# Earnings Management, Underpricing and Underperformance of Chinese IPOs[♣]

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## Abstract

We examine the underpricing and long-term performance of Chinese initial public offerings (IPOs) issued during the 1998-2003 period in the accrual context. While issuers use income-increasing discretionary accruals to inflate earnings prior to IPOs, sentiment investors do not price discretionary accruals correctly but extrapolate past histories of managed earnings too far into the future. Consistent with the hypothesis that investors' incorrect beliefs about unusual accruals lead to initial overpricing of the new issue and thereby seemingly underpricing from the issuer perspective, we find that discretionary accruals in the IPO year are positively related to underpricing but negatively related to long-term stock performance. These relations are statistically and economically significant and robust to alternative benchmarks, models, variable specifications, and robust standard errors.

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# 1. Introduction

Initial Public Offerings anomalies refer to the stylised fact that IPOs appear to be underpriced relative to initial trading prices and they underperform relative to indices and matching stocks in the three to five years after going public. Numerous studies have reported persuasive evidence of these two puzzling regularities in different markets and different sample periods. It is quite clear empirically that rational considerations on the part of the issuer and the underwriter can reconcile part of underpricing. What is less clear to us is whether or not irrational behaviour on the part of the investor contributes to the puzzle. This question becomes even more appealing in the Chinese context since the underwriter in China cannot price the well regulated new issue at their discretion, leaving existing explanations related to underwriters less important and the issuer-investor strand of studies more important.

We explore this question starting from well-developed bodies of behavioural theory. Ljungqvist et al. (2006) attribute IPO anomalies to investor sentiment in the sense that a class of investors are at times irrationally exuberant about the prospects of IPOs. Stocks underperform in the long term when exuberance fades. Barberis et al. (1998) use the cognitive bias of representativeness to develop a model of investor sentiment in which investors extrapolate past good performance into the future, leading to overreaction. We offer a source of sentiment for investors to extrapolate and to be exuberant about: financial performance for the past few years. A good record of past performance is desirable for listing and pricing. Thus as the measure of firm performance, earnings have been crucial in the IPO process, creating considerable incentives for earnings management. While investors who too focus on the past performance would overvalue the new issue, investors who look to both the history and the industry peers would adjust for potential manipulation not to overpay.

Our study links the empirical IPO anomalies- underpricing and long-run underperformance - and traces them to incorrect beliefs about accounting accruals[1] for a sample of 506 IPOs during the period of 1998-2003. The accrual variables in our study are those reported in the fiscal year when firms go public which thus include both pre- and post-IPO months. We do not use pre-IPO data to measure the extent of earnings management for two principal reasons. On one hand, reliable and consistent information on pre-IPO data are not readily available for Chinese IPOs. On the other, the data gleaned from the first public financial statement are still representative as the incentives to manage earnings are likely to persist after firms go public. Security regulations in China also tend to "encourage" issuers who engage in earnings management to maintain their earnings patterns. An immediate and unusual fall in company performance would soon attract the media spotlight and potentially trigger an official investigation by China's Securities Regulatory Commission (CSRC), the stock market regulator.

We use the modified Jones model (Dechow et al. 1995) to separate accruals into usual and unusual components. We focus on the latter component that is not explained by normal firm and business conditions and hence is termed discretionary. We relate the discretionary accrual to the underpricing of IPOs. Firms ranked in the highest quintile (aggressive IPOs) based on discretionary accruals earn a mean first-day return some 17 to 20 percentage points higher than that of firms ranked in the lowest quintile (conservative IPOs). We also relate the discretionary accrual to the long-term stock performance and find the most conservative firms perform best. After controlling for other determinants, the cross-sectional evidence shows that underpricing increases in discretionary accruals, in other words the extent of earnings

[1] The importance of accruals in IPO anomalies is first studied by Teoh et al. (1998b) who examine the market performance of IPOs for the subsequent three years.

management, while the long term stock performance decreases with these discretionary components, consistent with our hypothesis on extrapolating investors who have incorrect beliefs about the fundamental value of accruals.

Our study adds the understanding of IPO anomalies by linking them to accounting accruals. First, in sharp contrast to the general belief that IPOs are underpriced by issuers, they are also arguably overpriced by investors in the China's IPO market, because of investor sentiment, very much in the spirit of Barberis et al. (1998) and Ljungqvist et al. (2006) more recently. This is particularly true when the pricing policy in China is well regulated and closely related to some earnings measure thus the influence from the issuer on the offer price is rather limited.

Second, evidence of earnings management around IPOs is not new[2]. Our study contributes not because we examine the subsequent market performance of IPOs over long horizons as others, but because our analysis attributes underpricing to investors' incorrect beliefs about discretionary accruals as well, thereby reconciling the simultaneous existence of underpricing and long-run underperformance in one context. To the best of our knowledge, only the underwriter's reputation due to Carter et al. (1998) sheds light on the short and long run performance of IPOs.

Finally, our study adds to the literature that investigates the underpricing phenomenon of IPOs in China's stock markets, such as Mok and Hui (1998), Su and Fleisher (1999), Chan et al. (2004), Chi and Padgett (2005), and Su (2006). Whilst these studies focus on institutional characteristics which are difficult to quantify, earnings management and its impact can be readily estimated. Our study sheds new light on the underpricing phenomenon in China.

[2] Aharony et al. (1993), Teoh et al. (1998b), Teoh et al. (1998c), Aharony et al. (2000), Ducharme et al. (2001), and Roomsenboom (2003)

The remainder of the paper is organized as follows. Section 2 develops the hypothesis and empirical models examined in this study. Section 3 presents empirical results. Section 4 provides several robustness checks, and Section 5 concludes.

## 2. Hypothesis and Empirical Models

### 2.1 Hypothesis Development

Several adjustments to cash flow are required to calculate earnings in the traditional accrual accounting due to the timing and mismatching problems inherent in the former. The difference between cash flow and reported earnings is collectively called accruals. Those adjustments substantially subject to managerial discretion are designed to make earnings more informative than cash flow about the financial position of the firm. However, it is also possible that issuers take advantage of the flexibility to manage reported earnings opportunistically.

There are many reasons and goals for the issuing company to manage earnings. They could reduce the earnings number for tax purposes while they could increase reported income to raise as much capital as possible from equity sales. Given that the pricing of the new issue is very closely related to some earnings measure[3], there is good reason for IPO proceeds-maximising issuers to deceive investors by opportunistically manipulating earnings through accrual management. Since earnings have been crucially important as one stated measure of firm performance and China requires the listing candidates to have a good record of financial performance in the past three consecutive years, this improper use of accruals becomes the norm rather

[3] Before July 1999, the IPO price was determined by a formula as the product of the price-earning multiple set by the government and a variety of earnings measures. After July 1999, although the issuer and the lead underwriter are allowed to set their IPO price, price determination is still based on earnings valuation. Price determination in bookbuilding approach is also earnings-based.

the exception. The issuing companies all hope to look better than they actually are by stretching reported earnings and manipulating a promising growth trend.

Earnings could be managed only if opportunities present themselves. Since managers have much discretion when deciding on the size and timing of accruals, they can select appropriate accounting methods and estimates from a variety of acceptable choices. Thus depending on the methods selected and numerous estimates that must be made, reported earnings can vary considerably and yet still be in compliance with the GAAP.

### 2.1.1 Earnings Management and Market Performance

Prior studies report evidence of positive accruals around the time of IPOs[4]. If the issuing companies seek to sell their equity shares at higher prices, it seems plausible to assume that they drive up the offer price with more aggressive use of accruals. Positive accruals not only influence the offer price upward, they but also drive up the market price since investors may have incorrect beliefs about unusual positive accruals due to cognitive bias. As described by psychologist for example in Kahneman et al. (1982), investors often predict future uncertain events by taking a short history of data. Barberis et al. (1998) model such representativeness heuristics that investors extrapolate short past histories of rapid earnings growth into the future and therefore overprice these companies. This naïve mistake propels stock prices to unduly high levels, despite this is gradually corrected over longer horizons when past growth rates fail to repeat themselves. Ljungqvist et al. (2006) attribute long-run underperformance of IPOs to the presence of a class of irrationally exuberant investors. Stocks underperform in the long term when exuberance fades.

[4] Aharony et al. (1993), Teoh et al. (1998b), Teoh et al. (1998c), Aharony et al. (2000), Ducharme et al. (2001), and Roomsenboom (2003).

It follows that the relation between the use of earnings management and IPO underpricing is not straightforward. We argue that the increment in the initial trading price is more than that in the offer price for several distinctive features of China's stocks market. First, investment options for general public investors in China are rather limited since they are restricted from investing overseas. Even in the under-developed mainland China, the new issue available for trading typically represents a small proportion of shares outstanding. The majority of shares are owned by the state or other legal entities. Pricing the new issue far low, which was intended to arouse the enthusiasm of the public, exacerbates the imbalance between demand and supply for new issues. One direct consequence of the resultant overwhelming oversubscription[5] is that investors and sentiment investors in particular, have to purchase shares in the aftermarket if really interested, sending stock prices to unduly high levels.

The relation between the use of earnings management and long-term stock performance is straightforward. The literature on the pricing of discretionary accruals is well developed. From a vantage of longer horizons, evidence suggests that the market in general overprices the total accruals (Sloan 1996) and more precisely the abnormal accruals (Subramanyam 1996, Xie 2001) while evidence limited to IPOs (Teoh et al. 1998b) seems to be a special case.

Therefore we hypothesize that there is a positive relationship between the use of earnings management and IPO underpricing, and that there is a negative relationship between the use of earnings management and the long-term stock performance.

[5] 200 times on average, see Coakley et al. (2007)

## 2.2 Measures of Underpricing, Long-Term Stock Performance and Earnings Management

### 2.2.1 Underpricing of IPOs

IPO underpricing is normally defined as the initial return on the first day of trading or the percentage by which the first-day closing price exceeds the offer price. Ritter and Welch (2002) among others follow this definition. We follow this definition throughout this paper. The returns are given as follows:

- *Initial Return (IR)*

$$IR_{j,1} = \left( \frac{P_{j,1}}{P_{j,0}} - 1 \right) \times 100\% \quad (1)$$

- *Initial market return (IMKTRTN)*

$$IRm_{,1} = \left( \frac{P_{m,1}}{P_{m,0}} - 1 \right) \times 100\% \quad (2)$$

where $P_{j,0}$ and $P_{j,1}$ are the offer price and the closing price of new issue $j$ on the first day of trading. $P_{m,,0}$ and $P_{m,1}$ are the market index on the offer date and first trading day, respectively.

### 2.2.2 Long-term Performance of IPOs

Given the striking short-run abnormal returns of IPOs, it is interesting to examine whether this underpricing will be corrected in the long term as Barberis et al. (1998) and Ljungqvist et al. (2006) propose. Ritter (1991) is the first to explore this issue and many studies afterwards report similar evidence that IPOs underperform significantly relative to non-issuing firms for three to five years after listing.

We consider two measures of long-term stock performance: cumulative abnormal returns (CAR) from its offer date until the earliest of its delisting date, its

third anniversary, and December 31, 2006 and buy-and-hold returns (BHR) starting four months after the first fiscal year-end to allow for the reporting lag[6]. The former follows the study of Ritter (1991) while the latter follows Teoh et al. (1998b). We use the general market index[7] to adjust stock returns on a monthly basis. Both calendar time and event time are used to measure the length of period. The calendar time method defines every month as 21 successive trading days except that month 0 only comprises the first day of public trading. Thus the 2-22$^{nd}$ event days make up month 1, the 23-43$^{rd}$ event days make up month 2, and so on.

Monthly market-adjusted returns are calculated as the monthly raw return on a stock over the monthly market return for the corresponding period. The market-adjusted return for stock *j* in month *t* is given as:

$$R_{j,t} = r_{j,t} - r_{m,t} \tag{3}$$

The average market-adjusted on a portfolio of n stocks for event month t is the equally-weighted arithmetic average of the market-adjusted returns:

$$AR_t = \frac{1}{n}\sum_{j=1}^{n} IR_{j,t} \tag{4}$$

The cumulative market-adjusted aftermarket performance (CAR) from event month *q* to event month *s* is the summation of the average benchmark-adjusted returns over this period:

$$CAR_{q,s} = \sum_{t=q}^{s} AR_t \tag{5}$$

As an alternative to the use of CAR, we also consider buy and hold returns (BHR) with a 3-year holding period:

[6] The Chinese listed companies are required to release their audited annual reports no later than the end of the following April.
[7] SHSE A-share Index and SZSE A-share Composite Index.

$$BHR_j = \prod_{t=1}^{36} \left(1 + r_{j,t}\right) \quad (6)$$

### 2.2.3 Earnings Management

Following previous research on earnings management, we use discretionary accruals as a proxy for earnings management[8]. As adjustments to cash flows, total accruals in a given year are defined as reported earnings or net income in excess of operating cash flows.

