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Market Conditions in Long-Run IPO Performance in Junior Markets

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Abstract

The objective of this research was to investigate the 'hot market' hypothesis in the long-run performance of initial public offerings on Thailand's junior stock market, the Market for Alternative Investments (mai). A long run event study methodology was used, with periods of six, twelve, twenty-four and thirty-six months from the initial public offering selected for analysis. Predictor variables included trading volume, initial public offering frequency, and systemic crisis (2020-2022). Data was collected for 151 firms which issued an initial public offering between 2012 and 2023. The findings showed that trading volume was not a significant predictor of performance. However, initial public offering frequency negatively predicted performance, while systemic crisis positively predicted performance. The implication of this is that firms that enter the market during 'hot' periods may be systematically overpriced and as a result may underperform later.

Keywords: *Hot Market Hypothesis, Initial Public Offering, Market for Alternative Investments (Mai).*

Introduction

This research examines initial public offerings (IPOs) on Thailand's junior market, the Market for Alternative Investments (mai). The mai was established in 1998 as a route to access public investment funding for small and medium enterprises (SMEs) (SET, 2025). As the Stock Exchange of Thailand's (SET) junior market, the mai offers lighter regulation and has fewer requirements for governance and disclosure than the main SET, making it more suitable for new and small firms to access funding. This is common for junior markets, which typically use lighter regulation and have fewer constraints on listing than main markets (Granier et al., 2019; Shah, 2023).

Junior markets are a crucial part of the funding landscape for innovative SMEs (Granier et al., 2019). In the absence of a junior market, large firms which qualify for listing on main markets have a significant advantage in access to capital funding (Revest, 2018). Junior markets even the playing field to some extent, offering SMEs more access to equity funding and an opportunity to gain reputational and relational benefits associated with stock exchange listings (Revest, 2018). The funding support from junior markets is particularly important for innovative and 'born global' SMEs, which seek to quickly enter global markets and innovate rather than grow slowly as SMEs have traditionally done (Bhattacharya, 2017; Chishty et al., 2025). Firms can even 'graduate' to main markets over time, allowing even greater equity funding access and

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reputational benefits (Honjo & Kurihara, 2023). Thus, understanding the role of junior markets and how firms benefit from listing on them is important. However, this cannot be predicted simply through theoretical comparison, because the regulation of junior markets is so diverse (Killins, 2019). By extension, IPO performance in a market such as the mai cannot be understood without empirical research, which as far as the researcher can determine has not been done. This study seeks to fill this gap in understanding.

The objective of this research is to investigate the 'hot market' hypothesis in the long-run performance of IPOs on the mai. The research covers IPOs issued between 2012 and 2023, a period when a total of 177 firms were listed on the mai. The study investigates three market factors – trading volume, IPO frequency, and systemic crisis – which could affect IPO performance, as measured by cumulative abnormal return (CAR). An event study methodology is used, with four time intervals (6, 12, 24, and 36 months) used to examine the role of the market in which the firm issues its IPO on its subsequent performance.

The paper is organized as follows. First, the theories and empirical research the study is based on are presented in the literature review. The event study methodology is explained next. The findings are presented and analyzed and then discussed in relation to the theories and prior findings. A conclusion summarizes results and reflects on limitations and opportunities for further research.

Literature Review

Junior Markets

A junior market, also known as a junior stock exchange or alternative investment market, is an equity (stock) market which is intended to give smaller, newer, and potentially riskier firms access to public investment funding (Colombelli, 2010). This function is particularly important for innovation-driven SMEs, who may otherwise struggle to access adequate capital to implement their innovations (Granier et al., 2019). The original junior market, the London Stock Exchange's Alternative Investment Market (AIM) was set up in 1995 as a means of capitalizing small and medium enterprises (SMEs) which would not ordinarily qualify for public listing on the main markets (Acedo-Ramírez & Ruiz-Cabestre, 2017). While the AIM is a global listing exchange, there are also other alternative or junior markets which have been established around the world, especially in European and Asian markets (Granier et al., 2019). The context of this research is the Market for Alternative Investments (mai), which is the SET's junior market, which was established in 1998.

Alternative investment markets are characterized by several differences from main markets (Granier et al., 2019). Junior markets are typically intended for listing of SMEs, which have lower resources and lower capitalization (Colombelli, 2010). As a result, there are typically simplified listing processes and requirements in junior markets compared to main markets (Granier et al., 2019). For example, there may be less stringent rules on governance and accountability, and firms may be subject to less oversight regarding accounting and corporate governance requirements (Shah, 2023). As Shah (2023) notes, there are typically fewer people on the boards of SMEs listed on junior markets and more overlap between management and board positions, and SMEs listed on junior markets may have alternative governance mechanisms in place rather than the stringent requirements of main markets (Shah, 2023). With weaker corporate governance, such firms may show more volatility in financial performance, sustainability and other relevant measures (Saeed et al., 2025), but the firms may also have

stronger leadership (Adam et al., 2025). Thus, firms listed on junior markets may be qualitatively different than firms listed on senior markets. Furthermore, while there is typically no route for a firm to downgrade from a main market to an alternative investment market, it is typical that firms that perform well on junior markets and which meet listing requirements to eventually graduate to main markets (Honjo & Kurihara, 2023). While for many firms the junior market will be its main listing, for others, the junior market is a stepping stone to the main market and its access to larger pools of investor funding and higher returns (Honjo & Kurihara, 2023). Thus, there are substantial differences in the purpose, regulation, and function of junior markets compared to main markets.

