

On the Association between IPO Underpricing and Reversal and Taiwan's Regulatory Reforms for Mandatory Forecasts

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ABSTRACT

The unique institutions in Taiwan may add to our understanding of the effect of initial public offering (IPO) firm disclosures. Consistent with the notion of market mispricing, most of Taiwan's IPOs were with consecutive up-limit hits followed by substantial price reversals. In this study, we decompose IPO underpricing into two components: pure underpricing and subsequent reversal, exploring the impact of the 1991 mandate that IPO firms should include their management forecasts in the prospectuses on these two anomaly measures. Our results support the notion that disclosure regulations ameliorate investors' mispricing the stocks. First, pure underpricing and reversal are significantly less (more) pronounced for post-mandate (pre-mandate) IPO stocks. In contrast, consistent with the cheap talk hypothesis, the pre-mandate voluntary forecasters (non-forecasters) appear to be more (less) underpriced. Second, the duration of underpricing for the post-mandate (pre-mandate) IPOs appears to be shorter (longer). Nevertheless, underpricing lasted relatively longer (shorter) for the pre-mandate IPOs with (with no) voluntary disclosures. Copyright © 2009 John Wiley & Sons, Ltd.

KEY WORDS initial public offerings; mandatory management forecasts; voluntary forecasts; pure underpricing; subsequent reversal

INTRODUCTION

This paper examines both underpricing and honeymoon (the period during which the share price goes up¹) for firms conducting initial public offerings (IPOs) before and after Taiwan's mandate by the Securities and Futures Committee (hereafter SFC) on management forecasts in 1991. Specifically,

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¹See Moore (2000) for an example of practitioners' use of the term *IPO honeymoon*.

we investigate (1) the differences in pre-mandate underpricing, reversal and duration of honeymoon between the issuers that voluntarily disclose their earnings forecasts and non-forecasters and (2) the difference in underpricing, reversal and duration of honeymoon between pre- and post-mandate IPO firms. The former research question aims at exploring the relative effectiveness of voluntary forecasts in ameliorating information asymmetry in Taiwan's less litigious environment.² Due to differential litigation costs, we conjecture that our results would differ from the findings in prior studies.

The latter research question aims at exploring the effect of regulations on mitigating the IPO anomalies. Prior studies document large positive abnormal returns subsequent to the IPOs. Such underpricings appear internationally pervasive.³ For instance, the mean underpricings are 12%, 4%, 5–8%, and 167% for the USA, France, Canada, and Malaysia respectively (Jog, 1997; Loughran *et al.*, 1994). Such anecdotal evidence supports the notion that underpricing is more (less) pronounced among developing economies (industrialized economies).⁴ One of the prevalent explanations in prior studies for IPO underpricing is the information asymmetry during the IPO stage. The literature on the IPO differs in the genesis of the information asymmetry.⁵ Regardless of its origin, analytical and empirical studies suggest that information asymmetry is a variable to underpricing.⁶

There exist primarily two measures to mitigate such information asymmetry. The first measure is the IPO firms' voluntarily disseminating their private information regarding the firms' future prospect.⁷ Jog and McConomy (2003) examine the impact of Canadian issuers' voluntary earnings forecasts on underpricing and long-term performance, documenting that the voluntary disclosures help mitigate IPO underpricing. Nevertheless, with relatively low economic and legal penalties on inaccurate forecasts,⁸ the firms may have the incentives to issue upward-biased forecasts, and hence there may be a deviation from the separating equilibrium as we observe in the USA and Canada. The alternative measure to ameliorate information asymmetry is the regulatory authority's disclosure requirements. Starting 1991, Taiwan's SFC required the inclusion of management earnings forecasts in the IPO prospectuses. The mandate also stipulates a penalty for inaccurate forecasts and may thus add to investors' valuing the IPO firms. Accordingly, we conjecture that the mandatorily disclosing firms are less underpriced than the (pre-mandate) voluntary firms.

Prior studies also document long-term price decreases subsequent to the honeymoons.⁹ Two theories have been proposed to explain such phenomena of underperformance. First, Miller (1977)

²Prior to 1991, there was hardly any class action suit filed against firms on misleading disclosures.

³For instance, Grinblatt and Hwang (1989) and Allen and Faulhaber (1989) explain IPO underpricing from the signaling perspective. Also, Rock (1986) presents the winner's curse hypothesis. Furthermore, Baron (1982) provides the theory of investment bank oligopoly.

⁴See Table 1 in Hanley and Ritter (1992) for statistics in earlier years.

⁵Information asymmetry may arise from different knowledge regarding the IPO issuers: (1) between the firm and its underwriters (Baron, 1982); (2) between the firm and investors (Benveniste and Spindt, 1989); or (3) among investors (Rock, 1986).

⁶There exist competing theories for IPO underpricing: signaling, litigation risk and information asymmetry (Lowry and Shu, 2002). Notably, Welch (1989), Allen and Faulhaber (1989), as well as Grinblatt and Hwang (1989) suggest that underpricing serves as a signaling device. In contrast, Baron (1982) and Muscarella and Vetsuypens (1989) posit that underpricing results from the information asymmetry between underwriters and issuers of new securities. Furthermore, Rock (1986) suggests that underpricing results from the need to compensate uninformed investors, whose wellbeing may be jeopardized because of information asymmetry.

⁷In prior studies, the prevalent vehicles employed by IPO firms to convey private information include the reputation of the underwriters (Titman and Trueman, 1986; Carter and Manaster, 1990; Dater *et al.*, 1991), the quality of the auditor (Beatty, 1989; Menon and Williams, 1991), and the fraction of retention of equity by insiders (Leland and Pyle, 1977).

⁸The economic penalties include diminution of corporate reputation (Williams, 1996), and loss of future accounting flexibility. Moreover, serious forecast error may damage company value (Trueman, 1986).

⁹For instance, Hanley and Ritter (1992) report significant reversals after the IPO firm prices reach the peak. Weiss (1989) documents a large negative cumulative index-adjusted return through the first 6 months of seasoning for his closed-end fund sample.

predicts more diverse beliefs among the investors for firms with more uncertain future outlooks. As more information becomes available in the subsequent period, the divergence of opinion between the (overly) optimistic and pessimistic investors would narrow, and consequently the market price would drop. In contrast, Shiller (1990) indicates that the market for IPOs is subject to fads and that underpricing helps create the appearance of excess demand (to make an 'event'). Accordingly, long-run performance of the new issues would be negatively correlated to the short-run underpricing. Therefore, this study decomposes the difference between an IPO firm's offering price and its end-of-honeymoon price, the prevalent measure of underpricing, into two components: the immediate price increase (hereafter also called the pure underpricing component) and the subsequent reversal (hereafter also called the overreaction component). We conjecture that the less the information asymmetry there exists, the lower the magnitude of both pure underpricing and reversal.¹⁰ Furthermore, Taiwan's price limits on listed stocks contribute to the IPO honeymoon phenomenon and thus some research design issue. We hypothesize that the 1991 mandate would lessen the information asymmetry and thus shorten the honeymoon.

Subsequent to the 1991 legislature on disclosure of management forecasts, SFC further amended the rules in 1998 to include a more detailed set of rules for management forecasts and forecast revisions and to impose punishments for negligence or errors. The rules resulted in greater litigation cost and are likely to enhance the accuracy of the disclosed financial forecasts.¹¹ Thus we expect that pure underpricing, reversal and honeymoon would be less pronounced after the new disclosure rule.

Our findings show that the mandatory forecast firms are less underpriced than both withholding and voluntarily disclosing firms, indicating that the regulatory measure helps mitigate information asymmetry between the insiders and uninformed investors. Furthermore, (pre-mandate) voluntarily disclosing firms are more underpriced than the (pre-mandate) non-forecasters, indicating that those voluntary disclosures are with lower quality. The results are consistent with *cheap talk* and are contrasted with those in prior studies (Jog and McConomy, 2003), where the firms are likely with greater litigation costs and hence there exists a signaling equilibrium with less underpricing for the disclosing firms. We also find that firms in the mandatorily disclosing group have smaller pure underpricing as well as subsequent reversals and shorter honeymoon than (pre-mandate) non-forecasters as well as the (pre-mandate) voluntarily disclosing firms. Moreover, the pre-mandate voluntarily disclosing firms appear to have greater pure underpricing, more pronounced reversals and longer honeymoon than the non-forecasters. We also document that after the stricter 1998 amendment IPO underpricings became smaller.

This broad-based study contributes to the literature in three aspects. First, it serves as the first paper that examines the impact of regulatory measure and voluntary disclosures on IPO anomalies including pure underpricing, subsequent reversal and honeymoon. We also compare the difference in underpricing between mandatory and voluntary firms. Second, we document that in the context of voluntary disclosure withholding issuers are less underpriced in a relatively less litigious region like Taiwan. Our result is in contrast to those for more litigious markets, where the disclosing firms are less underpriced. Third, this study also contributes to the literature on IPO underpricing, primarily

¹⁰ Hereafter we also name it as overall underpricing.

¹¹ An empirical study of accountants' legal liability in the *Journal of National Federation of Certified Public Accountants of the Republic of China* (March, 2000) indicates that 96% of the accountants stated that they perceived significantly heavier pressure of legal liability than before.

by decomposing the prevalent measure of underpricing into immediate pure underpricing and reversal components to explore the impact of disclosure policies on both measures.