- *Total Accruals*

  AC ≡ Net Income – Operating Cash Flows (7)

Since issuers may have a preference for discretion over short- and long-term accruals (Guenther 1994), we distinguish between the current and long-term components of total accruals and evaluate them separately. Current accruals are defined as the change in non-cash current assets minus the change in operating current liabilities,

- *Current Accruals*

  CA ≡ Δ [Current Assets – Cash and Cash Equivalents]

  – Δ [Current Liabilities– Current Maturity of Long-term Debts] (8)

We understand that some accrual adjustments are appropriate and necessary given the business conditions typically faced by the firm in the industry. Without information on actual economic events and the timing of inflows and outflows, it is difficult for investors to infer the extent to which accruals are adjusted. In event studies, we use benchmarks to define abnormal returns. Likewise we need benchmarks here further to decompose accruals into two parts, one described by firm and industry conditions and the other presumed to be managed by issuers.

[8]For example, Jones (1991), Dechow et al. (1995), Subramanyam (1996), Teoh et al. (1998a) and (1998b), Rangan (1998), Hribar and Collins (2002), Kim and Park (2005).

We use the modified Jones cross-sectional model (Dechow et al. 1995) for this purpose[9]. "The cross-sectional approach automatically adjusts for the effects of fluctuating industry-wide economic conditions that influence accruals independent of any earnings management in each year." (Teoh et al. 1998b, p. 1940) Generally, current accruals (CA) are regressed on the change in sales in a cross-sectional regression using non-IPO benchmarks in the same industry *j* on a yearly basis. Non-IPO firms with at least two years of trading records in the market are used as benchmarks. All variables in the regression are scaled by the firm's total assets (TA) at the beginning of each fiscal year *t*.

$$\frac{CA_{j,t}}{TA_{j,t-1}} = \alpha_0\left(\frac{1}{TA_{j,t-1}}\right) + \alpha_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t} \tag{9}$$

The fitted current accruals of the issuers *i* in a given year *t* are calculated using the estimated coefficients from the regression and the change in sales net of the change in accounts receivable. The change in accounts receivable (ARec) is subtracted from the change in sales to allow for the possibility of sales manipulation. Fitted current accruals are considered to be the level necessary to support the firm's sales increase and are termed non-discretionary current accruals (NDCA).

$$NDCA_{i,t} \equiv \hat{\alpha}_0\left(\frac{1}{TA_{i,t-1}}\right) + \hat{\alpha}_1\left(\frac{\Delta Sales_{i,t} - \Delta A\mathrm{Re}c_{i,t}}{TA_{i,t-1}}\right) \tag{10}$$

The regression residual is presumed not to be dictated by firm and industry conditions but instead to have been managed. It is termed discretionary current accruals (DCA):

$$DCA_{i,t} \equiv \frac{CA_{i,t}}{TA_{i,t-1}} - NDCA_{i,t} \tag{11}$$

[9] We do not use other models such as Dechow and Dichev (2002) as the data before companies go public is not readily available.

To obtain discretionary and non-discretionary long-term accruals, we first estimate discretionary and non-discretionary total accruals. The discretionary total accrual (DAC) for firm *i* for year *t* is calculated in a manner similar to the current accrual (CA) except now the total accrual (AC) is used as the dependant variable and the regression includes gross property, plant, and equipment (PPE) as an additional explanatory variable.

$$\frac{AC_{j,t}}{TA_{j,t-1}} = \beta_0\left(\frac{1}{TA_{j,t-1}}\right) + \beta_1\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \beta_2\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t} \tag{12}$$

Non-discretionary total accruals (NDA) and discretionary total accruals (DA) calculated as:

$$NDA_{i,t} \equiv \hat{\beta}_0\left(\frac{1}{TA_{i,t-1}}\right) + \hat{\beta}_1\left(\frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{TA_{i,t-1}}\right) + \hat{\beta}_2\left(\frac{PPEi_{,t}}{TAi_{,t-1}}\right) \tag{13}$$

$$DA_{i,t} \equiv \frac{AC_{i,t}}{TA_{i,t-1}} - NDA_{i,t} \tag{14}$$

Non-discretionary long-term accruals (NDLA) are defined as the difference between non-discretionary total accruals (NDA) and non-discretionary current accruals (NDCA). Discretionary long-term accruals (DLA) are the difference between asset-scaled long-term accrual and non-discretionary long-term accruals (NDLA).

$$NDLA_{i,t} \equiv NDA_{i,t} - NDCA_{i,t} \tag{15}$$

$$DLA_{i,t} \equiv \frac{AC_{i,t} - CA_{i,t}}{TA_{i,t-1}} - NDLA_{i,t} \tag{16}$$

We emphasize in this study discretionary current accruals, DCA, as the key variables representing earnings management. Discretional total accruals (DA) are also examined as an alternative to DCA.

To illustrate the calculation of DA and DCA, consider JIELEE (stock ID 000996) which went public in July 2000, operating in the transportation Industry.

There were 24 non-IPO firms as benchmarks in this industry. Repeating the CA and AC computations for these firms, and estimating the Jones model yields the fitted equations (See equation (9) and (12) respectively):

$$\frac{CA_{j,t}}{TA_{j,t-1}} = -1289931.09\left(\frac{1}{TA_{j,t-1}}\right) + 0.062883\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t}$$

$$\frac{AC_{j,t}}{TA_{j,t-1}} = -21922520.14\left(\frac{1}{TA_{j,t-1}}\right) + 0.019605\left(\frac{\Delta Sales_{j,t}}{TA_{j,t-1}}\right) + 0.027634\left(\frac{PPE_{j,t}}{TA_{j,t-1}}\right) + \varepsilon_{j,t}$$

Equation (10) and (13) gives JIELEE's non-discretionary accruals as:

$$NDCA_{i,t} = \left(\frac{-1289931.09}{198535818.83}\right) + 0.062883\left(\frac{564358.45 - 34197722.90}{198535818.83}\right) = -0.017$$

$$NDA_{i,t} = \left(\frac{-21922520.14}{198535818.83}\right) + 0.019605\left(\frac{564358.45 - 34197722.90}{198535818.83}\right) + 0.027634\left(\frac{118945293.30}{198535818.83}\right) = -0.097$$

Equations (11), (14), (15) and (16) give the other variables as:

$$DA_{i,t} = \frac{62603851.85}{198535818.83} - (-0.097) = 0.412$$

$$DCA_{i,t} = \frac{177413343.53}{198535818.83} - (-0.017) = 0.911$$

$$NDLA_{i,t} = (-0.097) - (-0.017) = -0.080$$

$$DLA_{i,t} = \frac{62603851.85 - 177413343.53}{198535818.83} - (-0.080) = -0.498$$

### 2.3 Control Variables and Model Specifications

To reduce the possible model misspecification problem due to missing variables, we control for other determinants of underpricing and long-term stock performance of IPOs, respectively.

### 2.3.1 Models for Underpricing

Since few established theories show explanatory power in rationalizing severe underpricing of IPOs in China, we mainly focus on existent empirical studies and seek to find relevant determinants of underpricing. Previous studies report underpricing is related to the time lag between offering and listing, among them, Mok and Hui (1998), Su and Fleisher (1999), and Chan et al. (2004), to name but a few. The long time elapsed before the realization of initial returns is one of the most salient features of China's stock markets. Issuers of IPOs normally spend months waiting for approval from the CSRC. Due to the value of time, the longer the gap, the more compensation is required and thus the more underpricing observed in the aftermarket. However recent studies, for example Coakley et al. (2007a), further examine this issue and find that this relation is driven by IPOs issued in the early 1990s with exceptionally severe underpricing and much longer time lags between offering and listing. When pooling with IPOs issued in the late 1990s with more moderate underpricing and shorter time periods, the positive relation appears to indicate that the time lag is one determinant of underpricing. However, closer inspection of the results reveals that the relation does not hold when the sample is restricted to either particular years, or regulatory regimes, or simply excludes those issued in early years.

Prior studies also document that underpricing is related to the issuing size or funds raised (Su and Fleisher 1999, Chan et al. 2004, Chi and Padgett 2005). This relation could be explained by valuation uncertainty and information asymmetry (Rock 1986, Ritter and Welch 2002). When the issuing size increases, it becomes more difficult to value the firm. Investors should receive more compensation in the form of underpricing. Another determinant in the literature is the rate of allocation in oversubscribed IPOs (Chi and Padgett 2005, Coakley et al. 2007b). Underpricing of

IPOs reported in these two studies is negatively related to the rate of allocation due to adverse selection but this relation may be sample-specific again.

We also consider the market return in the period between offering and listing as a determinant of IPO underpricing. As Chan et al. (2004) document, IPO underpricing of Chinese IPOs is positively related to the return on the general market index.

To test our underpricing hypotheses, we first examine whether those variables are determinants of underpricing in the context of our sample and then combine control variables with accrual variables in the following two models.

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN \quad (17)$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN \quad (18)$$

where *IR* is initial returns, defined as the percentage difference between the offer price and the closing price on the first day of trading; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *IMKTRTN* is the return on general market index during the period between offering and listing.

### 2.3.2 Models for the Long-term Stock Performance

The seminal study of the US market by Teoh et al. (1998b) reports that the accruals variables in the regression model exhibit satisfactory explanatory power for post-issue long-term performance with the following control variables: MKTRNT, a contemporaneous three year buy-and hold market return from the exchange that listed the IPO; PROCEEDS, the natural logarithm of the issuing size in monetary units; ΔCapExp, the asset scaled change in capital expenditure; ΔNetIncome, the asset scaled change in net income; IR, the underpricing variable. Chan et al. (2004) study the stock performance of Chinese IPOs for the subsequent three years and find that the changes in several operating performance proxies around the offerings could be used to explain the long-term performance of IPOs. These operating performance variables include ΔROA, the change in operating profits on assets, ΔCFOA, the change in operating cash flows on assets, ΔSalesG, the change in sales growth, and ΔCapExp, the change in capital expenditure, ΔATO, is the change in asset turnover. All variable are scaled by the total assets at the beginning of year. We consider these potential variables for inclusion in our regression model in addition to accrual variables.

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR \quad (19)$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR \quad (20)$$

where *BHR* is the three-year post-issue buy-and-hold return calculated starting four months after the first fiscal year-end.

# 3. Empirical Results

## 3.1 Sample and Benchmark Selection

Data on annual reports and trading come from the Centre for Chinese Economic Research (CCER) database and the China Stock Market Accounting Research (CSMAR) database. The starting point of our sample is dictated by accounting standards and in particular by the *Accounting Standard for Business Enterprises: Cash Flow Statements* that became operative from January 1998. Since it is only feasible to calculate accruals using cash flow statements in the first post-IPO year, we use a sample of 506 IPOs issued 1998 to 2003 and listed within the next three years on the Shanghai Stock Exchange (SHSE) or Shenzhen Stock Exchange (SZSE). Companies that operated in the banking industry are excluded from our sample as their financial statements are presented in a different format.

We also gather financial information on 4351 non-IPO benchmark firms that match our sample IPOs firms over the same period to identify the discretionary components in accruals. These benchmark firms are required to have at least two years of history in the market. Following convention, we exclude abnormal non-issuing benchmarks with total accruals or current accruals greater than total assets at the beginning of year in absolute terms.

## 3.2 Descriptive Statistics

Table 1 provides descriptive statistics for the 506 IPO firms in our sample.

[Table 1 around here]

The distribution of the sample is reported in Panel A by year and in Panel B by industry. During the 1998-2003 period, our 506 sample IPOs exhibited average (median) underpricing of some 129% (116%). Both the IPO activity and underpricing peak in the year of 2000. It is not surprising that manufacturing industry dominates the others with 346 IPO firms that account for more than two thirds of the sample. IPO firms from two industries appear to be most underpriced: those in the real estate and the service industries. Panel C, with more industry specifications, further describes underpricing across industries in greater detail. This information is used to find matching benchmarks and to calculate the discretionary and non-discretionary components of accruals in our study.[10]

Table 2 reports the average market index-adjusted returns ( $AR_t$ ) and cumulative average returns ( $CAR_{1,t}$ ) for the 36 event months after going public for the 506 IPOs in 1998-2003.

