO share performance. Three different methods are used to construct the Malaysian IPO Market Sentiment Index: (1) Baker and Wurgler's (2007) Principal Component Analysis method; (2) Jiang *et al.*'s (2022) Scaled Principal Component Analysis method; and (3) Huang *et al.*'s (2015) Partial Least Squares method. **Findings:** This study found that overall the Malaysian IPOs underpriced by 28.48% based on the market-adjusted initial return. The findings evidence that sentiment factor plays a significant role in the short-run IPO share performance. The results of this study is consistent with the study by Leite (2005) shown that the presence of sentiment investors in IPOs reduces the winner's curse problem (Rock's hypothesis) in the issue by increasing the relative probability for the least-informed (rational) investor to be allocated underpriced shares. **Contributions:** This study acknowledges the limitations of neoclassical finance theories in explaining the behavior of investors in Malaysian IPO markets. By incorporating behavioral finance theories, this study recognises that fundamental factors might not be the sole driver of investor decisions. This shift in focus toward market sentiment and psychology adds a fresh perspective to understanding IPO underpricing.

**Keywords**: Malaysian IPOs, market sentiment, behavioral finance, neoclassical finance, multiple regression model, binary regression model.

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**JEL Classification**: X10, X12, X14

## 1. Introduction

In the past decade, there has been growing attention on the impact of investor sentiment on IPO underpricing and share market performance. Neoclassical finance theories, including the Efficient Market Hypothesis (EMH) and random walk theory, failed to consider investor sentiment as a factor in explaining the diverse behavior of investors. However, behavioral finance theories present an alternative model that recognises market rationality. These theories reveal how investor psychology influences market fluctuations, with Baker and Wurgler (2006) asserting that market sentiment influences investor speculation on share prices, often disregarding fundamental factors.

Empirical studies have explored short-run IPO underpricing on both international and local scales. The majority of these studies have been conducted in developed countries such as the United States (US) and European markets. Researchers such as Ibbotson (1975), Ibbotson and Jaffe (1975), Beatty and Ritter (1986), Tinic (1988), and Ibbotson *et al.* (1994) have documented IPO underpricing in the US market ranging from 10.0% to 15.0%. The phenomenon of short-run IPO underpricing appears to be more pronounced in developing countries. For instance, Dawson (1987) conducted a study on short-run share performance in three Asian markets: Malaysia, Hong Kong, and Singapore. The study revealed that Malaysia reported the highest IPO underpricing at 166.5%. Moreover, Ritter (2003) found that average initial returns for IPOs in 33 countries ranged from 13.6% to 388% in developing countries and 4.2% to 54.4% in developed countries.

Radical changes in Malaysia's financial environment, particularly changes in its capital market structure over the past few decades, may have led to increased heterogeneity among market participants and affected investors' risk-taking behavior. The study of investor sentiment in developing economies with rapidly growing capital markets is still in its early stages, and the impact of investor sentiment on the IPO market has received less exploration compared to previous research, which primarily focused on the influence of investor sentiment on investment returns. Furthermore, according to the Bursa Malaysia Research and Data Centre, between 1991 and 2003, an average of 91.35% of investors consisted of individual traders who were typically uninformed. These investors often based their trades on information from various sources, leading to a significant relationship between IPO underpricing and trading volume behavior (Chong, 2009).

The objective of this study is to enhance our understanding of the short-run performance of Malaysian IPOs and evaluate the impact of changes in Malaysia's capital market structure on IPO performance. While Albada and Yong (2017) focused on fundamental finance theories and factors such as information asymmetry, underwriter reputation, ownership structure, share lock-up period, pricing mechanisms, and institutional investor involvement, the present study extends their research by investigating the impact of investor sentiment and psychology on IPO underpricing. Through the incorporation of behavioral finance theories, this study aims to offer a more comprehensive understanding of the factors shaping IPO behavior in Malaysia. In pursuing a deeper understanding of the short-run performance of Malaysian IPOs and assessing the influence of changes in Malaysia's capital market structure on IPO performance, this study posits that sentiment factors play a significant role in shaping the short-run performance of Malaysian IPOs, while changes in the capital market structure exert a substantial impact on overall IPO performance.

## 2. Evidences on Changes in Malaysia's Capital Market Structure

Malaysia stock market is known as Malaysian Stock Exchange prior to changing its name to Bursa Malaysia Securities Berhad (Bursa Malaysia) on 14 April 2004. At that time, the

Malaysia stock market contains three listing boards namely Main Board, Second Board and Malaysian Exchange of Securities Dealing and Quotation Berhad (MESDAQ). Main Board is catered for larger sized firms, whereas for small and medium sized firms will seek to be listed on Second Board. For high revenue growth and technology firms that intend to raise funds from the stock market will be recommended to be listed on MESDAQ. In August 2009, Main Board and Second Board were merged and renamed as Main Market, and MESDAQ was renamed as ACE Market stands for “Access, Certainty, Efficiency”. ACE Market was established for firms that are technology based with high growth in revenue intend to raise funds via primary market. In December 2017, a new listing board has been introduced by Bursa Malaysia named Leading Entrepreneur Accelerator Platform Market (LEAP) Market. This market is mainly for small and medium firms to raise funds in the capital market which are unable to meet the listing criteria for Main Market and ACE Market (Yaakob and Halim, 2016). Such changes in board listing has affected IPO processes by the relevant authorities.

Figure 1 shows the Malaysia IPOs market trend from 1991 to 2020. Low and Yong (2011) document that in Malaysia stock market the most employed mechanism is the fixed price mechanism. With that, issuing firms and underwriters have minimal information about market demand for the new issuance of IPO shares. Given the uncertainty about the true value of the IPO, differences in opinions among investors are likely to occur as potential investors make different estimates of their expected return from the investment. Since prospective IPO investors have no opportunity to reveal their beliefs in offerings that employ fixed-price mechanism, divergence of opinions among IPO investors is believed to be the greatest in fixed-price IPOs. In Malaysia, given that most of the IPOs are priced using the fixed-price offer system, differences in opinions among investors are likely to be high. For the reason that differences in opinions have important behavioral implications, in this study, we examine factors that could potentially explain the level of IPO underpricing in Malaysia among IPO investors from fundamental and behavioral perspectives.

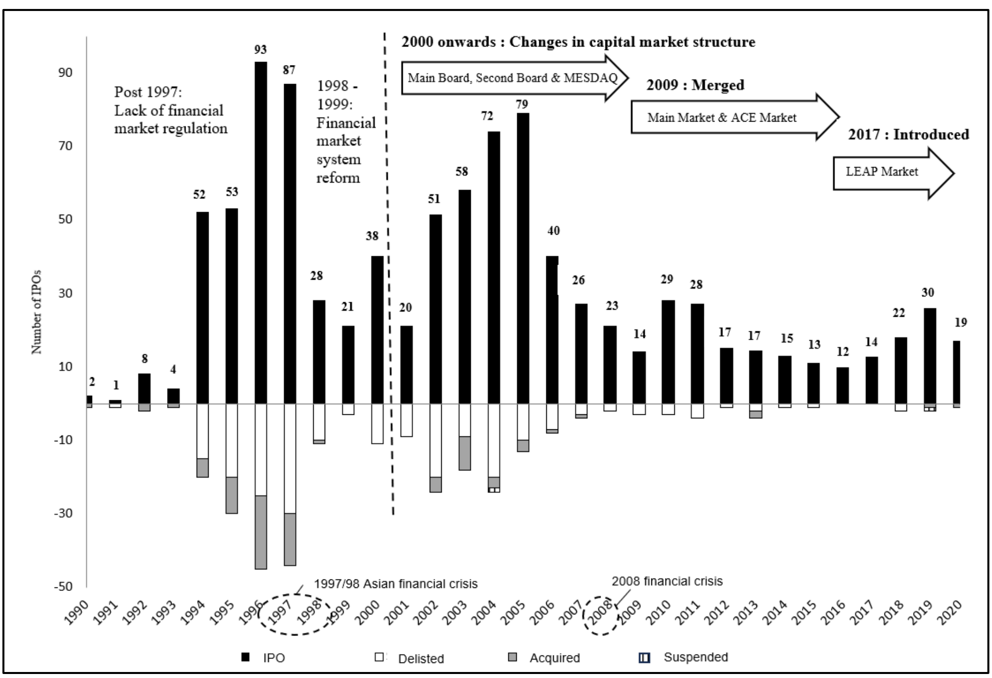


**Figure 1:** 30-year total number of IPOs, delisted, acquired and suspended cases

## 3. Literature Review

### 3.1 Stock Market Reaction Determinants

There are many factors that can affect or disrupt share prices and the market (Atiq *et al.*, 2010). Studies done by Atiq *et al.* (2010), and Al-Tamimia *et al.* (2011) prove that the determinants of stock market share prices include, company ideologies, extraneous factors, and outlook (investor behavior).

Sentiment is defined as the opinions, views and emotions of an individual or group. Meanwhile, market sentiment refers to the expectations and outlook of the entire market (Thorp, 2004). Chang *et al.* (2008) state that the sentiments of investors in the market is quantified by considering the investor's sentiment. Market sentiment, which is often subject to the bias and obstinacy of the individuals in the market is the subject of exploration and discussion in a nascent field of study called behavioral finance. Behavioral finance studies investor conduct and how it affects the prices of shares in the stock market (Haritha and Uchil, 2016). Figure 2 is a visual representation of how the market outlook leads investor's outlook and the behavioral pitfalls that affect sound business and economic judgments.

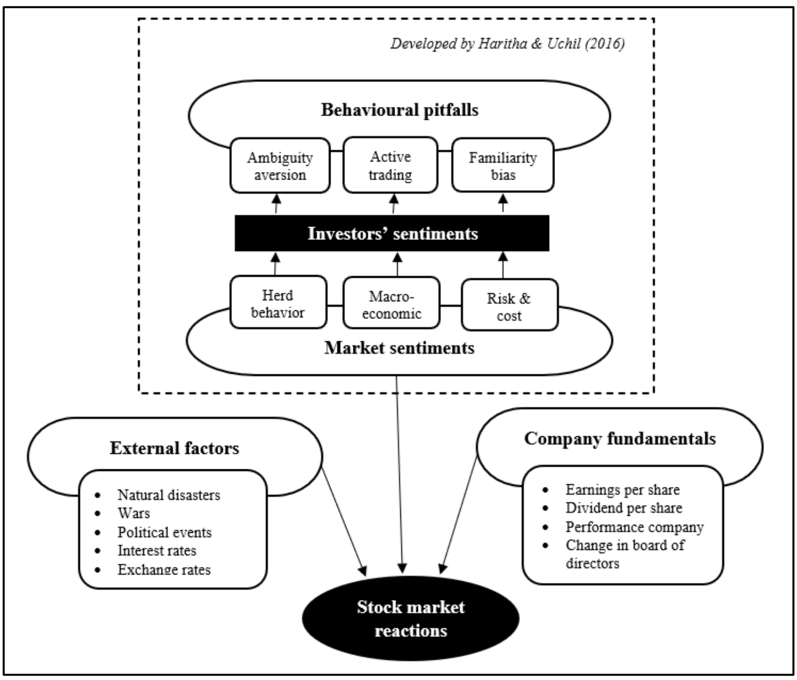


**Figure 2:** Determinants of stock markets' reaction

### 3.2 Theoretical Explanations for Short-Run IPO Share Performance

Ljungqvist (1997) classify the theories of IPO underpricing into three broad categories:

(i) information asymmetry based theories;
(ii) institutional based theories; and
(iii) behavioral based theories.

Albada and Yong (2017) find that the average initial return of the Malaysian IPO market is still quite high; perhaps due to the 'still' high level of information asymmetry in the Malaysian IPO market. For institutional based theories of IPO underpricing focus on the marketplace lawsuit and price stabilisation function of the underwriter. There are two main intuitional based theories to explain IPO underpricing. These are legal liability hypothesis (lawsuit hypothesis) and price stabilisation hypothesis. Both of these scenarios are not commonly found in Malaysia stock market; thus, these theories are not apply to Malaysian IPOs. Behavioral theories explained the underpricing phenomena in the presence of 'irrational investors' who opt to purchase IPO's shares beyond their intrinsic value. Yong (2011) examines the bandwagon effect on Malaysian IPOs it shows an 'increased interest' in a particular IPO which resulted in increase in its initial returns were brought in by a group of informed investors in an IPO exercise compared to uninformed investors. Their existence results in high trading activities among investors, as indicated by a higher dispersion of initial returns. This findings evidence the existence of a group of informed investors can create a bandwagon effect when the market overreacts to the underpricing of an IPO.