We structure the remainder of this paper as follows. The next section presents the institutional background and introduces our hypotheses. The third section specifies the research design. The fourth section presents the empirical results. The fifth section documents the results of our sensitivity analysis. The sixth section concludes the study.

INSTITUTIONAL BACKGROUND AND HYPOTHESES

In order to mitigate information asymmetry, Taiwan's SFC announced on December 1989 that, starting on June 1 1991, companies that apply for public listing should prepare and disclose their financial forecasts in accordance with Statements of Financial Accounting Standards No. 16, *Preparation of Financial Forecasts*, published by the Accounting Research and Development Foundation of ROC.¹² In March 1998, SFC issued *Amendment to the Criteria Governing the Offering and Issuance of Securities by Securities Issuers*. According to *Article 12, Items No. 1 and No. 3*, registrations for (subsequent) public offerings will not become effective until the arrival of notification of approval for those firms of which (1) the public financial forecasts have been requested to be corrected twice by the SFC in the year of application and in the two previous years, or (2) the financial forecast has been modified more than twice within one year.

Many prior studies on management disclosures lend their support to the mandate of Taiwan's SFC. Shefrin and Statman (1992) raise the fairness issue, proposing mandatory disclosures of private information in order to reduce the adversarial effect on social welfare due to information asymmetry. Beaver (1998) states that private information benefits certain investors and results in redistribution of social wealth. Accordingly, he proposes a regulatory legislature to reduce the deadweight loss of private information search costs and thus enhance the economic efficiency.

With its stipulation of penalty for biased forecasts, we expect that the 1991 mandate can help reduce information asymmetry among the various parties involved in the IPO. Accordingly, the study presents the following hypothesis:

H1a: IPO underpricings became lower after the enforcement of mandatory forecasts.

Consistent with the notion of market mispricing, most of Taiwan's IPOs are with consecutive up-limit hits followed by price reversals.¹³ Thus we decompose the measure of underpricing into two

¹²As stated in the *Guidelines for Disclosure of Financial Forecasts by Public Companies*, a company that applies to the Taiwan Stock Exchange Corporation for listing its stock or applies to the ROC Over-The-Counter Securities Exchange ('ROSE') for trading of its stock over the counter shall publicize the financial forecasts and shall continue to do so for the continuing 3 years after the competent authorities in charge approve of the listing or OTC listing.

¹³Taiwan's up- and down-limits for the listed stock prices have been changed frequently during the test period.

Period	Up-limit	Period	Down-limit
1979.01.04–1987.10.28	5%	1979.01.04–1987.10.28	5%
1987.10.29–1988.11.09	3%	1987.10.29–1988.11.09	3%
1988.11.10–1989.10.10	5%	1988.11.10–1989.10.10	5%
All other periods	7%	1999.09.27–1999.10.10, 2000.03.20–2000.03.24, 2000.10.04–2000.10.11, 2000.10.20–2000.11.07, 2000.11.21–2000.12.31	3.5%
		All other periods	7%

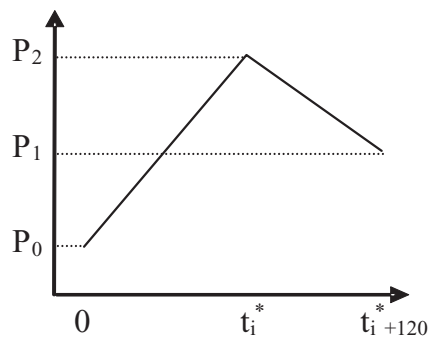


Figure 1. Drifts and reversals accompanying the IPOs

components: pure underpricing and subsequent reversal. Specifically, as depicted in Figure 1, the prevalent measure of underpricing is the difference between P_2 and P_0 . We further define reversal and pure underpricing as the difference between P_1 and P_2 and the difference between P_1 and P_0 , respectively, and present Hypotheses H1b and H1c:

H1b: Pure underpricings became lower after the enforcement of mandatory forecasts.

H1c: Price reversals subsequent to the IPOs became lower after the enforcement of mandatory forecasts.

Earnings forecasts are often used by managers of ‘good news’ firms to differentiate themselves (Lev and Penman, 1990). Also, Jog and McConomy (2003) document in the IPO context that voluntary earnings forecast disclosures have had a favorable and significant impact in the degree of underpricing and the post-issue return performance. Their focus, nevertheless, is on litigious markets of the USA or Canada. In Taiwan, we conjecture that with relatively low economic or legal penalties for biased voluntary forecasts before the mandate, the IPO firms may have stronger incentives to release upward biased forecasts. Thus we expect that the pre-mandate voluntary firms are more underpriced than the non-forecasters:

H2a: Prior to the mandate on management forecasts, the voluntary firms experienced greater IPO underpricings than the firms that withheld their forecasts.

H2b: Prior to the mandate on management forecasts, the voluntary firms experienced greater pure underpricings than the firms that withheld their forecasts.

H2c: Prior to the mandate on management forecasts, the voluntary firms experienced greater price reversals than the firms that withheld their forecasts.

The Taiwan Stock Exchange imposes up- and down-limits on share prices. Thus we anticipate that information asymmetry may serve as a variable not only to IPO underpricing but also to IPO honeymoon. Specifically, we anticipate that the three groups of firms (mandatory disclosing firms, withholding firms, and voluntarily disclosing firms) have different durations of honeymoons.

H3a: The IPO honeymoon was shorter (longer) after (before) the mandate on management forecasts.

H3b: Prior to the mandate on management forecasts, the voluntary disclosure firms experienced longer IPO honeymoons than the firms that withheld their forecasts.

Moreover, Taiwan's further amendment in March 1998 may impose greater costs on IPO firms with significant management forecast bias, which could hinder the process of any subsequent offerings or hamper the chance of future offering approvals. For fear of the adversarial effect on future financing events, the issuers are likely to enhance the quality of their earnings forecasts. Accordingly, we anticipate that IPO anomalies would become less pronounced after the 1998 amendment.

H4a: IPO underpricings, pure underpricings and reversals became less pronounced after the 1998 mandate.

H4b: IPO honeymoons became shorter after the 1998 mandate.

RESEARCH DESIGN AND SPECIFICS

Models and variables

We adopt the following equations in order to explore the differences in underpricing and honeymoon among the IPO firms:

$$Y_{it} = a_0 + a_1\text{MANDAT}_{it} + a_2\text{AUDITOR}_{it} + a_3\text{INDUS}_{it} + a_4\text{INSIDER}_{it} + a_5\text{IINV}_{it} + a_6\text{LEADUW}_{it} + a_7\text{ODDS}_{it} + a_8\text{SIZE}_{it} + a_9\text{TAIEX}_{it} + \varepsilon_{it} \quad (1)$$

$$Y_{it} = a_0 + a_1\text{POSTDISCL}_{it} + a_2\text{AUDITOR}_{it} + a_3\text{INDUS}_{it} + a_4\text{INSIDER}_{it} + a_5\text{IINV}_{it} + a_6\text{LEADUW}_{it} + a_7\text{ODDS}_{it} + a_8\text{SIZE}_{it} + a_9\text{TAIEX}_{it} + \varepsilon_{it} \quad (2)$$

$$Y_{it} = a_0 + a_1\text{PREDISCL}_{it} + a_2\text{AUDITOR}_{it} + a_3\text{INDUS}_{it} + a_4\text{INSIDER}_{it} + a_5\text{IINV}_{it} + a_6\text{LEADUW}_{it} + a_7\text{ODDS}_{it} + a_8\text{SIZE}_{it} + a_9\text{TAIEX}_{it} + \varepsilon_{it} \quad (3)$$

For tests of different hypotheses, dependent variable Y_{it} in the above three regression models may be UNDERPRICING_{it} , REVERSAL_{it} , PUREUND_{it} , or HM_{it} . The definitions and explanations of dependent and independent variables in the models are as follows.

Dependent variables

The dependent variable UNDERPRICING_{it} is an industry-adjusted measure for IPO underpricing. Because of frequent changes in stock price limits imposed by Taiwan's exchanges, this study adopts two alternative definitions for UNDERPRICING_{it} : UNDPRC_{it} and UNDPRCHIT_{it} .

