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THE INITIAL RETURNS OF PROFIT-EXEMPTED IPOS IN TAIWAN

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ABSTRACT

This study investigates a unique sample of firms exempted from the profitability requirement of conducting initial public offerings (IPOs) in Taiwan. From 2005–2018, 67.31% of profit-exempted IPO firms were concentrated in the chemical and bio-pharmaceutical industry. The underpricing of profit-exempted IPO firms was 5.06% lower than those of other IPO companies. Additionally, the initial returns of profit-exempted IPO companies during the hot market were 18.82% higher than those of other IPO companies. In opposition to the signaling hypothesis, high-tech firms that are exempted from the profitability requirement may issue IPOs in the hot issue market and deliver optimistic messages about their future operations to mislead investors. Profit-exempted IPO companies obtain higher proceeds from IPOs by misleading investors about the true value of their firms. Therefore, this study suggests that firms exempted from the profitability requirement of conducting IPOs more closely follow the market timing hypothesis.

JEL: G30, G32

KEYWORDS: Hot Issue, Market Timing, IPOs, Profit-Exempted, Underpricing

INTRODUCTION

Taiwan passed the Act for the Development of Biotech and Pharmaceutical Industry in 2007. In an attempt to replicate the semiconductor industry's success in the 1980s, the regulator of Taiwan exempts new biotechnology drug development firms from the profitability requirement of conducting initial public offerings (IPOs). Subsequently, biotech and pharmaceutical stocks have created a boom of IPOs in Taiwan and have attracted considerable interest from investors. This situation is consistent with the argument made by Ritter (1984) and Helwege and Liang (2004), when IPOs are concentrated on specific industries that had accounted for most of the issuance in the hot market. Their short-term abnormal returns of IPOs are significantly higher than those of other firms during the same period. This suggests that IPO returns are related to underwriters catering to market demand.

The following case is an example of firms in Taiwan taking the opportunity to issue IPOs during the hot market. In August 2020, ASLAN-KY (6497), whose net equity value per share was less than 5 New Taiwan Dollars (NTD), was delisted from Taiwan's capital market after less than three years, creating a shock for the market. In an interview with Business Week before the IPO, Carl Firth, CEO and former Chairman of ASLAN-KY (6497), stated, "Taiwan's retail investors have shown great interest in biotech stocks. Therefore, ASLAN chose to list in Taiwan to raise funds after studying the Taiwan over-the-counter (OTC) market and the U.S. Nasdaq market" (Cai, 2016).

Welch (1989) shows that high-quality issuers used the low offer price of IPOs to distinguish themselves from low-quality issuers, which affected their subsequent issuance and increased their capital. However, Demers and Joos (2007) suggest that high-tech start-ups, unlike other firms, have negative cash flows and large accumulated losses. They increasingly rely on intangible assets and equity financing and often post

significant accounting losses due to R&D failures. For profit-exempted high-tech firms, equity financing is extremely important for them. If the issuer uses the hot market to raise the earnings of their IPOs, there should be an incentive to send positive messages to reduce IPO price disagreement with investors and increase earnings. Zörgiebel (2016) finds that technology stocks with negative earnings give investors have overly optimistic expectations through marketing methods, creating market demand and increasing IPO gains. Regarding IPOs in the technology industry in Taiwan. Lu, Kao, and Chen (2012) also find substantial R&D expenditure and reveal that the greater the growth expectation, the more effective it is to reduce the underpricing of IPO issuance. In addition, Dittmar and Thakor (2007) and Boulton and Campbell (2016) suggest that lower underpricing of IPO would be observed. If issuers chose to set the underwriting period to a time when they and shareholders were in the least disagreement about firm value.

Therefore, due to the unique features of high-tech firms, this study examines a special sample set of firms exempted from the profitability requirement of conducting IPOs in Taiwan. The findings indicate that such firms are highly dependent on equity financing when they have negative cash flow, which gives the insiders an advantage over informed outsiders. Firms may declare optimistic prospects of their future operations in an attempt to mislead investors into misjudging their true value, thereby reducing IPO price disagreement and obtaining lower underpricing of IPOs. In addition, we find that firms exempted from the profitability requirement of conducting IPOs may issue in the hot market. They used market optimism to mislead investors into misestimating their true value, as the initial returns of their IPOs were higher than those of other firms during the hot-market period.

This paper has the following three contributions. First, this is the first study that focuses on the underpricing of IPOs for Taiwan's profit-exempted companies. Second, the results show that profit-exempted eligibility companies demonstrate behavior that is consistent with the market timing theory. Issuers will aggressively convey optimistic expectations to reduce IPO price divergence, i.e., lower first-day initial returns. Additionally, the profit-exempted eligibility companies may take the opportunity of hot market issuance to cause investors to misestimate the true value of their company to obtain IPO earnings. Third, the results of this paper can be used as a reference for regulatory agencies to manage profit-exempted IPO companies. This paper is organized as follows. Section 2 reviews the relevant literature and proposes the hypotheses. Section 3 describes the data and research methodology. Section 4 discusses the empirical results, and Section 5 is the conclusion of this paper.

LITERATURE REVIEW AND HYPOTHESIS

Exemption from the Profitability Requirement of IPOs in Taiwan

For the development of advanced technology firms that can raise funds through listing. The profit requirements exemption of IPO firms were approved by the Taiwan Stock Exchange (TWSE) for certain specialty industries in 1992 and the Taipei Exchange (TPEx) in 2008. In other words, IPO firms that meet specific conditions can be exempted from the profitability requirement. The profit-exempted rules are made by the TWSE Corporation's Securities Listing Review Guidelines and the Republic of China Securities OTC Trading Center Securities Dealer Business Office Review Guidelines. The Exemption from the Profitability Requirement before Conducting IPOs was approved by the Industrial Development Bureau, Ministry of Economic Affairs and the Council of Agriculture of the Executive Yuan, the Ministry of Culture, respectively.