The regulations and implementation of junior markets is heterogeneous, meaning that they have different rules and requirements for listing and maintenance of listings (Granier et al., 2019). This heterogeneity is important because it has an effect on the observable outcomes like IPO performance (Carpentier & Suret, 2018). For example, Canadian junior markets allow listing at a very early stage, which means that these markets are more volatile than junior markets in countries with more conservative listing requirements (Carpentier & Suret, 2018). These differences in market regulation and implementation make it difficult to generalize findings between junior markets, justifying research specifically on the mai.

IPOs and IPO Performance

The initial public offering (IPO) is the formal process by which a firm offers ownership sales to the public for the first time (Espinasse, 2021). The IPO is typically a formal regulatory process with stringent requirements for information disclosure, firm quality, and other requirements to protect investors (Espinasse, 2021). However, junior markets have their own IPO requirements, which are typically less stringent and impose fewer regulatory requirements than main markets (Granier et al., 2019; Shah, 2023). Firms may choose to undertake an IPO for a variety of strategic and commercial reasons (Lefebvre, 2023). First and foremost, IPOs provide firms with a significant amount of capital funding which they can use for investment, which has fewer constraints or requirements for return than loans or other sources of funding (Lefebvre, 2023). IPOs also offer firms an opportunity for improved reputation and leverage for commercial deals, although as Lefebvre (2023) points out, this comes at the cost of reduced ownership and control of the firm. For example, so-called born global firms may undertake IPOs in order to increase their capital and raise their international profile (Chishty et al., 2025). Ultimately, the IPO offers the firm the opportunity to invest in innovation and improve performance in the long run, although not all firms will achieve this (Lefebvre, 2023).

One of the fundamental problems of IPOs is how to price an asset that has never been offered for sale to the public previously (Chang et al., 2017). The process of IPO pricing is undertaken by the IPO underwriter, a commercial bank specializing in IPOs who assists the firm with pricing and listing requirements and acts as an intermediary between the firm and investors during the IPO process (Espenlaub et al., 2024). In order to price the stock for the IPO, the underwriter considers a variety of factors including the firm's own performance, market conditions, and performance of comparative firms (Espinasse, 2021). However, IPO pricing is not a straightforward process. It can be affected by factors like underwriter reputation and incentives (Espenlaub et al., 2024), analytical quality of the underwriter (Espinasse, 2021), investor sentiment (Tsukioka et al., 2018), and other factors (Ritter & Welch, 2002). This complex process leads to the phenomenon of IPO mispricing, in which the IPO price is either higher or lower than the market price (Reber & Vencappa, 2016).

IPO mispricing can be defined formally as a difference between the initial offering price and its subsequent market price (Reber & Vencappa, 2016). IPO mispricing can be considered in two different time horizons. Short-run IPO mispricing refers to a difference between the IPO price and the market price in the short run, typically defined as the difference between the IPO price and the price at the end of the first trading day (first-day returns) (Wen, 2013). Short-run mispricing is often related to the choice of price by the underwriter, who may choose to deliberately underprice the IPO in order to drive sales (Espenlaub et al., 2024; Zou et al., 2020). Long-run IPO mispricing refers to the difference between the IPO price and the trading price at some point in the future (for example, 30, 60, or 90 days) (Wen, 2013). While the long run could be any time horizon beyond the first-day return, in practice after two to three years of trading it becomes difficult to determine whether IPOs were underpriced in comparison to the market because the firm and market will have changed substantially (Dong et al., 2011). As a result, long-run performance typically does not refer to longer than two years. Long-run IPO performance is more difficult to explain.

Theoretical Explanations for IPO Underperformance

This research is mainly concerned with IPO underperformance, where firms achieve lower returns than would be expected given the initial IPO price (Dong et al., 2011; Wen, 2013). There have been a number of potential explanations given for IPO underperformance, which are worth considering briefly here.

Firm Fundamentals

The first theoretical explanation is the 'firm fundamentals' hypothesis. In brief, the 'firm fundamentals' hypothesis argues that IPO performance (whether underperformance or overperformance) is driven by the IPO's characteristics and the firm's own characteristics and performance (Daily et al., 2003; La Rocca, 2021; Wen, 2013). These characteristics, including financial performance and sales, firm size and age, and underwriter reputation and performance, affect long-run underpricing because they affect the price of the stock. Here, the firm fundamentals hypothesis is investigated as part of the control variables for the study.