[Table 2 around here]

Twenty-one of the 36 monthly-adjusted returns are negative, among which 11 are in the final 12 months. After ups and downs for the first 24 months, the cumulative average abnormal returns become poorer and poorer. By contrast, the decline in unadjusted cumulative returns appears to be more dramatic. Twenty-three are positive in the first 24 months and all but one are negative in the final 12 months, with 23 of them having *t*-statistics significant mainly at the level of 5% or better. By the end of month 36 excluding the initial returns, the cumulative average returns are -7.08% (t = -3.12) and -12.04% (t = -3.96) with market index adjustment and no adjustment respectively. The underperformance of IPOs is significant in both statistical and economical terms.

[10] We check the industry specifications of the firms year by year in case firms change their core business from one industry to another after the IPO.

Figure 1 illustrates this point in another way, with market-index adjusted CARs and the unadjusted CARs plotted over the 36 event months.

[Figure 1 around here]

Until the event month 19 in which the cumulative average abnormal returns peak at 0.88%, CARs with market index adjustment are small and move around zero and none is significant. But it is followed thereafter by a steady decline during the remaining months. The series of CARs with no adjustment follow a similar pattern but declines more dramatically from a peak of 4.30% in the event month 16 to a bottom of -12.03% in the event month 36. The underperformance is statistically significant.

Instead of using event months, Figure 2 depicts the movements of the two series over the 36 calendar months starting from four months after the first financial year-end.

[Figure 2 around here]

Both series in Figure 2 confirm underperformance of IPOs, with the market-adjusted CARs fluctuating more steadily than the unadjusted over the period. After 26 calendar months, both CARs are significantly negative. Table 3 presents benchmark descriptions on 4351 non-IPO firms with sufficient data to calculate components of accruals in the 1998-2003 period.

[Table 3 around here]

The distribution of non-issuing firms across industries follows the same broad pattern as the IPOs. There are more benchmarks in some industries such as manufacturing but fewer in others such as agriculture, construction, and services.

Table 4 presents summary statistics on selected variables for the 506 IPOs. Panel A and B provide descriptive statistics on accrual variables and control variables included in the models for underpricing and long-term performance respectively.

[Table 4 around here]

Inspection of accrual variables reveals that the average discretionary total accruals and the average discretionary current accruals are both significantly positive at the 1% level whilst the average discretionary long term accruals is negative at the 1% level. For total accruals in a given financial year, while the discretionary accrual (DA) is as small as 6.44% of total assets at the beginning of the year, the discretionary current accrual (DCA) is as large as 14.65% and the discretionary long-term accrual (DLA) accounts for 8.21%. These positive coefficients are consistent with evidence in the literature that issuers use income-increasing accruals to manage accruals. The negative coefficient on long term accruals indicates that the IPO firms shift earnings from the future to the present. Thus earnings manipulation around the IPO is short-term oriented at the expense of long-term gains.

Panel C of Table 4 reports the changes over three subsequent years in the discretionary components including DA, DCA and DLA, and the operating performance including NetIncome, ROA, CFOA, SalesG, CapExp, and ATO. DA continues to drop after the IPO year but it remains positive and significant. In comparison, the signs of DCA and DLA change quite soon after the first fiscal year ends. Although DCA is positive on average in the first financial report, it becomes significantly negative in the second and third statements; by contrast, DLA is negative on average in the first report but it turns positive in the second and third years. When compared to the operating performance over three years, SalesG does not vary a lot.

The steady decline in NetIncome, ROA, and ATO except for the increase in CapExp appears to coincide with the change in DA.

### 3.3 Univariate Analysis

Table 5 examines the relation between underpricing and earnings management by sorting selected variables into quintiles based on the magnitude of underpricing in Panel A, discretionary accruals in Panel B, and discretionary current accruals in Panel C.

[Table 5 around here]

Panel A presents the mean values for each quintile based on the magnitude of underpricing. The discretionary accruals (DA) for the most aggressive earnings management firms are associated with the highest quintile of underpricing. The mean DA and DCA in the lowest underpricing quintile are 0.0480 and 0.1289, compared to 0.0890 and 0.1793 in the highest quintile respectively. Panel B and C, based on the magnitude of discretionary accruals and discretionary current accruals respectively, share similarities in that the magnitude of underpricing increases in discretionary components. The mean underpricing in the most conservative quintiles is 122.85% and 120.13% in both panels, whereas the corresponding underpricing in the most aggressive quintiles is 139.50% and 140.24% respectively, a substantial difference of some 17-20 percent. Issuers with more aggressive use of accruals seem to experience a greater magnitude of underpricing.

Table 6 examines the relation between the long-term stock performance and earnings management by sorting three-year buy-and-hold returns into quintiles based on their magnitude.

[Table 6 around here]

Panel A presents the mean values for each quintile based on the three-year BHRs. The discretionary components of accruals, DA, DCA or DLA, are not monotonically related to stock performance over three years. However, the performance appears to be positively correlated with the contemporaneous three-year buy-and-hold market returns (MKTRTN) and the change in net income (ΔNetIncome), and negatively correlated with initial underpricing (IR). Panels B and C, based on the magnitude of discretionary accruals and discretionary current accruals, respectively, provide some insight into the relationship between BHR, DA, DCA and DLA. The mean BHR in the most conservative quintiles is -7.79% and -18.18%, whereas the corresponding BHR in the most aggressive quintiles is -10.34% and -22.14%, respectively. Although such a small difference between two extremes of 3-4% is not economically significant, we notice that the best BHR in Panel B is from the quintile with the smallest DA, DCA and DLA while the worst BHR in Panel C come from the quintile with the largest DA and DCA and the smallest DLA.

## 3.4 Multiple Regression Analysis

### 3.4.1. Underpricing

Our hypothesis and analysis of China's stock markets predict that, due to incorrect beliefs about discretionary accruals, irrational investors overprice the new issue to a greater extent than discretionary accruals drive up the offer price, which implies that IPO underpricing should be positively related to the discretionary components of accruals. We examine this hypothesis controlling for other determinants of underpricing.

Table 7 presents the results of regressing IPO underpricing on proxies for earnings management and control variables. The *t*-values are calculated using White's (1980) robust standard errors.

[Table 7 around here]

In Model 0, the non-accrual determinants of IPO underpricing are examined. Only the coefficients on PROCEEDS and IMKTRTN are statistically significant for both sample groups. We incorporate these two variables in the two models testing for the presence of earnings management.

In Model 1 with discretionary total accruals (DA) as a proxy for earnings management, we find a significantly positive relationship between DA and IPO underpricing. In Model 2 after distinguishing the current and long term components in DA and non-discretionary total accruals (NDA), there is a significantly positive relationship between both discretionary current accruals (DCA) and discretionary long-term accruals (DLA) and underpricing. This positive relationship between discretionary components in accruals and underpricing is consistent with the prediction that investors subject to cognitive bias extrapolate the growth trend in earnings without interpreting discretionary accruals correctly, leading to initial overpricing of the new issue. This relation obtains not only in the sample of 506 with the 13 basic industry classifications but also when we use 91 detailed industry specifications. Although the sample size reduces to 337 due to lack of non-IPO benchmarks in some sectors, the relation between the discretionary components of accruals and IPO underpricing stays positive.

The hypothesis examined here is based upon the assumption of less than fully rational investors and opportunistic issuers, but it does not rule out other possibilities such as rational investors who constitute part of the market participants. Since this

positive relation is a result net of all possibilities. The existence of any other possibility which predicts a non-positive relation will enforce our main hypothesis. Here we provide two such kind of possibilities.

Investors could roughly be classified as either rational or less than fully rational. With the rationality assumption on the investors, the initial trading prices cannot be influenced by the use of earnings management as all investors have correct beliefs about the accruals and the market prices thus adjust for potential manipulation of reported earnings. The implication with rational investors is that there should be a negative rather than positive relationship between discretionary accruals and IPO underpricing.

In addition to the representativeness heuristic, being less than fully rational also includes a certain type of sentiment, which we refer to as "errors around the mean". This is well described in the literature, for example in Stein (1996, p. 431), as "systematic errors in forming expectations so that stocks can become significantly over- or undervalued at particular points in time." Loughran and Ritter (1995) argue that firms take advantage of "windows of opportunity" by issuing stock when equities are substantially overvalued. Baker and Wurgler (2002) propose that managers tend to exploit temporary fluctuations in investor sentiment, issuing equity when market valuations are high and repurchasing shares otherwise. Successful market timing attempts enable issuers to sell their IPOs at higher prices, closing up the gap between the offer price and the market price. So the implication with the timing issuers and the investors subject to this type of sentiment is that there should be a negative relationship between discretionary accruals and IPO underpricing.

We know there may be other possibilities that the relationship could be potentially influenced at the other direction. But just as we discuss, none implies a

positive relationship as our main hypothesis does. The positive relation between discretionary accruals and underpricing would be even more significant if we could separate this extrapolation effect from others.

### 3.2.2. Long-Term Performance

Given that underpricing is so huge due to incorrect beliefs about discretionary accruals in the short run, it is interesting to see if this initial mistake corrects itself over the long term. Following the previous discussion, our hypothesis predicts that the issuing companies that manage their earnings aggressively tend to experience inferior long-run stock performance. The implication here is that the three-year buy-and-hold return (BHR) should be negatively related to the discretionary component of accruals controlling for other determinants of stock performance.

Table 8 presents the regression results of long-term performance on proxies for earnings management and control variables. The *t*-values are calculated using White's (1980) robust standard errors.

[Table 8 around here]

In the first model with discretionary total accruals (DA) as a proxy for earnings management, we find a significantly negative relation between DA and BHR. Model 4 further distinguishes between the current and long term components of DA and non-discretionary total accruals (NDA), and we find a significantly negative relationship between discretionary current accruals (DCA) and BHR. These findings are consistent with other studies such as Subramanyam (1996) and Xie (2001) that the market generally overprices the discretionary accruals and the discretionary components of accruals are good predictors of the long-term performance. In addition, the coefficient on discretionary long-term accrual (DLA) is also significantly negative at the 1%

level. Since discretionary accruals are employed to boost short-term reported earnings, it is unsurprising that they exacerbate long-term underperformance.

Another finding that deserves mention is the negative relation between BHR and IR. This evidence seems to suggest that the initial overreaction due to incorrect beliefs about discretionary accruals tend to correct itself in the long run. From the investors' point of view, the larger the initial overpricing, the larger the subsequent correction.

## 4. Robustness Checks

The tests in this subsection focus on four aspects that could potentially affect the validity of our findings: the choice of benchmarks, the choice of accrual models, the choice of proxies for earnings management, and the choice of robust standard errors when calculating *t*-values.

### 4.1 The Fama-French Industry Classification

The industry classification used in this study follows the official Chinese industry definition. Industries are sorted into thirteen categories, comprising of agriculture, real estate, manufacturing, mining, transportation, construction, information technology, trade, finance, services, media, and conglomerate. Based upon the Fama-French 12-industry classification, we reallocate the non-IPO benchmarks into appropriate groups and then estimate the accruals to see if the results are affected by this alternative industry classification.

[Table 9 around here]

Table 9 shows the two different industry grouping in Panel A and B and allocates the Chinese industries to the Fama-French industry codes in Panel C. Based upon this converted industry classifications, Table 10 and Table 11 present the summary results

on this robustness checks for the underpricing and long-term performance models respectively. The *t*-values are calculated using White's (1980) robust standard errors.

[Table 10 around here]

[Table 11 around here]

The relationship between underpricing and the discretionary total and current accruals remains significantly positive at the 5% level. Controlling for a set of variables, the negative relationship between three-year BHRs and the discretionary components of accruals remain significant at the 5% level as well. Our results clearly indicate that shifting earnings from the future to the present undermines the stock performance over the subsequent years. Not only DA but also DCA and DLA are good predictors for long-term stock performance. The choice of non-IPO benchmarks does not matter!

### 4.2 Jones (1991) Model

We rely on the modified Jones model (Dechow et al. 1995) to identify accruals in our analysis. Here we use the original Jones (1991) model to see if the results are robust to this alternative model specification. The difference between the original and modified Jones model lies on the estimation of the non-discretionary component. The latter subtracts the changes in accounts receivable (ARec) from the changes in sales while the former does not. Advocates contend that this modification is to accommodate sales manipulation in many scenarios, for example, when credit policies are relaxed to achieve high sales prior to the offering. Table 12 and Table 13 present regression results for the underpricing and long-term performance models respectively using the original Jones model (1991). The *t*-values are calculated using White's (1980) robust standard errors.