In 2017, the exemption from the profitability requirement of IPOs was approved by the Ministry of Economic Affairs (MEA). The MEA convenes with the experts and holds a meeting to evaluate and vote for the permissions according to different industry types. The obtained certificate can be applied for IPOs within one year.

Initial Returns of IPOs

The dot-com bubble in 2000 provided a comparison of the difference in the IPOs between high-tech stocks issued by firms with negative cash flows and IPOs issued by firms in general. Aggarwal, Bhagat, and Rangan (2009) investigated IPOs in the U.S. from 1986–2001 and found that the market-to-book ratio of firms with more negative earnings was higher than that of firms with low negative earnings. They suggest that large accumulated losses are a proxy for growth opportunities for internet firms, as investors have optimistic expectations for the future growth potential of companies with large accumulated losses. In addition to electronic technology stocks, Guo, Lev, and Zhou (2005) examine the offering price of IPOs for biotechnology stocks. They find that it is entirely different from discounted cash flows but relies on the ratio of R&D expenditures to expenses. Overall, the more R&D expenditures, the greater accumulated losses, which indicates greater growth strength of intangible assets of the firm. Moreover, Zörgiebel (2016) use a sample of U.S. IPOs from 1994–2013. He finds that technology stocks with negative earnings, venture capital and underwriters may use marketing methods to give investors excessively optimistic expectations, creating market demand and increasing their IPO revenue. Neill, Pourciau, and Schaefer (1995); Friedlan (1994); and DuCharme, Malatesta, and Sefcik (2001) also suggest that IPO issuers will use information asymmetry to mislead investors about future growth expectations to affect the underwriting price of IPOs, thereby increasing their IPO proceeds. In terms of Taiwanese technology stock IPOs, Lu, Kao, and Chen (2012) find that the higher the proportion of corporate R&D expenditures, the lower the underpricing of IPOs.

Rock (1986) suggests that the underpricing of IPOs must be increased to enable uninformed investors to earn a risk-adjusted return due to high uncertainty. However, considering that IPOs of high-tech stocks with negative earnings are the main source of capital increases and that firm valuation focuses on expectations of high future growth. The managers of high-tech IPOs may proactively mislead investors by exaggerating their future growth potential, convincing them that their future growth uncertainty is low and thus reducing IPO price disagreement to increase their IPO gains. Therefore, lower initial returns of IPOs can be observed. Boulton and Campbell (2016); Dittmar and Thakor (2007); and Heaton (2002) suggest that when the disagreement between issuing firms and investors is low, the manager will issue equity to maximize the proceeds of IPOs, which decreases the underpricing of IPOs.

For the initial returns of IPOs, the unique high-tech firms that are exempted from the profitability requirement of conducting IPOs in Taiwan. It provides a good sample source for the analysis of the difference between high-tech firms with negative cash flows and firms in general. These firms not only have unstable cash flows but also may continue to lose money after the issuance. As it is not easy to conduct debt financing, external equity financing is an important source of financing, so obtaining funds during the IPO stage has a significant impact on a company's future operations. Therefore, to increase their IPO revenue, issuers have incentives to proactively convey optimistic messages to convince investors that their future growth uncertainty is quite low and reduce the offering price disagreement with investors.

Hypothesis 1: The initial returns of firms that are exempted from the profitability requirement of IPOs are lower than other IPO firms.

IPO Issuances under Hot Market

Banerjee, Güçbilmez, and Pawlina (2016) propose a theoretical approach that models the dynamics of going public within an IPO wave. They suggest that the early leaders of IPOs receive high valuation and high initial returns, attracting more followers to enter the IPO market and forming a clustering phenomenon. Derrien (2005) suggest that investor sentiment affects value judgment when IPOs are issued during the hot market, and rising market demand leads to rising investor sentiment, causing IPOs to be overpriced with high initial returns. Ljungqvist, Nanda, and Singh (2006) reveal that during the dot-com IPO boom from

1999–2000, underwriters would attempt to sell stocks to maximize their own profits at the expense of irrational investors. Therefore, the high initial returns of IPOs are the result of limiting the stock supply and attempting to maintain the market price.

Furthermore, it is widely assumed that high-tech firms have more fluctuating cash flows and find it difficult to obtain favorable terms with respect to interest conditions and repayment obligations. Therefore, it is imperative that they choose listed equity financing to raise funds. In addition, high-tech firms with negative earnings are significantly different from firms in general in terms of intangible assets, patents, R&D expenses, and accumulated losses (Joos and Zhdanov, 2008). Considering the differences in financial characteristics, the evaluation model used for the prediction of high-tech IPO results should not be the same as that for firms in general. Therefore, the comparison of IPOs in high-tech industries should be analyzed independently (Demers and Joos, 2007).

Moreover, the information gap between the high-tech firms exempted from the profitability requirement of conducting IPOs and investors is quite large. If it is true that high-tech firms proactively send optimistic signals in an attempt to increase the gains of IPOs, there are incentives for them to issue in the hot market to attract investors. In addition, equity financing is more important for high-tech firms than other firms. Therefore, they use issuance in the hot market to mislead investors to misestimate the value of their investments and the initial returns of their IPOs would be higher than those of firms in general.

Hypothesis 2: The initial returns of firms that exempted from the profitability requirement of IPOs in the hot market are higher than other IPO firms.

DATA AND METHODOLOGY

Data Source

This paper examines 738 IPO cases between 2005 and 2018 in Taiwan. Fifty-two of them were eligible for profit exemption, and 35 of these were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample. Variables in this paper related to issuance price, listing date, the issue success rate of IPOs, issuance amount, listing category, and lead underwriter were obtained from the official announcements of the TWSE and the underwriting announcements of the Taiwan Securities Association. Financial information such as first-day initial returns of IPOs, market-weighted index, industry category, total assets, market-to-book ratio, and long-term liabilities was retrieved from the Taiwan Economic Journal (TEJ). The information on venture capital was obtained from the public disclosure statement of each firm's IPO. This study started with the first listing exempted from the profitability requirement in Taiwan.