The 'fad' hypothesis

The second theoretical explanation is the so-called 'fad hypothesis' (E. M. Miller, 1977, 2000). The fad hypothesis argues in brief that there are often differences of opinion between earlier and later investors of a given stock, due to differences in optimism and the amount of information available to investors (E. M. Miller, 1977, 2000). These differences are presumed to stem from information asymmetry and market inefficiency mechanisms, which cause initial investors to undervalue (or overvalue) the stock (Aggarwal & Rivoli, 1991), as well as other factors. For example, underwriters can deliberately overprice to drive interest (Qian et al., 2024) or deliberately underprice to drive demand (Katti & Phani, 2016). Over time, the accumulation of public information about the performance of the stock causes a correction (increase or decrease) in the price (Aggarwal & Rivoli, 1991). Thus, according to the fad hypothesis, differences between initial IPO pricing and long-run performance results from a price correction resulting from increased information. This hypothesis can be seen to be related to the 'firm fundamentals' explanation, with the added nuance that it is information about firm performance, not just firm performance, which causes price corrections.

The 'hot market' hypothesis

The third theoretical explanation is the 'hot market' hypothesis. This hypothesis is based on the concept of the cyclical market for IPOs, in which market conditions vary between more and less welcoming to IPO investment (Helwege & Liang, 2004). In a 'hot' market, there is a high volume of trading and investors are willing to pay higher prices for IPO investments, while in a 'cold' market trading is slower and investors have less willingness to pay (Yung et al., 2008). These conditions are cyclical in nature; when the market is 'hot' firms often rush into IPOs, increasing the temperature of the market in return, which ultimately causes a correction as there are then too many firms competing for IPO funding (Yung et al., 2008). Additionally, other market conditions may influence the temperature of the IPO market; for example, oil prices are known to have a systemic impact on stock performance, including IPOs (Bengana et al., 2025). Typically, firms undertaking an IPO will attempt to time their market entry to enter in a hot market, where they will have the most interest (though also the most competition) (de Jong & Legierse, 2022). While some firms may choose to enter in a cold market, others may choose to wait for better market conditions or withdraw entirely (Jamaani & Alawadhi, 2023). Whether the market is hot or cold can influence initial pricing; for example, firms IPOing in hot markets may be initially overpriced and thus may underperform in the long run, while firms IPOing in cold markets may be initially underpriced to drive demand and may overperform in the long run (Helwege & Liang, 2004).

While IPO markets can be observed to be cyclical (Yung et al., 2008), it is also relevant to consider the effect of systemic or structural crisis on the IPO market. Structural crises are crises which affect all aspects of the market and economy, and which can be transmitted between different markets as well through a process called contagion (Leaven & Valencia, 2018). Such systemic crises can also be transmitted between one sector of the economy to the other, for example moving from the banking sector to the entire banking sector (Leaven & Valencia, 2018). Systemic crises can have an effect on the IPO market, including the rate of listing as well as pricing and performance (Armanious, 2024). Therefore, it is also essential to consider the impact of systemic crises on IPO performance.

Market Conditions and Long-Run IPO Performance

This research focuses on the 'hot market' hypothesis, addressing the market conditions that could affect IPO performance in the long run depending on the conditions that were in place in the market when the IPO was issued. There are three specific variables investigated here. These factors, which include trading volume, IPO frequency, and systemic crisis, together indicate optimistic or pessimistic conditions.

Trading Volume and IPO Performance

The first factor investigated as part of the market conditions contributing to long-run IPO performance is trading volume. While there are several common measures of trading volume, its intuitive definition is the number of shares changing hands on any particular day (Karpoff, 1986). Trading volume can be measured at the level of the individual stock or of the market (Karpoff, 1986). Thus, trading volume can be viewed as a proxy for the stock's or market's activity levels and liquidity (Darolles et al., 2015). Trading volume can fluctuate rapidly depending on factors like revision of opinion based on new information (Karpoff, 1986) and demand for liquidity (Darolles et al., 2015). Trading volume is also generally different between firms and markets, with some firms and markets having higher trading volume than others

(Anderson & Dyl, 2005). The effect of trading volume on IPO performance stems from the 'hot market' hypothesis, which argues for an effect of overall trading volume on the performance of a stock (Helwege & Liang, 2004).

Studies have shown conflicting evidence on the impact of trading volume in long-run IPO performance. Some studies have suggested that IPOs that were issued in high-volume markets (the 'hot' market) outperformed other firms in a relatively short time period (Arora & Singh, 2020; Komenkul & Siriwattanakul, 2016; Thomadakis et al., 2012). However, other studies which used a longer time horizon (up to three years) found that these effects may not last long and may not be seen in all markets. For example, Thomadakis et al. (2012), who investigated long-run IPO performance in Greek stock markets, found that effects were nonlinear, with firms outperforming expected returns for the first two years and then underperforming. On the other hand, firms that enter in a period of low trading volume are less likely to use earnings management, making earnings more consistent with market expectations (Lin et al., 2021). One study suggested that high trading volume could be an indicator of investor optimism, potentially explaining this differential effect and why it may fade over time (Ikeda, 2023). However, this is only a partial explanation and does not reduce the ambiguity of potential effects that could be observed.