## 4. Data and Methodology

### 4.1 Data and Sample Selection

In this study, all the sample data of IPOs issuing firms selection must be based on the following conditions. First, IPOs includes the IPO's issuing firms listed on Bursa Malaysia from January 2000 to December 2020 (past 20 years). Second, the sample data of IPOs identified for this study were from Main Board and Second Board, which subsequently merged into Main Market after August 2009, and MESDAQ renamed as ACE Market. Third, the eligible offerings considered in this study are limited to those conducted through public issues, offers for sale, or a combination of both, specifically involving the issuance of shares. This is consistent with prior study conducted by Abdul-Rahim and Yong (200) and Yong (2007), certain types of IPOs are excluded from the final sample. These exclusions encompass restricted offer-for-sale, restricted public issue, restricted offer-for-sale to eligible employees, restricted offer-for-sale to Bumiputera investors (referring to Malaysia and other indigenous people in Peninsular and East Malaysia), special and restricted issues to Bumiputera investors, tender offers, and special issues. The rationale behind these exclusions is to avoid including Malaysian companies with a typical types of issuances that may yield less meaningful outcomes in the analysis.

This study has covered the longest sample period (post-2000) as compared to the rest of empirical study done for Malaysian IPOs. The sample period from January 2000 to December 2020 is selected because these periods are characterised by a significant amount of regulatory, policy, capital market changes are inevitably imparted on investor psychology and stock market development which translate to changes in listing boards.

The data collection process are completed following these steps. The first step is to collect all the names of IPO issuing firms that went for listing from January 2000 to December 2020 which are identified from Bursa Malaysia's database available on Bursa Malaysia's website. In the second step, hand collected data were extracted from each of the IPO firm's prospectus such as offer price, IPO period, offer size, total listing costs, total IPO proceeds, listing date, listing board, underwriters, firm age, and book value per share. In the third step, the secondary historical financial and market data such as share price and trading volume are extracted from Bloomberg. Finally, the survey-based data such as business conditions index and consumer sentiment index are obtained from Malaysian Institute of Economic Research's survey reports.

### 4.2 Methodology

*4.2.1 Construction of Malaysian IPO Market Sentiment Index*

In order to construct Malaysian IPO Market Sentiment Index (MIMSI) specifically tailored for the Malaysian stock market, this study has employed three different methods: Baker and Wurgler's (2007) analysis using Principal Component Analysis (PCA) method, Jiang *et al.*'s (2022) Scaled Principal Component Analysis (sPCA) method, and Huang *et al.*'s (2015) Partial Least Squares (PLS) method.

PCA is a multivariate method in which several unified quantitative variables describing the observations are reduced to produce single variable via dimensionality reduction. PCA aims to find and extract the most significant information from the data by compressing the size and simplifying the data without losing the important information (Abdi and Williams, 2010). sPCA is a new dimension reduction technique for supervised learning proposed by Huang *et al.* (2022). This method scales each predictor with its predictability for the target variable. Compared with the conventional PCA method, sPCA method improves the predictability for the target variable by capturing the useful information inside the target variable. According to Huang *et al.* (2022), the sPCA method could screen out noisier forecasters and assign shrinking weights to them by letting the target variable be the guide in the dimension reduction. They provide evidence that sPCA method generally improves the predictability of index compared to index generated using conventional PCA method, similarly, forecasting performance of index in the context of Malaysian IPO markets can be improved by using sPCA method. According to Huang *et al.* (2015), and Kelly and Pruitt (2014), compared with the conventional PCA method, the PLS method could separate the common noises which are irrelevant to the target variable from proxies, thus, leading to a more effective predictor.

In this study, Baker and Wurgler (2007) sentiment indicators are adopted as baseline regression because it is extensively accepted in various empirical studies. This study follows the same market-based sentiment measure adopted by Baker and Wurgler (2007) to formulate IPO market sentiment index namely, natural log of Share Turnover (TURN) representing the ratio of the trading volume to the total share capital, Number of IPOs (NIPO) representing the number of IPOs, First-day Returns of IPOs (RIPO) representing the first-day returns of IPOs, Dividend Premium (PDND) in this study, due to the availability of data in Malaysia the dividend premium was calculated using the fraction of net income of an issuing firm pays to its shareholders in the form of dividends, instead of the firm's dividend premium payable into between payers and non-payers at the end of financial year as explained by Baker and Wurgler (2007), and natural log of Equity Shares in New Issues (ESNI) representing total number of total equity and debt issues by all firms. The proxy of Close-End Fund Discount rate (CEFD) has been excluded in this study because there is only one close-end fund company listed on Main Market of Bursa Malaysia. Therefore, it could create biasness to analysis results. According to Naik and Padhi (2016), survey-based sentiment measure are commonly used in combination with market-based sentiment measure. In this study, we have selected two survey-based sentiment measure namely, business conditions index (BCI), and consumer sentiment index (CCI). The data of TURN, NIPO, RIPO, PDND, ESNI, BCI and CCI are compiled based on quarterly basis in accordance with an IPO firm's listing date.

The predictive regression in constructing of MIMSI is as follows:

$$\begin{aligned} SENT_{it} = {} & \beta_1 \, TURN_{it} + \beta_2 \, NIPO_{it} + \beta_3 \, RIPO_{it} + \beta_4 \, PDND_{it} + \beta_5 \, ESNI_{it} + \beta_6 \, BCI_{it} \\ & + \beta_7 \, CCI_{it} + \varepsilon_{it} \end{aligned} \tag{1}$$

However, the central issue revolves around the selection of sentiment proxy variables. Considering that the indices published by different countries vary and market rules differ, it becomes necessary for each country to adapt the set of proxy variables based on their specific conditions.

*4.2.1(a) Principal Component Analysis*

In this study, a composite index is created that captures the common component in the seven proxies while also accounting for the fact that certain variables take longer to convey similar attitude. PCA method is used to reduce the dimensionality of huge data sets by reducing a large set of variables into a smaller one that retains most of the information. It is a statistical procedure that, using orthogonal transformation, transform those variables into a set of values, named principal components. The transformation is defined in such a way that the first component explains the most variation and each succeeding component accounts for the highest variance possible. In very beginning standardisation is necessary, since PCA is sensitive to initial variable variances. Therefore, if initial variable ranges differ substantially, larger ranges will prevail, resulting in biased outcomes. To avoid such biasness, it is necessary to standardise the initial variables used as proxy for the composition of index. The equation below is representing the method for the standardisation of each proxy variable:

$$\mathcal{S}_t = \frac{I_{\mathrm{t}} - \bar{X}}{SD} \tag{2}$$

Here, $\mathcal{S}_t$ is representing standardised form of each proxy variable in time $t$, and $I$ stand for the value of specific observation in time. While $\bar{X}$ and $SD$ are the mean and standard deviations of the variable under standardisation process. The index begins by estimating the first principal component $PC_t$ via seven standardised proxies using lag and level forms in first stage of index generation. As per Baker and Wurgler (2007), the rule is to select the representation of each variable (among lag and level) having maximum correlation with $PC_t$ for optimal representation of each variable for second stage of index generation. Table 1 shows the pairwise correlation of first stage principal component with all lag and level form of proxies.

The results of correlations of first stage principal component with sentiment proxy variables in Table 1 suggested to select lagged for of $TURN, RIPO$ and $BCI$, and level form of other proxies i.e. $TURN, RIPO$ and $BCI$ for the second stage of index generation. Table 2 represents the results of second stage principal component analysis. Specifically, Panel A represents the proportion of total variance of all the sentiment proxies captured in each principal component. Panel B is represents the part of variance of each sentiment proxy coming into each principal component. By following the study of Baker and Wurgler (2007), this study uses first principal component ($C_1$) as sentiment index ($\mathrm{SENT}_t^{\mathrm{PCA}}$). The first principal component accounts for 38.04% of the variance observed in the data set, leading researcher to infer that a single factor captures significant portion of the shared variation.

**Table 1:** Correlation matrix of first principal component

| | $PC_t$ | $TURN_t$ | $NIPO_t$ | $RIPO_t$ | $P_t^{D-ND}$ | $ESNI_t$ | $BCI_t$ |
|---|---|---|---|---|---|---|---|
| $PC_t$ | 1.0000 | | | | | | |
| $TURN_t$ | 0.8692 | 1.0000 | | | | | |
| $NIPO_t$ | -0.6792 | -0.5259 | 1.0000 | | | | |
| $RIPO_t$ | -0.3419 | -0.2296 | 0.1517 | 1.0000 | | | |
| $P_t^{D-ND}$ | 0.7345 | 0.6557 | -0.3575 | -0.2061 | 1.0000 | | |
| $ESNI_t$ | 0.0318 | 0.0175 | 0.2795 | -0.0819 | 0.1618 | 1.0000 | |
| $BCI_t$ | 0.4238 | 0.4995 | 0.0615 | -0.1308 | 0.4651 | 0.2166 | 1.0000 |
| $CCI_t$ | -0.5257 | -0.2809 | 0.4441 | 0.3402 | -0.2065 | 0.0974 | 0.1506 |
| $TURN_{t-1}$ | 0.9020 | 0.8709 | -0.5526 | -0.1133 | 0.7338 | 0.0820 | 0.4586 |
| $NIPO_{t-1}$ | -0.6567 | -0.5499 | 0.7716 | 0.0773 | -0.3142 | 0.1409 | 0.0287 |
| $RIPO_{t-1}$ | -0.4133 | -0.2166 | 0.1763 | 0.5440 | -0.1513 | -0.0672 | -0.1560 |
| $P_{t-1}^{D-ND}$ | 0.7265 | 0.6052 | -0.3812 | -0.2435 | 0.4634 | 0.1545 | 0.2763 |
| $ESNI_{t-1}$ | -0.0072 | -0.0132 | 0.0733 | -0.1530 | 0.0531 | 0.2224 | 0.1170 |
| $BCI_{t-1}$ | 0.4715 | 0.4065 | 0.0821 | -0.0921 | 0.5962 | 0.2966 | 0.7754 |
| $CCI_{t-1}$ | -0.4944 | -0.3051 | 0.4556 | 0.3092 | -0.1367 | 0.1789 | 0.1499 |

**Table 1** *(continued)*

| | $CCI_t$ | $TURN_{t-1}$ | $NIPO_{t-1}$ | $RIPO_{t-1}$ | $P_{t-1}^{D-ND}$ | $ESNI_{t-1}$ | $BCI_{t-1}$ | $CCI_{t-1}$ |
|---|---|---|---|---|---|---|---|---|
| $PC_t$ | | | | | | | | |
| $TURN_t$ | | | | | | | | |
| $NIPO_t$ | | | | | | | | |
| $RIPO_t$ | | | | | | | | |
| $P_t^{D-ND}$ | | | | | | | | |
| $ESNI_t$ | | | | | | | | |
| $BCI_t$ | | | | | | | | |
| $CCI_t$ | 1.0000 | | | | | | | |
| $TURN_{t-1}$ | -0.3410 | 1.0000 | | | | | | |
| $NIPO_{t-1}$ | 0.4310 | -0.5269 | 1.0000 | | | | | |
| $RIPO_{t-1}$ | 0.3649 | -0.2272 | 0.1506 | 1.0000 | | | | |
| $P_{t-1}^{D-ND}$ | -0.2788 | 0.6639 | -0.3577 | -0.2061 | 1.0000 | | | |
| $ESNI_{t-1}$ | 0.1582 | -0.0215 | 0.2972 | -0.0760 | 0.1656 | 1.0000 | | |
| $BCI_{t-1}$ | 0.0995 | 0.4916 | 0.0660 | -0.1280 | 0.4673 | 0.1985 | 1.0000 | |
| $CCI_{t-1}$ | 0.7386 | -0.2702 | 0.4427 | 0.3387 | -0.2071 | 0.1237 | 0.1622 | 1.0000 |

*Notes*: Table 1 presents the pairwise correlation among first principal component in first stage with their set of sentiment variables. Where, $PC_t$ is first principal component , $TURN_t$ is share turnover, $NIPO_t$ is number of IPOs, $RIPO_t$ is first-day returns of IPOs, $P_t^{D-ND}$ is dividend premium, $ESNI_t$ is equity shares in new issues, $BCI_t$ is business confidence index, $CCI_t$ consumer confidence index. Additionally, t and t-1 represent level and lagged values of each variable.