For firm i , UNDPRC_{it} is defined as

$$\text{UNDPRC}_{it} = \log(P_{it}/P_0) - \log(I_{it}/I_0)$$

where t , the duration of IPO honeymoon (HM_{it}), is the number of days with consecutive positive industry-adjusted returns, which are derived from the 3-day cumulative returns less the concurrent returns of the industrial indices. Specifically, $t = \max\{t \mid \log(P_t/P_{t-3j}) - \log(I_t/I_{t-3j}) > 0, \forall j < t, \text{ where } j = 1, 2, 3, \dots, \text{ and } t = 1, 2, 3, \dots\}$. P_t is the closing price on the t th day after the offering, whereas P_0 is the offering price. I_t (I_0) is the closing TAIEX industrial index at date t (date 0). Namely, UNDPRC_{it} denotes underpricing during the honeymoon less the concurrent industry (benchmark)

returns.¹⁴ Our definition is in contrast to that in many prior studies, which define IPO honeymoon as the number of consecutive limit-hit days. We use this alternative measure, $UNDPRC_{it}$, because during the process that the market price converges to the perceived value some short-lived macro-economic or industrial factors may emerge. Thus there may be further converging price movements after the end of the consecutive limit-hits. In a sensitivity analysis, alternative measure t^* is defined as the last trading day of the consecutive limit-hits. We use the closing price on day t^* to calculate $UNDPRCHIT_{it}^*$.¹⁵

We further decompose the measure of underpricing, $UNDERPRICING_{it}$ (including $UNDPRC_{it}$ and $UNDPRCHIT_{it}$) into two components: $REVERSAL_{it}$, and $PUREUND_{it}$. As shown in Figure 1, for a firm that pays no dividends we define the industry-adjusted cumulative returns from the IPO day (time 0) to day t as $UNDPRC_{it}$. The reversal returns from day t to the 120th trading day after t (time $t + 120$) is denoted as $REVERSAL_{it}$. We further define $PUREUND_{it}$ as the difference between $UNDPRC_{it}$ and $REVERSAL_{it}$. $PUREUND_{it}$ can be viewed as the pure underpricing when the market misprices the stocks of firm i . Specifically, $PUREUND_{it} = \log(P_{t+120}/P_0) - \log(I_{t+120}/I_0)$ and $REVERSAL_{it} = \log(P_{t+120}/P_t) - \log(I_{t+120}/I_t)$.¹⁶

Independent variables

In order to test the differences in underpricing for post- versus pre-mandate firms, mandatorily versus voluntarily forecasting firms and pre-mandate forecasting versus withholding firms, this study adopts dummy variables $MANDAT_{it}$, $POSTDISCL_{it}$, and $PREDISCL_{it}$, respectively.

- (a) Post-/pre-mandate disclosing firm: we set dummy variable $MANDAT_{it}$ to 1 (0) for post-mandate (pre-mandate) disclosing firms.
- (b) Mandatorily/voluntarily forecasting firms: we set dummy variable $POSTDISCL_{it}$ to 1 (0) for mandatorily (voluntarily) forecasting firms.
- (c) Pre-mandate forecasting/withholding firms: we set dummy variable $PREDISCL_{it}$ to 1 (0) for pre-mandate disclosing firms (withholding firms).

We also adopt the following control variables:

- (a) Auditor: employing reputable accountants signals low risks of the firms (Titman and Trueman, 1986; Carter and Manaster, 1990; Dater *et al.*, 1991; Beatty, 1989; Willenborg, 1999). Thus we set dummy variable $AUDITOR_{it}$ to be 1 (0) for the firms audited by ‘Big Five’ (not audited by ‘Big Five’) accountants.¹⁷
- (b) Stock index indicator: we define $INDUS_{it}$ as follows:

$$INDUS_{it} = (R_{0i} - R_{-2i})/R_{-2i} - (R_{0m} - R_{-2m})/R_{-2m}$$

¹⁴In our later section on sensitivity analysis, we also present the results with respect the following two alternative measures of t^* for $UNDPRC_{it}^*$ in our hypothesis tests:

$$t_i^* = \max \{t | \log(P_t/P_{-3t}) - \log(I_t/I_{-3t}) > 1\%, \forall j < t, \text{ where } i = 1, 2, 3, \dots, \text{ and } t = 1, 2, 3, \dots\}.$$

$$t_i^* = \max \{t | \log(P_t/P_{-3t}) - \log(I_t/I_{-3t}) > 2\%, \forall j < t, \text{ where } i = 1, 2, 3, \dots, \text{ and } t = 1, 2, 3, \dots\}.$$

¹⁵The advantage of using the above-mentioned $UNDPRC_{it}^*$ approach to measure returns during IPO honeymoon t^* is the independence of the returns measure with respect to the regulatory changes in stock price limits. Specifically, the less stringent the price limits, the shorter the honeymoon t^* is likely to be estimated with respect to $UNDPRCHIT_{it}^*$.

¹⁶Hanley and Ritter (1992) adopt offering day close price to calculate $UNDPRC$ in their tests for firms in the US market. They also use the 120 days since IPO as the window for long-term performance. In contrast, we use the 120 days subsequent to t^* to calculate the window for $PUREUND$ because Taiwan’s companies are subject to stock price limits.

¹⁷The ‘Big Five’ accounting firms in Taiwan are KPMG, Ernst & Young, Price Waterhouse, Deloitte & Touche, and Arthur Andersen.

where (1) R_{it} denotes the industrial index returns at the end of month t , (2) R_{mt} denotes the TAIEX market index at the end of month t , and (3) month 0 is the IPO month. Specifically, $INDUS$ is defined as the 2-month holding period returns of the corresponding TAIEX industrial index less the concurrent returns of TAIEX market index.

- (c) Insider shareholdings: the insider stockholdings, $INSIDER_{it}$, also help signal insiders' expectation on firm values, thus reduce the underpricing (Leland and Pyle, 1977; Downes and Heinkel, 1982; Beatty and Welch, 1996). Taiwan's SFC defines the insiders as the board members, top executives, shareholders who own at least 10% of the issued shares as well as the spouses and under-aged lineal relatives of the above persons.
- (d) Institutional investor shareholdings: the lower the percentage of institutional investor stockholdings, $IINV_{it}$, is, the greater the extent the information asymmetry (Barth and Kasznik, 1999). We calculate $IINV_{it}$ by cumulating institutional or government investors' stockholdings.
- (e) Underwriter reputation: our inclusion of the control variable of lead underwriting firm size is motivated by Beatty and Ritter (1986) and Carter and Manaster (1990). Specifically, Carter and Manaster (1990) indicate that IPOs with more reputable underwriters are associated with less underpricing. We adopt the mean market share of lead underwriters during the 3-year period prior to the IPO's to proxy underwriter reputation, setting the categorical variable, $LEADUW_{it}$, to be 1 (0) if the underwriter's market share is above (below) the median. We would anticipate that underpricing decreases with $LEADUW_{it}$.
- (f) Odds of lottery: the more optimistic the investors are regarding the IPO firms, the smaller the odds of lottery, $ODDS_{it}$, for one to get subscribing the newly issued shares (Lin and Fok, 1997). Thus $ODDS$ is negatively correlated with underpricing.
- (g) Log of market capitalization: Barth and Kasznik (1999) document that larger firms are less likely to be subject to information asymmetry. In this study we adopt the log of market value, $SIZE_{it}$, as the second control variable and anticipate that $SIZE_{it}$ would be negatively correlated with underpricing.¹⁸
- (h) TAIEX/OTC firm: there may be more intensive media coverage on TAIEX firms than the OTC firms (Barth and Kasznik, 1999; Lowry and Shu, 2002). Therefore, we set the dummy variable $TAIEX_{it}$ as 1 (0) for over-the-counter (TAIEX) firms.

Data description and specifics

Sample selection and data sources

We retrieve insider shareholdings from Taiwan's Securities and Futures Institute, the IPO firms' prospectuses as well as the Taiwan Economic Journal Database. Data items provided by the Taiwan Economic Journal Database also include offering price, odds of lottery, net income, market value, name of auditor, number of outstanding shares, initial public offering date, industrial index, and closing stock price.

We adopt the following criteria: (1) the earnings forecasts by IPO firms have to be approved by the board of directors, shareholder meetings, or the top executives. (2) Banks and insurance companies are excluded since they are regulated and thus their financial decisions differ from the other firms. (3) We limit our sample to firms with a 31 December fiscal year-end. Many non-calendar-year firms are with substantial government stockholdings and hence their incentives to earnings or

¹⁸We also use the log of gross proceeds as another proxy for firm size (Ibbotson *et al.*, 1988; Tinic, 1988; Schultz, 1993). The empirical results are also robust.

expectation management may deviate from the private companies'. One special feature of this study is its use of a large sample of all firms filing for IPOs on either TAIEX or OTC during 1985–2000. Our selection criteria result in a total of 722 IPO firms on TAIEX and OTC during the sample period.

Panel A of Table I presents the descriptive statistics for the sample firms, indicating that the mean (median) underpricing UNDP RC is 0.1467 (0.1038) and is statistically significant ($P < 0.000$).¹⁹ We further decompose UNDP RC into overreaction component, REVERSAL, and pure underpricing component, PUREUND. The mean of REVERSAL is -0.0617 (significant at 0.0001), signifying that investors are overly optimistic to the prospects of the IPO firms. Consistently, following the peak, there is on average a price reversal of 0.0617. To sum up, by subtracting the reversal portion, we determine the pure underpricing to be 0.0844 (significant at the 0.0001 level). Consistently, mean (median) UNDP RCHIT is 0.1322 (0.0876), whereas the mean duration for IPO honeymoon is 8.54 days. Figure 2 indicates that the mean offering price for the IPO firms is \$26.2, which can go up to as high as \$39.63 after an average of 8.54 days, then fall back to \$36.5.²⁰ Institutional investor stockholdings (IINV) account for 32.27%, indicating that individual investors comprise a major part of Taiwan's stock market. The median of odds of lottery (ODDS) is 1.37, which is significantly less than the mean of 12.1665, indicating that there exist some sample firms with large odds of lottery. Consistent with the notion that the insiders hold a large proportion of Taiwan's newly issued shares, the mean insider stockholdings (INSIDER) is 0.4667. Moreover, the mean auditors (AUDITOR) is 0.74, indicating that IPO firms tend to hire Big Five accounting firms.