Junior markets differ from main markets in trading volume, with the markets themselves being lower and firms not having as high a required trading volume to be listed on the market (Honjo & Kurihara, 2023). Thus, it is worth looking at how trading volume influences long-run IPO performance in junior markets specifically. However, evidence is limited in junior markets, with only a few studies addressing these markets (Arora & Singh, 2020; Honjo & Kurihara, 2023). This offers an opportunity to contribute additional knowledge from this study.

In summary, there is evidence from studies in main markets that trading volume could be a predictive indicator for short-run IPO performance, but little evidence from junior markets or long-run markets. It is also ambiguous as to whether this effect could be positive, negative, or non-linear. This research investigates the hypothesis of a relationship between trading volume at the time of IPO and long-run IPO performance:

Hypothesis 1: Trading volume at the time of IPO affects long-run IPO performance.

IPO Frequency and IPO Performance

Another measure of a 'hot market' is IPO frequency, which measures how many IPOs are being conducted within a certain period of time around the IPO being examined (Komenkul & Siriwattanakul, 2016). IPOs tend to be brought to market in waves, with higher frequency of IPOs observed during favorable market and investment conditions (Özyeşil & Benhür Aktürk, 2024). Thus, a 'hot' market can be viewed as one where there are a relatively high level of IPOs occurring, compared to a 'cold' market, where there are relatively few IPOs occurring at the time (Helwege & Liang, 2004). However, it is not the IPO frequency itself which makes markets hot or cold, but rather that there are favorable conditions for and interest in IPOs on the part of investors, which makes it an attractive time to undertake an IPO (Helwege & Liang, 2004).

There has been little empirical research which has directly investigated IPO frequency and subsequent underperformance on junior markets. One study which did reflect on this issue investigated IPO survival on London's AIM (Espenlaub et al., 2012). These authors found that periods of high IPO activity were followed by periods of relatively high IPO failure and underperformance in the market (Espenlaub et al., 2012). A study which investigated IPO

frequency suggested that there are co-occurring cycles between IPO volume and IPO underperformance (Lowry, 2003). These authors also argued that there was no obvious causal mechanism between the two factors, and that these may co-occur as a result of a third factor such as market conditions. However, other authors have argued that there is a potential mechanism by which IPO frequency (or volume) may affect long-run IPO underperformance. One study, which was conducted in China, focused on firms' acquisition and stockpiling of excess capital funding as a result of their IPO (Wang et al., 2024). The authors argued that the sudden acquisition of these funds resulted in a fundamental change in business strategy for the firms, for example turning them towards acquisition as a growth strategy rather than innovation. The implication is that firms which have excess funds available from an IPO may not continue on the same strategic path as they were on when they issued the IPO, which could cause a change in investor sentiment (either positively or negatively) (Wang et al., 2024). Thus, firms which enter the market during a period of high IPO activity, which may not receive as much funding as one which enters in a period of low activity, could not have as much deviation from the expected strategy. However, this is a relatively uncertain hypothesis which needs additional testing.

In summary, there is a theoretical argument and a small amount of empirical evidence that IPO frequency at the time of the IPO could be used to predict long-run IPO performance, although the evidence on directionality of the relationship is mixed. Furthermore, there is little empirical evidence directly on the role of IPO frequency, with most studies focusing more broadly on market volume. Furthermore, it is unclear whether the two factors are actually a causal relationship, or whether they co-vary. The second hypothesis, which is based on this evidence, is stated as:

Hypothesis 2: IPO frequency at the time of IPO affects long-run IPO performance.

Systemic Crisis and IPO Performance

The final factor considered here is systemic crisis, for example a banking or financial crisis or the type of general economic crisis caused by the COVID-19 pandemic. Systemic economic crises are the opposite of a 'hot market' (Leaven & Valencia, 2018). During a systemic crisis, markets may be characterized by low and falling trading volume and liquidity, as investors become more cautious and less willing to take on risks (Braasch, 2010). Such crises are also characterized by a general withdrawal from the market, as investors seek out safer avenues for investment than stock markets (Braasch, 2010). Thus, systemic crises have a holistic effect on the market, including IPO performance.

There is some evidence that systemic crises may have an effect on IPO performance, although this effect is complicated by the relationship between systemic crises and IPOs. Many (perhaps most) firms undertaking an IPO will not willingly choose to launch the IPO during a systemic crisis due to the potential risk of failure and will instead choose to cancel or postpone the IPO in order to achieve better market conditions (Humphrey, 2024). While IPO withdrawal does have an effect on the firm, as Humphrey (2024) notes, the potential effect of IPO failure due to a mistimed market entry could be substantially greater, causing many firms to decide to withdraw in any case.