Definition of Variables

The definitions of independent variables and dependent variables in this study are listed below.

Exemption from the Profitability Requirement before Conducting IPOs (FREE): The main observation variable in this study is profit-exempted firms. Therefore, for firms with exemption from the profitability requirement before conducting IPOs, *FREE* = 1; for firms that are not qualified, *FREE* = 0.

IPO initial returns (UP): The definition of IPO initial return follows that of Chang, Chiang, Qian, and Ritter (2017). They computed the percentage change between the closing price on the first date that does not hit the limit price and the offering price of the IPO. In addition, we also deducted the corresponding market return from the initial return to obtain the risk-adjusted initial return of IPOs.

$$UP = \frac{(P_C - P_S)}{P_S} - \frac{(I_C - I_S)}{I_S} \quad (1)$$

Pc is the closing price on the first non-hit day after the issuance. *Ps* is the IPO issue price. *Ic* is the closing price of the market-weighted index on the first non-hit day after the issuance. Finally, *Is* is the closing price of the market-weighted index on the day before the issuance.

Market-to-book value ratio (MB): This paper uses the market value at the end of the IPO year divided by the book value of shareholders' equity as a proxy for future growth potential.

Listed or OTC (EXC): If IPOs are listed OTC, *EXC* = 1; otherwise, *EXC* = 0.

Venture capital holdings (VC): If there are venture capital holdings at the time of the IPO, *VC* = 1; otherwise, *VC*=0.

High-tech industry (TECH): If IPOs belong to high-tech industries classified by the Ministry of Science and Technology, R.O.C, *TECH* = 1; for the rest, *TECH* = 0.

The percentage of issue success rate (OVERSUB): The percentage of issue success rate is the total number of shares subscribed by IPOs divided by the total number of shares subscribed by investors.

Underwriter's reputation (UNDEWR): This paper uses the market share of the underwriter in the year of the IPO as a proxy variable for the underwriter's reputation.

Leverage ratio (LEV): This paper defines the leverage ratio as the ratio of long-term liabilities to total assets in the fiscal year before the IPO.

Thirty-day Market Index Return before the IPO filing date (PRIOP30): I_F is the market-weighted stock price index on the IPO application date, while I_{F30} is the market-weighted index thirty days before the IPO application.

$$PRIOP30 = \frac{(I_F - I_{F30})}{I_{F30}} \quad (2)$$

Firm idiosyncratic risk (RMSE): Regression analysis of daily returns and market-weighted index returns within one year after IPOs is used to obtain the standard deviation of the residuals as a proxy variable for the firm idiosyncratic risk.

Timing of IPOs (HOT, COLD): If the initial return of IPOs and the moving average of the IPOs' monthly issuance volume is higher than 75% of all sample values, it is regarded as a hot issuance, and *HOT* = 1; the rest *HOT* = 0. Conversely, if it is lower than 25% of all sample values, it is regarded as a cold issuance, and *COLD* = 1; the rest *COLD* = 0.

Company Size (lnASSET): This paper uses the natural logarithm of total assets in the fiscal year before the issuance of IPOs as a proxy variable for company size.

Fundraising scale (PROSEED): In this paper, we calculated the fundraising scale as the natural logarithm of the total funds raised by the IPO.

Research Methodology

For Hypothesis 1, we estimated the following ordinary least squares (OLS) regression model:

$$UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 EXC_i + \alpha_3 OVERSUB_i + \alpha_4 VC_i + \alpha_5 TECH_i + \alpha_6 UNDEWR_i + \alpha_7 LEV_i + \alpha_8 PRIOR30_i + \alpha_9 RMSE_i + \alpha_{10} HOT_i + \alpha_{11} COLD_i + \alpha_{12} InASSET_i + \alpha_{13} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (3)$$

The dependent variable is *UP*, and the main explanatory variable is *FREE. EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

The control variables included follow Lu and Chen (2017). If Hypothesis 1 is supported, firms exempted from the profitability requirement of IPOs would tend to proactively and positively convey high future growth signals to reduce the offering price disagreement with investors. It suggests that *UP* of profit-exempted firms would lower than other IPO firms. The coefficient α_1 for *FREE* should be negative.

For Hypothesis 2, we estimated the following OLS regression model:

$$UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 (FREE_i \times HOT_i) + \alpha_3 EXC_i + \alpha_4 OVERSUB_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 UNDEWR_i + \alpha_8 LEV_i + \alpha_9 PRIOR30_i + \alpha_{10} RMSE_i + \alpha_{11} HOT_i + \alpha_{12} COLD_i + \alpha_{13} InASSET_i + \alpha_{14} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (4)$$

The dependent variable is *UP*, and the main explanatory variable is the interaction term of *FREE* and *HOT*. *EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

If Hypothesis 2 is supported, firms exempted from the profitability requirement would issue IPOs in the hot market to cause investors to misestimate the true value of firms. Therefore, the initial returns of IPOs issued by these firms during the hot market would be higher than other IPO firms. The coefficient α_2 of the interaction term between *FREE* and the control variable of *HOT* should be positive.