Panel B of Table I compares returns and honeymoons among mandatory disclosure, voluntary disclosure and withholding firms. The first row of panel B compares sample firms before and after the mandate, documenting significantly less (more) pronounced underpricing and pure underpricing for the post- (pre-)mandate group. Moreover, post-mandate IPOs appear to have significantly shorter honeymoons than the measures for the pre-mandate group ($P = 0.000$). The finding is consistent with the notion that the pre-mandate firms are subject to more significant information asymmetry. Nevertheless, there is an alternative explanation for the results: as time goes by, even without mandatory earnings forecasts in place, there may be a smaller magnitude of underpricing in a better-developed market. We will pursue this aspect later.

We further partition the observations into voluntarily forecasting and withholding groups for the pre-mandate era. The second (third) row of panel B presents the comparison test results for the post-mandate *vis-à-vis* the pre-mandate withholding (voluntary) sample. The results indicate that post-mandate firm UNDP RC and PUREUND are significantly less than the measures of both withholding and voluntarily firms. The fourth row of panel B indicates that the voluntarily disclosing firms' mean UNDP RC is significantly greater than that of the withholding firms. This result is consistent with the notion that, due to low litigation costs earlier in Taiwan, voluntarily disclosed earnings forecasts tend to be biased and thus add to information asymmetry. As for the two components of UNDP RC, we find REVERSAL is not significantly different and hence the difference is primarily attributed to PUREUND. The drift period for the voluntary group is also significantly longer than the withholding group ($P = 0.021$). To sum up, both UNDP RC and PUREUND of the voluntarily forecasting firms (Group d) are greater than the measures for the withholding firms (Group c), which in term exceed the measures for post-mandate forecasting observations (Group a).

¹⁹Taiwan's vmean underpricing is slightly greater than the US measure of 12%.

²⁰By holding the IPO stocks for an average of 8.54 days, investors may realize a mean return $UNDP RC_{it}^*$ of 0.1467. Then the stock price may start to decrease by 0.0617. Therefore the mean cumulative return ($PUREUND_{it}^*$) is 0.0844.

Table I. Descriptive statistics for the sample IPO firms

Panel A. Descriptive statistics for test variables					
	Mean	SD	Median	Minimum	Maximum
UNDRPC	0.1467*** (17.047)	0.1738	0.1038*** (2.125)	-0.2746	0.8938
REVERSAL	-0.0617*** (-9.568)	0.1315	-0.0578** (1.832)	-0.4245	0.3890
PUREUND	0.0844*** (7.626)	0.2235	0.0609** (1.674)	-0.4580	0.9546
UNDRCHIT	0.1322*** (15.986)	0.1652	0.0876*** (2.468)	-0.2746	0.8938
HM	8.54*** (19.847)	8.21	6*** (3.873)	0	48
AUDITOR	0.74*** (68.927)	0.44	1*** (10.587)	0	1
INDUS	0.01019*** (176.048)	0.1134	0.0107*** (1.917)	-0.95	0.30
INSIDER	0.4667** (1.834)	0.1847	0.45** (1.396)	0	0.96
IINV (%)	32.2715*** (26.949)	26.6969	25.90*** (2.527)	0	100
LEADUW	0.87*** (9.675)	0.55	1*** (10.451)	0	1
ODDS (%)	12.1665*** (56.717)	26.677	1.37*** (7.415)	0	100
SIZE	3.4425*** (38.666)	0.4386	3.3979** (1.502)	2.48	5.21

Panel B. Mean difference in market-adjusted returns and honeymoons for the three test groups

	UNDRPC	REVERSAL	PUREUND	UNDRCHIT	HM
1. Post-mandate – Pre-mandate (<i>a</i> – <i>b</i>)	-6.542*** (0.000)	-2.696*** (0.003)	-7.337*** (0.000)	-5.531*** (0.000)	-7.848*** (0.000)
2. Post-mandate – Withholding (<i>a</i> – <i>c</i>)	-2.983*** (0.002)	-0.037 (0.150)	-3.034*** (0.002)	-2.822*** (0.003)	-2.841*** (0.005)
3. Post-mandate – Voluntary (<i>a</i> – <i>d</i>)	-6.233*** (0.000)	-2.654*** (0.004)	-7.472*** (0.000)	-5.142*** (0.000)	-7.901*** (0.000)
4. Withholding – Voluntary (<i>c</i> – <i>d</i>)	-2.512*** (0.008)	-0.668 (0.253)	-2.111** (0.018)	-2.140** (0.019)	-2.081*** (0.021)
Summary results	<i>d</i> > <i>c</i> > <i>a</i>	<i>d</i> > <i>a</i>	<i>d</i> > <i>c</i> > <i>a</i>	<i>d</i> > <i>c</i> > <i>a</i>	<i>d</i> > <i>c</i> > <i>a</i>

Notes: UNDRPC, REVERSAL, and PUREUND are the cumulative return measures for overall underpricing, subsequent reversal, and pure underpricing, respectively. UNDRCHIT denotes the industry-return adjusted cumulative underpricing during the period of consecutive up-limit hits; HM is the duration of the honeymoon; IINV is the institutional investors' stockholdings; SIZE is the log of market value; ODDS is the odds of lottery; INSIDER is the insider stockholdings; INDUS is the industrial returns less the market index returns; AUDITOR is the auditor dummy. LEADUW is 1 (0) if the underwriter's market share is above (below) the median.

Asterisks indicate significance at the *10%, **5%, and ***1% levels (for one-tailed tests).

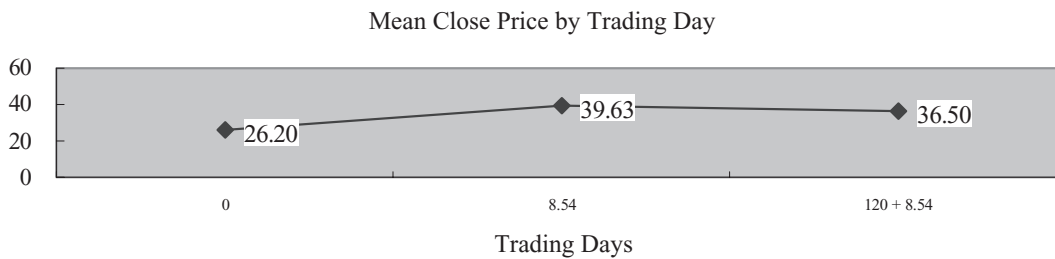


Figure 2. Mean stock price subsequent to the IPO

Panel B also presents the differences in mean REVERSAL among the sample groups. Contrary to our predictions, without introducing any control variables, we find that mean REVERSAL of the mandatory (pre-mandate) group is significantly less (greater) ($P = 0.003$). More specifically, mandatory forecasts firms are with less REVERSAL than non-forecasters and voluntarily disclosing firms ($P = 0.150$ and 0.004 , respectively), indicating that the post-mandate group experiences significantly greater price reversal than both pre-mandate groups. Furthermore, there exists an insignificant difference in REVERSAL between withholding and voluntary groups ($P = 0.253$).

The last column in panel B reports difference in durations of IPO honeymoons. Due to the price limits imposed in Taiwan's stock market, the greater the information asymmetry, the larger the number of days with consecutive positive industry-adjusted returns (the honeymoon) that issuing firms might experience.²¹ Consistent with the notion that firms with voluntary forecasts exhibit greater extent of information asymmetry, the voluntary group experiences a significantly longer honeymoon than the withholding group ($P = 0.021$). Moreover, both withholding and voluntary groups are with significantly longer honeymoons as compared with the post-mandate group ($P = 0.005$ and 0.000 , respectively). Our analysis also documents another interesting result (not tabulated): the coefficient on the IPO firm auditor for the post-mandate (pre-mandate) group is significantly greater (less) ($P = 0.002$), supporting the notion that after the mandate more reputable accountants were appointed.

Figure 3(a) depicts the mean cumulative returns during IPO honeymoon by year. Also, Figure 3(b) and (c) depicts the two components, pure underpricing and subsequent reversal, respectively, during the sample years. These figures show that during 1985–1989 IPO underpricing appeared to grow rapidly over time and peaked in 1989. Then it slipped considerably in 1990 but was still large. After the 1991 enforcement of mandatory management forecasts, the IPO underpricing dropped significantly. The result in Figure 3(b) supports the notion that REVERSAL was negative for most of the sample years, indicating that stock price reversals are a common phenomenon. Nevertheless, in terms of pre- versus post-1990 reversals, during the bullish pre-1990 (bearish post-1990) era REVERSAL appears to be greater (less).²² The figure suggests that the price reversal is less (more) pronounced in bull (bear) market.

In March 1998, a new legislature enacted authorized Taiwan's Securities and Futures Commission to exert its administrative jurisdiction to defer or reject the issuing firms from getting approval of their future seasoned equity offerings. Table II presents the IPO returns and honeymoon

²¹ In our sensitivity analysis, nevertheless, we define IPO honeymoon as the duration of consecutive limit hits.

²² With our further exclusion of the observations in 1988, we find insignificant difference in REVERSAL between mandatory and non-mandatory groups.