Complicating our understanding of how IPO issuance during a systemic crisis affects long-term performance is the fact that performance of the firm during the intervening period is likely to affect firms as well. One study investigated the role of crisis conditions during the 2007-2009

financial crisis on IPO firm performance (Tupper, 2016). This study showed that even matching other factors, firms whose IPO followed the crisis period outperformed firms whose IPO took place during the crisis period (Tupper, 2016). The implication of this finding is that an IPO which takes place during a crisis period may underperform in the long run in comparison to others, regardless of its fundamental financial performance or other factors. However, this relationship has not been elaborated on much in the literature, with few studies focusing specifically on the impact of crisis conditions on IPO performance in the long run. This is an opportunity for the current research to contribute to the literature on IPO performance.

In summary, IPO issuance during a period of systemic crisis has a direct effect on IPO performance and may have a long-run effect as well, although this effect may be difficult to disentangle from the general effects of the systemic crisis on the firm's performance during the intervening periods. This research investigates the following as the third hypothesis to examine this effect:

Hypothesis 3: Systemic crisis at the time of IPO affects long-run IPO performance.

Data and Methods

Event Study

The research design used was an event study. An event study investigates the effect of a particular event, such as an IPO, at a specific period of time following the event (D. L. Miller, 2023). Event study models are used in economics and finance to investigate dynamic changes in time, including causal effects within a period of time, including before and after the event. The event study was invented in the 1930s for use in finance studies and has been used since this period (D. L. Miller, 2023). There has recently been a significant increase in the use of event studies in economics and finance, which has coincided with the growth of big data analytics (Currie et al., 2020). The development of these large-scale data collection and analysis techniques has enabled the growth of event studies as well (Currie et al., 2020).

Time Horizons and Event Intervals

Event study methodologies do differ depending on whether the study's time horizon is a short run or long run horizon (Ang & Zhang, 2015). This study employed a long run time horizon, in keeping with the research objectives to investigate the long-run performance of the IPO. There were four time periods for the study, measured in months past the event (IPO) (6M, 12M, 24M, 36M). The research did not try to go beyond the 36M horizon, due to the increased risk that past this period an accumulation of confounding factors may overdetermine IPO performance (Dong et al., 2011), making it impossible to distinguish any meaningful effects.

Variables

Variable definitions and calculations are summarized in Table 1. All variable definitions and calculations or measurements are based on standard measures used for the variables in other studies. All variables were measured at monthly frequency.

Independent variables, including TVOL, IPOF and CRISIS, were extracted directly from market data. The dependent variable of cumulative abnormal return (CAR) was calculated by the researcher in a two-stage process, following the process set out by Ritter (1991) and Fama (1998), as outlined by Arora and Singh (2020). This approach begins with the calculation of a raw return:

$r_{i,t} = \frac{(P_{i,t} - P_{i,t-1})}{P_{i,t-1}}$ (Equation 1)

Where $r_{i,t}$ is the return for company *i* in period *t*; $P_{i,t}$ is the last traded price for company *i* in period *t*; and $P_{i,t-1}$ is the last traded price for company *i* in period *t-1*.

The raw return is then calculated as:

$AR_{i,t} = R_{i,t} - R_{m,t}$ (Equation 2)

Where $AR_{i,t}$ is the abnormal return of firm *i* in time *t*; $R_{i,t}$ is the return of firm *i* in time *t*; and $R_{m,t}$ is the return of market *m* in time *t*.

Once AR has been calculated, CAR is calculated as

$CAR_{q,s} = \sum_{t=q}^{S} AR_t$ (Equation 3)

Where *q* is the event period, *s* is the interval period, and AR_t is the abnormal return during each period (Arora & Singh, 2020; Fama, 1998; Ritter, 1991).

Variable	Definition	Calculation or Measurement	Source
Dependent			
Cumulative Abnormal Return (CAR)	The sum of returns above (below) anticipated return during the time period.	$CAR_{q,s} = \sum_{t=q}^{S} AR_t$	Ang and Zhang (2015) Arora and Singh (2020) Miller (2023)
Independent			
Trading Volume (TVOL)	Volume of trade at time of measurement	3-month moving average of mai trading volume	Thomadakis et al. (2012)
IPO Frequency (IPOF)	IPO frequency at time of measurement	3-month moving average of mai IPO frequency	Thomadakis et al. (2012)
Crisis Period (CRISIS)	IPO was issued during a crisis period	Dummy: 1 = IPO issued in 2020-2022	Tupper (2016)

Table 1 Summary of Variable Definitions and Measures

Data Collection

Data was collected for the period 2012 to 2023. The data was collected from mai market statistics, including statistics on the firm's performance and the market performance. The period was selected because prior to 2012, the mai data is incomplete and there were a small number of firms listed. Firms listed in 2024 and later did not have a long enough period of operation at the time the data was collected to be included.

The population of interest included firms undertaking an IPO on the mai during this time period. Firms which withdrew or were delisted during the 36-month period following IPO were eliminated from the sample, as these firms typically had incomplete or missing financial

information. This does lead to a survivorship bias, which can affect estimates (Linnainmaa, 2013), but it was done to ensure that the maximum number of firms could be investigated for the full three-year period. The final sample included 151 firms, compared to the 177 firms that listed IPOs during this period. Summary statistics of total IPOs per year and average market capitalization and revenues are summarized in Table 2.