**Table 2:** Principal components

| | Eigen values | Difference | Proportion explained | Cumulative proportion explained |
|---|---|---|---|---|
| Panel A: Variance in principal components | | | | |
| $C_1$ | 2.6628 | 0.9696 | 0.3804 | 0.3804 |
| $C_2$ | 1.6932 | 0.6501 | 0.2419 | 0.6223 |
| $C_3$ | 1.0431 | 0.3787 | 0.149 | 0.7713 |
| $C_4$ | 0.6644 | 0.1941 | 0.0949 | 0.8662 |
| $C_5$ | 0.4703 | 0.2098 | 0.0672 | 0.9334 |
| $C_6$ | 0.2604 | 0.0549 | 0.0372 | 0.9706 |
| $C_7$ | 0.2056 | - | 0.0294 | 1.0000 |

| Panel B: Variance from variables | | | | | | | |
|---|---|---|---|---|---|---|---|
| Variable | $C_1$ | $C_2$ | $C_3$ | $C_4$ | $C_5$ | $C_6$ | $C_7$ |
| $TURN_{t-1}$ | 0.5558 | 0.0407 | 0.1678 | 0.0900 | -0.0853 | -0.2558 | 0.7619 |
| $NIPO_t$ | -0.3814 | 0.4458 | -0.2494 | -0.2069 | 0.4980 | 0.2691 | 0.4800 |
| $RIPO_{t-1}$ | -0.2590 | 0.1400 | 0.7375 | 0.5016 | 0.3309 | -0.0856 | -0.0319 |
| $P_t^{D-ND}$ | 0.5144 | 0.2153 | 0.2218 | -0.0243 | 0.0400 | 0.7811 | -0.1660 |
| $ESNI_t$ | 0.0578 | 0.5126 | -0.4433 | 0.6849 | -0.2409 | -0.0395 | -0.0931 |
| $BCI_{t-1}$ | 0.3418 | 0.5238 | 0.0553 | -0.3585 | 0.3025 | -0.4922 | -0.3786 |
| $CCI_t$ | -0.3062 | 0.4434 | 0.3420 | -0.3151 | -0.6957 | 0.0279 | 0.0931 |

*Notes*: Table 2 represents the results of PCA. Where, Panel A represents the eigen values, differences between current eigen value and next eigen value, the proportion of all the proxies explained by each principal component in percentage and cumulative percentage of explanation in components. Additionally, $C_1$to $C_7$ represent the number of principal components.

Finally, Equation 3 represents detailed portion, direction and representation of each variable used to generate parsimonious sentiment index by PCA method:

$$\begin{aligned} \mathrm{SENT}_t^{\mathrm{PCA}} = {} & 0.5558\, TURN_{t-1} - 0.3814\, NIPO_t - 0.2590\, RIPO_{t-1} \\ & +0.5144\, P_t^{D-ND} + 0.0578\, ESNI_t + 0.3418\, BCI_{t-1} \\ & -0.3062\, CCI_t \end{aligned} \tag{3}$$

Here, $\mathrm{SENT}_t^{\mathrm{PCA}}$ is the sentiment index generated by PCA method, $TURN_{t-1}$ is lag of share turnover, $NIPO_t$ is number of IPOs, $RIPO_{t-1}$ is lag of closing returns of IPOs day, $P_t^{D-ND}$ is dividend premium, $ESNI_t$ is equity shares in new issues, $BCI_{t-1}$ is lag of business confidence index, $CCI_t$ consumer confidence index. Detailed correlation of each sentiment proxy with final sentiment index is represented in Table 3 below.

**Table 3:** Correlation of $SENT^{PCA}$

| | $\text{SENT}_t^{\text{PCA}}$ | $TURN_{t-1}$ | $NIPO_t$ | $RIPO_{t-1}$ | $P_t^{D-ND}$ | $ESNI_t$ | $BCI_{t-1}$ | $CCI_t$ |
|---|---|---|---|---|---|---|---|---|
| $\text{SENT}_t^{\text{PCA}}$ | 1.0000 | | | | | | | |
| $TURN_{t-1}$ | 0.9070 | 1.0000 | | | | | | |
| $NIPO_t$ | -0.6224 | -0.5526 | 1.0000 | | | | | |
| $RIPO_{t-1}$ | -0.4227 | -0.2272 | 0.1763 | 1.0000 | | | | |
| $P_t^{D-ND}$ | 0.8393 | 0.7338 | -0.3575 | -0.1513 | 1.0000 | | | |
| $ESNI_t$ | 0.0943 | 0.0820 | 0.2795 | -0.0672 | 0.1618 | 1.0000 | | |
| $BCI_{t-1}$ | 0.5578 | 0.4916 | 0.0821 | -0.1280 | 0.5962 | 0.2966 | 1.0000 | |
| $CCI_t$ | -0.4996 | -0.3410 | 0.4441 | 0.3649 | -0.2065 | 0.0974 | 0.0995 | 1.0000 |

*Notes*: Table 3 represents detailed correlation of $\text{SENT}_t^{\text{PCA}}$ sentiment index generated by PCA method with $TURN_{t-1}$ lag of share turnover, $NIPO_t$ number of IPOs, $RIPO_{t-1}$ lag of closing returns of IPOs day, $P_t^{D-ND}$ dividend premium, $ESNI_t$ equity shares in new issues, $BCI_{t-1}$ lag of business confidence index and $CCI_t$ consumer confidence index.

The results of correlation table depict that, $\text{SENT}_t^{\text{PCA}}$ has 90.70% correlation with lag of share turnover, -62.24% with number of IPOs, -42.27% with lag of closing returns of IPOs day, 83.93% with dividend premium, 9.43% with equity shares in new issues, 55.78% with lag of business confidence index and -49.96% with consumer confidence index. The correlation coefficient between the 14-terms first-stage index and $SENT^{PCA}$ index is 96.16%, indicating that there is minimal loss of information after excluding the seven terms with different time subscripts.

*4.2.1(b) Scaled Principal Component Analysis*

In this study, we extracts the sPCA factors in 2 steps. First, by running a predictive regression of the target on each predictor and scale the predictor with the regression slope. Second, by applying the PCA method to the scaled predictors to obtain principal components as the sPCA factors. In this way, the sPCA tends to down-weight those predictors with weak forecasting power, while overweight those with strong forecasting power. As a result, the sPCA factors are more likely to outperform the PCA factors for forecasting and estimation purposes. The details of each of two steps is as follows:

**Step 1**: Given $N$ number of orthogonalise sentiment proxies to be $(X_1, X_2, \dots, X_N)$, obtain a panel of scaled predictors $(\widehat{\delta_1}X_1, \widehat{\delta_2}X_2, \dots, \widehat{\delta_N}X_N)$ by running N times time-series regressions. More specifically, the scaled coefficient $\widehat{\delta_\iota}$ is the estimated slope that comes from regressing the target variable (market adjusted initial returns MAIR in this study) on the $i^{th}$ sentiment proxy as follows:

$$MAIR_{t+h} = \vartheta_i + \delta_i X_{i,t} + \varepsilon_{t+h}; \qquad where\ i = 1,2, \dots, N \tag{4}$$

Consequently, the relationship between the $i^{th}$ sentiment proxy and unobserved $SENT^{sPCA}$ can be represented in Equation 5, and values of estimated slop $\widehat{\delta_\iota}$ for all the sentiment proxies is represented in Table 4 bellow.

$$\delta_i X_{i,t} = \theta_i SENT^{sPCA} + e_{i,t} \tag{5}$$

**Table 4:** Estimated slopes

| | $TURN_t$ | $NIPO_t$ | $RIPO_t$ | $\hat{P}_t^{D-ND}$ | $\widehat{ESNI}_t$ | $BCI_t$ | $CCI_t$ |
|---|---|---|---|---|---|---|---|
| $\widehat{\delta_\iota}$ | -0.0218 | 0.0184 | 0.0640 | -0.0282 | -0.0231 | -0.0181 | 0.0347 |
| | (-1.64) | (1.37) | (5.55) | (-2.14) | (-1.74) | (-1.35) | (2.67) |
| $R^2$(%) | 3.17 | 2.25 | 27.27 | 5.28 | 3.57 | 2.18 | 8.02 |

*Notes*: Table 4 is representing results of estimated slopes to be used to scale each sentiment proxy $X_1$ to $X_N$. The dependent variable in all regression models in columns one day ahead market adjusted initial returns $MAIR$ (as target variable). Values in parenthesis are *t*-statistics and R-squared is represented in percentage.

**Step 2**: In the second step the author used scaled predictors $(\widehat{\delta_1}X_1, \widehat{\delta_2}X_2, \ldots, \widehat{\delta_N}X_N)$ obtained in Step 1 to generate sentiment index by sPCA method. Since, the second step of sPCA is dimensionality reduction, same as conventional PCA (Huang *et al.*, 2022), so this begins by estimating the first principal component $sPC_t$ by seven standardised proxies scaled for target variable using lag and level forms. Followed by the selecting optimal representation for second step based on highest correlation among lag and level forms of each proxy. Consequently, Table 5 is representing correlation of first scaled principal component $sPC_t$ with each sentiment proxy variable.

The results of correlation table (in Table 5) depict that, after scaling for the target variable the direction of correlation with all the sentiment proxies changed to positive. Specifically, compared to correlation matrix of first principal component of basic PCA in Table 1 the direction of lagged and level form of $NIPO_t, RIPO_t$ and $CCI_t$ is changed from negative to positive. However, the size of correlation is same since the data of standardised variables is same. Consequently, the optimal representation of sentiment proxies in second stage sPCA as per Baker and Wurgler (2007) is same. The equation number 6 is representing optimal representation of proxy variables.

$$\begin{aligned}\mathrm{SENT}_t^{\mathrm{sPCA}} = {} & 0.5558\,TURN_{t-1} + 0.3814\,NIPO_t + 0.2590\,RIPO_{t-1} \\ & +0.5144\,P_t^{DND} + 0.0578\,ESNI_t + 0.3418\,BCI_{t-1} + 0.3062\,CCI_t\end{aligned} \quad (6)$$

Table 6 is representing the results of second stage of sPCA. Specifically, Panel A is representing the proportion of total variance of all the sentiment proxies captured in each principal component. And, Panel B is representing the part of variance of each sentiment proxy coming into each principal component. Compared to the results of conventional PCA (in Table 2) the direction of explanation from sentiment proxies such as $NIPO_t, RIPO_{t-1}$ and $CCI_t$ is changed from negative to positive.

**Table 5:** Correlation matrix of first principal component

| | $sPC_t$ | $TURN_t$ | $NIPO_t$ | $RIPO_t$ | $P_t^{D-ND}$ | $ESNI_t$ | $BCI_t$ |
|---|---|---|---|---|---|---|---|
| $sPC_t$ | 1.0000 | | | | | | |
| $TURN_t$ | 0.8692 | 1.0000 | | | | | |
| $NIPO_t$ | 0.6792 | 0.5259 | 1.0000 | | | | |
| $RIPO_t$ | 0.3419 | 0.2296 | 0.1517 | 1.0000 | | | |
| $P_t^{D-ND}$ | 0.7345 | 0.6557 | 0.3575 | 0.2061 | 1.0000 | | |
| $ESNI_t$ | 0.0318 | 0.0175 | -0.2795 | 0.0819 | 0.1618 | 1.0000 | |
| $BCI_t$ | 0.4238 | 0.4995 | -0.0615 | 0.1308 | 0.4651 | 0.2166 | 1.0000 |
| $CCI_t$ | 0.5257 | 0.2809 | 0.4441 | 0.3402 | 0.2065 | -0.0974 | -0.1506 |
| $TURN_{t-1}$ | 0.9020 | 0.8709 | 0.5526 | 0.1133 | 0.7338 | 0.082 | 0.4586 |
| $NIPO_{t-1}$ | 0.6567 | 0.5499 | 0.7716 | 0.0773 | 0.3142 | -0.1409 | -0.0287 |
| $RIPO_{t-1}$ | 0.4133 | 0.2166 | 0.1763 | 0.5440 | 0.1513 | 0.0672 | 0.1560 |
| $P_{t-1}^{D-ND}$ | 0.7265 | 0.6052 | 0.3812 | 0.2435 | 0.4634 | 0.1545 | 0.2763 |
| $ESNI_{t-1}$ | -0.0072 | -0.0132 | -0.0733 | 0.1530 | 0.0531 | 0.2224 | 0.1170 |
| $BCI_{t-1}$ | 0.4715 | 0.4065 | -0.0821 | 0.0921 | 0.5962 | 0.2966 | 0.7754 |
| $CCI_{t-1}$ | 0.4944 | 0.3051 | 0.4556 | 0.3092 | 0.1367 | -0.1789 | -0.1499 |

**Table 5** *(continued)*

| | $CCI_t$ | $TURN_{t-1}$ | $NIPO_{t-1}$ | $RIPO_{t-1}$ | $P_{t-1}^{D-ND}$ | $ESNI_{t-1}$ | $BCI_{t-1}$ | $CCI_{t-1}$ |
|---|---|---|---|---|---|---|---|---|
| $sPC_t$ | | | | | | | | |
| $TURN_t$ | | | | | | | | |
| $NIPO_t$ | | | | | | | | |
| $RIPO_t$ | | | | | | | | |
| $P_t^{D-ND}$ | | | | | | | | |
| $ESNI_t$ | | | | | | | | |
| $BCI_t$ | | | | | | | | |
| $CCI_t$ | 1.0000 | | | | | | | |
| $TURN_{t-1}$ | 0.3410 | 1.0000 | | | | | | |
| $NIPO_{t-1}$ | 0.4310 | 0.5269 | 1.0000 | | | | | |
| $RIPO_{t-1}$ | 0.3649 | 0.2272 | 0.1506 | 1.0000 | | | | |
| $P_{t-1}^{D-ND}$ | 0.2788 | 0.6639 | 0.3577 | 0.2061 | 1.0000 | | | |
| $ESNI_{t-1}$ | -0.1582 | -0.0215 | -0.2972 | 0.076 | 0.1656 | 1.0000 | | |
| $BCI_{t-1}$ | -0.0995 | 0.4916 | -0.066 | 0.128 | 0.4673 | 0.1985 | 1.0000 | |
| $CCI_{t-1}$ | 0.7386 | 0.2702 | 0.4427 | 0.3387 | 0.2071 | -0.1237 | -0.1622 | 1.0000 |

*Notes*: Table 5 presents the pairwise correlation among first principal component in first stage with set of scaled sentiment variables. Where, $sPC_t$ is first principal component , $TURN_t$ is share turnover, $NIPO_t$ is number of IPOs, $RIPO_t$ is first-day returns of IPOs, $P_t^{D-ND}$ is dividend premium, $ESNI_t$ is equity shares in new issues, $BCI_t$ is business confidence index, $CCI_t$ consumer confidence index. Additionally, t and t-1 are representing level and lagged values of each variable.