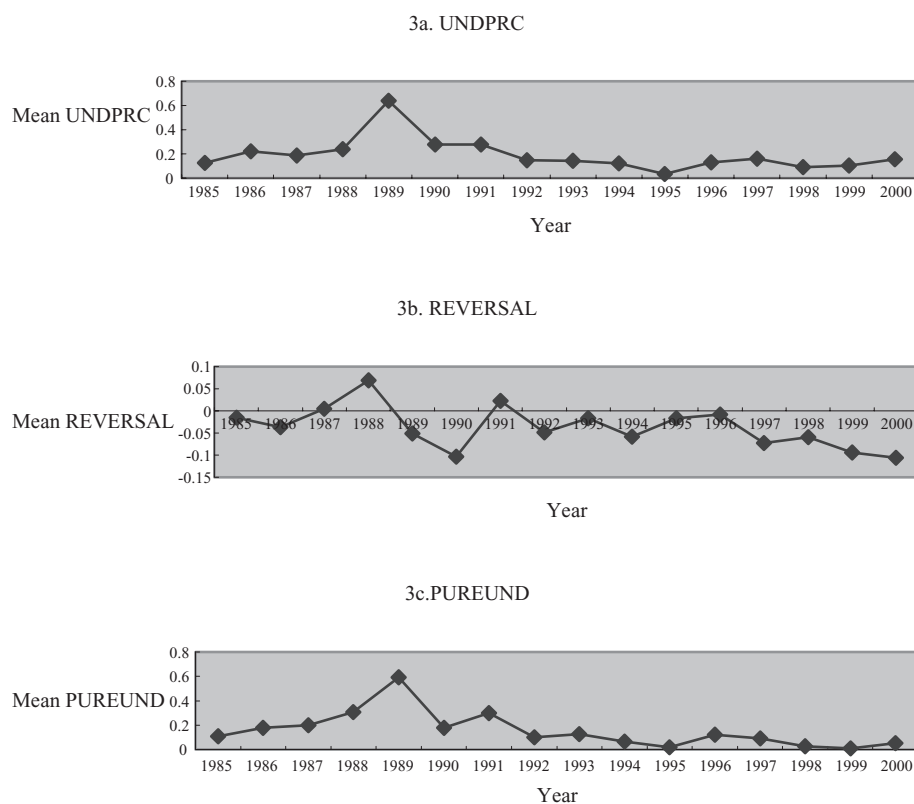


Figure 3. IPO underpricing, pure underpricing and reversals by year

Table II. Association between SFC punishments and underpricing, pure underpricing, reversal as well as honeymoon

	Group ^a	Mean	Median	SD	<i>t</i> -value (<i>p</i> -value)
UNDPRC	Before March 1998 (133)	0.1266	0.0985	0.1196	0.932 (0.176)
	After March 1998 (217)	0.1127	0.0701	0.1580	
REVERSAL	Before March 1998 (134)	-0.031	-0.034	0.0976	4.841*** (0.000)
	After March 1998 (210)	-0.092	-0.091	0.1417	
PUREUND	Before March 1998 (133)	0.096	0.0867	0.1464	3.976*** (0.000)
	After March 1998 (217)	0.0188	-0.0161	0.2166	
UNDPRCHIT	Before March 1998 (134)	0.1198	0.0857	0.1160	1.417* (0.078)
	After March 1998 (210)	0.0988	0.0585	0.1444	
HM	Before March 1998 (180)	4.66	3.50	3.86	2.005*** (0.023)
	After March 1998 (247)	3.85	2.00	4.30	

^aBefore (after) March 1998, the IPO firms are subject to less (more) stringent punishment.

Note: Asterisks indicate significance at the *10%, **5% and ***1% levels (for one-tailed tests).

accompanying the enforcement of the March 1998 rules, indicating that UNDP RC and UNDP RCHIT are less (greater) regarding the observations subject to more (less) severe punishments ($P = 0.176$ and $P = 0.078$, respectively). Consistently, HM appears to be shorter (longer) and PUREUND appears to be less (greater) for the post- (pre-) 1998 observations ($P = 0.023$ and $P = 0.000$, respectively.) As for the reversals to overreaction, REVERSAL for the period subject to punishment is -0.092 , which is more pronounced than the pre-mandate measure -0.031 ($P = 0.000$).

Table III presents the correlation matrix for our variable set, indicating that the correlation coefficients among the control variables are statistically significant but economically trivial. Table III also reveals that, as predicted, MANDAT is significantly and negatively correlated with UNDP RC and PUREUND.

EMPIRICAL RESULTS

Association between the disclosure mandate and underpricing, pure underpricing as well as subsequent reversal

Table IV presents the differences among the sample groups (mandatory *vis-à-vis* non-mandatory, mandatory *vis-à-vis* voluntary, and voluntary *vis-à-vis* withholding firm) in terms of UNDP RC, REVERSAL, and PUREUND. Model 1A sets UNDP RC as the dependent variable in the comparison tests for difference between mandatory and non-mandatory sample groups. Consistent with our predictions, the coefficient on MANDAT is significantly negative ($P < 0.001$), indicating that the mandate helps mitigate the information asymmetry between investors and insiders and thus reduce IPO underpricing.

By including control variable TIME, Model 1 in Table IV discriminates against the competing explanation that investors' gradual learning results in negative coefficient for MANDAT. Specifically, it shows that the coefficient estimate for control variable TIME is insignificant, suggesting that underpricing did not change monotonically over the years. Figure 3 indicates that underpricing was greater during 1985–1990, a period when the market soared. Accordingly, we also partition the sample into January 1985–June 1991 and June 1991–December 2000 test periods. Model 4 results that the coefficient for TIME prior to June 1991 is significantly negative indicate that underpricing became less pronounced during 1985–1990. In contrast, the corresponding estimate regarding TIME in the latter subperiod, when Taiwan's market experienced a lower underpricing (see Figure 3), is insignificant.

As to the estimates of other control variables, our results regarding Model 4 that the mean AUDITOR coefficient is significantly negative support the notion that underpricing decreases with accountant reputation. The post-1991 coefficient for IINV is significantly negative, suggesting that the greater the institutional investors' stockholdings are, the smaller the underpricing. The coefficients for INDUS are positive (marginally significant), indicating that underpricing increases with excess industrial returns. Furthermore, the coefficient for TAIEX is significantly positive, indicating that the OTC firms (TAIEX firms) are subject to greater (less) information asymmetry. Contrast with the results in prior studies, the coefficient for LEADUW is significantly positive ($P = 0.023$), suggesting that underpricing increases with the size of the underwriting firms.

Table IV shows that the coefficient on POSTDISCL with respect to Model 2A is significantly negative, suggesting that mandatory (voluntary) forecast firm underpricing is less (more) pronounced. Moreover, Model 3A results present that the coefficient for PREDISCL, namely the difference in underpricing between pre-mandate forecasting and withholding firms, is significantly

Table III. Estimates of correlation coefficients

	UNDRPC	REVERSAL	PUREUND	MANDAT	IINV	SIZE	ODDS	INSIDER	INDUS	AUDITOR	LEADUW
UNDRPC		0.050 (0.313)	0.807 (0.000)	-0.947 (0.000)	-0.333 (0.000)	-0.065 (0.196)	-0.313 (0.000)	0.005 (0.915)	0.071 (0.153)	-0.094 (0.057)	-0.125 (0.015)
REVERSAL	0.103 (0.037)		0.630 (0.000)	0.027 (0.585)	-0.111 (0.024)	-0.094 (0.060)	-0.143 (0.007)	0.069 (0.167)	0.080 (0.106)	-0.017 (0.730)	0.025 (0.633)
PUREUND	0.771 (0.000)	0.652 (0.000)		-0.755 (0.000)	-0.332 (0.000)	-0.106 (0.035)	-0.328 (0.000)	0.043 (0.390)	0.103 (0.038)	-0.085 (0.086)	-0.083 (0.105)
MANDAT	-0.341 (0.000)	-0.124 (0.011)	-0.355 (0.000)		0.028 (0.532)	-0.063 (0.161)	0.183 (0.000)	-0.101 (0.023)	0.055 (0.266)	0.135 (0.002)	-0.236 (0.000)
IINV	-0.151 (0.003)	-0.078 (0.121)	-0.172 (0.001)	0.037 (0.413)		0.125 (0.006)	0.063 (0.196)	0.104 (0.023)	-0.076 (0.132)	0.088 (0.049)	-0.022 (0.633)
SIZE	-0.063 (0.208)	-0.112 (0.025)	-0.103 (0.039)	-0.089 (0.045)	0.144 (0.001)		0.067 (0.163)	0.080 (0.078)	-0.008 (0.873)	0.121 (0.007)	0.029 (0.538)
ODDS	-0.501 (0.000)	-0.199 (0.000)	-0.467 (0.000)	0.432 (0.000)	0.108 (0.025)	0.048 (0.310)		-0.012 (0.799)	-0.201 (0.000)	0.001 (0.981)	-0.070 (0.136)
INSIDER	0.033 (0.517)	0.050 (0.321)	0.044 (0.376)	-0.085 (0.058)	0.039 (0.392)	0.087 (0.053)	-0.015 (0.754)		-0.093 (0.060)	-0.016 (0.725)	-0.017 (0.716)
INDUS	0.169 (0.001)	0.056 (0.257)	0.162 (0.001)	0.020 (0.689)	-0.047 (0.345)	-0.026 (0.605)	-0.198 (0.000)	-0.094 (0.060)		0.130 (0.008)	0.112 (0.028)
AUDITOR	-0.072 (0.144)	-0.014 (0.770)	-0.071 (0.001)	0.150 (0.001)	0.083 (0.064)	0.107 (0.016)	0.067 (0.158)	-0.016 (0.727)	0.079 (0.108)		-0.049 (0.282)
LEADUW	-0.104 (0.043)	0.018 (0.727)	-0.072 (0.172)	-0.232 (0.000)	-0.017 (0.717)	0.011 (0.811)	-0.114 (0.016)	-0.010 (0.836)	0.090 (0.078)	-0.063 (0.168)	