Year	IPOs	Average Sales (Million Baht)	Average Market Capitalization (Baht)
2012	9	1209.93	845,598,785
2013	11	754.57	541,087,147
2014	16	832.45	1,098,817,018
2015	12	732.81	1,180,456,030
2016	10	763.20	1,420,109,758
2017	11	1076.91	1,297,410,723
2018	7	750.50	845,733,018
2019	12	537.57	855,046,718
2020	10	596.97	582,011,055
2021	17	613.84	1,295,746,665
2022	17	798.34	1,584,491,562
2023	19	726.29	1,465,208,160
Total	151		
Average		782.78	1,084,309,720

Table 2 Summary Characteristics of the Sample

Data Analysis

Data analysis was conducted in GRETL, an open-source econometrics software package which offers flexible and powerful analysis tools (Tarassow, 2019). Prior to the main analysis, descriptive statistics were prepared for main variables of CAR, TVOL, and IPOF, in order to investigate assumptions of normal distribution.

The analysis of hypotheses followed event study methodology by using ordinary least squares (OLS) regression (D. L. Miller, 2023). OLS regression is a linear regression technique which seeks to minimize the sum of squared differences (SSD) between predicted and observed values, resulting in an unbiased maximum likelihood estimator (Asteriou & Hall, 2021). The OLS regression equation used to investigate the hypotheses was stated as:

$$Y_{CAR} = \alpha + \beta_1(TVOL) + \beta_2(IPOF) + \beta_3(CRISIS)$$ (Equation 4)

In order to evaluate the hypotheses, a standard of $p < .10$ was applied (Asteriou & Hall, 2021). Additionally, other tests were applied to investigate the other assumptions of OLS, including assumptions on multicollinearity and heteroskedasticity (Asteriou & Hall, 2021).

Findings

Descriptive Statistics

Descriptive statistics are summarized in Table 3. As the table shows, the number of total observations began at 118 in the 6-month window, then dropped gradually, with only 74 firms included in the 36-month window. This was not due to firm failure during the intervening period; rather, it is due to inclusion of firms from 2021-2023, which did not have had the full 36 months of performance to analyze. Since these years had a surprisingly high rate of listings compared to earlier periods, this resulted in a significant reduction in the observation totals between the shorter and longer time intervals.

There are some patterns in the statistical data. Mean trading volume was typically lower in later periods than in earlier periods, potentially due to the increasing number of cyclical downturns later data encompasses compared to the general pattern of IPOs listing at high trading points. However, IPO frequency was within a consistent range, averaging between 11.372 and 12.178 IPOs in the moving three-month period prior to IPO. The biggest differences between time periods can be seen in CAR, with the 6M CAR (M = -0.753) being much lower than the 36M CAR (M = -4.194). These figures indicate that on average, firms performed under the expected return, and that this expected return was higher the longer the time interval.

The main issue to consider here is skewness, kurtosis, and Shapiro-Wilk W, as these measures are used to evaluate normal distribution (Illowski & Dean, 2024). These measures are important because OLS regression uses an assumption of normal distribution (Asteriou & Hall, 2021).The Shapiro-Wilk test is a strict test of normal distribution, with $p < .05$ indicating the data is not normally distributed (Illowski & Dean, 2024). As the table shows, there are only a few variables which are normally distributed based on W, including the 24M and 36M CAR variables. Skewness and kurtosis are approximate measures of normal distribution, with 0 indicating normal distribution (as calculated in GRETL). A general rule of thumb states that a value of +/- 3 on skewness and kurtosis is indicative of an approximately normal distribution (Illowski & Dean, 2024). Most variables meet this, except for the 6M and 12M TVOL variables. Thus, the variables are approximately normally distributed, except for the shorter window TVOL variables, which do show some variability from this distribution. These variations from normal distribution do not make the variables unusable with OLS, but it does mean that there may be more error in the estimate than would be the case for a normal distribution (Asteriou & Hall, 2021).

	Time Period			
	6M	12M	24M	36M
TVOL				
Mean	31,518,000,000	29,491,000,000	23,176,000,000	25,322,000,000
Median	20,256,000,000	19,558,000,000	17,507,000,000	20,256,000,000
Std. Dev.	27,310,000,000	26,567,000,000	14,131,000,000	14,078,000,000
Skewness	2.467	2.818	1.320	1.241
Kurtosis	8.080	10.41	1.384	1.134
W (p)	0.738 (.000)	0.695 (.000)	0.859 (.000)	0.870 (.000)

IPOF				
Mean	12.178	11.936	11.372	11.649
Median	12.000	11.000	11.500	11.000
Std. Dev.	3.223	3.186	3.174	3.304
Skewness	0.382	0.497	0.847	0.687
Kurtosis	-1.059	-0.950	-0.455	-0.817
W (p)	0.928 (.000)	0.920 (.000)	0.777 (.000)	0.884 (.000)
CAR				
Mean	-0.753	-1.437	-2.833	-4.194
Median	-0.815	-1.535	-2.818	-4.189
Std. Dev.	1.047	1.230	1.411	1.288
Skewness	0.003	-0.290	0.322	-0.415
Kurtosis	0.967	1.194	-0.315	-0.185
W (p)	0.970 (.010)	0.970 (0.014)	0.984 (.357)	0.980 (0.274)
Observations	*118*	*109*	*86*	*74*

Table 3 Descriptive Statistics

Effects of Market Conditions on CAR

OLS was used to investigate the effect of market conditions (trading volume, IPO frequency, and crisis conditions) on the measure of IPO performance (CAR). The results are summarized in Table 4.