**Table 6:** Principal components

| | Eigen values | | Difference | Proportion explained | | Cumulative proportion explained | |
|---|---|---|---|---|---|---|---|
| Panel A: Variance in principal components | | | | | | | |
| $sC_1$ | 2.6628 | | 0.9696 | 0.3804 | | 0.3804 | |
| $sC_2$ | 1.6932 | | 0.6501 | 0.2419 | | 0.6223 | |
| $sC_3$ | 1.0431 | | 0.3787 | 0.149 | | 0.7713 | |
| $sC_4$ | 0.6644 | | 0.1941 | 0.0949 | | 0.8662 | |
| $sC_5$ | 0.4703 | | 0.2098 | 0.0672 | | 0.9334 | |
| $sC_6$ | 0.2604 | | 0.0549 | 0.0372 | | 0.9706 | |
| $sC_7$ | 0.2056 | | - | 0.0294 | | 1.0000 | |
| Panel B: Variance form variables | | | | | | | |
| Variable | $sC_1$ | $sC_2$ | $sC_3$ | $sC_4$ | $sC_5$ | $sC_6$ | $sC_7$ |
| $TURN_{t-1}$ | 0.5558 | 0.0407 | -0.1678 | 0.0900 | 0.0853 | 0.2558 | -0.7619 |
| $NIPO_t$ | 0.3814 | -0.4458 | -0.2494 | 0.2069 | 0.4980 | 0.2691 | 0.4800 |
| $RIPO_{t-1}$ | 0.2590 | -0.1400 | 0.7375 | -0.5016 | 0.3309 | -0.0856 | -0.0319 |
| $P_t^{D-ND}$ | 0.5144 | 0.2153 | -0.2218 | -0.0243 | -0.0400 | -0.7811 | 0.1660 |
| $ESNI_t$ | 0.0578 | 0.5126 | 0.4433 | 0.6849 | 0.2409 | 0.0395 | 0.0931 |
| $BCI_{t-1}$ | 0.3418 | 0.5238 | -0.0553 | -0.3585 | -0.3025 | 0.4922 | 0.3786 |
| $CCI_t$ | 0.3062 | -0.4434 | 0.3420 | 0.3151 | -0.6957 | 0.0279 | 0.0931 |

*Notes*: Table 6 is representing the results of sPCA. Where, Panel A is representing the eigen values, differences between current eigen value and next eigen value, the proportion of all the proxies explained by each principal component in percentage and cumulative percentage of explanation in components. Additionally, $sC_1$ to $sC_7$ are representing the number of scaled principal components.

Following the study by Baker and Wurgler (2007), first principal component ($sC_1$) generated by sPCA is used as IPO sentiment index ($\mathrm{SENT}_t^{\mathrm{sPCA}}$). The first principal component carries 38.04% of the explanation in the scaled proxy variables, leading author to conclude that first captures significant portion of the shared variation. Table 7 below is representative of correlation matrix, representing the correlation of $SENT^{sPCA}$ with proxies of sentiments. Where, all the proxies are positively correlated with $SENT^{sPCA}$ depicting that the index is explaining all the proxies in same direction instead of different directions compared to basic PCA index in Table 3.

**Table 7:** Correlation of $SENT^{sPCA}$

| | $SENT_t^{sPCA}$ | $TURN_{t-1}$ | $NIPO_t$ | $RIPO_{t-1}$ | $P_t^{D-ND}$ | $ESNI_t$ | $BCI_{t-1}$ | $CCI_t$ |
|---|---|---|---|---|---|---|---|---|
| $SENT_t^{sPCA}$ | 1.0000 | | | | | | | |
| $TURN_{t-1}$ | 0.9070 | 1.0000 | | | | | | |
| $NIPO_t$ | 0.6224 | 0.5526 | 1.0000 | | | | | |
| $RIPO_{t-1}$ | 0.4227 | 0.2272 | 0.1763 | 1.0000 | | | | |
| $P_t^{D-ND}$ | 0.8393 | 0.7338 | 0.3575 | 0.1513 | 1.0000 | | | |
| $ESNI_t$ | 0.0943 | 0.0820 | -0.2795 | 0.0672 | 0.1618 | 1.0000 | | |
| $BCI_{t-1}$ | 0.5578 | 0.4916 | -0.0821 | 0.1280 | 0.5962 | 0.2966 | 1.0000 | |
| $CCI_t$ | 0.4996 | 0.3410 | 0.4441 | 0.3649 | 0.2065 | -0.0974 | -0.0995 | 1.0000 |

*Notes*: Table 7 is representing detailed correlation of $SENT_t^{sPCA}$ sentiment index generated by sPCA method with $TURN_{t-1}$ lag of share turnover, $NIPO_t$ number of IPOs, $RIPO_{t-1}$ lag of closing returns of IPOs day, $P_t^{D-ND}$ dividend premium, $ESNI_t$ equity shares in new issues, $BCI_{t-1}$ lag of business confidence index and $CCI_t$ consumer confidence index.

### *4.2.1(c) Partial Least Squares Analysis*

Here, we used first lag of sentiment factor as dependent variables. We use the one-quarter-ahead of initial returns as the target variable and the orthogonalise sentiment proxies $(X_1, X_2, \dots, X_N)$ to construct market sentiment using PLS method are as follows:

**Step 1**: Let $(X_{1,t}, X_{2,t}, \dots, X_{N,t})$be the $T \times N$ matrix of orthogonalise sentiment proxies. The key idea is to use the PLS method to extract the unobservable IPO investor sentiment $SENT_t$ from the cross-section according to its covariance with future initial returns. In the first step, N time-series regressions are conducted.

$$X_{i,t-1} = \pi_{i,0} + \pi_i(MAIR_t) + \mu_{i,t-1}; \qquad where\ i = 1,2, \dots, T \tag{7}$$

**Table 8:** Predictions for each sentiment proxy for PLS

| | $TURN_t$ | $NIPO_t$ | $RIPO_t$ | $P_t^{D-ND}$ | $ESNI_t$ | $BCI_t$ | $CCI_t$ |
|---|---|---|---|---|---|---|---|
| $\hat{\pi}_i$ | 0.2315 | 5.2514 | 3.0125 | -6.0614 | -1.2344 | -18.9348 | 45.8383 |
| | (0.87) | (0.95) | (5.48) | (-1.38) | (-0.27) | (-0.89) | (2.90) |
| $R^2$(%) | 0.94 | 1.10 | 27.07 | 2.30 | 0.09 | 0.98 | 9.39 |

*Notes*: Table 8 is representing results of estimated slopes of MAIR as $\pi_i$. The dependent variable used in all regression models is lag of variables mentioned as columns header. Values in parenthesis are *t*-statistics and R-squared is represented in percentage.

The coefficient $\pi_i$ presents how each sentiment measure.

**Step 2**: We use the estimated loading from Step 1, and $x_{i,t}$ to run T cross-sectional regressions: for each period t, we run a cross-sectional regression of $x_{i,t}$ on the corresponding loading $\hat{\pi}$i.

$$x_i = c_i + \hat{\pi}_i SENT^{PLS} + v_i; \qquad where\ i = 1,2, \dots, N \tag{8}$$

sentiment index we mentioned above. This approach uses time t+1 initial returns to extract $SENT^{PLS}$ from individual sentiment proxies, therefore, $SENT^{PLS}$ is only relevant for predicting initial returns and separated from the component that is irrelevant for predictions.

## 4.3 Robustness Checks on Construction of MIMSI

The significance of robustness checks in this study is to maintain consistency in variable selection. Besides, the conduct robustness checks is to ensure the validity and robustness of results. Table 9 shows the robustness checks for the construction of MIMSI using PCA, sPCA and PLS methods.

**Table 9:** Robustness checks in the construction of MIMSI using PCA, sPCA and PLS methods

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | $TURN_t$ | $NIPO_t$ | $RIPO_t$ | $P_t^{D-ND}$ |
| Panel A: Robustness for PCA | | | | |
| Term | -1.2222*** | -.1498*** | -.9327*** | .3299*** |
| | (-4.67) | (-19.52) | (-8.54) | (38.29) |
| Constant | -.8261*** | .9200*** | -.5524*** | -4.0682*** |
| | (-12.07) | (8.68) | (-7.39) | (-44.60) |
| Panel B: Robustness for sPCA | | | | |
| Term | 1.2222*** | .1498*** | .9327*** | -.3299*** |
| | (4.67) | (19.52) | (8.54) | (-38.29) |
| Constant | .8261*** | -.9200*** | .5524*** | 4.0682*** |
| | (12.07) | (-8.68) | (7.39) | (44.60) |
| Panel C: Robustness for PLS | | | | |
| Term | -.1294 | .0155*** | .2152*** | -.0411*** |
| | (-.25) | (8.69) | (10.56) | (-15.65) |
| Constant | .8488*** | .6625*** | -.7760*** | 1.2473*** |
| | (63.29) | (26.74) | (55.61) | (44.87) |
| Observations (N) | 564 | 564 | 564 | 564 |

| | (5) | (6) | (7) |
|---|---|---|---|
| | $ESNI_t$ | $BCI_t$ | $CCI_t$ |
| Panel A: Robustness for PCA | | | |
| Term | .3826*** | .0335*** | -.0645*** |
| | (4.48) | (12.38) | (-15.50) |
| Constant | -9.1795*** | -4.0642*** | 5.9878*** |
| | (-4.94) | (-15.31) | (13.42) |
| Panel B: Robustness for sPCA | | | |
| Term | -.3826*** | -.0335*** | .0645*** |
| | (-4.48) | (-12.38) | (15.50) |
| Constant | 9.1795*** | 4.0642*** | -5.9878*** |
| | (4.94) | (15.31) | (-13.42) |
| Panel C: Robustness for PLS | | | |
| Term | -.0859*** | -.0086*** | .0160*** |
| | (-5.27) | (-18.92) | (23.81) |
| Constant | 2.7151*** | 1.6768*** | -.8577*** |
| | (7.65) | (37.26) | (-11.87) |
| Observations (N) | 564 | 564 | 564 |

### 4.4 Multiple Regression Model

Aggarwal and Conroy (2000); Barry and Jennings (1993); Bradley *et al.* (2009); Chorruk and Worthington (2010); and Schultz and Zaman (1994) used initial returns (IR), and market adjusted initial returns (MAIR) to measure short-run IPO share performance using the following equation:

Initial return:

$$\mathrm{IR_{it}} = \frac{P_{i1} - P_{i0}}{P_{i0}} \times 100 \quad (9)$$

where:

$\mathrm{IR_{it}}$ = the initial return of the stock$_i$ at period$_t$;
$P_{i0}$ = the IPO offer price of the stock$_i$ as stated in the IPO prospectus; and
$P_{i1}$ = the closing price of the stock$_i$ at the end of the first day of trading.

Market adjusted initial return:

$$\text{MAIR}_{\text{it}} = \left(\frac{P_{i1} - P_{i0}}{P_{i0}} - \frac{MI_{i1} - MI_{i0}}{MI_{i0}}\right) \times 100 \tag{10}$$

where:

| | | |
|---|---|---|
| $\text{MAIR}_{\text{it}}$ | = | the initial return of stock$_i$ adjusted to the market effect of the corresponding stock exchange for period$_t$; |
| $MI_{i0}$ | = | the closing price of the general market index of the stock exchange where stock$_i$ is listed at offering day of the stock; and |
| $MI_{i1}$ | = | the closing price of the general market index of the stock exchange where stock$_i$ is listed at the end of the first day of trading. |

The formula for computing IR does not account for changes in market conditions or stock exchanges, which could impact on the accuracy of the results. Consequently, many researchers opt for an alternative formula that adjusts the returns based on market fluctuations. This study adopts IPO's MAIR as a dependent variable to investigate the short-run IPO share performance. In addition, other independent variables and description are explained in Table 10.