[Table 12 around here]

[Table 13 around here]

The positive relation between underpricing and the discretionary accrual components remains significant at the 5% level. The negative relation between three-year BHRs and discretionary accrual components becomes even more significant, at the 1% level. Our results are robust to the choice of accrual model.

### 4.3 Operating Income

The total accruals in both the original and modified Jones models are calculated as the difference between reported earnings (net income) and cash flow from operations. We note that not all earnings reported in financial statements come from operations and those non-operating profits are not likely to pertain as regularly as the operating ones. For example, debt restructuring and disposal of fixed assets, whether a gain or loss, are either infrequent in occurrence or unusual in nature.

In the empirical literature, some use as a precaution earnings before discontinued operations and extraordinary items (Subramanyam (1996), Ducharme et al. (2001) and Kim and Park (2005)), yet some others choose earnings (Rangan (1998), Teoh et al. (1998a) and Teoh et al. (1998b)). Because the former is not readily available in China as an annual item in financial statements, here we consider operating income instead of earnings to estimate total accruals. Operating income is similar in content to earnings before discontinued operations and extraordinary items. It is the operating revenues in excess of cost of goods sold and the general expenses in sales and administration, but does not contain any gain or loss from discontinued operations and extraordinary items. This gives the AC* as:

$$AC^* \equiv \text{Operating Income} - \text{Cash Flow from Operations} \quad (19)$$

Other things being equal, including the estimating process of discretionary components, the industry classification, and the modified Jones model, we examine whether the results are robust to alternative definition of total accruals. Table 14 and Table 15 present regression results when using operating income to calculate total accruals for the underpricing and long-term performance models respectively.

[Table 14 around here]

[Table 15 around here]

As to the positive relations between the discretionary accrual components and underpricing, the influence caused by replacing net income with operating income is far from substantial. The relationship between three-year BHRs and the discretionary accrual components stays significantly negative at the 5% and 1% level for the DA and DCA-DLA model respectively. The consistent relation further confirms our findings. Due to the incorrect beliefs, prices following the IPO initially overreact to discretionary accruals, resulting in underpricing in the short-run. Over a longer horizon this overpricing is corrected and stock prices reverse as the expectation on earnings fails to materialize, leading to the long-term underperformance. The positive short-run relation and negative long-term relation are unaffected and robust to alternative accrual specifications.

### 4.4 Newey-West HAC Standard Errors

The *t*-values are calculated using White's (1980) robust standard errors throughout the paper. In addition to heteroskedasticity, the results might be affected with the presence of serial correlation. We examine this issue using Newey-West (Newey and West 1987) HAC standard errors, which adjust for both problems.

[Table 16 around here]

[Table 17 around here]

Table 16 and 17 present the result for the underpricing and underperformance models respectively. It follows that our findings are not affected as the positive relation between discretionary accruals and IPO underpricing, and the negative relation between discretionary accruals and long term stock performance hold significant.

## 5. Conclusions

We examine the underpricing and underperformance of IPOs issued in China during the 1998-2003 period. Consistent with previous evidence that the initial price run-up appears to be undone in the long term, the first-day return is as high as 129.23% on average while the cumulative abnormal return in the subsequent three years is just as low as -7.08%. Relating to accounting accruals, we empirically test the hypothesis that incorrect beliefs about discretionary accruals lead sentiment investors to extrapolate past performance into the future and overvalue the new issue in the aftermarket initially, giving rise to seemingly underpricing from the issuer perspective despite this overreaction is corrected over longer horizons, which is the long-run underperformance.

We estimate the managed accrual components using the modified Jones model. We separate non-discretionary from discretionary total accruals and then decompose them into short and long term parts. We use non-IPO year-industry benchmarks to generate the fitted coefficients in the model to estimate the non-discretionary components of the sample IPO accruals. We find evidence of significantly positive discretionary accruals consistent with prior studies. Controlling for other determinants of underpricing, we find a positive relation between underpricing and these discretionary accruals, a source of sentiment for investors to extrapolate and to be

exuberant about, consistent with our hypothesis that investors' incorrect beliefs about the fundamental value lead to initial overpricing in the aftermarket, and thereby underpricing of IPOs from the issuers perspective. Controlling for other determinants of the long-term performance, we find a negative relationship between discretionary accruals, underpricing and three-year BHRs consistent with our hypothesis that the overpricing of discretionary accruals tend to correct itself in the long term.

These findings are quite robust to the choice of benchmark, accrual model, proxies for earnings management, and robust standard errors. We use the Fama-French 12-industry classification as an alternative to the official Chinese classification including 13 industries. We use the original Jones (1991) model to estimate accrual components. We use operating income in place of net income to calculate accruals. We also use Newey-West HAC standard errors (1987) to calculate t-values as alternative to White's (1980). The results of these robustness checks show that the short term and the long term relations are not affected at all.

Our findings provide strong evidence of overreaction in the IPO market indicating that incorrect beliefs about discretionary accruals are to blame for the anomalous initial positive returns and the regular correction in the subsequent three years. The first-day positive return in China is not only issuer-oriented but equally likely investor-oriented. Due to some distinctive features in the Chinese market, the influence on the offer price from the issuer and the underwriters is rather limited while its counterpart on the initial trading price from the sentiment investors is not. Our study not only complements the literature on accruals that examines earnings management around IPOs but also sheds new light on anomalies in Chinese IPOs.

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**Table 1: Sample Characteristics**

The sample consists of 506 domestic IPO firms, going public in the period from 1998-2003. The sample is reported in Panel A by year, in Panel B by industry and in Panel C by sector.

Panel A: Time Distribution

| Year | Freq. | Underpricing | Min | Median | Max | St. Dev. |
|---|---|---|---|---|---|---|
| 1998 | 78 | 131.83% | 2.08% | 119.83% | 429.48% | 83.13% |
| 1999 | 88 | 119.14% | 7.14% | 103.81% | 830.21% | 110.10% |
| 2000 | 135 | 151.97% | 0.28% | 141.35% | 476.77% | 86.60% |
| 2001 | 76 | 138.08% | 0.74% | 126.75% | 413.79% | 88.35% |
| 2002 | 68 | 133.54% | 27.77% | 116.96% | 428.25% | 80.92% |
| 2003 | 61 | 74.32% | -31.45% | 71.86% | 227.99% | 44.66% |
| Total | 506 | 129.23% | -31.45% | 116.31% | 830.21% | 89.07% |

Panel B: Industry Distribution

| Codes | Freq. | Underpricing | Min | Median | Max | Std. Dev. | Specifications |
|---|---|---|---|---|---|---|---|
| A | 9 | 73.23% | 3.23% | 71.03% | 125.87% | 47.86% | Mining |
| B | 5 | 154.11% | 95.68% | 176.87% | 185.56% | 38.58% | Real Estate |
| C | 346 | 126.57% | 0.28% | 112.21% | 468.27% | 83.19% | Manufacturing |
| D | 18 | 149.83% | 41.82% | 149.89% | 344.70% | 72.65% | Agriculture |
| E | 22 | 121.20% | 34.61% | 119.75% | 198.10% | 52.28% | Utilities |
| F | 11 | 88.50% | 21.31% | 86.30% | 176.45% | 52.79% | Construction |
| G | 32 | 81.74% | -31.45% | 73.58% | 246.44% | 55.87% | Transportation |
| H | 24 | 171.20% | 16.43% | 143.56% | 476.77% | 115.37% | Information Technology |
| I | 19 | 174.42% | 41.38% | 173.28% | 404.17% | 77.22% | Wholesales and Retails |
| J | 0 | | | | | | Finance |
| K | 11 | 178.30% | 7.14% | 171.45% | 452.77% | 122.62% | Services |
| L | 0 | | | | | | Media |
| M | 9 | 200.98% | 44.29% | 124.18% | 830.21% | 231.88% | Conglomerate |
| Total | 506 | 129.23% | -31.45% | 116.31% | 830.21% | 89.07% | |

Panel C: Sector Distribution

| Codes | Freq. | Underpricing | Min | Median | Max | Std. Dev. | Industry details |
|---|---|---|---|---|---|---|---|
| A01 | 5 | 70.36% | 10.73% | 71.03% | 125.87% | 46.64% | Coal Extraction |
| A03 | 2 | 32.70% | 3.32% | 32.70% | 62.08% | 41.55% | Oil and Gas Ext. |
| A07 | 2 | 120.92% | 117.78% | 120.92% | 124.06% | 4.44% | Non-ferrous Metal |
| B01 | 5 | 154.11% | 95.68% | 176.87% | 185.56% | 38.58% | Real Estate |
| C01 | 16 | 137.90% | 32.20% | 127.58% | 358.21% | 77.01% | Food Processing |
| C03 | 5 | 123.38% | 45.79% | 124.23% | 180.77% | 52.86% | Food Making |
| C05 | 11 | 117.94% | 13.25% | 99.74% | 262.69% | 75.44% | Drinks |
| C11 | 18 | 104.61% | 0.28% | 100.81% | 215.55% | 64.55% | Textiles |
| C13 | 9 | 98.63% | 26.83% | 72.94% | 293.13% | 84.21% | Apparel |
| C14 | 1 | 47.98% | 47.98% | 47.98% | 47.98% | – | Leather |
| C25 | 1 | 136.82% | 136.82% | 136.82% | 136.82% | – | Furniture |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C31 | 12 | 145.49% | 6.97% | 114.60% | 413.79% | 120.79% | Paper products |
| C35 | 1 | 319.39% | 319.39% | 319.39% | 319.39% | – | Printing |
| C41 | 6 | 89.44% | -5.00% | 70.36% | 216.35% | 78.55% | Petrol products |
| C43 | 38 | 116.66% | 12.88% | 109.72% | 323.86% | 63.34% | Chemicals |
| C47 | 5 | 120.62% | 29.87% | 70.65% | 255.68% | 96.58% | Chemical Fibre |
| C48 | 4 | 114.73% | 52.38% | 147.58% | 263.29% | 59.62% | Rubber products |
| C49 | 6 | 123.46% | 52.38% | 140.22% | 154.14% | 40.07% | Plastics |
| C51 | 13 | 157.92% | 35.54% | 117.05% | 428.25% | 110.32% | Electronic comp. |
| C57 | 1 | 310.23% | 310.23% | 310.23% | 310.23% | – | Other Electronic |
| C61 | 24 | 100.45% | 7.32% | 101.84% | 237.98% | 51.38% | Non-metals |
| C65 | 15 | 26.60% | 0.74% | 23.55% | 70.56% | 20.73% | Ferrous metals |
| C67 | 15 | 129.90% | 20.74% | 101.50% | 468.27% | 114.02% | Non-fer metals |
| C69 | 6 | 164.25% | 58.91% | 131.87% | 311.57% | 90.31% | Metal products |
| C71 | 13 | 146.99% | 30.40% | 121.83% | 340.15% | 106.20% | Gen. Machinery |
| C73 | 24 | 139.15% | 36.56% | 133.85% | 405.21% | 81.96% | Spec. Machinery |
| C75 | 29 | 91.35% | 13.57% | 85.37% | 177.78% | 51.10% | Cars and Trucks |
| C76 | 18 | 132.63% | 32.77% | 100.75% | 363.34% | 89.80% | Elect. Equip. |
| C78 | 5 | 123.20% | 46.41% | 102.00% | 305.07% | 104.65% | Apparatus |
| C81 | 32 | 161.33% | 50.00% | 146.02% | 343.84% | 73.55% | Drugs |
| C85 | 5 | 143.99% | 86.90% | 135.53% | 228.89% | 60.79% | Biochemicals |
| C99 | 13 | 170.56% | 41.86% | 141.00% | 429.48% | 102.62% | Misc Manuf. |
| D01 | 12 | 160.03% | 64.52% | 161.44% | 264.20% | 58.08% | Agriculture |
| D03 | 2 | 204.21% | 197.40% | 204.21% | 211.02% | 9.63% | Forestry |
| D07 | 4 | 158.82% | 87.13% | 161.76% | 224.62% | 56.66% | Fishery |
| E01 | 19 | 115.36% | 34.61% | 107.89% | 344.70% | 73.82% | Electricity |
| E03 | 1 | 198.10% | 198.10% | 198.10% | 198.10% | – | Gas |
| E05 | 2 | 142.77% | 100.83% | 142.77% | 184.71% | 59.31% | Water |
| F01 | 10 | 134.93% | 43.72% | 142.62% | 189.83% | 47.16% | Buildings |
| F05 | 1 | 158.38% | 158.38% | 158.38% | 158.38% | – | Decoration |
| G01 | 1 | 32.02% | 32.02% | 32.02% | 32.02% | – | Railway |
| G03 | 2 | 131.38% | 86.30% | 131.38% | 176.45% | 63.75% | Highway |
| G07 | 3 | 82.37% | 33.90% | 105.81% | 107.40% | 41.99% | Water |
| G09 | 5 | 102.89% | 21.31% | 76.63% | 241.23% | 87.61% | Airline |
| G11 | 21 | 80.04% | 26.58% | 66.94% | 246.44% | 51.53% | Transp. Services |
| H81 | 11 | 75.45% | -31.45% | 82.24% | 136.29% | 45.49% | Communications |
| H83 | 2 | 245.08% | 214.52% | 245.08% | 275.64% | 43.22% | Comp. Products |
| H87 | 11 | 175.91% | 16.43% | 121.91% | 476.77% | 152.77% | IT Application |
| I01 | 4 | 210.35% | 94.96% | 224.82% | 296.79% | 86.25% | Non durables |
| I03 | 1 | 86.81% | 86.81% | 86.81% | 86.81% | – | Energy Material |
| I11 | 6 | 141.46% | 50.24% | 155.42% | 229.59% | 64.88% | Other Wholesales |
| I21 | 8 | 154.18% | 91.38% | 164.41% | 209.06% | 45.73% | Agency Business |
| K01 | 3 | 149.25% | 118.99% | 144.43% | 184.35% | 32.95% | Public Services |
| K32 | 2 | 233.42% | 221.94% | 233.42% | 244.90% | 16.24% | Hotels |
| K34 | 3 | 238.21% | 111.58% | 198.88% | 404.17% | 150.21% | Travels & Tours |
| K39 | 1 | 180.30% | 180.30% | 180.30% | 180.30% | – | Lease |
| K99 | 2 | 247.07% | 41.38% | 247.07% | 452.77% | 290.90% | Other Services |
| M00 | 9 | 175.79% | 7.14% | 154.82% | 830.21% | 174.63% | Conglomerate |
| Total | 506 | 129.23% | -31.45% | 116.31% | 830.21% | 89.07% | |