6M CAR. The first model estimated the CAR at 6M based on TVOL, IPOF, and CRISIS. Collinearity was investigated using VIF, and all variables were VIF < 10, indicating there was no evidence of significant collinearity (Asteriou & Hall, 2021). The Breusch-Pagan test was used to investigate heteroskedasticity. The result (p = 0.270) indicates that the error term is constant; in other words, the model displays homoskedasticity. Thus, this model meets the two key assumptions of the OLS model (Asteriou & Hall, 2021).

The regression equation for 6M CAR is specified as follows:

$$Y_{6M\ CAR} = 0.407 + 0.000(TVOL) - 0.119(IPOF) + 0.627(CRISIS)$$ (Equation 5)

The significance of the t-test are used to determine which of the three predictors was significant, while the unstandardized coefficient is used to investigate the effect's direction and size. The effect of TVOL was insignificant (p = .872), while IPOF had a negative significant effect (p = .000), and CRISIS had a positive significant effect (p = .001).

12M CAR. The second model estimated the CAR at 12M, using the same predictors as the 6M CAR. All variables were VIF < 10, indicating there was no evidence for collinearity. The Breusch-Pagan test (p = 0.574) indicated that the error term is constant. Therefore, the assumptions of OLS were met.

The regression equation for 12M CAR is specified as follows:

$$Y_{12M\ CAR} = -0.041 + 0.000(TVOL) - 0.137(IPOF) + 0.829(CRISIS)$$ (Equation 6)

Once again, TVOL was not a significant predictor of 12M CAR (p = .580). However, IPOF had

a negative significant effect (p = .001), while CRISIS had a positive significant effect (p = .000). These effects are consistent with the effects of 6M CAR.

24M CAR. The third model estimated CAR at 24M, following the pattern set out for the other variables. All variables showed VIF < 10, indicating no concern for collinearity. The Breusch-Pagan test (p = 0.873) indicated that there was no evidence of heteroskedasticity and that the error term was constant, meeting the assumptions of OLS.

The regression equation for 24M CAR is specified as follows:

$$Y_{24M\ CAR} = -2.207 + 0.000(TVOL) - 0.076(IPOF) + 1.973(CRISIS)$$ (Equation 7)

As with other models, TVOL was not a significant predictor of 24M CAR (p = .472). In this time period, IPOF was also not a significant predictor (p = .127). However, CRISIS remained a significant predictor (p = .000). Therefore, these results varied slightly from the earlier periods.

36M CAR. The fourth model estimated CAR at 36M, following the same pattern as others. All variables indicated VIF < 10, meaning there was no concern about collinearity. The Breusch-Pagan test (p = 0.436) also indicated the error term was consistent, and therefore no concern about heteroskedasticity.

The regression equation for 36M is specified as follows:

$$Y_{36M\ CAR} = -1.465 + 0.000(TVOL) - 0.227(IPOF) + .404(CRISIS)$$ (Equation 8)

In this model, as in the earlier time periods, TVOL is not a significant predictor (p = .688). IPOF is a significant and negative predictor (p = .000). CRISIS is no longer a significant predictor at this point (p = 0.333). However, this should be considered with caution as there were a smaller number of firms in the 36M sample, as most of the firms which did IPO during the crisis had not yet reached the point of inclusion in this sample.

	Time Period							
	6M		12M		24M		36M	
	Coefficient	P(t)	Coefficient	P(t)	Coefficient	P(t)	Coefficient	P(t)
Const	0.407	.262	-0.041	.925	-2.207	.000	-1.465	.003
TVOL	0.000	.872	0.000	.580	0.000	.472	0.000	.688
IPOF	-0.119	.000	-0.137	.001	-0.076	.127	-0.227	.000
CRISIS	0.627	.001	0.829	.000	1.973	.000	0.404	.333
R^2	0.203		0.258		0.512		0.429	
Adj. R^2	0.182		0.237		0.494		0.404	
F (p)	9.695 (.000)		12.198 (.000)		28.620 (.000)		17.517 (.000)	

Table 4 Ols Regressions

In response to these findings, the hypotheses were evaluated (Table 5). There was no evidence for an effect of TVOL on CAR during any time period. Therefore, H1 was rejected. However, IPOF had a negative effect on CAR, and therefore H2 was supported. CRISIS had a positive effect on CAR, and therefore H3 was also supported. These findings are discussed in the following section of the paper.