Besides, this study estimates the IPO underpricing by using multiple regression model and binary regression model as set out in the following equation:

Ordinary least square regression model:

$$\begin{aligned}\text{MAIR}_{it} = {} & \beta_0 + \beta_1\,\text{SENT}_{it} + \beta_2\,\text{IPOP}_{it} + \beta_3\,\text{PRICE}_{it} + \beta_4\,\text{OSIZE}_{it} + \beta_5\,\text{ICOR}_{it} \\ & + \beta_6\,\text{BOOK}_{it} + \beta_7\,\text{FAGE}_{it} + \beta_8\,\text{MVL}_{it} + \beta_9\,\text{OVER}_{it} + \beta_{10}\,\text{D}_{\text{UREP}it} \\ & + \beta_{11}\,\text{D}_{\text{HOT}it} + \beta_{12}\,\text{D}_{\text{BLIST}it} + \varepsilon_{it}\end{aligned} \tag{11}$$

where, $\text{MAIR}_{it}$ is the market adjusted first-day initial returns of firm$_i$. $\text{SENT}_{it}$ is the Malaysian IPO market sentiment index was constructed using three different methods including PCA, sPCA, and PLS methods. $\text{IPOP}_{it}$ is calculated as the period from opening to closing days of the offer (in calendar days). $\text{PRICE}_{it}$ is calculated as the offer price of the IPO share. $\text{OSIZE}_{it}$ is the natural log offer size calculated as total gross proceeds from the IPO. $\text{ICOR}_{it}$ is calculated as the total issue costs relative to the total offer proceeds such as professional fees, brokers' fees, printing and other costs. $\text{BOOK}_{it}$ is calculated as the total equity capital divided by the number of equity shares (equivalent to net assets per share). $\text{FAGE}_{it}$ is calculated as the age of the firm since incorporation. $\text{MVL}_{it}$ is calculated as the standard deviation of the daily FTSE Bursa Malaysia Kuala Lumpur Composite Index for the first one month (30 calendar days) prior to the IPO. $\text{OVER}_{it}$ is calculated as the magnitude of response from investors to an IPO, which is estimated as the ratio of the application size to the issue size (in volume). $\text{D}_{\text{UREP}it}$ {underwriter dummy equals '1' if the lead underwriter includes one of the Tier 1 financial institutions, CIMB Bank, Maybank and RHB Bank and '0' if otherwise}. $\text{D}_{\text{HOT}it}$ {hot issue market was identified as issue year using IPO volume and first-day return, where number of IPOs and average first-day return are greater than the sample's average. Dummy variable, which denotes '1' for hot issue market and '0' for otherwise}. $\text{D}_{\text{BLIST}it}$ {board listing is to determine Main Market (established listing company) and ACE Market (young and growing company). Dummy variable, which denotes '1' for Main Market and '0' for ACE Market}. $\beta_0$ is the intercept of the equation. $\varepsilon_{it}$ is the error term of the equation.

**Table 10:** Summary of variables for short-run IPO share performance

| Factors | Variables | Variables measurements | Authors (year) | Expected sign | Theory |
|---|---|---|---|---|---|
| Dependent variable | Market adjusted initial return (MAIR): First-day initial returns | $MAIR_{it} = \left(\frac{P_{i1} - P_{i0}}{P_{i0}} - \frac{MI_{i1} - MI_{i0}}{MI_{i0}}\right) \times 100$<br>$MI_{i0}$ = the closing price of the general market index of the stock exchange where $stock_i$ is listed at offering day of the stock<br>$MI_{i1}$ = the closing price of the general market index of the stock exchange where $stock_i$ is listed at the end of the first day of trading | Aggarwal and Conroy (2000); Barry and Jennings (1993); Bradley *et al.* (2009); Chang *et al.* (2008); and Chorruk and Worthington (2010) | - | - |
| Independent variables | (i) Behavioral Characteristics | | | | |
| | Malaysian IPO Market Sentiment Index (SENT) | Market sentiment constructed using PCA, sPCA, and PLS methods using sentiment proxies including share turnover, number of IPOs, first-day returns of IPOs, dividend premium, and equity shares in new issues, consumer confidence index, and business conditions index. | Firth *et al.* (2015); Boulton *et al.* (2011); Ritter and Welch (2002); and Song *et al.* (2014) | +ve | Ex-ante uncertainty / Signalling hypothesis |
| | (ii) Issue Characteristics | | | | |
| | IPO period (IPOP) | Period from opening to closing days of the offer (in calendar days) | Lee *et al.* (1996); How (2000); How *et al.* (2007); and Ekkayokkaya and Pengniti (2012) | -ve | Winner's curse / Rock hypothesis |
| | Offer price (PRICE) | Offer price of the IPO share | Guo and Brooks (2008); Dimovski *et al.* (2011); Certo *et al.* (2001); and Kutsuna *et al.* (2008) | -ve | Ex-ante uncertainty / Signalling hypothesis |
| | Offer size (OSIZE) | Natural log of total gross proceeds from the IPO | Alanazi and Al-Zoubi (2015); and Yu and Tse (2005) | -ve | Ex-ante uncertainty hypothesis |
| | Issue cost ratio (ICOR) | Natural log of total issue costs relative to the total offer proceeds. Total issue costs such as professional fees, brokers' fees, printing and other costs | Ritter (1998); and Dimovski and Brooks (2004) | +ve | Ex-ante uncertainty hypothesis |
| | Underwriter reputation (UREP) | Underwriter dummy equals '1' if the lead underwriter includes one of the Tier 1 financial institutions, CIMB Bank, Maybank and RHB Bank and '0' if otherwise | Dimovski and Brooks (2004); and Aggarwal and Conroy (2000) | +ve | Ex-ante uncertainty / Signalling hypothesis |

**Table 10** *(continued)*

| Factors | Variables | Variables measurements | Authors (year) | Expected sign | Theory |
|---|---|---|---|---|---|
| Independent variables | (iii) Firm Characteristics | | | | |
| | Book value per share (BOOK) | Total equity capital divided by the number of equity shares (Equivalent to net assets per share) | Pukthuangthong Le and Varaiya (2007); and Klein (1996) | +ve | Signalling hypothesis |
| | Firm age (FAGE) | Age of the firm since incorporation | Ritter (1984); Kirkulak and Davis (2005); and Loughran *et al.* (1994) | -ve | Ex-ante uncertainty hypothesis |
| | (iv) Market Characteristics | | | | |
| | Market volatility (MVL) | Standard deviation of the daily FTSE Bursa Malaysia Kuala Lumpur Composite Index for the first one month (30 calendar days) prior to the IPO | Omran (2005); and Paudyal *et al.* (1998) | +ve | Ex-ante uncertainty hypothesis |
| | Oversubscription ratio (OVER) | Indicates magnitude of response of the investors for an IPO. Estimated as the ratio of application size to the issue size (in volume) | Agarwal *et al.* (2008); Kandel *et al.* (1999); and Chowdhry and Sherman (1996) | +ve | Signalling / Ex-ante uncertainty / Winner's curse hypothesis |
| | Hot issue market (HOT) | Hot issue market was identified as issue year using IPO volume and first-day return, where number of IPOs and average first-day return are greater than the sample's average. Dummy variable, which denotes '1' for hot issue market and '0' for otherwise | Guo *et al.* (2008); Lowry *et al.* (2010); Samarakoon (2010); and Alli *et al.* (2010) | +ve | Ex-ante uncertainty / Window of opportunity hypothesis |
| | Board listing (BLIST) | Board listing is to determine Main Market (established listing company) and ACE Market (young and growing company). Dummy variable, which denotes '1' for Main Market and '0' for ACE Market | Chen et al. (2004); and Gounopoulos (2003) | -ve | Signalling / Ex-ante uncertainty hypothesis |

### 4.5 Interaction Analysis

Additionally, interaction effects occur when the combined effect of two or more variables on a dependent variable differs from the sum of their individual effects. In other words, the relationship between one variable and the outcome is not constant but varies depending on the level or presence of another variable. It provides valuable insights into how variables related to each other.

To investigate whether the interaction terms may affect the regression result, the key determinant variables for short-run IPO share performance are extracted and added into the multiple regression model. The following is the multiple regression model with interaction terms:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \ldots + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \varepsilon_{it} \quad (12)$$

where $Y_i$ is the predicted value of a dependent variable, in this case it refers to market sentiment (SENT), $X_i$ is the key determinant of independent variables, $\beta_i$ is the regression coefficients and $\varepsilon_i$ = the error term of the model.

**4.6 Binary Regression Model**

The binary regression model holds greater significance for IPO investors compared to the multiple regression model due to several reasons. Firstly, it does not rely on assumptions of normal distribution and linearity. Secondly, it allows for the estimation of associated probabilities (risks) of determinants, which is particularly important given the dynamic nature of economic and financial factors in the market. Thirdly, the associated probability (risk) of a determinant, known as marginal probability, becomes crucial in identifying directional changes in IPO market performance. Lastly, the marginal probability can provide valuable information related to market timing, which is of utmost importance for investment decisions. However, binary regression models have generally received less attention in the IPO literature, including the specific context of Malaysia. Consequently, in order to identify the determinants of short-run IPO market performance, this study employed the logit regression model, which is binary regression model widely used in the field as set out in the following equation:

Logit regression model:

$$\left(\frac{P_i}{1-P_I}\right) = \beta_0 + \beta_1\ SENT_{it} + \beta_2\ IPOP_{it} + \beta_3\ PRICE_{it} + \beta_4\ OSIZE_{it} + \beta_5\ ICOR_{it} + \beta_6\ BOOK_{it} + \beta_7\ FAGE_{it} + \beta_8\ MVL_{it} + \beta_9\ OVER_{it} + \beta_{10}\ D_{UREPit} + \beta_{11}\ D_{HOTit} + \beta_{12}\ D_{BLISTit} + \varepsilon_{it} \quad (13)$$

Probit regression model:

$$P_i = \beta_0 + \beta_1\ SENT_{it} + \beta_2\ IPOP_{it} + \beta_3\ PRICE_{it} + \beta_4\ OSIZE_{it} + \beta_5\ ICOR_{it} + \beta_6\ BOOK_{it} + \beta_7\ FAGE_{it} + \beta_8\ MVL_{it} + \beta_9\ OVER_{it} + \beta_{10}\ D_{UREPit} + \beta_{11}\ D_{HOTit} + \beta_{12}\ D_{BLISTit} + \varepsilon_{it} \quad (14)$$

where, $P_i$ = the probability of IPO underpricing occurs in the short-run IPO market, –1 - $P_i$ = the probability of IPO underpricing does not occur or the underperformance occurs in the short-run IPO market, $(\frac{P_i}{1-P_i})$ = the value of the odds ratios (in other words, the probability of occurring) for the event of IPO underpricing occurrence. The independent variables have the same explanation in Equation (2) above.

**4.7 Marginal Probabilities Analysis**

Additionally, marginal probability analysis was used to identify the directional changes between short-run underpricing and overpricing, due to change in probability ($\Delta p$) associated with the determinants. Marginal probabilities can be estimated only with the logit model because the logit model transforms the estimated function into a logistic probability using logistic distribution function. Following Maddala (2001) and Gujarati (2003), this study estimated the marginal probability ($\Delta p$) of each variable in the logit models as follows:

$$\Delta p = \beta_i\ P_i\ (1 - P_i) \quad (15)$$

where $P_i$ = the probability of IPO underpricing occurs in the short-run market, $\Delta p$ = marginal probability, $\beta_i$ = coefficient of each explanatory variable and $X_i$ = the average value of each explanatory variable.

**5. Results and Discussion**

As shown in Table 11, the findings show that the IPOs are underpriced across all the time periods from January 2000 to December 2020. This means that investors earned positive initial returns by investing in IPOs. The highest level of underpricing is recorded in 2000 where IPO's firm is on average underpriced at 63.67% in year 2000. The underpricing from year 2005 onwards shows a decreasing trend ranges from 8.52% to 36.68%. This implies that Malaysian investors could earn initial returns if they bought the IPO share at the offer price and sell it on the market price at the first trading day. This evidence is consistent with the previous Malaysian studies (Dawson, 1987; Yong and Isa, 2003; Mohamed *et al.*, 1994; Paudyal *et al.*, 1998; Jelic *et al.*, 2001). Nevertheless, the degree of underpricing varies significantly across markets. Ritter (1998) pointed out that the average initial return of new listings in 33 countries ranged from 13.60% to 388.00% in the developing market and 4.20% to 54.40% in the developed market. Initial underpricing of new listings on Bursa Malaysia was ranked among the top five in the list. It highlights that a more developed market registers a lower level of underpricing than an emerging market.