Notes: The upper-right (lower-left) elements are the estimates for Pearson correlation (Spearman rank correlation) coefficients. Figures in parentheses are the probabilities for the two-tailed tests. UNDRPC, REVERSAL and PUREUND are overall underpricing, subsequent reversal, and pure underpricing, respectively. We set MANDAT = 0 for pre-1991 observations and MANDAT = 1 for post-mandate firms. IINV is the institutional investors' stockholdings; SIZE is the log of market value; ODDS is the odds of lottery; INSIDER is the insider stockholdings; INDUS is the industrial returns less TAIEX market index returns. AUDITOR is the dummy for auditing firm. LEADUW is 1 (0) if the underwriter's market share is above (below) the median.

positive. The finding is consistent with the notion that the voluntary forecasts prior to IPOs were less accurate. In contrast, the 1991 mandate detailed punishments on misleading forecasts and thus resulted in increased forecast quality, which has, in turn, reduced information asymmetry and underpricing. The results suggest that disclosure regulations (voluntary forecasts) are effective (not effective) in mitigating information asymmetry in an economy with low litigation cost.²³

We decompose $UNDPRC_{it}$ into two components: $PUREUND_{it}$ and $REVERSAL_{it}$. The latter component measures overreaction, whereas the former is the pure underpricing component and is calculated by subtracting the measure of reversal from $UNDPRC_{it}$. Columns B and C in Table IV present the differences in $REVERSAL_{it}$ and $PUREUND_{it}$ among the three test groups. Specifically, our Model 1B estimate regarding MANDAT is significantly positive, suggesting that both overreactions and reversals became less pronounced after the new mandate on management forecasts. The results of Model 2B test, which adopts $REVERSAL_{it}$ for firms with mandatory versus voluntary forecasts, indicate that the coefficient of POSTDISCL is 0.149, which is significantly positive ($P = 0.035$), as predicted. The coefficients on TIME with respect to Models 1B and 2B are significantly negative ($P < 0.000$), indicating that in Taiwan's stock market the subsequent reversals increased over the sample period.²⁴

Model 3B presents the difference in REVERSAL between (pre-mandate) voluntary firms *vis-à-vis* withholding firms. A significantly negative *t*-statistic would lend support to the notion that prior to the 1991 mandate voluntary firm IPOs were more underpriced. The result, nevertheless, indicates an insignificant difference between the two groups. In column C for each model we present the results of comparison tests for PUREUND. As predicted, the results for Models 1C–3C in Table IV are similar to the result of Model A in Table IV. Specifically, the estimate for MANDAT is significantly negative, indicating that the 1991 mandate may help lower the IPO underpricing. Moreover, the significantly negative ($P < 0.000$) coefficient on POSTDISCL for Model 2C suggests that mandatory forecasts are more effective than voluntary forecasts in mitigating information asymmetry. Also consistently, Model 3C results show that the coefficient for PREDISCL is significantly positive.

Extent to which the 1998 amendments on legal penalty help alleviate pure underpricing and reversals

Table V demonstrates the extent to which Taiwan's March 1998 amendment, which imposes a more severe penalty, deters the strategic violators that issue biased forecasts. With dummy variable D_{RULE} being set equal to 1 (0) for the firms that went public after (before) March 1998, the significant coefficient estimate on D_{RULE} indicates that both overreaction (measured by PUREUND) and reversals are less pronounced for the post-March 1988 observations. The findings suggest that the 1998 rule imposes a credible threat and enhances the quality of mandatory forecasts.

Association between mandatory forecasts and duration of IPO honeymoon

With our modified measure of underpricing, this section explores the differences in IPO honeymoon amongst the three groups of firms. Our underpricing measure is in contrast to those adopted by the

²³We also examine the correlation between voluntary firms' magnitude of reported earnings (deflated by beginning total assets and current-year sales revenues respectively) and IPO underpricing. We document marginally significant results that voluntary firm underpricing increases with absolute earnings.

²⁴We also divide the sample period into two test periods—January 1985 to June 1991 and June 1991 to December 2000—for our refinement tests. The untabulated results indicate that the coefficient on TIME from January 1985 to June 1991 is insignificant, whereas the corresponding coefficient for the periods from June 1991 to 2000 is statistically significant.

Table IV. Regression models for underpricing, reversals and pure underpricing

Independent variables	UNDRPC					
	Model 1: Mandatory forecast vs. Pre-mandate observations			Model 2: Mandatory forecast vs. Voluntary forecast observations		
	A	B	C	A	B	C
	UNDRPC	REVERSAL	PUREUND	UNDRPC	REVERSAL	PUREUND
MANDAT (-, +, -)	-0.515 (-6.864***)	0.159 (1.761**)	-0.318 (-3.996***)			
POSTDISCL (-, +, -)				-0.672 (-11.021***)	0.149 (1.813**)	-0.451 (-6.542***)
PREDISCL (+, -, +)						
TIME (-)	0.003 (0.038)	-0.250 (-2.339**)	-0.140 (-1.478*)	0.064 (0.882)	-0.235 (-2.399***)	-0.084 (-1.028)
AUDITOR (-)	-0.079 (-1.579*)	-0.016 (-0.264)	-0.072 (-1.350*)	-0.042 (-0.921)	-0.021 (-0.346)	-0.046 (-0.889)
INDUS (+)	0.059 (1.156)	0.098 (1.597*)	0.102 (1.893**)	0.053 (1.144)	0.094 (1.513*)	0.096 (1.850**)
INSIDER (-)	-0.013 (-0.266)	-0.007 (-0.120)	-0.014 (-0.276)	0.010 (0.220)	-0.015 (-0.253)	-0.001 (-0.018)
IINV (-)	-0.027 (-0.532)	0.003 (0.048)	-0.020 (-0.367)	-0.077 (-1.661**)	0.002 (0.033)	-0.060 (-1.151)
LEADUW (-)	0.052 (1.000)	0.070 (1.125)	0.081 (1.472*)	0.090 (1.920**)	0.083 (1.326*)	0.120 (2.270**)
ODDS (-)	-0.262 (-5.101***)	-0.054 (-0.874)	-0.238 (-4.376***)	-0.263 (-5.669***)	-0.054 (-0.864)	-0.242 (-4.602***)
SIZE (-)	-0.042 (-0.839)	-0.047 (-0.795)	-0.060 (-1.140)	-0.049 (-1.093)	-0.045 (-0.736)	-0.065 (-1.279)
TAIEX (+)	0.147 (2.380***)	-0.131 (-1.766**)	0.042 (0.642)	0.126 (2.268**)	-0.128 (-1.709**)	0.027 (0.427)
<i>F</i>	15.667***	2.725***	10.889***	25.943***	2.703***	14.672***
Adj. <i>R</i> ²	0.345	0.058	0.262	0.482	0.060	0.338
<i>N</i>	280	280	280	269	269	269

Notes: See Table III for definition of variables. We adopt the covariance matrix estimator introduced by White (1980) as a remedial measure for heteroskedasticity.

Asterisks indicate significance at the *10%, **5%, and ***1% levels (for one-tailed tests).

studies on US firms. Specifically, the prior studies calculate underpricing via the difference between the IPO day close price and the offering price. Taiwan's listed stocks, nevertheless, are subject to both up- and down-price-limits. Furthermore, over the test period, the up- and down-limits changed quite frequently. With the price limits, the IPO underpricing may persist for a longer period.

In Table VI, the Model 1 test compares the difference in duration of IPO honeymoon between pre-mandate (with MANDAT equal to 0) and post-mandate (with MANDAT equal to 1) regimes. As predicted, the coefficient on MANDAT is significantly negative ($P = 0.000$), suggesting that the 1991 mandate helped the investors become better informed and therefore helped shorten the IPO honeymoon. Furthermore, the Model 2 test compares the difference in the duration of IPO honeymoon between mandatory and (pre-mandate) voluntary firms. The coefficient on POSTDISCL is -0.560 ($P = 0.000$), indicating that the mandatory (voluntary) forecasts are more (less) informative. Moreover, our Model 3 test result that the coefficient on PREDISCL is significantly positive supports

Model 3: Pre-mandate forecast vs. Withholding observations			Model 4: Mandatory forecast vs. Pre-mandate observations (UNDPRC)	
A	B	C		
UNDPRC	REVERSAL	PUREUND	Pre-mandate	Post-mandate
0.963 (5.569***)	-0.326 (-1.164)	0.701 (3.278***)		
0.121 (0.643)	0.256 (0.838)	0.214 (0.918)	-0.542 (-2.086**)	0.068 (0.935)
0.014 (0.089)	-0.882 (-3.554***)	-0.361 (-1.909**)	-0.056 (-0.206)	-0.078 (-1.326*)
-0.156 (-1.098)	0.220 (0.959)	-0.042 (-0.242)	-0.088 (-0.350)	0.085 (1.421*)
-0.002 (-0.018)	0.218 (1.091)	0.090 (0.592)	-0.135 (-0.632)	-0.006 (-0.101)
0.109 (0.872)	0.324 (1.603*)	0.232 (1.503*)	0.067 (0.304)	-0.104 (-1.725**)
-0.372 (-2.199**)	-0.518 (-1.891**)	-0.543 (-2.599**)	-0.084 (-0.295)	0.117 (2.008**)
0.079 (0.584)	-0.290 (-1.319)	-0.054 (-0.321)	-0.170 (-0.751)	-0.338 (-5.634***)
-0.451 (-3.250***)	-0.449 (-1.997**)	-0.583 (-3.398***)	-0.218 (-0.928)	-0.043 (-0.735)
				0.157 (2.213**)
8.097***	2.193*	4.806***	1.664*	6.648***
0.744	0.328	0.609	0.195	0.166
23	23	23	23	257

the notion that the (pre-mandate) voluntarily forecasting firms have a significantly longer honeymoon than the withholding firms. The results are consistent with that of the underpricing (UNDPRC) tests. Finally, our Model 4 test examines the extent to which the 1998 amendment on legal penalty helps shortening IPO honeymoons. The result that the coefficient for D_{RULE} is significantly negative supports the notion of shorter IPO honeymoon after the 1998 amendment.