**Table 2: Cumulative Abnormal Returns for IPOs in 1998-2003**

| Month | Number | $AR_t$ (%) | *t*-stat | $CAR_{1,t}$ (%) | *t*-stat | $CAR_{1,t}$ (%) no adj. | *t*-stat |
|---|---|---|---|---|---|---|---|
| 1 | 506 | -0.9786 | **-2.27** | -0.9768 | **-2.79** | -0.4970 | -1.06 |
| 2 | 506 | 0.7437 | **1.86** | -0.2331 | -0.47 | 0.9536 | 1.44 |
| 3 | 506 | 0.2577 | 0.66 | 0.0246 | 0.04 | 1.7058 | **2.10** |
| 4 | 506 | 0.3726 | 1.07 | 0.3972 | 0.57 | 2.6412 | **2.81** |
| 5 | 506 | 0.2998 | 0.79 | 0.6970 | 0.89 | 3.3728 | **3.21** |
| 6 | 505 | 0.0877 | 0.25 | 0.7847 | 0.91 | 4.0678 | **3.53** |
| 7 | 505 | -0.3886 | -1.27 | 0.3961 | 0.43 | 3.2152 | **2.58** |
| 8 | 505 | -0.8894 | -2.58 | -0.4933 | -0.50 | 2.4991 | **1.88** |
| 9 | 505 | -0.4770 | -1.50 | -0.9703 | -0.92 | 2.3634 | 1.67 |
| 10 | 505 | 0.1775 | 0.54 | -0.7928 | -0.71 | 2.6063 | 1.75 |
| 11 | 505 | 0.3943 | 1.13 | -0.3985 | -0.34 | 3.0478 | **1.95** |
| 12 | 505 | 0.0865 | 0.22 | -0.3120 | -0.26 | 3.1781 | **1.95** |
| 13 | 505 | 0.0321 | 0.09 | -0.2799 | -0.22 | 3.5660 | **2.10** |
| 14 | 505 | 0.7970 | **2.18** | 0.5172 | 0.39 | 4.2287 | **2.40** |
| 15 | 505 | 0.0320 | 0.10 | 0.5492 | 0.40 | 4.1672 | **2.29** |
| 16 | 505 | -0.3005 | -0.87 | 0.2487 | 0.18 | 4.2984 | **2.28** |
| 17 | 505 | -0.0348 | -0.10 | 0.2139 | 0.15 | 4.2133 | **2.17** |
| 18 | 505 | 0.5621 | 1.71 | 0.7760 | 0.52 | 4.1762 | **2.09** |
| 19 | 505 | 0.1086 | 0.27 | 0.8847 | 0.58 | 3.9841 | **1.94** |
| 20 | 505 | -0.6813 | **-2.08** | 0.2034 | 0.13 | 3.2462 | 1.54 |
| 21 | 505 | -0.2656 | -0.75 | -0.0622 | -0.04 | 2.3161 | 1.07 |
| 22 | 505 | 0.1231 | 0.36 | 0.0608 | 0.04 | 2.0583 | 0.93 |
| 23 | 505 | -0.2256 | -0.70 | -0.1647 | -0.10 | 2.1503 | 0.95 |
| 24 | 502 | -0.1815 | -0.55 | -0.3462 | -0.20 | 1.8800 | 0.81 |
| 25 | 496 | -0.2818 | -0.89 | -0.6280 | -0.35 | 0.8908 | 0.38 |
| 26 | 492 | -0.4756 | -1.33 | -1.1036 | -0.61 | -0.5956 | -0.24 |
| 27 | 483 | -0.6179 | -1.75 | -1.7215 | -0.92 | -2.3592 | -0.94 |
| 28 | 474 | -0.1915 | -0.58 | -1.9130 | -1.00 | -3.3945 | -1.32 |
| 29 | 467 | -0.5593 | -1.61 | -2.4723 | -1.26 | -4.3898 | -1.67 |
| 30 | 461 | -1.1776 | **-3.48** | -3.6499 | **-1.81** | -6.4109 | **-2.38** |
| 31 | 459 | -1.1054 | **-3.40** | -4.7553 | **-2.32** | -8.0975 | **-2.95** |
| 32 | 452 | -1.3594 | **-3.34** | -6.1147 | **-2.91** | -10.0726 | **-3.58** |
| 33 | 446 | -0.1855 | -0.47 | -6.3002 | **-2.94** | -10.2677 | **-3.57** |
| 34 | 444 | -0.2916 | -0.85 | -6.5918 | **-3.02** | -10.8126 | **-3.69** |
| 35 | 441 | -0.4948 | -1.25 | -7.0866 | **-3.19** | -11.3670 | **-3.81** |
| 36 | 435 | 0.0113 | 0.03 | -7.0753 | **-3.12** | -12.0356 | **-3.96** |

Average market index-adjusted returns ( $AR_t$ ) and cumulative average returns ( $CAR_{1,t}$ ) in percentage, with associated t-statistics for the 36 months after going public, excluding the initial return on the first day of trading. $AR_t = \frac{1}{n_t}\sum_{i=1}^{n_t}\left(r_{i,t} - r_{m,t}\right)$, where $r_{i,t}$ is the total return on initial public offering firm *i* in event month *t* and $r_{m,t}$ is the total return on the corresponding market index. The *t*-statistics for the average

adjusted return is computed for each month as $\frac{AR_t \cdot \sqrt{n_t}}{sd_t}$, where $AR_t$ is the average market index-adjusted return for month *t*, $n_t$ is the number of observations in month *t*, the cross-sectional standard deviations vary from a low of 6.88 percent in month 7 to a high of 9.69 in month 1. The *t*-statistics for the cumulative average adjusted return in month *t*, $CAR_{1,t}$, is computed as $\frac{CAR_{1,t} \cdot \sqrt{n_t}}{csd_t}$, where $n_t$ is the number of firms trading in each month, and $csd_t$ is computed as $csd_t = \sqrt{t \cdot \text{var} + 2 \cdot (t-1) \cdot \text{cov}}$, where *t* is the event month, *var* is the average (over 36 months) cross-sectional variance, and *cov* is the first-order autocovariance of the $AR_t$ series.

**Table 3: Benchmark Descriptions**

The benchmarks consist of 4351 non-IPO firms with sufficient data to calculate four components of accruals in the IPO year.

| Industry\year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|---|---|---|---|---|---|---|---|
| A | 2 | 3 | 5 | 9 | 11 | 14 | 44 |
| B | 11 | 15 | 16 | 14 | 16 | 18 | 90 |
| C | 243 | 370 | 426 | 468 | 540 | 596 | 2643 |
| D | 4 | 8 | 13 | 16 | 21 | 20 | 82 |
| E | 18 | 27 | 31 | 32 | 41 | 42 | 191 |
| F | 2 | 4 | 7 | 6 | 8 | 13 | 40 |
| G | 13 | 20 | 23 | 27 | 34 | 37 | 154 |
| H | 8 | 17 | 19 | 23 | 36 | 42 | 145 |
| I | 64 | 80 | 78 | 73 | 78 | 76 | 449 |
| J | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| K | 15 | 22 | 24 | 27 | 34 | 31 | 153 |
| L | 1 | 2 | 2 | 4 | 6 | 6 | 21 |
| M | 39 | 49 | 63 | 64 | 62 | 61 | 338 |
| Total | 420 | 618 | 707 | 763 | 887 | 956 | 4351 |

**Table 4: Descriptive Statistics on Selected Variables**

*Panel A: Variables for Underpricing (506 IPOs)*

| Variable | Mean | (*t*-value) | Median | Minimum | Maximum | Std. Dev. |
|---|---|---|---|---|---|---|
| *IR* | 129.23% | (32.64)*** | 116.31% | -31.45% | 830.21% | 89.07% |
| *DA* | 0.0644 | (8.10)*** | 0.0554 | -1.6718 | 0.7256 | 0.1787 |
| *NDA* | -0.0128 | (-5.31)*** | -0.0062 | -0.5418 | 0.1648 | 0.0542 |
| *DCA* | 0.1465 | (11.16)*** | 0.1162 | -1.6137 | 1.9274 | 0.2953 |
| *NDCA* | -0.0154 | (-8.27)*** | -0.0126 | -0.4241 | 0.2099 | 0.0420 |
| *DLA* | -0.0821 | (-6.80)*** | -0.0564 | -1.8456 | 1.4328 | 0.2717 |
| *NDLA* | 0.0026 | (1.14) | 0.0069 | -0.3022 | 0.2332 | 0.0520 |
| *PROCEEDS* | 8.6166 | (671.93)*** | 8.8513 | 7.8405 | 10.0725 | 0.2885 |
| *IMKTRTN* | 0.91% | (2.65)*** | 0.58% | -19.32% | 48.51% | 7.74% |

*Panel B: Variables for Underperformance (380 IPOs)*

| Variable | Mean | (*t*-value) | Median | Minimum | Maximum | Std. Dev. |
|---|---|---|---|---|---|---|
| *BHR* | -14.89% | (-5.12)*** | -34.39% | -82.48% | 250.87% | 56.63% |
| *DA* | 0.0738 | (8.32)*** | 0.0595 | -1.4233 | 0.7256 | 0.1730 |
| *NDA* | -0.0027 | (-1.20) | -0.0006 | -0.1610 | 0.1648 | 0.0433 |
| *DCA* | 0.1749 | (11.53)*** | 0.1387 | -1.3252 | 1.9274 | 0.2956 |
| *NDCA* | -0.0127 | (-6.16)*** | -0.0111 | -0.2232 | 0.2097 | 0.0402 |
| *DLA* | -0.1010 | (-6.96)*** | -0.0776 | -1.8456 | 1.4328 | 0.2830 |
| *NDLA* | 0.0100 | (4.23)*** | 0.0116 | -0.2442 | 0.2332 | 0.0463 |
| *PROCEEDS* | 8.6312 | (592.33)*** | 8.6018 | 7.8405 | 10.0725 | 0.2841 |
| *MKTRTN* | -11.01% | (-7.11)*** | -24.43% | -43.50% | 46.64% | 30.21% |
| *IR* | 138.85% | (29.04)*** | 122.94% | -5.46% | 820.50% | 91.85% |
| Δ*NetIncome* | -0.0024 | (-0.74) | -0.0009 | -0.6401 | 0.1694 | 0.0618 |
| Δ*ROA* | -0.0719 | (-18.42)*** | -0.0544 | -0.5238 | 0.1048 | 0.0761 |
| Δ*CFOA* | 0.0175 | (1.78)* | 0.0092 | -1.7123 | 0.7180 | 0.1926 |
| Δ*SalesG* | 0.4716 | (9.37)*** | 0.2945 | -0.7097 | 13.0123 | 0.9813 |
| Δ*CapExp* | -0.0003 | (-0.06) | 0.0061 | -0.4070 | 0.5377 | 0.1012 |
| Δ*ATO* | -0.0699 | (-5.02)*** | -0.0625 | -2.2105 | 1.1877 | 0.2715 |
| *IR* | 138.13% | (28.88)*** | 125.05% | 0.28% | 830.21% | 93.23% |