**Table 11:** IPO underpricing segmentation by listing year, industry, and board listing

| By listing year | N | MAIR | *t*-statistic |
|---|---|---|---|
| 2000 | 38 | .6367 | 8.4866*** |
| 2001 | 20 | .2369 | 1.9658*** |
| 2002 | 51 | .1840 | 3.9953*** |
| 2003 | 58 | .4006 | 6.4846*** |
| 2004 | 72 | .3974 | 6.3379*** |
| 2005 | 75 | .1629 | 2.6466*** |
| 2006 | 35 | .2487 | 3.8091*** |
| 2007 | 22 | .3233 | 4.3943*** |
| 2008 | 23 | .2578 | 0.6702*** |
| 2009 | 14 | .1255 | 2.2059*** |
| 2010 | 27 | .0852 | 1.3657*** |
| 2011 | 25 | .2280 | 2.9759*** |
| 2012 | 14 | .3525 | 1.2384*** |
| 2013 | 16 | .2656 | 2.7523*** |
| 2014 | 13 | .1983 | 2.7815*** |
| 2015 | 9 | .3051 | 2.6257*** |
| 2016 | 11 | .1895 | 4.7333*** |
| 2017 | 10 | .1466 | 3.7975*** |
| 2018 | 11 | .3668 | 2.5991*** |
| 2019 | 15 | .1590 | 1.6581*** |
| 2020 | 12 | .3537 | 2.5165*** |
| Overall | 571 | .2848 | 11.5416 |
| By industry | N | MAIR | *t*-statistic |
| Industrial products & services | 145 | .2382 | 8.1487*** |
| Trading & services | 140 | .3665 | 4.6781*** |
| Technology | 111 | .3350 | 6.1291*** |
| Consumer products & services | 89 | .2344 | 6.5240*** |
| Property | 23 | .1433 | 2.2238*** |
| Construction | 22 | .2310 | 3.6136*** |
| Plantation | 13 | .1816 | 3.0421*** |
| Financial services | 10 | .1104 | 1.8491*** |
| Infrastructure | 4 | -.01599 | -.1856*** |
| Energy | 2 | .5862 | 1.4846*** |
| Health care | 1 | - | - |
| Overall | 571 | .2848 | 11.5416 |
| By board listing | N | MAIR | t-statistic |
| Main Market | 364 | .2467 | 8.3599*** |
| ACE Market | 207 | .3518 | 8.0392*** |

*Notes*: Table 11 represents the year distribution of IPO underpricing for 571 Malaysian IPOs from January 2000 to December 2020. 'N' is the total number of firms per year, 'and 'MAIR' is market adjusted initial returns. *t*-statistic is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

For the industry sector, the highest IPO underpricing is recorded for energy industry where investors earned 58.62% returns on the first trading day followed by trading & services industry (36.65%), technology industry (33.50%), and industrial products & services (23.82%). However, the infrastructure industry generated significant negative initial returns of -1.59%. This indicates that on average investors lose the money by investing in IPO's belonging to the infrastructure industry. The industry distribution of IPO underpricing shows that, in Malaysia, industry performance varies in between 58.62% to -1.59% across different industries.

It can be observed that the phenomenon of IPO underpricing is greater in the ACE Market compared to the Main Market with MAIR of 35.18% and 24.67%, respectively. This means that investors can earn approximately 35.18% initial returns by investing in IPOs in the ACE Market.

Table 12 provides the estimation of equation at behavioral characteristics, issue characteristics, firm characteristics, and market characteristics for short-run IPO share performance determinants based on OLS regression model. Our result concludes that the behavioral characteristics plays a significant role in all models, followed by issue characteristics namely, offer price (PRICE), offer size (OSIZE), and issue cost ratio (ICOR). Further, our finding shows that Malaysian IPO market sentiment ($SENT^{PLS}$) is insignificant relates to the short-run IPO share performance with the appearance of market characteristics variables namely, hot issue market (HOT) and oversubscription ratio (OVER) which are commonly used as sentiment proxy in the past empirical study, Yong and Isa (2003), Derrien (2005) and Yong (2007), have outweighed the significance level of IPO market sentiment ($SENT^{PLS}$). This implies that the hot issue market (HOT) and oversubscription ratio (OVER) are absorbing some of the impact arising from these sentiment proxies.

Unlike PCA and sPCA methods, it shows that $SENT^{PCA}$ and $SENT^{sPCA}$ are significantly relates to short-run IPO share performance. Both $SENT^{PCA}$ and $SENT^{sPCA}$ have the same coefficients. $SENT^{sPCA}$ has adjusted for target variable, therefore the effects of $SENT^{sPCA}$ towards initial returns show negative as compared to $SENT^{PCA}$. For $SENT^{sPCA}$, even though we apply the market characteristics variables namely, hot issue market (HOT) and oversubscription ratio (OVER), it still shows significant results as compared to $SENT^{PCA}$ and $SENT^{PLS}$. Therefore, sPCA is a better method among these three methods. This is consistent with the study by Huang *et al.* (2022), Gong *et al.*, (2022), and Song *et al.*, (2023), sPCA is a more robust model for dimensionality reduction. Hence, it is giving more accurate results.

Our finding shows market sentiment (SENT) in all models has significantly relates to IPO underpricing. This statement is consistent with Leite (2005) state that the presence of sentiment investors in IPOs reduces the winner's curse problem (Rock's hypothesis) in the issue by increasing the relative probability for the least-informed (rational) investor to be allocated underpriced shares.

Besides, our finding shows that there is positive relationship between offer size (OSIZE) and IPO underpricing which implied that higher offer size can increase the ex-ante uncertainty on the newly listed firm among Malaysian investors. This contradicts with Ritter (1984), Corhay *et al.* (2002) report that a negative relationship between offer size and market return. They further explain that a smaller firm is subject to higher uncertainty and higher uncertainty in turn will generate greater differences in opinion, thus a negative relationship is expected for offer size (OSIZE).

Nonetheless, the investors always assume that companies which offered large size of IPO will have more guarantee towards their future financial performance. Therefore, issuers are encouraged to offer larger size to the investors, not only stabilise the offer price, but also raising more funds for company development. More firms have an incentive to go public following periods of high underpricing. This is because such periods are often associated with high investor enthusiasm and firms issue equity to take advantage of investors' optimism (Loughran, 1994; Baker and Wurgler, 2000; Ljungqvist and Wilhelm, 2003). Empirical evidence has proven otherwise, as argued by Lowry and Schwert (2002), if firms want to raise as much money as possible from their IPOs, it will only make sense that they would issue equity only when IPO underpricing is at the lowest.

Our finding also shows that there is a negative relationship between offer price (PRICE) and the degree of IPO underpricing. This is consistent with Benveniste and Busaba (1997) state that within the framework of fixed-price mechanism, offer price plays an important role in affecting investor demand during the pre-market period. The level of offer price has the potential of creating incidences of demand cascades (positive or negative) because the offer price is established without soliciting investor information. Additionally, Ljungqvist *et al.* (2006) state that it seems plausible that the presence of sentiment investors could lead to higher offer prices and a lower level of underpricing as rational issuers take advantage of them.

Last but not least, our finding shows that there is a negative relationship between issue costs ratio (ICOR) and IPO underpricing. However, there is no empirical evidence in Malaysia stock market which supports that issue costs ratio (ICOR) plays a significant factor in influencing the IPO underpricing.

The coefficient of each variable is given along with *t*-statistic in the parentheses. The *t*-statistic are computed by robust standard errors in order to avoid the heteroscedasticity problem. In OLS regression model, the F-statistics are used (instead of likelihood ratio (LR)) to evaluate the overall fitness of the models. The F-statistic result shows that OLS regression model as shown in Table 12, Model 4 are fit and significant at 1% level, which shows that all the models can be used for the analysis.

Table 13 provides the interaction analysis results between Malaysian IPO market sentiment with the key determinants independent variables with 5% significance level (in Table 12) i.e., SENT*PRICE, SENT*OSIZE, SENT*ICOR, and SENT*HOT.

However, when an interaction effect is considered, SENT*PRICE in all models appear to have no interaction effect. It implies that any changes in offer price (PRICE) will not influence the market sentiment (SENT). Additionally, the $SENT^{PLS}$*HOT has no interaction effect and this could be a consequence of the hot market (HOT) serving as a proxy for sentiment, absorbs some of the impact.

Overall, the interaction analysis results show that market sentiment (SENT) in all models interact significantly with offer size (OSIZE), issue cost ratio (ICOR), and hot market (HOT).

**Table 12:** Short-run IPO share performance determinants based on OLS with $SENT^{PCA}$, $SENT^{SPCA}$, and $SENT^{PLS}$

| | PCA | | | | sPCA | | | | PLS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Dependent variable : MAIR | | | | Dependent variable : MAIR | | | | Dependent variable : MAIR | | | |
| | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 | Model 1 | Model 2 | Model 3 | Model 4 |
| Independent variables | Behavioral | Behavioral-and-Issue | Behavioral-Issue-and-Firm | (Overall) Behavioral-Issue-Firm-and-Market | Behavioral | Behavioral-and-Issue | Behavioral-Issue-and-Firm | (Overall) Behavioral-Issue-Firm-and-Market | Behavioral | Behavioral-and-Issue | Behavioral-Issue-and-Firm | (Overall) Behavioral-Issue-Firm-and-Market |
| SENT | .297 | .554*** | .551*** | .381** | -.297 | -.554*** | -.551*** | -.381*** | -1.836*** | -1.850*** | -1.809*** | -.486 |
| | (1.49) | (2.77) | (2.76) | (2.24) | (-1.49) | (-2.77) | (-2.76) | (-2.24) | (-2.62) | (-2.70) | (-2.64) | (-.84) |
| IPOP | | -.000408 | -.00643 | -.00176 | | -.000408 | -.000643 | -.00176 | | -.00143 | -.00164 | -.00205 |
| | | (-.10) | (-.15) | (-.51) | | (-.10) | (-.15) | (-.51) | | (-.34) | (-.39) | (-.59) |
| PRICE | | -.0407*** | -.0387*** | -.0227*** | | -.0407*** | -.0387*** | -.0227** | | -.0347*** | -.0327*** | -.0189*** |
| | | (-4.54) | (-4.30) | (-2.89) | | (-4.54) | (-4.30) | (-2.89) | | (-4.03) | (-3.79) | (-2.45) |
| OSIZE | | .0449*** | .0504*** | .0700*** | | .0449*** | .0504*** | .0700*** | | .0457*** | .0510*** | .0700*** |
| | | (2.79) | (3.10) | (5.01) | | (2.79) | (3.10) | (5.01) | | (2.83) | (3.12) | (4.97) |
| ICOR | | -.0792*** | -.0734*** | -.0748*** | | -.0792*** | -.0734*** | -.0748*** | | -.0771*** | -.0715*** | -.0750*** |
| | | (-5.63) | (-5.12) | (-6.18) | | (-5.63) | (-5.12) | (-6.18) | | (-5.47) | (-4.98) | (-6.17) |
| UREP | | -.0121 | .0167 | -.0122 | | -.0121 | .0167 | -.0122 | | -.0191 | .000903 | -.00106 |
| | | (-.20) | (.27) | (-.24) | | (-.20) | (.27) | (-.24) | | (-.32) | (.15) | (-.21) |
| BOOK | | | -.0991* | -.0252 | | | -.0991* | -.0252 | | | -.0951 | -.0179 |
| | | | (-1.60) | (-.42) | | | (-1.60) | (-.42) | | | (-1.53) | (-.30) |
| FAGE | | | -.00284 | .000891 | | | -.00284 | .000891 | | | -.00282 | .000763 |
| | | | (-1.20) | (.45) | | | (-1.20) | (.45) | | | (-1.19) | (-.39) |
| MVL | | | | .0281 | | | | .0281 | | | | .0526 |
| | | | | (.37) | | | | (.37) | | | | (.70) |
| OVER | | | | .000826* | | | | .000826* | | | | .00102** |
| | | | | (1.59) | | | | (1.59) | | | | (1.99) |
| HOT | | | | .681*** | | | | .681*** | | | | .672*** |
| | | | | (13.90) | | | | (13.90) | | | | (13.58) |
| BLIST | | | | -.0749 | | | | -.0749 | | | | -.0789 |
| | | | | (-1.31) | | | | (-1.31) | | | | (-1.37) |
| Constant | .241*** | .662*** | .579*** | -.0405 | .241*** | .662*** | .579*** | -.0405 | .230*** | .631*** | .553*** | -.0402 |
| | (8.16) | (2.41) | (2.09) | (-.17) | (8.16) | (2.41) | (2.09) | (-.17) | (8.00) | (2.28) | (1.98) | (-.16) |
| F-statistics (F) | 2.21 | 9.27*** | 7.54*** | 28.08*** | 2.21 | 9.27*** | 7.54*** | 28.08*** | 6.88*** | 9.19*** | 7.45*** | 27.48*** |
| R-squared ($R^2$) | .0044 | .1008 | .1088 | .4075 | .0044 | .1008 | .1088 | .4075 | .0135 | .1001 | .1076 | .4023 |
| Adjusted $R^2$ | .0024 | .0899 | .0944 | .3930 | .0024 | .0899 | .0944 | .3930 | .0115 | .0892 | .0932 | .3876 |
| Observations (N) | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 |