Table 1: Industry Annual Distribution of Observations Companies

Years	Number of IPOs	Number of Profit-exempted Firms	Profit-exempted Percentage	Profit-exempted Firms in Chemical and Bio-pharmaceutical Industry	Profit-exempted Firms in Chemical and Bio-pharmaceutical Industry Percentage
2005	62	2	3.85%	1	1.92%
2006	43	1	1.92%	1	1.92%
2007	52	1	1.92%	1	1.92%
2008	36	0	0.00%	0	0.00%
2009	39	1	1.92%	0	0.00%
2010	45	3	5.77%	1	1.92%
2011	82	3	5.77%	3	5.77%
2012	61	9	17.31%	6	11.54%
2013	58	8	15.38%	6	11.54%
2014	50	5	9.62%	3	5.77%
2015	54	7	13.46%	4	7.69%
2016	57	3	5.77%	3	5.77%
2017	39	4	7.69%	3	5.77%
2018	60	5	9.62%	3	5.77%
Total	738	52	100.00%	35	67.31%

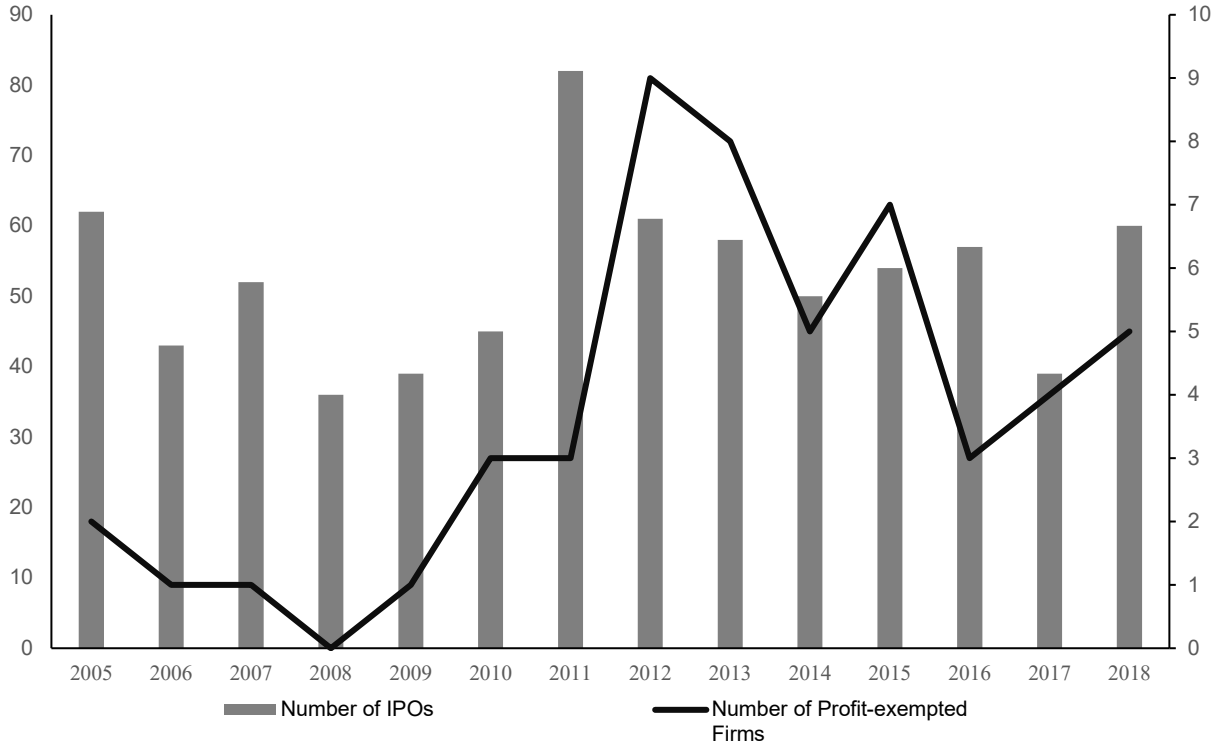
This table shows the total number of IPO and profit-exempted firms between 2005 and 2018 by year, respectively. Profit-exempted percentage is the percentage value of the annual the number of profit-exempted firms over the total number of profit-exempted firms. Profit-exempted firms in chemical and bio-pharmaceutical industry percentage is the percentage value of the annual the number of profit-exempted firms in chemical and bio-pharmaceutical industry over the total number of profit-exempted firms.

Sampling Distribution

Table 1 shows the sample distribution of IPO firms and profit-exempted firms by year. A total of 52 firms were exempted from the profitability requirement of IPOs, of which, 35 were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample.

From 2012–2015, the number of profit-exempt firms was 29, which equals 55.77% of the total number of profit-exempted firms. Subsequently, there was a decline in these firms from 2016–2018, with only 12 profit-exempted firms, which equals 23.08% of all profit-exempted firms. The above distribution suggests that firms exempted from the profitability requirement of IPOs are concentrated in the same set of industries and in certain years. It is consistent with the argument made by Ritter (1984) and Helwege and Liang (2004) that IPOs are concentrated in the same industries during both hot and cold markets.

Figure 1: Annual Distribution of Sample Companies



This figure shows the sample distribution of the number of total IPO firms and profit-exempted firms by year, respectively. The left axis is the number of total IPOs while the right axis is the number of profit-exempted firms.

Descriptive Statistics

Table 2 presents the results of summary statistics. The mean, standard deviation, 25th percentile, median, and 75th percentile of all variables are reported in Table 2. The results show that 7.1% of IPOs were *FREE* firms. The mean value of *UP* was 37.6%, and the median was 26.1%, indicating that the average initial returns of IPOs were affected by a small number of stocks that obtained highly positive initial returns. Overall, 64.23% of IPOs is listed on the OTC, which is in line with the threshold for listing requirement on the OTC, which is relatively lower than the TWSE. Thereby, the number of IPOs is higher than that of listed companies in the TWSE. The average ratio of *VC* was 47.97%. The average ratio of *TECH* was 58.7%, which is in line with Taiwan's IPOs firms being mainly in the electronics industry. The average value of *OVERSUB* was 4.84%, and the median was 2.04%. The subscription ratio was the reciprocal of the issue success rate. The subscription ratio is the total number of shares subscribed by investors divided by the total number of shares subscribed by IPOs. Hence, the average subscription ratio is computed from 1/0.0484 = 20.66, and the median subscription ratio is computed from 1/0.0204 = 49.02. The average leverage ratio (*LEV*) of long-term liabilities to total assets was 6.09%. The mean value of *PRIOP30* was 0.22%. The average value of *RMSE* was 0.038. The *HOT* ratio was 1.76%, and the *COLD* ratio was 4.20%. The average of *lnASSET* of individual companies in the fiscal year before IPOs was 14.42. For *PROSEED*, the mean of the natural logarithm was 19.36.