Hypothesis	Statement	Outcome
1	Trading volume at the time of IPO affects long-run IPO performance.	Rejected
2	IPO frequency at the time of IPO affects long-run IPO performance.	Supported
3	Systemic crisis at the time of IPO affects long-run IPO performance.	Supported

Table 5 Hypothesis Outcomes

Discussion

The findings showed that IPOs underperformed on average, with underperformance increasing over the 36-month period of analysis. However, the results were somewhat inconsistent with a 'hot market' theory.

The effect of trading volume was not significant at any period. To an extent, this contradicts the general theory of a bull market, which suggests that in a very active market with a high volume of trading, investors may be willing to pay higher prices for IPOs and may be less critical about performance (Helwege & Liang, 2004). The results did not really bear this out, although this could be a problem of measurement error due to the differences in magnitude between trading volume and the CAR measures. However, these findings are not necessarily in conflict with what has actually been observed in prior studies. These prior studies have suggested that in the short run, trading volume can affect CAR (Arora & Singh, 2020; Komenkul & Siriwattanakul, 2016; Thomadakis et al., 2012). However, in the long run, there is less effect and potentially a non-significant effect of trading volume on CAR (Lin et al., 2021; Thomadakis et al., 2012; Wen, 2013). In short, firms which have been in the market for a while may be less susceptible to problems such as information asymmetry and therefore, their performance is closer to market expectations and less subject to optimism or pessimism (Ikeda, 2023). Given that the entire study took place in a long run time horizon, it is therefore unsurprising that this factor was not significant.

The effect of IPO frequency was significant in most periods (except for 24M), and furthermore it had a negative effect. This means that firms that entered at a time with higher IPO frequency (a 'hot market') had higher negative CAR than firms that entered at a time with lower IPO frequency (a 'cold market'). This suggests that IPOs conducted in hot markets are typically overvalued compared to IPOs conducted in cold markets. This finding is consistent with findings from other markets, which have suggested similar effects. For example, a study of the London AIM found that cycles of high IPO issuances were followed by periods of high underperformance and IPO firm failure (Espenlaub et al., 2012). This could occur for a variety of reasons. For example, firms entering in a hot market may be viewed very optimistically and as a result fundamentally overpriced at IPO entry, making it difficult for the firms to perform to market expectations (Ikeda, 2023). Another possibility is that the influx of capital resulting from

the IPO causes firms to shift their strategies to potentially riskier strategies, as seen in Chinese junior markets (Wang et al., 2024). These potential factors need more investigation of market dynamics.

The final factor considered was the 2020-2022 global economic crisis. Surprisingly, the results showed a positive effect of the crisis period on firm performance, although systemic crisis could be expected to have a depressing effect on IPO performance based on prior analysis (Tupper, 2016). There are a few possible explanations for this effect, however. First, it is notable that the crisis period was also marked by an increase in the number of firms listing on the mai compared to previous years. The implication is that some firms may have chosen to list on the mai, rather than on the SET, due to the reduced difficulty of listing requirements and lighter regulation (Shah, 2023). Another possibility is that firms which were at risk of IPO failure may have chosen not to enter the market at this time (Humphrey, 2024), which could reduce the difference between expected and actual performance. Finally, investors during a crisis period are typically less willing to take risks (Braasch, 2010), and therefore may have been less willing to pay higher prices for IPOs during this period despite the high rate of issuance.

Conclusion

This research was conducted with the objective of identifying the role market conditions play in long-run IPO performance in junior markets. Specifically, the research investigated the 'hot market' hypothesis, investigating the effect of general market activity, IPO activity, and systemic crisis on cumulative abnormal returns (CAR) for IPO firms. The research used a case study of the mai, Thailand's junior market, which has not been studied much in IPO research despite its relatively long history. The study investigated the three-year performance of firms listed on the mai between 2012 and 2023.

The findings showed that there was no significant effect of trading volume on CAR during any time period. However, IPO frequency did have a significant negative effect on CAR during most time periods. This suggests that firms that enter the market at the top of an IPO wave – a period of high IPO activity – are likely to underperform more than firms that enter during the trough – a period of low IPO activity. This is likely to be due to factors like investor optimism during IPO waves, which increases initial overpricing. Somewhat surprisingly, firms that conducted an IPO on the mai during the 2020-2022 financial crisis caused by COVID-19 had a positive effect on their CAR during most periods. While this is initially unintuitive, it does not mean that these firms have performed better than those listed during normal periods – instead, it likely means that the IPOs were less overpriced in the first place due to cautious investor sentiment and that some firms may have chosen to either not list or to list on the easier junior market rather than attempt a main market listing.

There are limitations to this research, particularly with respect to the variables included. Market performance following IPOs is complex, particularly in the long run. It is affected not only by market conditions, but also by factors relating to the firm's own performance, its choice of underwriter, the market and industry sector, and many other factors. Only a relatively small number of factors were included in this research, which was only focused on the market conditions. However, this research is part of an ongoing research study, which is designed to look at firm, industry, and market factors in long run market performance on junior markets, and therefore future research will address these limitations. There is also room for more research on global junior markets and IPO conditions, which is particularly important given the variety of regulatory approaches that have been adopted for junior markets.

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