*Notes:* Table 12 shows the short-run IPO share performance at each level of behavioral-issue-firm-and-market characteristics by using OLS regression model. The above table consists of four models: Model 1 consist of behavioral characteristics, Model 2 consist of behavioral-and-issue characteristics, Model 3 consist of behavioral-issue-and-firm characteristics, Model 4 consist of behavioral-issue-firm-and-market characteristics (overall). The dependent variable dichotomous takes the value of '1' if the firm is underpriced and takes the value '0' if the firm is overpriced. *t*-statistic is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 13:** Short-run IPO share performance interaction analysis between SENT with PRICE, OSIZE, and HOT

| Independent variables | PCA<br>Dependent variable : MAIR<br>Model 1<br>SENT*PRICE | Model 2<br>SENT*OSIZE | Model 3<br>SENT*ICOR | Model 4<br>SENT*HOT | sPCA<br>Dependent variable : MAIR<br>Model 1<br>SENT*PRICE | Model 2<br>SENT*OSIZE | Model 3<br>SENT*ICOR | Model 4<br>SENT*HOT | PLS<br>Dependent variable : MAIR<br>Model 1<br>SENT*PRICE | Model 2<br>SENT*OSIZE | Model 3<br>SENT*ICOR | Model 4<br>SENT*HOT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SENT | .2740 | -10.2100*** | 8.9100*** | .1380 | -.2740 | 10.2100*** | -8.910*** | -.1380 | -.350 | 20.67*** | -24.92*** | -.380 |
| | (1.43) | (-5.26) | (12.08) | (.70) | (-1.43) | (5.26) | (-12.08) | (-.70) | (-.55) | (3.44) | (-7.96) | (-.58) |
| IPOP | -.00191 | .00110 | -.00225 | -.00138 | -.000191 | .00110 | -.00225 | -.00138 | -.00207 | -.00197 | -.000741 | -.00210 |
| | (-.55) | (.32) | (-.74) | (-.40) | (-.55) | (.32) | (-.74) | (-.40) | (-.59) | (-.57) | (-.23) | (-.60) |
| PRICE | -.0443** | -.0211*** | -.0171** | -.0206*** | -.0443** | -.0211*** | -.0171** | -.0206*** | -.0214** | -.0184** | -.0187*** | -.0187** |
| | (-2.29) | (-2.76) | (-2.45) | (-2.61) | (-2.29) | (-2.76) | (-2.45) | (-2.61) | (-2.30) | (-2.42) | (-2.58) | (-2.43) |
| OSIZE | .0733*** | .0462*** | .0448*** | .0677*** | 0.0733*** | .0462*** | .0488*** | .0677*** | .0705*** | .0339** | .0746*** | .0697*** |
| | (5.15) | (3.24) | (3.58) | (4.86) | (5.15) | (3.24) | (3.58) | (4.86) | (4.99) | (1.96) | (5.62) | (4.94) |
| ICOR | -.0760*** | -.0594*** | -.0494*** | -.0725*** | -.0760*** | -.0594*** | -.0494*** | -.0725*** | -.0752*** | -.0760*** | -.0328*** | -.0747*** |
| | (-6.26) | (-4.91) | (-4.53) | (-6.00) | (-6.26) | (-4.91) | (-4.53) | (-6.00) | (-6.18) | (-6.32) | (-2.60) | (-6.12) |
| UREP | -.0124 | -.0227 | -.0000101 | -.00883 | -.0124 | -.0227 | -.0000101 | -.00883 | -.0113 | .00117 | -.00279 | -.0115 |
| | (-.24) | (-.46) | (-.00) | (-.17) | (-.24) | (-.46) | (-.00) | (-.17) | (-.22) | (.23) | (-.58) | (-.22) |
| BOOK | -.0163 | -.0419 | -.0129 | -.0292 | -.0163 | -.0419 | -.0129 | -.0292 | -.00178 | -.0109 | -.0196 | -.0188 |
| | (-.27) | (-.72) | (-.24) | (-.49) | (-.27) | (-.72) | (-.24) | (-.49) | (-.30) | (-.18) | (-.35) | (-.31) |
| FAGE | .000819 | .000488 | .000544 | .000486 | .000819 | .000488 | .000544 | .000486 | .000739 | .000101 | .000311 | .000755 |
| | (.42) | (.26) | (.31) | (.25) | (.42) | (.26) | (.31) | (.25) | (.37) | (.52) | (.17) | (.38) |
| MVL | .0389 | -.000531 | .0529 | .0394 | .0389 | -.000531 | .0529 | .0394 | .0610 | .0566 | .0764 | .0517 |
| | (.51) | (-.01) | (.79) | (.52) | (.51) | (-.01) | (.79) | (.52) | (.79) | (.76) | (1.08) | (.69) |
| OVER | .000858 | .00119** | .000960** | .000690 | .000858 | .00119** | .000960** | .000690 | .00103** | .000994* | .00114** | .00101** |
| | (1.65) | (2.33) | (2.09) | (1.32) | (1.65) | (2.33) | (2.09) | (1.32) | (2.00) | (1.95) | (2.35) | (1.96) |
| HOT | .6790*** | .6710*** | .6560*** | .628*** | .6790*** | .6710*** | .6560*** | .628*** | .672*** | .665*** | .662*** | .662*** |
| | (13.84) | (14.09) | (15.15) | (11.71) | (13.84) | (14.09) | (15.15) | (11.71) | (13.57) | (13.60) | (14.21) | (11.64) |
| BLIST | -.0702 | -.0777 | -.0498 | -.0747 | -.0702 | -.0777 | -.0498 | -.0747 | -.0693 | -.0740 | -.0792 | -.0764 |
| | (-1.22) | (-1.39) | (-.98) | (-1.31) | (-1.22) | (-1.39) | (-.98) | (-1.31) | (-1.20) | (-1.29) | (-1.37) | (-1.33) |
| SENT*PRICE | .0831 | - | - | - | -.0831 | - | - | - | -.0766 | - | - | - |
| | (1.22) | | | | (-1.22) | | | | (-.48) | | | |
| SENT*OSIZE | - | .6020*** | - | - | - | -.0602*** | - | - | - | -1.206*** | - | - |
| | | (5.47) | | | | (-5.47) | | | | (-3.53) | | |
| SENT*ICOR | - | - | -.6000*** | - | - | - | .6000*** | - | - | - | 1.693*** | - |
| | | | (-11.81) | | | | (11.81) | | | | (7.92) | |
| SENT*HOT(1) | - | - | - | .8660** | - | - | - | -.8660** | - | - | - | -.452 |
| | | | | (2.39) | | | | (-2.39) | | | | (-.34) |
| SENT*HOT(0) | - | - | - | - | - | - | - | - | - | - | - | - |
| Constant | -.0698 | .154 | .00131 | -.0242 | -.0698 | .154 | .00131 | -.0242 | -.0470 | .592*** | -.760*** | -.0368 |
| | (-.29) | (.65) | (.01) | (-.10) | (-.29) | (.65) | (.01) | (-.10) | (-.19) | (1.97) | (-3.07) | (-.15) |
| F-statistics (F) | 26.06*** | 29.76*** | 43.98*** | 26.61*** | 26.06*** | 29.76*** | 43.98*** | 26.61*** | 25.81*** | 26.16*** | 25.33*** | 24.68*** |
| R-squared ($R^2$) | .4093 | .4417 | .5390 | .4144 | .4093 | .4417 | .5390 | .4144 | .4069 | .4102 | .4024 | .4145 |
| Adjusted $R^2$ | .3936 | .4268 | .5267 | .3988 | .3936 | .4268 | .5267 | .3988 | .3911 | .3945 | .3865 | .3977 |
| Observations (N) | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 |

*Notes*: Table 13 shows the short-run IPO share performance interaction analysis between sentiment with key determinants short-run IPO share performance. The above table consists of four interactions: Model 1 consist of SENT*PRICE, Model 2 consist of SENT*OSIZE, Model 3 consist of SENT*ICOR, and Model 4 consist of SENT*HOT. *t*-statistic is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

The binary regression models have an advantage of being more realistic than OLS regression model because of its dichotomous in nature. Moreover, binary regression models do not assume the data normality assumption of regressions. Table 14 shows the frequency of dummy for short-run dependent variable, i.e. MAIR. In running the binary regression model, hot market (HOT) has been dropped from independent variables due to the lack of number of observations, which prevents the generation of meaningful binary results.

**Table 14:** Frequency of dummy for short-run dependent variable

| Dummy variable for MAIR | Observations (N) | |
|---|---|---|
| IPO underpricing denotes '1' | 394 | 78.33% |
| IPO overpricing denotes '0' | 109 | 21.67% |
| Total | 503 | 100.00% |

Based on OLS regression model, the key determinants such as market sentiment (SENT), offer price (PRICE), offer size (OSIZE), and issue cost ratio (ICOR) are within the realm of IPOs as discussed in Table 12. Separately, in binary regression model, the significant key determinant are offer price (PRICE), offer size (OSIZE), underwriter reputation (UREP), book value per share (BOOK), and oversubscription ratio (OVER), distinct from the factors considered in an OLS regression model, influencing IPO underpricing in Malaysia. This means in the event of IPO underpricing, investors also examine the underwriter reputation and book value per share of IPO firms.

The overall result of binary regression model in terms of *t*-statistic and significance level of each parameter are relatively better than the probit model. In binary regression, the likelihood ratio (LR) tests are used (instead of F-statistic) to evaluate the overall fitness of the models. The LR result shows that all the models (in Table 15 and Table 16) are fit and significant at 1% level, which shows that all the models can be used for the analysis.

Marginal analysis was used to identify the most important explanatory variables that contributed to the change in the short-run share performance of the Malaysian IPOs. Marginal analysis measures the likelihood of change in probability ($\Delta p$) associated with short-run share performance due to a change in the explanatory variables. Table 17 shows the calculated changes in probability associated with the short-run IPO share performance based on probit regression model. For the logit regression model, no marginal probability analysis is present in this study because the result of probit regression model is similar or close to the result of logit regression model.

As shown in Table 17, there is no significant explanatory for market sentiment (SENT). The marginal analysis indicates that offer price (PRICE), underwriter reputation (UREP), and oversubscription ratio (OVER) are the most important explanatory variables (with 5% significance level) in Malaysian IPO market as compared with the others due to the highest probability associated with IPO underpricing used to measure the short-run IPO share performance. The results are consistently apply in all models.