Table 2: Summary Statistics

Variables	N	Mean	S.D.	Percentile		
				25	Median	75
FREE	738	0.071	0.256	0.000	0.000	0.000
UP	738	0.376	0.508	0.091	0.261	0.491
MB	738	2.704	2.194	1.486	2.118	3.225
EXC	738	0.642	0.480	0.000	1.000	1.000
VC	738	0.480	0.500	0.000	0.000	1.000
TECH	738	0.587	0.493	0.000	1.000	1.000
OVERSUB (%)	738	4.839	11.805	1.070	2.040	4.048
UNDEWR	738	0.066	0.050	0.024	0.042	0.112
LEV	738	0.061	0.093	0.000	0.019	0.095
PRIOP30	738	0.002	0.054	-0.029	0.007	0.036
RMSE	738	0.038	0.028	0.025	0.032	0.042
HOT	738	0.018	0.132	0.000	0.000	0.000
COLD	738	0.042	0.201	0.000	0.000	0.000
LnASSET	738	14.424	1.097	13.697	14.253	14.926
PROSEED	738	19.364	1.009	18.625	19.272	20.005

The table above presented the variables of Mean, Standard deviation, Median, Percentile and Skewness Coefficient. Including of Exemption from the Profitability Requirement before Conducting IPOs (Free), IPO initial returns (UP), Market-to-book value ratio (MB), Listed or OTC (EXC), Venture capital holdings (VC), High-tech industry (TECH), The percentage of issue success rate (OVERSUB), Underwriter's reputation (UNDEWR), Financial leverage (LEV), Thirty-days Market Index Return before the IPO filing date (PRIOP30), Firm idiosyncratic risk (RMSE), Timing of IPOs (HOT, COLD), Company Size (lnASSET), Fundraising scale (PROSEED).

RESULTS

Exemption from the Profitability Requirement of IPOs and Initial Returns

Table 3 demonstrates the regression results of the relation between the exemption from the profitability requirement of IPOs and initial returns of IPOs. We first controlled the IPO characteristics and year fixed effect in models (1) and (3). Then, we controlled the industry and other firm characteristics in models (2) and (4). For all models used in Table 3, the coefficients of FREE was negative and significant at the 10% level at least. Specifically, in model (4) of Table 3, after all variables and fixed effects were controlled, the results indicate a negative relationship between FREE and UP of IPOs, with a coefficient of −0.0506 and a t-value of −1.67. The coefficient was significant at the 10% level, which supports Hypothesis 1. The results indicated that the firms exempted from the profitability requirement of IPOs had underpricing that was 5.06% lower than that of other IPO companies.

Previous studies have highlighted that due to high uncertainty, the underpricing of high-tech stocks must be increased to attract uninformed investors (Rock, 1986). However, the results of this study indicate that high-tech stocks of firms exempted from the profitability requirement of conducting IPOs are overpriced, which is consistent with previous studies by Aggarwal, Bhagat and Rangan (2009) and Zörgiebel (2016). This suggests that high-tech firms exempted from the profitability requirement of conducting IPOs with negative cash flows have a higher tendency to proactively convey high future growth signals than other

IPO firms. As investors are convinced that their future uncertainty is low and the IPO price disagreement is reduced to increase IPO proceeds, the underpricing of IPOs is lower than that of other IPO firms. In other words, the valuation of high-tech firms exempted from the profitability requirement of conducting IPOs is higher than that of firms in general. This study suggests the initial returns of IPOs issued by firms exempted from the profitability requirement in Taiwan are significantly lower than those of other IPO firms.

For the control variables, in model (4), OVERSUB was negatively correlated with UP of IPOs with a coefficient of −0.0024 and was significant at the 1% level, indicating that a lower issue success rate (higher subscription ratio) led to higher initial returns of IPOs. The findings are consistent with those of past studies (Rock, 1986; Beatty and Ritter, 1986). PRIOP30 was positive and significantly correlated with UP of IPOs. This suggests that there is a lead–lag relationship between issuance under a hot-market period and initial returns of IPOs. It shows that liquid market returns before IPO pricing positively affected initial returns of IPOs (Lowry and Schwert, 2004). RMSE was significantly positively correlated with the UP of IPOs, which supported previous findings that asset risk premium is positively correlated with the stand-alone risk. When uncertainty increased in a firm, the degree of information asymmetry became higher, and it would need to increase its returns to attract investors to subscribe (Goyal and Santa-Clara, 2003).

In terms of firm size, previous studies have concluded that firm size has a positive correlation with the initial returns of IPOs. It is argued that the larger the total assets of the firm, the higher the discount on IPOs. Issuers attempt to create excessive demand by suppressing the underwriting price of IPOs, which results in a diversification effect on equity. It reduces the monitoring of the firm by major shareholders, eventually separating the ownership and control of the firm (Field and Sheehan, 2004). Hanley (1993) and Hanley and Wilhelm (1995) find that underwriters play an important role in the equity allocation and price adjustment of IPOs. Generally speaking, the larger the amount of capital raised, the lower the initial returns of IPOs. The results of this paper are consistent with previous literature: the larger the amount of capital raised, the lower the initial returns of IPOs.