*Panel C: Changes in discretionary variables and operating performance variables over three subsequent years*

| Variable | T=1 (506 IPOs) | | T=2 (448 IPOs) | | T=3 (380 IPOs) | |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | Mean | Median |
| *DA* | 0.0644 (8.10)*** | 0.0554 (6.97)*** | 0.0310 (6.94)*** | 0.0268 (6.00)*** | 0.0103 (2.29)** | 0.0134 (2.97)*** |
| *DCA* | 0.1465 (11.16)*** | 0.1162 (8.85)*** | -0.0327 (-3.15)*** | -0.0361 (-3.48)*** | -0.0292 (-3.57)*** | -0.0282 (-3.45)*** |
| *DLA* | -0.0821 (-6.80)*** | -0.0564 (-4.67)*** | 0.0637 (5.68)*** | 0.0641 (5.71)*** | 0.0395 (4.86)*** | 0.0381 (4.69)*** |
| *NetIncome* | 0.1116 | 0.0947 | 0.0595 | 0.0556 | 0.0465 | 0.0456 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | (35.68)*** | (30.26)*** | (28.39)*** | (26.52)*** | (17.25)*** | (16.93)*** |
| *ROA* | 0.1273 | 0.1111 | 0.0653 | 0.0589 | 0.0544 | 0.0525 |
| | (34.71)*** | (30.31)*** | (26.49)*** | (23.90)*** | (17.93)*** | (17.31)*** |
| *CFOA* | 0.0601 | 0.0649 | 0.0469 | 0.0434 | 0.0615 | 0.0608 |
| | (7.17)*** | (7.73)*** | (9.94)*** | (9.21)*** | (13.13)*** | (12.99)*** |
| *SalesG* | 0.2042 | 0.1294 | 0.2217 | 0.1660 | 0.2497 | 0.1821 |
| | (12.26)*** | (7.77)*** | (12.21)*** | (9.14)*** | (10.80)*** | (7.88)*** |
| *CapExp* | 0.1903 | 0.1082 | 0.1237 | 0.0855 | 0.0986 | 0.0785 |
| | (18.40)*** | (10.46)*** | (22.27)*** | (15.40)*** | (23.10)*** | (18.40)*** |
| *ATO* | 0.6739 | 0.5639 | 0.5644 | 0.4586 | 0.5855 | 0.4770 |
| | (34.02)*** | (28.46)*** | (29.52)*** | (23.99)*** | (30.62)*** | (24.95)*** |

*IR* is the initial return; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks; *MKTRTN* is the contemporaneous three-year buy-and-hold market returns; Δ*NetIncome* is the asset-scaled change in net income; Δ*ROA* is the change in operating profits on assets; Δ*CFOA* is the change in operating cash flows on assets; Δ*SalesG* is the change in sales growth; Δ*CapExp* is the change in capital expenditure scaled by lagged total assets; Δ*ATO* is the change in asset turnover.

* Significance at the 10% level
** Significance at the 5% level
*** Significance at the 1% level

**Table 5: Univariate Analysis for Underpricing**

Panel A: Quintiles based on IPO underpricing

| Quintiles | Obs. | DA | DCA | PROCEEDS | IMKTRTN |
|---|---|---|---|---|---|
| Lowest | 101 | 0.0480 | 0.1289 | 8.9012 | -1.83% |
| 2 | 101 | 0.0371 | 0.1040 | 8.6731 | 0.02% |
| 3 | 102 | 0.0851 | 0.1815 | 8.5556 | 1.39% |
| 4 | 101 | 0.0630 | 0.1391 | 8.4973 | 1.75% |
| Highest | 101 | 0.0890 | 0.1793 | 8.4564 | 3.23% |
| Total | 506 | 0.0645 | 0.1466 | 8.6166 | 0.91% |

Panel B: Quintiles based on discretionary accruals

| Quintiles | Obs. | DCA | IR | PROCEEDS | IMKTRTN |
|---|---|---|---|---|---|
| Lowest | 101 | 0.0042 | 122.85% | 8.6296 | 0.94% |
| 2 | 101 | 0.0809 | 127.75% | 8.6450 | 0.74% |
| 3 | 102 | 0.1533 | 129.42% | 8.6318 | 0.32% |
| 4 | 101 | 0.1567 | 126.62% | 8.5712 | 0.38% |
| Highest | 101 | 0.3380 | 139.50% | 8.6152 | 2.18% |
| Total | 506 | 0.1466 | 129.23% | 8.6166 | 0.91% |

Panel C: Quintiles based on discretionary current accruals

| Quintiles | Obs. | DA | IR | PROCEEDS | IMKTRTN |
|---|---|---|---|---|---|
| Lowest | 101 | -0.0350 | 120.13% | 8.6126 | 0.06% |
| 2 | 101 | 0.0390 | 120.00% | 8.6562 | 0.34% |
| 3 | 102 | 0.0432 | 132.07% | 8.6096 | 1.10% |
| 4 | 101 | 0.0905 | 133.69% | 8.6074 | 1.26% |
| Highest | 101 | 0.1849 | 140.24% | 8.5972 | 1.78% |
| Total | 506 | 0.0645 | 129.23% | 8.6166 | 0.91% |

**Table 6: Univariate Analysis for Underperformance**

*Panel A: Quintiles based on three-year buy-and-hold returns*

| Quintiles | Obs. | DA | DCA | DLA | IR | ΔNetIncome | MKTRTN |
|---|---|---|---|---|---|---|---|
| Lowest | 76 | 0.0897 | 0.1961 | -0.1064 | 186.15% | -0.0416 | -0.2933 |
| 2 | 76 | 0.0610 | 0.1603 | -0.0992 | 166.27% | -0.0007 | -0.2794 |
| 3 | 76 | 0.0838 | 0.1835 | -0.0998 | 119.08% | 0.0026 | -0.2502 |
| 4 | 76 | 0.0488 | 0.1463 | -0.0975 | 107.51% | 0.0108 | -0.0409 |
| Highest | 76 | 0.0859 | 0.1880 | -0.1021 | 111.59% | 0.0172 | 0.3130 |
| Total | 380 | 0.0738 | 0.1749 | -0.1010 | 138.13% | -0.0024 | -0.1101 |

*Panel B: Quintiles based on discretionary accruals*

| Quintiles | Obs. | BHR | DCA | DLA | IR | ΔNetIncome | MKTRTN |
|---|---|---|---|---|---|---|---|
| Lowest | 76 | -0.0779 | 0.0273 | -0.1530 | 132.78% | 0.0083 | -0.0831 |
| 2 | 76 | -0.1618 | 0.1173 | -0.1130 | 137.02% | 0.0043 | -0.1367 |
| 3 | 76 | -0.1793 | 0.1942 | -0.1362 | 133.92% | -0.0057 | -0.1689 |
| 4 | 76 | -0.2220 | 0.1767 | -0.0494 | 136.88% | -0.0067 | -0.1221 |
| Highest | 76 | -0.1034 | 0.3586 | -0.0536 | 150.05% | -0.0120 | -0.0399 |
| Total | 380 | -0.1489 | 0.1749 | -0.1010 | 138.13% | -0.0024 | -0.1101 |

*Panel C: Quintiles based on discretionary current accruals*

| Quintiles | Obs. | BHR | DA | DLA | IR | ΔNetIncome | MKTRTN |
|---|---|---|---|---|---|---|---|
| Lowest | 76 | -0.1818 | -0.0281 | 0.1268 | 122.79% | -0.0050 | -0.1229 |
| 2 | 76 | -0.0783 | 0.0353 | 0.0012 | 142.59% | -0.0020 | -0.1089 |
| 3 | 76 | -0.2654 | 0.0541 | -0.0883 | 145.88% | -0.0055 | -0.1693 |
| 4 | 76 | 0.0026 | 0.1076 | -0.1411 | 141.35% | 0.0035 | -0.0462 |
| Highest | 76 | -0.2214 | 0.2003 | -0.4036 | 138.04% | -0.0027 | -0.1034 |
| Total | 380 | -0.1489 | 0.0738 | -0.1010 | 138.13% | -0.0024 | -0.1101 |

**Table 7: IPO Underpricing and Proxies for Earnings Management**

| | 506 IPOs | | | 337 IPOs | | |
|---|---|---|---|---|---|---|
| Model | 0 | 1 | 2 | 0 | 1 | 2 |
| Intercept | 1482.12 (11.73)*** | 1420.30 (9.96)*** | 1385.82 (10.81)*** | 1483.06 (9.70)*** | 1422.97 (7.45)*** | 1445.16 (7.60)*** |
| DA | | 34.65 (2.06)** | | | 47.34 (2.39)** | |
| NDA | | 95.53 (1.53) | | | 46.16 (2.01)** | |
| DCA | | | 36.46 (2.12)** | | | 53.06 (2.54)** |
| NDCA | | | 8.85 (0.11) | | | 64.20 (2.10)** |
| DLA | | | 35.47 (1.85)* | | | 30.71 (1.48) |
| NDLA | | | 145.98 (1.50) | | | 15.64 (0.54) |
| PROCEEDS | -158.78 (-10.61)*** | -150.17 (-9.16)*** | -146.37 (-9.89)*** | -160.83 (-8.81)*** | -152.14 (-6.91)*** | -154.94 (-7.07)*** |
| TIMELAG | 0.33 (1.06) | | | 0.39 (1.01) | | |
| ALLOC | 1.22 (1.17) | | | 1.44 (1.37) | | |
| IMKTRTN | 2.11 (4.63)*** | 2.10 (4.72)*** | 2.12 (4.67)*** | 1.67 (3.69)*** | 1.64 (3.86)*** | 1.61 (3.76)*** |
| Adjusted $R^2$ | 0.3058 | 0.2879 | 0.2884 | 0.3253 | 0.2890 | 0.2903 |

The following equations are estimated:

Model 0:

$$IR = \gamma_0 + \gamma_1 PROCEEDS + \gamma_2 TIMELAG + \gamma_3 ALLOC + \gamma_4 IMKTRTN$$

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN$$

where *IR* is the initial return, defined as the percentage difference between the offer price and the closing price on the first day of trading; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *TIMELAG* is the time elapsed between offering and listing; *ALLOC* is the rate of allocation in an oversubscribed IPO; *IMKTRTN* is the return on general market index during the period between offering and listing; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long

term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks.