**Table 15:** Short-run IPO share performance determinants based on logit with $SENT^{PCA}$, $SENT^{SPCA}$, and $SENT^{PLS}$

| | PCA | | | | sPCA | | | | PLS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability occurrence : $\ln\left(\frac{P_i}{1-P_i}\right)$ | | | | Probability occurrence : $\ln\left(\frac{P_i}{1-P_i}\right)$ | | | | Probability occurrence : $\ln\left(\frac{P_i}{1-P_i}\right)$ | | | |
| Independent variables | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market |
| SENT | -.1330 | .8730 | .8280 | -.7320 | .1330 | -.8730 | -.8280 | .7320 | -4.0070 | -4.1510 | -4.0320 | -.0469 |
| | (-.16) | (1.00) | (.94) | (-.68) | (.16) | (-1.00) | (-.94) | (.68) | (-1.41) | (-1.40) | (-1.35) | (-.01) |
| IPOP | | .0255 | .0249 | .0319 | | .0255 | .0249 | .0319 | | .0229 | .0225 | .0317 |
| | | (1.37) | (1.34) | (1.51) | | (1.37) | (1.34) | (1.51) | | (1.23) | (1.21) | (1.50) |
| PRICE | | -.1380*** | -.1470*** | -.0896** | | -.1380*** | -.1470*** | -.0896** | | -.1300*** | -.1390*** | -.0976** |
| | | (-3.76) | (-3.81) | (-2.14) | | (-3.76) | (-3.81) | (-2.14) | | (-3.75) | (-3.82) | (-2.41) |
| OSIZE | | .1220 | .0917 | .1990* | | .1220 | .0917 | .1990* | | .1280 | .0967 | .2040* |
| | | (1.40) | (1.07) | (1.66) | | (1.40) | (1.07) | (1.66) | | (1.46) | (1.13) | (1.74) |
| ICOR | | -0.1130 | -.1190 | -.1950 | | -.1130 | -.1190 | -.1950 | | -.1070 | -.1140 | -.2000 |
| | | (-1.14) | (-1.28) | (-1.35) | | (-1.14) | (-1.28) | (-1.35) | | (-1.09) | (-1.23) | (-1.42) |
| UREP | | .7570** | .6140** | .7430** | | .7570** | .6140** | .7430** | | .7320** | .5870** | .7270** |
| | | (2.54) | (2.01) | (2.24) | | (2.54) | (2.01) | (2.24) | | (2.45) | (1.91) | (2.20) |
| BOOK | | | .6690** | .8900** | | | .6690** | .8900** | | | .6700** | .8870** |
| | | | (2.16) | (2.29) | | | (2.16) | (2.29) | | | (2.16) | (2.27) |
| FAGE | | | -.0002 | .0129 | | | -.0002 | .0012 | | | -.0003 | .0013 |
| | | | (-.02) | (1.11) | | | (-.02) | (1.11) | | | (-.03) | (1.21) |
| MVL | | | | .5210 | | | | .5210 | | | | .4530 |
| | | | | (1.09) | | | | (1.09) | | | | (.97) |
| OVER | | | | .0435*** | | | | .0435*** | | | | .0425*** |
| | | | | (4.53) | | | | (4.53) | | | | (4.46) |
| BLIST | | | | .4230 | | | | .4230 | | | | .4120 |
| | | | | (1.25) | | | | (1.25) | | | | (1.22) |
| Constant | 1.2960*** | .4590 | .8170 | -2.1330* | 1.2960*** | .4590 | .8170 | -2.1330* | 1.2280*** | .3050 | .6770 | -2.1360* |
| | (10.70) | (.40) | (.68) | (-1.60) | (10.70) | (.40) | (.68) | (-1.60) | (10.70) | (.26) | (.55) | (-1.59) |
| Likelihood ratio (LR) | -263.148 | -249.225 | -246.684 | -216.840 | -263.148 | -249.225 | -246.684 | -216.840 | -262.170 | -248.746 | -246.206 | -217.093 |
| $Chi^2$ | .0300 | 27.38*** | 32.471*** | 92.15*** | .0300 | 27.38*** | 32.47*** | 92.15*** | 1.98 | 28.34*** | 33.42*** | 91.65*** |
| Pseudo $R^2$ | .00205 | .0521 | .0617 | .1753 | .0001 | .0521 | .0617 | .1753 | .0038 | .0539 | .0636 | .1743 |
| Observations (N) | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 |

*Notes*: Table 15 shows the short-run IPO share performance at each level of behavioral-issue-firm-and-market characteristics by using logit regression model. The above table consists of four models: Model 1 consist of behavioral characteristics, Model 2 consist of behavioral-and-issue characteristics, Model 3 consist of behavioral-issue-and-firm characteristics, Model 4 consist of behavioral-issue-firm-and-market characteristics (overall). The dependent variable dichotomous takes the value of '1' if the firm is underpriced and takes the value '0' if the firm is overpriced. *t*-statistic is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 16:** Short-run IPO share performance determinants based on probit with $SENT^{PCA}$, $SENT^{SPCA}$, and $SENT^{PLS}$

| Independent variables | PCA | | | | sPCA | | | | PLS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Probability occurrence : $P_i$ | | | | Probability occurrence : $P_i$ | | | | Probability occurrence : $P_i$ | | | |
| | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market | Model 1 Behavioral | Model 2 Behavioral-and-Issue | Model 3 Behavioral-Issue-and-Firm | Model 4 (Overall) Behavioral-Issue-Firm-and-Market |
| SENT | -.0757 | .5250 | .4960 | -.4470 | .0757 | -.5250 | -.4960 | .4470 | -2.2730 | -2.2860 | -2.2410 | .0168 |
| | (-.16) | (1.03) | (.97) | (-.71) | (.16) | (-1.03) | (-.97) | (.71) | (-1.39) | (-1.34) | (-1.31) | (.09) |
| IPOP | | .0142 | .0137 | .0187 | | .0142 | .0137 | .0187 | | .0126 | .0121 | .0185 |
| | | (1.32) | (1.27) | (1.47) | | (1.32) | (1.27) | (1.47) | | (1.17) | (1.12) | (1.45) |
| PRICE | | -.0828*** | -.0886*** | -.0554** | | -.0828*** | -.0886*** | -.0554** | | -.0776*** | -.0838*** | -.0603** |
| | | (-3.89) | (-4.04) | (-2.27) | | (-3.89) | (-4.04) | (-2.27) | | (-3.84) | (-4.03) | (-2.56) |
| OSIZE | | .0705 | .0544 | .1180 | | .0705 | .0544 | .1180 | | .0723 | .0564 | .1210 |
| | | (1.45) | (1.13) | (1.71) | | (1.45) | (1.13) | (1.71) | | (1.49) | (1.18) | (1.77) |
| ICOR | | -.0648 | -.0704 | -.1170 | | -.0648 | -.0704 | -.1170 | | -.0609 | -.0668 | -.1200 |
| | | (-1.19) | (-1.36) | (-1.41) | | (-1.19) | (-1.36) | (-1.41) | | (-1.13) | (-1.03) | (-1.47) |
| UREP | | .4270*** | .3520** | .4460** | | .427*** | .352** | .4460** | | .4120*** | .3360** | .4390** |
| | | (2.63) | (2.12) | (2.30) | | (2.63) | (2.12) | (2.30) | | (2.54) | (2.01) | (2.26) |
| BOOK | | | .3930** | .5380** | | | .3930** | .5380** | | | .3960** | .5330** |
| | | | (2.12) | (2.40) | | | (2.28) | (2.40) | | | (2.30) | (2.37) |
| FAGE | | | .0002 | .0084 | | | .0002 | .0084 | | | .00007 | .00912 |
| | | | (.03) | (1.19) | | | (.03) | (1.19) | | | (.01) | (1.30) |
| MVL | | | | .3170 | | | | .3170 | | | | .2780 |
| | | | | (1.12) | | | | (1.12) | | | | (.99) |
| OVER | | | | .0261*** | | | | .0261*** | | | | .0254*** |
| | | | | (4.79) | | | | (4.79) | | | | (4.74) |
| BLIST | | | | .2600 | | | | . .2600 | | | | .2550 |
| | | | | (1.28) | | | | (1.28) | | | | (1.24) |
| Constant | .7900*** | .3100 | .5120 | -1.2690 | .7900*** | .3100 | .5120 | -1.269 | .7500*** | .2380 | .4410 | -1.2570 |
| | (11.31) | (.46) | (.76) | (-1.68) | (11.31) | (.46) | (.76) | (-1.68) | (11.18) | (.35) | (.65) | (-1.66) |
| Likelihood ratio (LR) | -263.148 | -249.185 | -246.414 | -216.061 | -263.148 | -249.185 | -246.414 | -216.061 | -262.192 | -248.817 | -246.020 | -216.406 |
| $Chi^2$ | .0300 | 27.46*** | 33.01*** | 93.71*** | .0300 | 27.46*** | 33.01*** | 93.71*** | 1.94 | 28.20*** | 33.79*** | 93.02*** |
| Pseudo $R^2$ | .0000 | .0522 | .0628 | .1782 | .0000 | .0522 | .0628 | .1782 | .0037 | .0536 | .0643 | .1769 |
| Observations (N) | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 | 503 |

*Notes*: Table 16 shows the short-run IPO share performance at each level of behavioral-issue-firm-and-market characteristics by using probit regressions. The above table consists of four models: Model 1 consist of behavioral characteristics, Model 2 consist of behavioral-and-issue characteristics, Model 3 consist of behavioral-issue-and-firm characteristics, Model 4 consist of behavioral-issue-firm-and-market characteristics (overall). The dependent variable dichotomous takes the value of '1' if the firm is underpriced and takes the value '0' if the firm is overpriced. *t*-statistic is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

**Table 17:** The change in probability (Δp) due to a change in explanatory

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| (Overall) behavioral-issue-firm-and-market | Change in probability | p-value | Change in probability | p-value | Change in probability | p-value |
| $SENT^{PCA}$ | -0.1303 | 0.4940 | - | - | - | - |
| $SENT^{sPCA}$ | - | - | 0.1303 | 0.4940 | - | - |
| $SENT^{PLS}$ | - | - | - | - | -0.0083 | 0.9890 |
| IPOP | 0.0056 | 0.1260 | 0.0056 | 0.1260 | 0.0056 | 0.1300 |
| PRICE | -0.1595*** | 0.0028 | -0.0159*** | 0.0280 | -0.0174*** | 0.0130 |
| OSIZE | 0.0353** | 0.0920 | 0.0353** | 0.0920 | 0.0363** | 0.0780 |
| ICOR | -0.0347** | 0.1740 | -0.0347** | 0.1740 | -0.0355* | 0.1520 |
| UREP | 0.1323*** | 0.0220 | 0.1323*** | 0.0220 | 0.1296*** | 0.0250 |
| BOOK | 0.1584** | 0.0190 | 0.1584** | 0.0190 | 0.1581** | 0.0200 |
| FAGE | 0.0022 | 0.2650 | 0.0022 | 0.2650 | 0.0024 | 0.2240 |
| MVL | 0.0926** | 0.2720 | 0.0926** | 0.2720 | 0.0808 | 0.3310 |
| OVER | 0.0077*** | 0.0000 | 0.0077*** | 0.0000 | 0.0075*** | 0.0000 |
| BLIST | 0.0753 | 0.2060 | 0.0753 | 0.2060 | 0.7351 | 0.2190 |

*Notes*: Table 17 shows the change in probability due to a change in explanatory at (overall) behavioral-issue-firm-and-market characteristics by marginal analysis. The above table consists of three models: Model 1 with $SENT^{PCA}$, Model 2 with $SENT^{sPCA}$, and Model 3 with $SENT^{PLS}$. p-value is given with significance level as follows: *** Significant at the 1% level, ** Significant at the 5% level, * Significant at the 10% level.

## 5. Conclusion

The study findings indicate that sentiment factor plays a significant role in explaining IPO underpricing. The results support the study done by Leite (2005) states that the presence of the sentiment investor reduces the winner's curse problem in the issue by increasing the relative probability for the least-informed (rational) investor to be allocated underpriced shares. A reduction in the participation probability of the sentiment investor increases the winner's curse problem in the issue, and this forces the issuer to reduce the IPO price and thereby leave more money on the table for investors. According to Rock (1986), the winner's curse argument accounts for the empirical evidence of underpricing in IPOs as compensation to uninformed investors for being allocated a disproportionately large fraction of overpriced issues. The findings also demonstrate there is significant impact of fundamental factors, particularly issue characteristics, on predicting IPO underpricing in Malaysia. Specifically, the offer price and issue cost ratio exhibit a negative correlation with IPO underpricing whereas offer size exhibits positive correlation with IPO underpricing, indicating their significant relationship in the context of Malaysian IPOs.

Nevertheless, this study has certain limitations. Our analysis primarily focused on examining the relationship between IPO underpricing and a composite measure of Malaysian IPO market sentiment using various proxies. in the future study, it would be interesting to explore the impact of individual investors' sentiment and retail investors' sentiment separately on IPO underpricing. This would help determine if the previously observed non-significant relationship between Malaysian IPO market sentiment and underpricing holds true for specific investor groups.

It is able to facilitate the country's long-term economic growth to be in line with Malaysia's national development plans. Combining with the reality of IPO underpricing in Malaysia stock market, this study puts forward some countermeasures and suggestions in order to weaken the problem of Malaysian IPO market in respect of market sentiment to promote a healthy development of Malaysia stock market. With this, the regulators are able to implement some forms of policy to pay more attention on investor education so as to reduce the proportion of investors who make decisions in selling or buying securities in the stock market without the support of professional advice, or fundamental and technical analysis. It helps investors to avoid psychology traps.

The findings of this study indicate that in the Malaysian IPO market, sentiment factors plays a significant role while fundamental factors, particularly issue characteristics have some degree of influence on predicting IPO underpricing. Given this insight, policymakers should concentrate on creating an environment that promotes transparency, efficient information dissemination, and fair valuation practices in the IPO market. This can help reduce information asymmetry and enhance market efficiency, ultimately leading to more accurate pricing of IPOs and minimising the extent of underpricing. Furthermore, since the study found that sentiment does interact with offer size (OSIZE), issue cost ratio (ICOR) and hot market (HOT), policymakers should monitor the impact of offer size (OSIZE), issue cost ratio (ICOR) and hot market (HOT) on market sentiment. Considering this interaction can be crucial in tailoring policies to address potential issues related to market sentiment and offer size (OSIZE), issue cost ratio (ICOR) and hot market (HOT), leading to more informed investment decisions and better IPO pricing outcomes.

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