Table 3: Exemption from the Profitability Requirement before Conducting IPOs and Initial Returns

	(1)	**(2)**	**(3)**	**(4)**
Intercept	-0.2235*** (-12.98)	-0.1297 (-1.041)	-0.2472*** (-5.205)	-0.1357 (-0.984)
FREE	-0.0687** (-2.474)	-0.0546** (-1.965)	-0.0581* (-1.904)	-0.0506* (-1.669)
EXC	-0.0115 (-1.162)	-0.0107 (-0.789)	-0.0086 (-0.832)	-0.0111 (-0.780)
OVERSUB	-0.0023*** (-3.336)	-0.0023*** (-3.325)	-0.0024*** (-3.474)	-0.0024*** (-3.445)
TECH	-0.0122 (-1.167)	-0.0069 (-0.631)	0.0088 (0.474)	0.0112 (0.591)
UNDEWR	0.1002 (1.039)	0.1283 (1.347)	0.0948 (0.947)	0.1045 (1.071)
PRIOP30	0.3944*** (4.434)	0.3971*** (4.468)	0.3767*** (4.218)	0.3780*** (4.231)
RMSE	17.0620*** (69.00)	17.0700*** (63.75)	17.1393*** (62.09)	17.1157*** (59.86)
HOT	-0.0386 (-1.124)	-0.0386 (-1.143)	-0.0472 (-1.639)	-0.0507* (-1.768)
COLD	-0.0332 (-1.412)	-0.0361 (-1.520)	-0.0193 (-0.858)	-0.0211 (-0.933)
VC		-0.0136 (-1.312)		-0.0069 (-0.647)
LEV		-0.0325 (-0.695)		-0.0655 (-1.339)
LnASSET		0.0131** (2.099)		0.0093 (1.298)
PROSEED		-0.0145** (-2.188)		-0.0118* (-1.670)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.9294	0.9297	0.9316	0.9315

The table above conducts a multivariate analysis of profit-exempted eligibility (FREE) and initial returns for IPOs (UP) ,estimates the initial return of IPOs using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE). $UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2 EXC_i + \alpha_3 OVERSUB_i + \alpha_4 VC_i + \alpha_5 TECH_i + \alpha_6 UNDEWR_i + \alpha_7 LEV_i + \alpha_8 PRIOR30_i + \alpha_9 RMSE_i + \alpha_{10} HOT_i + \alpha_{11} COLD_i + \alpha_{12} InASSET_i + \alpha_{13} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ *(3). The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance, set HOT = 1; the rest HOT = 0. Cold issuance, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

Exemption from the Profitability Requirement of IPOs and Issuance under a Hot Market

Table 4: Exemption from the Profitability Requirement before Conducting IPOs and Issuance under Hot Market

	(1)	(2)	(3)	(4)
Intercept	-0.2237*** (-12.98)	-0.1417 (-1.141)	-0.2481*** (-5.200)	-0.1493 (-1.085)
FREE	-0.0728*** (-2.587)	-0.0590** (-2.091)	-0.0619** (-2.005)	-0.0545* (-1.773)
FREE×HOT	0.1927*** (4.706)	0.1917*** (4.414)	0.1974*** (5.126)	0.1882*** (4.701)
EXC	-0.0109 (-1.098)	-0.0093 (-0.685)	-0.0078 (-0.752)	-0.0095 (-0.670)
OVERSUB	-0.0022*** (-3.323)	-0.0023*** (-3.314)	-0.0024*** (-3.467)	-0.0024*** (-3.437)
TECH	-0.0121 (-1.157)	-0.0067 (-0.615)	0.0090 (0.4812)	0.0113 (0.601)
UNDEWR	0.0974 (1.010)	0.1237 (1.300)	0.0924 (0.950)	0.1003 (1.027)
PRIOP30	0.3930*** (4.414)	0.3954*** (4.444)	0.3748*** (4.194)	0.3757*** (4.203)
RMSE	17.0724*** (68.73)	17.0823*** (63.47)	17.1508*** (61.89)	17.1287*** (59.66)
HOT	-0.0528 (-1.608)	-0.0526 (-1.595)	-0.0619** (-2.325)	-0.6453** (-2.400)
COLD	-0.0331 (-1.406)	-0.0359 (-1.514)	-0.0191 (-0.850)	-0.0209 (-0.923)
VC		-0.0139 (-1.342)		-0.0073 (-0.677)
LEV		-0.0303 (-0.644)		-0.0629 (-1.285)
LnASSET		0.0132** (2.123)		0.0093 (1.303)
PROSEED		-0.0140** (-2.115)		-0.0111 (-1.589)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.9295	0.9298	0.9317	0.9316

The table above conducts a multivariate analysis of profit-exempted eligibility (FREE) and initial returns for IPOs (UP), estimates the initial return of IPOs using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE) interaction with the Hot Market (HOT) issue (FREE×HOT). $UP_i = \alpha_0 + \alpha_1 FREE_i + \alpha_2(FREE_i \times HOT_i) + \alpha_3 EXC_i + \alpha_4 OVERSUB_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 UNDEWR_i + \alpha_8 LEV_i + \alpha_9 PRIOR30_i + \alpha_{10} RMSE_i + \alpha_{11} HOT_i + \alpha_{12} COLD_i + \alpha_{13} InASSET_i + \alpha_{14} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ (4). *The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance, set HOT = 1; the rest HOT = 0. Cold issuance season, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

Table 4 shows the empirical regression results on the relations between the exemption from the profitability requirement of IPOs and the issuance under a hot market. As with Table 3, we estimated different models to control for different control variables and fixed effects. For all models controlled in Table 4, there was a positive relationship between the interaction term of FREE×HOT and initial returns of IPOs with a 1% significance level. Specially, after all variables and fixed effects were controlled, model (4) of Table 4 showed that the coefficient of the interaction term, FREE×HOT, was 0.1882 and that it was significant at a 1% level, which supports Hypothesis 2.