ADDITIONAL TESTS

Sensitivity analysis on underpricing

In the above analyses underpricing is defined as $UNDPRC_{it^*} = \log(P_{it^*}/P_0) - \log(I_{it^*}/I_0)$, where $t^* = \max t \mid \log(P_t/P_{t-3i}) - \log(I_t/I_{t-3i}) > 0, \forall 3i < t$, where $i = 1, 2, 3, \dots$, and $t = 1, 2, 3, \dots$. In this section we use alternative definitions of t^* . Namely, we specify

Table V. Regressing IPO underpricing on D_{RULE} and the control variables

Variable	UNDRPC	REVERSAL	PUREUND
D_{RULE}	-0.207	0.140	-0.167
(-, +, -)	(-2.004**)	(1.356*)	(-1.579*)
TIME	-0.062	-0.128	-0.121
(-)	(-0.582)	(-1.224)	(-1.192)
AUDITOR	-0.056	0.009	-0.044
(-)	(-1.042)	(0.155)	(-0.818)
INDUS	0.085	0.079	0.115
(+)	(1.571*)	(1.412*)	(2.120**)
INSIDER	0.024	-0.008	0.017
(-)	(0.454)	(-0.145)	(0.311)
IINV	-0.059	-0.014	-0.048
(-)	(-1.094)	(-0.260)	(-0.888)
LEADUW	0.105	0.099	0.130
(-)	(1.976**)	(1.779**)	(2.419***)
ODDS	-0.317	-0.030	-0.269
(-)	(-5.797***)	(-0.529)	(-4.896***)
SIZE	0.001	-0.030	-0.048
(-)	(0.022)	(-0.542)	(-0.886)
TAIEX	0.227	-0.081	0.104
(+)	(3.368***)	(-1.167)	(1.530*)
F	6.211***	3.946***	5.998***
Adj. R^2	0.167	0.084	0.135
N	321	321	321

Notes: See Table III for the definition of the variables. We adopt the covariance matrix estimator introduced by White (1980) as a remedial measure for heteroskedasticity.

Asterisks indicate significance at the *10%, **5%, and ***1% levels (for one-tailed tests).

$$t^* = \max \{t \mid \log(P_t/P_{t-3i}) - \log(I_t/I_{t-3i}) > 1\%, \forall 3i < t, \text{ where } i = 1, 2, 3, \dots, \text{ and } t = 1, 2, 3, \dots\}.$$

or

$$t^* = \max \{t \mid \log(P_t/P_{t-3i}) - \log(I_t/I_{t-3i}) > 2\%, \forall 3i < t, \text{ where } i = 1, 2, 3, \dots, \text{ and } t = 1, 2, 3, \dots\}.$$

Table VII reports significant differences in underpricing and price reversals among the three groups, with specifications of either $\log(P_t/P_{t-3i}) - \log(I_t/I_{t-3i}) > 1\%$ or $\log(P_t/P_{t-3i}) - \log(I_t/I_{t-3i}) > 2\%$ for UNDRPC_{it}^* , REVERSAL_{it}^* , and PUREUND_{it}^* . Consistent with our documented cheap talk phenomenon, the sensitivity results show that the voluntarily disclosing firms are subject to greater underpricing and greater subsequent reversals than the withholding firms. The mandate appears to help lower the underpricing (including REVERSAL and PUREUND) as well as the subsequent price reversals.

Adopting an alternative measure, UNDRCHIT_{it} , for underpricing

This section defines t^* as the last consecutive limit-hit day and uses the close price on that day to calculate UNDRCHIT_{it}^* . The findings with the alternative measure UNDRCHIT_{it} , nevertheless,

Table VI. Regression analyses for difference in honeymoon duration among the forecasting/withholding groups

Variable	Model			
	Model 1: Mandatory vs. Pre-mandate observations	Model 2: Mandatory vs. Voluntary observations	Model 3: Pre-mandate voluntarily forecasting vs. Withholding observations	Model 4: Pre- vs. Post-1998 reform mandatory observations
MANDAT (-)	-0.425 (-5.330***)			
POSTDISCL (-)		-0.531 (-7.702***)		
PREDISCL (+)			0.602 (2.366**)	
D_{RULE} (-)				-0.181 (-2.203***)
TIME (-)	-0.025 (-0.262)	0.024 (0.296)	0.090 (0.322)	-0.479 (-5.311***)
AUDITOR (-)	-0.124 (-2.322**)	-0.096 (-1.857**)	-0.183 (-0.813)	-0.120 (-2.356**)
INDUS (+)	0.111 (2.049**)	0.115 (2.216**)	-0.173 (-0.827)	0.127 (2.482**)
INSIDER (-)	0.034 (0.641)	0.050 (0.994)	-0.110 (-0.606)	0.013 (0.254)
IINV (-)	0.020 (0.376)	-0.019 (-0.370)	0.362 (1.973**)	0.032 (0.624)
LEADUW (-)	0.065 (1.186)	0.107 (2.033**)	-0.392 (-1.575*)	0.037 (0.712)
ODDS (-)	-0.216 (-3.968***)	-0.220 (-4.194***)	0.090 (0.451)	-0.219 (-4.222***)
SIZE (-)	-0.014 (-0.274)	-0.018 (-0.355)	-0.436 (-2.135**)	-0.027 (-0.529)
TAIEX (+)	0.128 (1.956**)	0.114 (1.824**)		0.188 (2.918***)
F	10.902***	14.699***	2.964**	8.503***
Adj. R^2	0.262	0.338	0.445	0.451
N	280	269	23	321

Notes: See Table III for definition of control variables. We adopt the covariance matrix estimator introduced by White (1980) as a remedial measure for heteroskedasticity.

Asterisks indicate significance at the *10%, **5%, and ***1% levels (for one-tailed tests).

are approximately the same as the above-mentioned results, suggesting that the results are robust. $UNDPRC_{it}$, an alternative measure of IPO underpricing, is defined as $UNDPRCHIT_{it} = \log(P_t^*/P_0) - \log(I_t^*/I_0)$. We use the industrial index return as the benchmark since the magnitude of IPO underpricing varies by industry. Our second alternative measure of underpricing, $UNDPRCRAW_{it}$, is defined as $\log(P_t^*/P_0)$. The findings with $UNDPRCRAW_{it}$ are also similar to the above ones.

We also conduct tests with an alternative measure of IPO honeymoon. With respect to t^* , the duration of the consecutive limit-hit period from the IPO day, the (untabulated) results are more pronounced than the results in Table V.

Table VII. Investigating the sensitivity with respect to alternative definitions of t^*

Variable	$\{t^* = \max\{t \mid \log(P/P_{t-3}) - \log(I/I_{t-3}) > 1\%\}$								
	Model 1: Mandatory vs. Pre-mandate observations			Model 2: Mandatory vs. Voluntary observations			Model 3: Pre-mandate voluntarily forecasting vs. Withholding observations		
	UNDP RC	REVERSAL	PUREUND	UNDP RC	REVERSAL	PUREUND	UNDP RC	REVERSAL	PUREUND
MANDAT (-,+,-)	-0.527 (-7.025***)	0.167 (1.855**)	-0.331 (-4.146***)						
POSTDISCL (-,+,-)				-0.684 (-11.277***)	0.154 (1.874**)	-0.472 (-7.111***)			
PREDISCL (+,-,+)							0.975 (5.646***)	-0.326 (-1.182)	0.711 (3.420***)
TIME (-)	0.0016 (1.198)	-0.272 (-2.544***)	-0.131 (-1.385*)	0.076 (1.057)	-0.254 (-2.604***)	-0.056 (-0.827)	0.131 (0.695)	0.246 (0.819)	0.221 (0.972)
AUDITOR (-)	-0.080 (-1.584*)	-0.011 (-0.184)	-0.070 (-1.312*)	-0.043 (-0.948)	-0.015 (-0.239)	-0.044 (-0.868)	0.030 (0.199)	-0.903 (-3.703***)	-0.363 (-1.972**)
INDUS (+)	0.059 (1.163)	0.097 (1.592*)	0.104 (1.934**)	0.052 (1.143)	0.095 (1.544*)	0.101 (1.950**)	-0.154 (-1.086)	0.209 (0.924)	-0.044 (-0.260)
INSIDER (-)	-0.020 (-0.399)	0.013 (0.225)	-0.008 (-0.149)	0.004 (0.085)	0.004 (0.060)	0.004 (0.085)	-0.001 (-0.007)	0.227 (1.156)	0.097 (0.656)
IINV (-)	-0.033 (-1.654)	0.010 (0.159)	-0.028 (-0.522)	-0.084 (-1.826**)	0.009 (0.145)	-0.073 (-1.421*)	0.115 (0.921)	0.332 (1.669*)	0.243 (1.622*)
LEADUW (-)	0.047 (0.904)	0.088 (1.423**)	0.088 (1.598*)	0.086 (1.854**)	0.101 (1.607*)	0.127 (2.433***)	-0.373 (-2.212**)	-0.519 (-1.926**)	-0.550 (-2.705***)
ODDS (-)	-0.254 (-4.963***)	-0.070 (-1.135)	-0.238 (-4.391***)	-0.256 (-5.541***)	-0.069 (-1.113)	-0.240 (-4.615***)	0.188 (0.653)	-0.270 (-1.250)	-0.039 (-0.241)
SIZE (-)	-0.038 (-0.764)	-0.054 (-0.910)	-0.072 (-1.387*)	-0.045 (-1.007)	-0.052 (-0.855)	-0.080 (-1.592*)	-0.455 (-3.281***)	-0.456 (-2.060**)	-0.594 (-3.557***)
TAIEX (+)	0.144 (2.329**)	-0.120 (-1.630*)	0.041 (0.635)	0.122 (2.215**)	-0.117 (-1.576*)	0.023 (0.367)			
F	15.759***	3.059***	11.237***	26.433***	3.045***	17.043***	8.125***	2.316*	5.155***
Adj. R ²	0.346	0.069	0.269	0.487	0.071	0.351	0.745	0.350	0.630
N	280	279	279	269	268	268	23	23	23