* Significance at the 10% level
** Significance at the 5% level
*** Significance at the 1% level

**Table 8: BHR and Proxies for Earnings Management**

| | Model 3 | | Model 4 | |
|---|---|---|---|---|
| | coefficient | (t-value) | coefficient | (t-value) |
| Intercept | 0.4180 | (0.53) | 0.7323 | (0.87) |
| DA | -0.4615 | (-2.12)** | | |
| NDA | -0.1127 | (-0.26) | | |
| DCA | | | -0.4786 | (-2.19)** |
| NDCA | | | 0.4553 | (0.97) |
| DLA | | | -0.4885 | (-2.18)** |
| NDLA | | | -0.4973 | (-0.99) |
| PROCEEDS | -0.0253 | (-0.28) | -0.0613 | (-0.65) |
| MKTRTN | 1.2905 | (15.69)*** | .1.2626 | (15.03)*** |
| ΔNetIncome | 1.6291 | (3.21)*** | 1.7249 | (3.09)*** |
| ΔROA | 0.2885 | (0.79) | 0.2075 | (0.55) |
| ΔCFOA | 0.3308 | (1.60) | 0.3374 | (1.61) |
| ΔSalesG | -0.0059 | (-0.35) | -0.0070 | (-0.41) |
| ΔCapExp | 0.0474 | (0.92) | 0.0570 | (1.09) |
| ΔATO | -0.1193 | (-1.21) | -0.1141 | (-1.16) |
| IR | -0.1178 | (-4.19)*** | -0.1185 | (-3.97)*** |
| Adjusted $R^2$ | 0.5964 | | 0.5975 | |

The following models are estimated:

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR$$

where BHR is the three-year buy-and-hold return; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks. MKTRNT is the contemporaneous three year buy-and hold market return; PROCEEDS is the natural logarithm of the issuing size in monetary units; ΔNetIncome is the asset scaled change in net income; ΔROA is the change in operating profits on assets; ΔCFOA is the change in operating cash flows on assets; ΔSalesG is the change in sales growth; ΔCapExp is the change in capital expenditure; ΔATO is the change in asset turnover; *IR* is the initial excess return on the first day of trading.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 9: CSRC industry codes and the Fama-French industry codes**

*Panel A: CSRC industry classifications*

| | | |
|---|---|---|
| A | Mining | Coal, Oil and Gas, Metal, and non-metal, Mining services |
| B | Real Estates | Real Estate Development, Real Estate Management |
| C | Manufacturing | Food products, Textiles, Apparel, Machinery, Chemicals |
| D | Agriculture | Agriculture, Forestry, Animal Husbandry, Fishery, |
| E | Utilities | Electricity, Gas, Water products and supply |
| F | Construction | Building, Railway, Highway |
| G | Transportation | Railway, Highway, Pipe, Water, Airline |
| H | Information Technology | Communications, computer equipments, IT Application |
| I | Wholesales and Retails | Wholesales, Retails, Agency services |
| J | Finance | Banking, Insurance, Trusts, Funds |
| K | Services | City Bus services, Restaurants, Hotels, Tours |
| L | Media | Publications, Sounds and Pictures, Broadcasts |
| M | Conglomerate | Multi-industry |

*Panel B: Fama-French 12-industry classifications*

| | | |
|---|---|---|
| 1 | Non-Durables | Food, Tobacco, Textiles, Apparel, Leather, Toys |
| 2 | Durables | Cars, TVs, Furniture, Household Appliances |
| 3 | Manufacturing | Machinery, Trucks, Planes, Off Furniture, Paper |
| 4 | Energy | Oil, Gas, and Coal Extraction and Products |
| 5 | Chemicals | Chemicals and Allied Products |
| 6 | Business Equip. | Computer, Software, and Electronic Equipments |
| 7 | Telephone | Telephone and Television Transmission |
| 8 | Utilities | Electric, Gas, Water and other Services |
| 9 | Shops | Wholesales, Retails, and some Services |
| 10 | Health Care | Medical Equipments and Drugs |
| 11 | Finance | Banking, Insurance, Real Estate |
| 12 | Others | Others |

*Panel C: Conversion from CSRC to Fama-French definition*

| *CSRC* | Details | *F-F* | *CSRC* | Details | *F-F* |
|---|---|---|---|---|---|
| A0100 | Coal Mining | 4 | D0900 | Agricul. Services | 12 |
| A0300 | Oil and Gas | 4 | E0100 | Electricity | 8 |
| A0500 | Ferrous Metal | 12 | E0300 | Gas | 8 |
| A0700 | Non-ferrous Metal | 12 | E0500 | Water | 8 |
| A0900 | Nonmetal Minerals | 12 | F0100 | Buildings | 12 |
| A4900 | Other Mining | 12 | F0500 | Decoration | 12 |
| A5000 | Mining Services | 12 | G0100 | Railway | 12 |
| B0100 | Real Estate Dev. | 12 | G0300 | Highway | 12 |
| B0500 | Real Estate Mgt. | 12 | G0500 | Pipeline | 12 |
| B0900 | R.E. Intermediary | 12 | G0700 | Water | 12 |
| C0100 | Food Processing | 1 | G0900 | Airline | 12 |

| | | | | | |
|---|---|---|---|---|---|
| C0300 | Food Making | 1 | G1100 | Transportation Services | 12 |
| C0500 | Drinks | 1 | G1900 | Other transportation | 12 |
| C1100 | Textiles | 1 | G2100 | Storage | 12 |
| C1300 | Apparel | 1 | H8100 | Communications | 7 |
| C1400 | Leather Products | 1 | H8300 | Computer | 6 |
| C2100 | Timber Processing | 1 | H8500 | Telephone | 7 |
| C2500 | Furniture | 2 | H8700 | Computer Application | 12 |
| C3100 | Paper products | 3 | I0100 | Non-Durables | 9 |
| C3500 | Print | 3 | I0300 | Energy, Materials | 9 |
| C3700 | Culture goods | 3 | I0900 | Other Wholesales | 9 |
| C4100 | Petroleum Products | 5 | I1100 | Retails | 9 |
| C4300 | Chemical Products | 5 | I2100 | Agency Business | 12 |
| C4700 | Chemical Fibre | 5 | J0100 | Banking | 11 |
| C4800 | Rubber Products | 2 | J1100 | Insurances | 11 |
| C4900 | Plastic | 5 | J2100 | Securities and Futures | 11 |
| C5100 | Elect. Components | 3 | J3100 | Trusts and Investments | 11 |
| C5500 | Dur. Elect. Instru. | 2 | J4100 | Funds | 11 |
| C5700 | Other Elect. Instru. | 2 | J9900 | Others | 11 |
| C5900 | Repairing | 9 | K0100 | Public Facility Services | 12 |
| C6100 | Nonmetal Products | 12 | K1000 | Post Office Services | 12 |
| C6500 | Ferrous Metal | 12 | K2000 | Consulting Services | 12 |
| C6700 | Non-ferrous Metal | 12 | K3000 | Restaurants | 12 |
| C6900 | Metal Products | 12 | K3200 | Hotels | 12 |
| C7100 | General Machinery | 3 | K3400 | Tours | 12 |
| C7300 | Special Machinery | 3 | K3600 | Entertainments | 12 |
| C7500 | Cars and Trucks | 3 | K3700 | Heath care | 12 |
| C7600 | Electronic Equip. | 3 | K3900 | Lease | 12 |
| C7800 | Apparatus | 6 | K9900 | Other Services | 12 |
| C8100 | Drugs | 10 | L0100 | Publications | 12 |
| C8500 | Biochemicals | 10 | L0500 | Sounds and Pictures | 12 |
| C9900 | Other Manuf. | 12 | L1000 | Broadcasts et al. | 12 |
| D0100 | Agriculture | 12 | L1500 | Arts | 12 |
| D0300 | Forestry | 12 | L2000 | Misc Media | 12 |
| D0500 | Animal husbandry | 12 | L9900 | Other Medias | 12 |
| D0700 | Fishery | 12 | M0000 | Conglomerates | 12 |

**Table 10: Robustness Checks with the Fama-French 12 Industry Specification**

*The Underpricing Models*

| | 13 Chinese official industries | | 12 Fama-French industries | |
|---|---|---|---|---|
| Model | 1 | 2 | 1 | 2 |
| Intercept | 1420.30 | 1385.82 | 1446.27 | 1458.52 |
| | (9.96)*** | (10.81)*** | (9.62)*** | (9.66)*** |
| DA | 34.65 | | 36.06 | |
| | (2.06)** | | (2.17)** | |
| NDA | 95.53 | | 58.92 | |
| | (1.53) | | (0.93) | |
| DCA | | 36.46 | | 36.96 |
| | | (2.12)** | | (2.16)** |
| NDCA | | 8.85 | | 45.93 |
| | | (0.11) | | (0.78) |
| DLA | | 35.47 | | 33.72 |
| | | (1.85)* | | (1.72)* |
| NDLA | | 145.98 | | 72.19 |
| | | (1.50) | | (0.89) |
| PROCEEDS | -150.17 | -146.37 | -153.26 | -154.77 |
| | (-9.16)*** | (-9.89)*** | (-8.86)*** | (-8.91)*** |
| IMKTRTN | 2.10 | 2.12 | 2.10 | 2.10 |
| | (4.72)*** | (4.67)*** | (4.68)*** | (4.69)*** |
| Adjusted $R^2$ | 0.2879 | 0.2884 | 0.2868 | 0.2845 |

The following equations are estimated:

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN$$

where *IR* is the initial return, defined as the percentage difference between the offer price and the closing price on the first day of trading; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *IMKTRTN* is the return on general market index during the period between offering and listing; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 11: Robustness Checks with the Fama-French 12 Industry Specification**

*The Underperformance Models*

| | Model 3 | | Model 4 | |
|---|---|---|---|---|
| | coefficient | (t-value) | coefficient | (t-value) |
| Intercept | 0.5820 | (0.73) | 0.5526 | (0.68) |
| DA | -0.4498 | (-2.07)** | | |
| NDA | -0.4723 | (-1.22) | | |
| DCA | | | -0.4589 | (-2.10)** |
| NDCA | | | -0.4516 | (-1.11) |
| DLA | | | -0.4636 | (-2.05)** |
| NDLA | | | -0.5620 | (-1.35) |
| PROCEEDS | -0.0447 | (-0.50) | -0.0410 | (-0.45) |
| MKTRTN | 1.3038 | (15.98)*** | 1.3018 | (15.88)*** |
| ΔNetIncome | 1.6263 | (3.21)*** | 1.6202 | (3.19)*** |
| ΔROA | 0.2695 | (0.73) | 0.2731 | (0.72) |
| ΔCFOA | 0.3236 | (1.55) | 0.3329 | (1.58) |
| ΔSalesG | -0.0046 | (-0.29) | -0.0042 | (-0.26) |
| ΔCapExp | 0.0544 | (1.07) | 0.0529 | (1.02) |
| ΔATO | -0.1149 | (-1.18) | -0.1138 | (-1.17) |
| IR | -0.1182 | (-4.15)*** | -0.1184 | (-4.11)*** |
| Adjusted $R^2$ | 0.5977 | | 0.5957 | |

The following models are estimated:

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR$$

where BHR is the three-year buy-and-hold return; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks. MKTRNT is the contemporaneous three year buy-and hold market return; PROCEEDS is the natural logarithm of the issuing size in monetary units; ΔNetIncome is the asset scaled change in net income; ΔROA is the change in operating profits on assets; ΔCFOA is the change in operating cash flows on assets; ΔSalesG is the change in sales growth; ΔCapExp is the change in capital expenditure; ΔATO is the change in asset turnover; *IR* is the initial excess return on the first day of trading.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 12: Robustness Checks with Jones (1991) Model**

*The Underpricing Models*

| | the modified Jones (1991) | | the original Jones (1991) | |
|---|---|---|---|---|
| Model | 1 | 2 | 1 | 2 |
| Intercept | 1420.30 | 1385.82 | 1437.33 | 1454.92 |
| | (9.96)*** | (10.81)*** | (9.78)*** | (9.71)*** |
| DA | 34.65 | | 37.08 | |
| | (2.06)** | | (2.23)** | |
| NDA | 95.53 | | 32.99 | |
| | (1.53) | | (0.73) | |
| DCA | | 36.46 | | 39.81 |
| | | (2.12)** | | (2.33)** |
| NDCA | | 8.85 | | -15.95 |
| | | (0.11) | | (-0.25) |
| DLA | | 35.47 | | 35.23 |
| | | (1.85)* | | (1.79)* |
| NDLA | | 145.98 | | 42.17 |
| | | (1.50) | | (0.84) |
| PROCEEDS | -150.17 | -146.37 | -152.31 | -154.51 |
| | (-9.16)*** | (-9.89)*** | (-9.00)*** | (-8.93)*** |
| IMKTRTN | 2.10 | 2.12 | 2.12 | 2.15 |
| | (4.72)*** | (4.67)*** | (4.72)*** | (4.71)*** |
| Adjusted $R^2$ | 0.2879 | 0.2884 | 0.2866 | 0.2853 |

The following equations are estimated:

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN$$

where *IR* is the initial return, defined as the percentage difference between the offer price and the closing price on the first day of trading; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *IMKTRTN* is the return on general market index during the period between offering and listing; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 13: Robustness Checks with Jones (1991) Model**

*The Underperformance Models*

| | Model 3 | | Model 4 | |
|---|---|---|---|---|
| | coefficient | (t-value) | coefficient | (t-value) |
| Intercept | 0.2543 | (0.32) | 0.2129 | (0.26) |
| DA | -0.4652 | (-2.16)** | | |
| NDA | 0.2012 | (0.63) | | |
| DCA | | | -0.4925 | (-2.31)** |
| NDCA | | | 0.5492 | (1.30) |
| DLA | | | -0.4963 | (-2.27)** |
| NDLA | | | 0.0679 | (0.22) |
| PROCEEDS | -0.0076 | (-0.08) | -0.0012 | (-0.01) |
| MKTRTN | 1.2791 | (15.87)*** | 1.2616 | (15.38)*** |
| ΔNetIncome | 1.6275 | (3.20)*** | 1.6564 | (3.21)*** |
| ΔROA | 0.3024 | (0.83) | 0.3350 | (0.88) |
| ΔCFOA | 0.3241 | (1.57) | 0.3389 | (1.66) |
| ΔSalesG | -0.0057 | (-0.36) | -0.0060 | (-0.36) |
| ΔCapExp | 0.0681 | (1.33) | 0.0631 | (1.22) |
| ΔATO | -0.1160 | (-1.19) | -0.1118 | (-1.13) |
| IR | -0.1142 | (-4.08)*** | -0.1149 | (-4.02)*** |
| Adjusted $R^2$ | 0.6009 | | 0.6008 | |