This study suggests that IPOs issued in a hot market by firms exempted from the profitability requirement had significantly higher initial returns. These results are consistent with those of previous studies conducted by Allen and Faulhaber (1989); Ljungqvist, Nanda, and Singh (2006); and Stambaugh, Yu, and Yuan (2012). They indicate that high-tech firms exempted from the profitability requirement of conducting IPOs with negative cash flows may take advantage of issuance in a hot market to cause investors to misestimate the true value of their investments. Therefore, the initial returns of IPOs would be significantly higher than those of other IPO firms. In terms of the economic significance, this study finds that the average UP of IPOs issued by profit-exempted firms in the hot market was significantly higher than that by other IPO firms in general by approximately 18.82%. Driven by the clustering of IPOs issued by firms exempted from the profitability requirement in the hot market, the overall average UP of IPOs are higher than those of other IPO firms.

Additional Test: Exemption from the Profitability Requirement of IPOs and Market-to-book Ratio

So far, we have examined how the profit-exempted requirement of IPO affects the underpricing of IPOs and how the joint effect of profit-exempted requirement of IPO and hot issue market affects the initial returns of IPOs. Next, we determined whether the exemption from the profitability requirement of IPOs increases the company's valuation and reduces the underpricing issuance by affecting investors' optimistic expectations.

Aggarwal, Bhagat, and Rangan (2009); Guo, Lev, and Zhou (2005); and Zörgiebel (2016) find that the MB of IPOs of high-tech stocks with higher negative earnings is greater than that of high-tech stocks with lower negative earnings. They indicate that accumulated losses for intangible asset investments represented future growth potential and has a significant impact on investors' IPO valuation. If it is true that firms exempted from the profitability requirement before conducting IPOs have high growth potential in the future. Their corporations' value should be evaluated higher than that of other IPO firms; in other words, they should have a higher MB.

Moreover, Zörgiebel (2016) point out that technology stocks with negative earnings may create market demand through marketing tools, giving investors overly optimistic expectations, thereby increasing IPO proceeds. Lu, Kao, and Chen (2012) also indicate that the higher the ratio of R&D expenses of a technology company, the more attractive the growth potential to investors, and the better the effect of reducing Taiwan IPO underpricing. De Bondt and Thaler (1987); Daniel, Hirshleifer, and Subrahmanyam (1998, 2001); and Lakonishok, Shleifer, and Vishny (1994) find that high market-to-book ratios are associated with the overreaction of investors' perceptions of company performance, leading to investors' misjudgment of enterprise value. Therefore, if investors have high growth expectations for profit-exempted firms with negative cash flow, higher market-to-book value ratios and lower IPO underpricing would be observed concurrently.

Based on the above discussion, in this subsection, we conducted the following OLS regression model to analyze the relation between MB and firms exempted from the profitability requirement of conducting IPOs.

$$MB_i = \alpha_0 + \alpha_1 UP_i + \alpha_2 FREE_i + \alpha_3 (FREE_i \times UP_i) + \alpha_4 EXC_i + \alpha_6 VC_i + \alpha_7 TECH_i + \alpha_8 LEV_i + \alpha_9 HOT_i + \alpha_{10} COLD_i + \alpha_{11} InASSET_i + \alpha_{12} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i \quad (5)$$

The dependent variable is *MB* at the end of the IPO year. The main explanatory variables are *FREE* and the interaction term of *FREE* and *UP* of IPOs. *EXC, OVERSUB, VC, TECH, UNDEWR, LEV, PRIOP30, RMSE, HOT, COLD, LnASSET*, and *PROSEED* are control variables. γ is a vector of year fixed effect, and δ is a vector of industry fixed effect. The standard error is a heteroscedasticity-consistent standard error.

If the predictions are consistent with previous discussions, the firms that are exempted from the profitability requirement of IPOs should have high growth potential in the future. Hence, their market-to-book value ratio should be evaluated higher than other IPO firms. We should observe the coefficient α1 for exemption from the profitability requirement of conducting IPOs is positive. In particular, if investors have high growth expectations for profit-exempted firms and lower initial returns of IPO are associated with the reduced price disagreement between investors and underwriters. We should observe that firms exempted from the profitability requirement of IPOs have lower initial returns of IPOs and higher market-to-book ratios, suggesting that the coefficient α3 should be negative.

Table 5 presents the regression results of the exemption from the profitability requirement of IPOs and the market-to-book ratio at the end of the IPO year. In models (1) and (2) of Table 5, we included all control variables but only controlled for year fixed effect. In models (3) and (4), we additionally controlled for industry fixed effects. In model (3) of Table 5, after all variables and fixed effects were controlled, the regression results suggested that firms exempted from the profitability requirement of conducting IPOs and MB were positively correlated; moreover, the MB ratio of firms exempted from the profitability requirement of conducting IPOs was 1.13 times higher than those of other IPO firms.

In model (4) of Table 5, we added an interaction term between FREE and UP to further examine the joint effect of profit-exempted firms and initial return of IPO on market-to-book ratios. The coefficient of interaction term FREE×UP was −0.6748 and was significant at a 5% level. That is also consistent with the expectation that if investors have high growth expectations for profit-exempted firms, higher market-to-book value ratios and lower IPO underpricing would be observed concurrently.