Note: See Table III for the definition of the variables. We adopt the covariance matrix estimator introduced by White (1980) as a remedial measure for heteroskedasticity.

An alternative measure for the duration of IPO honeymoon

Taiwan's stock market experienced frequent changes in price limits during the test period. Nevertheless, the less stringent the limits, the shorter the honeymoon is likely to be estimated. For instance, if stock XYZ is underpriced on the offering day by 14%, it is likely to experience limit hits for two (four) consecutive days when the price limit is 7% (3.5%). Accordingly, we adopt an alternative duration measure and define the adjustment factor as the ratio of the concurrent price limit during the IPO period to our benchmark price limit of 7%. Suppose the stock price hit the up-limit of 3.5% for four consecutive days, then we set the adjustment factor to be 0.5 (3.5%/7%) and set the duration of honeymoon to be $4 \times 0.5 = 2$ (days). The test results shown in Table VIII support the notion that our findings are robust.

Rank-regression results

In order to examine whether the results are driven by extreme observations, we also conduct rank regressions. Specifically, for each independent variable, we set the category measure for the first

$$\{t^* = \max\{t \mid \log(P/P_{t-3}) - \log(I/I_{t-3}) > 2\%\}$$

Model 1: Mandatory vs. Pre-mandate observations			Model 2: Mandatory vs. Voluntary observations			Model 3: Pre-mandate voluntarily forecasting vs. Withholding observations		
UNDP RC	REVERSAL	PUREUND	UNDP RC	REVERSAL	PUREUND	UNDP RC	REVERSAL	PUREUND
-0.531 (-7.116***)	0.137 (1.524*)	-0.343 (-4.321***)	-0.689 (-11.445***)	0.144 (1.756**)	-0.467 (-6.801***)	0.974 (5.657***)	-0.272 (-0.909)	0.714 (3.178***)
0.010 (0.113)	-0.252 (-2.370***)	-0.126 (-1.334*)	0.071 (0.994)	-0.242 (-2.489***)	-0.073 (-0.894)	0.134 (0.715)	0.303 (0.925)	0.255 (1.039)
-0.077 (-1.538*)	-0.007 (-0.122)	-0.064 (-1.216)	-0.041 (-0.901)	-0.016 (-0.253)	-0.041 (-0.804)	0.035 (0.230)	-0.819 (-3.087***)	-0.346 (-1.740*)
0.054 (1.067)	0.110 (1.822**)	0.107 (1.997**)	0.047 (1.028)	0.106 (1.723**)	0.100 (1.941**)	-0.159 (-1.125)	0.232 (0.943)	-0.031 (-0.165)
-0.016 (-0.328)	0.002 (0.028)	-0.011 (-0.220)	0.008 (0.175)	-0.003 (-0.051)	0.004 (0.087)	-0.003 (-0.024)	0.163 (0.765)	0.073 (0.453)
-0.031 (-0.604)	-0.003 (-0.057)	-0.033 (-0.607)	-0.082 (-1.782**)	0.001 (0.019)	-0.072 (-1.372*)	0.116 (0.935)	0.273 (1.262)	0.226 (1.391*)
0.044 (0.853)	0.101 (1.631*)	0.092 (1.685**)	0.083 (1.807**)	0.105 (1.688**)	0.127 (2.436***)	-0.382 (-2.271**)	-0.449 (-1.535*)	-0.536 (-2.440**)
-0.254 (-4.970***)	-0.068 (-1.123)	-0.234 (-4.306***)	-0.256 (-5.571***)	-0.071 (-1.140)	-0.239 (-4.585***)	0.084 (0.621)	-0.244 (-1.039)	-0.040 (-0.227)
-0.030 (-0.613)	-0.080 (-1.356*)	-0.080 (-1.541*)	-0.037 (-0.832)	-0.072 (-1.203)	-0.084 (-1.659**)	-0.460 (-3.327***)	-0.494 (-2.054**)	-0.623 (-3.455***)
0.153 (2.484***)	-0.137 (-1.863**)	0.037 (0.565)	0.131 (2.397***)	-0.132 (-1.783**)	0.023 (0.366)			
16.119***	3.341***	11.576***	21.178***	3.265***	15.371***	8.185***	1.737	4.208**
0.351	0.078	0.276	0.494	0.078	0.350	0.746	0.232	0.568
280	279	279	269	268	268	23	23	23

(tenth) decile to be 0 (1) in the model. The results (not tabulated) of pure underpricing, reversal and honeymoon rank regressions are not significantly different from those reported in the above sections.

CONCLUSION

This study decomposes the anomaly of IPO underpricing into two components: pure underpricing and subsequent reversal, exploring the impact of the 1991 mandate by Taiwan Stock Exchange. The mandate required all IPO firms to include their management forecasts in the prospectuses. We aim at the differences in pure underpricing and long-term price reversal among the post-mandate group, the (pre-mandate) voluntary group, and the (pre-mandate) withholding group. Our empirical results indicate that both pure underpricing and subsequent reversal are significantly less for

Table VIII. Investigating sensitivity with respect to an alternative definition of IPO honeymoon duration: incorporating ratio of the concurrent price limit during the IPO period to the benchmark price limit of 7%

	Predicted sign of coefficient estimate	Model 1: Mandatory vs. Pre-mandate observations	Model 2: Mandatory vs. Voluntary observations	Model 3: Pre-mandate voluntarily forecasting vs. withholding observations
MANDAT	(-)	-0.406 (-5.034***)		
POSTDISCL	(-)		-0.505 (-7.177***)	
PREDISCL	(+)			0.805 (3.374***)
TIME	(-)	-0.021 (-0.222)	0.021 (0.246)	0.233 (0.894)
AUDITOR	(-)	-0.119 (-2.210**)	-0.087 (-1.647*)	-0.196 (-0.928)
INDUS	(+)	0.106 (2.043**)	0.106 (1.991**)	-0.205 (-1.045)
INSIDER	(-)	0.036 (0.683)	0.054 (1.043)	-0.062 (-0.362)
IINV	(-)	0.006 (0.119)	-0.025 (-0.461)	0.233 (1.351)
LEADUW	(-)	0.088 (1.580*)	0.112 (2.086)	-0.361 (-1.546*)
ODDS	(-)	-0.223 (-4.049***)	-0.226 (-4.209***)	0.071 (0.378)
SIZE	(-)	-0.014 (-0.256)	-0.018 (-0.351)	-0.465 (-2.425**)
TAIEX	(+)	0.118 (1.775**)	0.105 (1.645*)	
<i>F</i>		9.953***	13.063***	3.567**
Adj. <i>R</i> ²		0.243	0.310	0.512
<i>N</i>		280	269	23

Notes: See Table III for definition of variables. We adopt an alternative measure of honeymoon and define the adjustment factor as the ratio of the concurrent price limit during the IPO period to our benchmark price limit of 7%. For instance, suppose the stock price hits the up-limit of 3.5% for two consecutive days, we would set the adjustment factor to be 0.5 (3.5%/7%) and set the duration of honeymoon to be $4 \times 0.5 = 2$ (days). We adopt the covariance matrix estimator introduced by White (1980) as a remedial measure for heteroskedasticity.

Asterisks indicate significance at the *10%, **5% and ***1% levels (for one-tailed tests).

the post-mandate group than for withholding as well as voluntary groups, showing that the disclosure rule helps ameliorate investors' mispricing the stocks. Moreover, perhaps due to relatively low litigation costs, both pure underpricing and reversals are significantly greater (less) for the pre-mandate voluntary forecasters (withholding firms). Finally, the post-mandate forecasters have shorter IPO honeymoon than both withholding firms and voluntary forecasters, whereas before the mandate the voluntary forecasters (the withholding firms) have longer (shorter) honeymoons.

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