The following models are estimated:

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR$$

where BHR is the three-year buy-and-hold return; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks. MKTRNT is the contemporaneous three year buy-and hold market return; PROCEEDS is the natural logarithm of the issuing size in monetary units; ΔNetIncome is the asset scaled change in net income; ΔROA is the change in operating profits on assets; ΔCFOA is the change in operating cash flows on assets; ΔSalesG is the change in sales growth; ΔCapExp is the change in capital expenditure; ΔATO is the change in asset turnover; *IR* is the initial excess return on the first day of trading.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 14: Robustness Checks with Operating Income**

*The Underpricing Models*

| | Net Income | | Operating Income | |
|---|---|---|---|---|
| Model | 1 | 2 | 1 | 2 |
| Intercept | 1420.30<br>(9.96)*** | 1385.82<br>(10.81)*** | 1429.81<br>(9.82)*** | 1408.02<br>(10.53)*** |
| DA | 34.65<br>(2.06)** | | 34.37<br>(2.07)** | |
| NDA | 95.53<br>(1.53) | | 132.26<br>(1.75)* | |
| DCA | | 36.46<br>(2.12)** | | 36.52<br>(2.19)** |
| NDCA | | 8.85<br>(0.11) | | 72.19<br>(0.90) |
| DLA | | 35.47<br>(1.85)* | | 33.23<br>(1.73)* |
| NDLA | | 145.98<br>(1.50) | | 175.34<br>(1.57) |
| PROCEEDS | -150.17<br>(-9.16)*** | -146.37<br>(-9.89)*** | -151.20<br>(-9.04)*** | -148.84<br>(-9.65)*** |
| IMKTRTN | 2.10<br>(4.72)*** | 2.12<br>(4.67)*** | 2.10<br>(4.72)*** | 2.11<br>(4.70)*** |
| Adjusted $R^2$ | 0.2879 | 0.2884 | 0.2897 | 0.2891 |

The following equations are estimated:

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN$$

where *IR* is the initial return, defined as the percentage difference between the offer price and the closing price on the first day of trading; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *IMKTRTN* is the return on general market index during the period between offering and listing; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 15: Robustness Checks with Operating Income**

*The Underperformance Models*

| | Model 3 | | Model 4 | |
|---|---|---|---|---|
| | coefficient | (t-value) | coefficient | (t-value) |
| Intercept | 0.4853 | (0.61) | 0.8467 | (1.01) |
| DA | -0.4491 | (-2.08)** | | |
| NDA | 0.0309 | (0.07) | | |
| DCA | | | -0.4759 | (-2.21)** |
| NDCA | | | 0.7741 | (1.63) |
| DLA | | | -0.4774 | (-2.16)** |
| NDLA | | | 0.3804 | (0.76) |
| PROCEEDS | -0.0327 | (-0.37) | -0.0740 | (-0.78) |
| MKTRTN | 1.2819 | (15.53)*** | 1.2462 | (15.20)*** |
| ΔNetIncome | 1.6352 | (3.24)*** | 1.7334 | (3.30)*** |
| ΔROA | 0.2904 | (0.80) | 0.1937 | (0.51) |
| ΔCFOA | 0.3245 | (1.57) | 0.3323 | (1.60) |
| ΔSalesG | -0.0087 | (-0.51) | -0.0096 | (-0.54) |
| ΔCapExp | 0.0483 | (0.95) | 0.0634 | (1.20) |
| ΔATO | -0.1171 | (-1.20) | -0.1077 | (-1.10) |
| IR | -0.1190 | (-4.25)*** | -0.1208 | (-4.02)*** |
| Adjusted $R^2$ | 0.5969 | | 0.5999 | |

The following models are estimated:

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR$$

where BHR is the three-year buy-and-hold return; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks. MKTRNT is the contemporaneous three year buy-and hold market return; PROCEEDS is the natural logarithm of the issuing size in monetary units; ΔNetIncome is the asset scaled change in net income; ΔROA is the change in operating profits on assets; ΔCFOA is the change in operating cash flows on assets; ΔSalesG is the change in sales growth; ΔCapExp is the change in capital expenditure; ΔATO is the change in asset turnover; *IR* is the initial excess return on the first day of trading.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 16: Robustness Checks with Newey-West HAC Standard Errors**

*The Underpricing Models*

| | White (1980) | | Newey-West (1987) | |
|---|---|---|---|---|
| Model | 1 | 2 | 1 | 2 |
| Intercept | 1420.30 (9.96)*** | 1385.82 (10.81)*** | 1420.30 (9.79)*** | 1385.82 (10.40)*** |
| DA | 34.65 (2.06)** | | 34.65 (2.00)** | |
| NDA | 95.53 (1.53) | | 95.52 (1.55) | |
| DCA | | 36.46 (2.12)** | | 36.46 (2.01)** |
| NDCA | | 8.85 (0.11) | | 8.85 (0.11) |
| DLA | | 35.47 (1.85)* | | 35.47 (1.86)** |
| NDLA | | 145.98 (1.50) | | 145.98 (1.47) |
| PROCEEDS | -150.17 (-9.16)*** | -146.37 (-9.89)*** | -150.17 (-8.99)*** | -146.37 (-9.52)*** |
| IMKTRTN | 2.10 (4.72)*** | 2.12 (4.67)*** | 2.10 (4.72)*** | 2.12 (4.67)*** |
| Adjusted $R^2$ | 0.2879 | 0.2884 | 0.2879 | 0.2884 |

The following equations are estimated:

Model 1:

$$IR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 IMKTRTN$$

Model 2:

$$IR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \beta_6 IMKTRTN$$

where *IR* is the initial return, defined as the percentage difference between the offer price and the closing price on the first day of trading; *PROCEEDS* is the natural logarithm of the issuing size in monetary units; *IMKTRTN* is the return on general market index during the period between offering and listing; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Table 17: Robustness Checks with Newey-West HAC Standard Errors.**

*The Underperformance Models*

| | Model 3 | | Model 4 | |
|---|---|---|---|---|
| | coefficient | (t-value) | coefficient | (t-value) |
| Intercept | 0.4180 | (0.52) | 0.7323 | (0.88) |
| DA | -0.4615 | (-2.12)** | | |
| NDA | -0.1127 | (-0.26) | | |
| DCA | | | -0.4786 | (-2.18)** |
| NDCA | | | 0.4553 | (0.99) |
| DLA | | | -0.4885 | (-2.16)** |
| NDLA | | | -0.4973 | (-1.00) |
| PROCEEDS | -0.0253 | (-0.28) | -0.0613 | (-0.65) |
| MKTRTN | 1.2905 | (16.29)*** | .1.2626 | (15.13)*** |
| ΔNetIncome | 1.6291 | (3.12)*** | 1.7249 | (3.21)*** |
| ΔROA | 0.2885 | (0.78) | 0.2075 | (0.52) |
| ΔCFOA | 0.3308 | (1.61) | 0.3374 | (1.60) |
| ΔSalesG | -0.0059 | (-0.36) | -0.0070 | (-0.42) |
| ΔCapExp | 0.0474 | (1.03) | 0.0570 | (1.23) |
| ΔATO | -0.1193 | (-1.17) | -0.1141 | (-1.13) |
| IR | -0.1178 | (-4.42)*** | -0.1185 | (-4.17)*** |
| Adjusted $R^2$ | 0.5964 | | 0.5975 | |

The following models are estimated:

Model 3: $$BHR = \alpha_0 + \alpha_1 DA + \alpha_2 NDA + \alpha_3 PROCEEDS + \alpha_4 \Delta MKTRTN + \alpha_5 \Delta NetIncome + \alpha_6 \Delta ROA + \alpha_7 \Delta CFOA + \alpha_8 \Delta SalesG + \alpha_9 \Delta CapExp + \alpha_{10} \Delta ATO + \alpha_{11} IR$$

Model 4: $$BHR = \beta_0 + \beta_1 DCA + \beta_2 NDCA + \beta_3 DLA + \beta_4 NDLA + \beta_5 PROCEEDS + \alpha_6 \Delta MKTRTN + \alpha_7 \Delta NetIncome + \alpha_8 \Delta ROA + \alpha_9 \Delta CFOA + \beta_{10} \Delta SalesG + \beta_{11} \Delta CapExp + \beta_{12} \Delta ATO + \beta_{13} IR$$

where BHR is the three-year buy-and-hold return; *DA* is discretionary total accruals scaled by total assets at the beginning of year; *NDA* is non-discretionary total accruals estimated from the fitted coefficients generated from benchmarks; *DCA* is discretionary current accruals scaled by total assets at the beginning of year; *NDCA* is non-discretionary current accruals estimated from the fitted coefficients generated from benchmarks; *DLA* is discretionary long term accruals scaled by total assets at the beginning of year; *NDLA* is non-discretionary long term accruals estimated from the fitted coefficients generated from benchmarks. MKTRNT is the contemporaneous three year buy-and hold market return; PROCEEDS is the natural logarithm of the issuing size in monetary units; ΔNetIncome is the asset scaled change in net income; ΔROA is the change in operating profits on assets; ΔCFOA is the change in operating cash flows on assets; ΔSalesG is the change in sales growth; ΔCapExp is the change in capital expenditure; ΔATO is the change in asset turnover; *IR* is the initial excess return on the first day of trading.

* Significance at the 10% level

** Significance at the 5% level

*** Significance at the 1% level

**Figure 1: Cumulative average adjusted returns an equally-weighted portfolio of 506 initial public offerings in 1998-2003, with monthly rebalancing.**

Two CAR series are plotted for the 36 event months after going public: 1) no adjustment (raw returns) and 2) SHSE A-share index and SZSE composite A-share index adjustment.

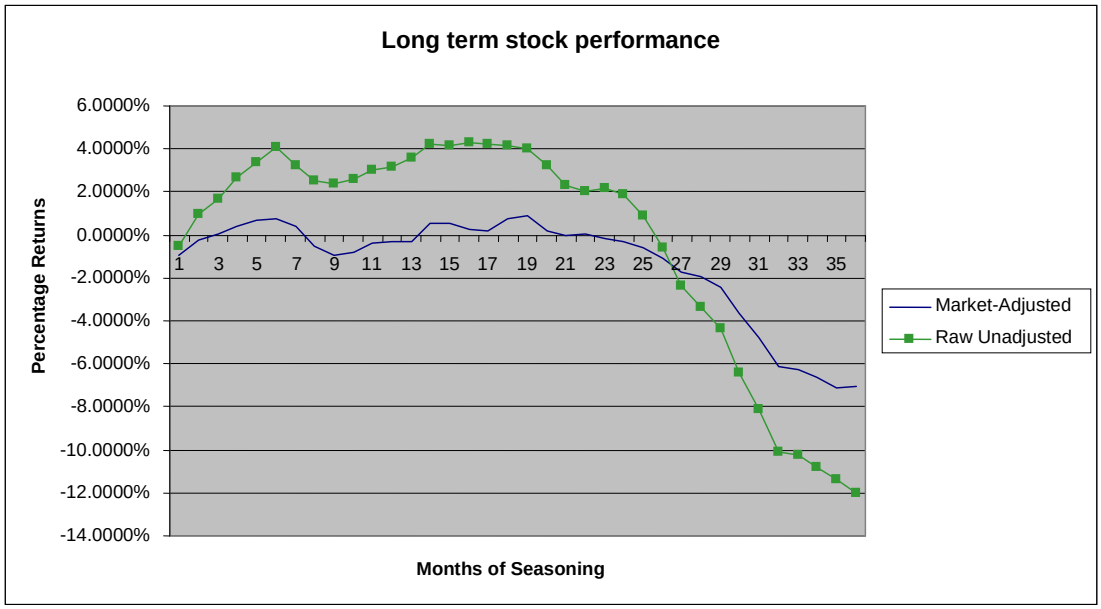

**Figure 2: Cumulative average adjusted returns an equally-weighted portfolio of 506 initial public offerings in 1998-2003, with monthly rebalancing.**

Two CAR series are plotted for the 36 calendar months after going public: 1) no adjustment (raw returns) and 2) SHSE A-share index and SZSE composite A-share index adjustment.