Table 5: Exemption from the Profitability Requirement before Conducting IPOs and Market-to-book Ratio

	(1)	(2)	(3)	(4)
Intercept	-16.1234***	-16.0710***	-15.2038**	-15.1515***
	(-8.038)	(-8.068)	(-6.887)	(-6.905)
UP	0.6732***	0.8920***	0.6575***	0.8729***
	(3.376)	(5.592)	(3.212)	(5.483)
FREE	1.3692***	1.7055***	1.1396**	1.4737***
	(2.588)	(2.843)	(2.491)	(2.780)
UP×FREE		-0.6955***		-0.6748**
		(-2.601)		(-2.480)
EXC	0.6941***	0.6774***	0.5663***	0.5518***
	(4.179)	(4.120)	(3.299)	(3.240)
VC	-0.0069	-0.0203	-0.0037	-0.0161
	(-0.088)	(-0.188)	(-0.031)	(-0.136)
TECH	0.0416	0.0187	0.0393	0.0103
	(0.409)	(0.186)	(0.272)	(0.072)
LEV	-0.2927	-0.3745	-0.0708	0.1336
	(-0.402)	(-0.516)	(-0.095)	(0.180)
HOT	-0.3214	-0.3153	-0.4148	-0.4070
	(-1.111)	(-1.033)	(-1.313)	(-1.240)
COLD	-0.1646	-0.1553	-0.2181	-0.2080
	(-0.628)	(-0.599)	(-0.833)	(-0.801)
LnASSET	-0.8071***	-0.7896***	-0.8422***	-0.8245***
	(-7.159)	(-7.209)	(-7.543)	(-7.608)
PROSEED	1.5174***	1.4987	1.5054***	1.4871***
	(11.090)	(11.210)	(10.150)	(10.250)
INDUSTRY	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	738	738	738	738
Adjusted R2	0.4435	0.4477	0.4394	0.4436

The table above conducts a multivariate analysis of Market-to-book value ratio (MB) and profit-exempted eligibility (FREE), estimates the Market-to-book value ratio (MB) using ordinary least squares regression (OLS) with the main observation variable being the exemption from profit conditions (FREE) and Exemption from Profit Condition Eligibility (FREE) interaction IPOs initial return (UP). $MB_i = \alpha_0 + \alpha_1 UP_i + \alpha_2 FREE_i + \alpha_3(FREE_i \times UP_i) + \alpha_4 EXC_i + \alpha_5 VC_i + \alpha_6 TECH_i + \alpha_7 LEV_i + \alpha_8 HOT_i + \alpha_9 COLD_i + \alpha_{10} InASSET_i + \alpha_{11} PROSEED_i + \delta INDUSTRY_i + \gamma YEAR_i + \varepsilon_i$ *(5). The control variables: If IPOs are listed for the OTC, set EXC = 1; otherwise, set EXC = 0. If IPOs belong to the high-tech industry, let TECH = 1, and the rest, TECH = 0. PRIOP30 is thirty-days Market Index Return before the IPO filing date. RMSE is firm idiosyncratic risk. If there are venture capital holdings at the time of the IPO, let VC=1; otherwise, no venture capital holdings, let VC=0. OVERSUB, the issue success rate. UNDEWR, Underwriters reputation. LEV, financial leverage. Hot issuance season, set HOT = 1; the rest HOT = 0. Cold issuance season, set COLD = 1; the rest COLD = 0. MB is Market-to-book value ratio. LnASSET, Asset size, the natural logarithm of the total assets of IPOs in the previous fiscal year. PROSEED, the scale of funds raised by IPOs, the natural logarithm of the total funds raised by IPO. Year and Industry fixed effects are included. t-value is reported in parentheses, and the standard error is adjusted by heteroscedasticity. *, **, and *** refer to the 10%, 5%, and 1% significance level, respectively.*

CONCLUDING COMMENTS

This study studied Taiwan's unique profit-exempted IPO conditions to distinguish whether profit-exempted IPO firms conform to signal theory or market timing through observation of their initial returns. Since the insiders of the firms have more information than outside investors, they attempt to convey information to participants during the process of IPOs. However, the outcome of issuers' messages and IPOs depend on when or how issuers choose to express their faith about the firm. The market timing hypothesis states that issuers set the underwriting period at the time when the disagreement between issuers and investors on firm value is at its lowest. If the issuers indeed time the market to issue equities when disagreement on firm value is minimal, we should observe higher firm valuations and lower underpricing of IPOs. Alternatively, the signaling hypothesis expects issuers to use higher discounts on IPOs to convey their firm quality to investors. Under this assumption, higher underpricing of IPOs should be observed.

This study used a cross-sectional OLS regression model to examine 738 IPO cases between 2005 and 2018 in Taiwan. Fifty-two of them were eligible for profit-exemption, of which 35 were concentrated in the chemical and bio-pharmaceutical industry, accounting for 67.31% of the total sample. This report find that the underpricing of profit-exempted IPO firms is 5.06% lower than that of other IPO companies. The initial returns of profit-exempted IPO companies during the hot market are 18.82% higher than those of other IPO companies. It is deduced that, consistent with the market timing hypothesis, firms exempted from the profitability requirement of conducting IPOs exploited opportunism to mislead investors in an attempt to achieve higher proceeds. This caused lower first-day market returns (lower discount levels) to be observed. This view differed from the traditional signaling hypothesis (e.g., Welch, 1989), in which issuers using signaling strategies would have higher initial returns (discount level) of IPOs. In addition, there is a clustering phenomenon of IPOs issued by firms exempted from the profitability requirement in the hot-market periods. They take advantage of the high market sentiment to obtain high initial returns of IPOs, making the average initial returns of IPOs of such firms higher than that of other IPO firms. This clearly showed that issuers take advantage of issuance under a hot-market period to cause investors to misestimate firm value to obtain the proceed of IPOs. It shows that managers of profit-exempted high-tech IPO companies tried to use information asymmetry and optimistic messages to mislead investors, which may affect the fundraising of IPOs and may be harmful to shareholders' interests as a whole. The findings of this study can provide a reference for government agencies to consider the post-listing management of high-tech companies exempt from profit conditions.

In terms of research restrictions, Taiwan's unique profit-free IPO conditions only existed after 2005. In the future, this article will provide a basis for discussion on the IPO value of negative-earnings high-tech companies, which can include dialogue about equity allocation, agency conflict, and irrational behavior.

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