Wealth Destruction on a Massive Scale for Investors?
The Wedge between Security and Investor Returns in an Emerging Market

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Abstract

This paper examines the striking disparity between buy-and-hold and investors' actual returns in China, the largest emerging market. During 1990–2020, the annualized buy-and-hold return is 11%, whereas investors' actual return (dollar-weighted return) is 5.8%. The difference is 3.5 times those of developed markets (Dichev, 2007) and implies a wealth loss of US$2.9 trillion, 1/4 of the market capitalization in 2020. Investors' wealth loss is related to a set of institutional characteristics facilitating market timing of issuances, including volatility, price run-up, and earnings management. Funds raised by market timing are associated with inefficient investments and acquisitions and worse operating performance.

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1. Introduction

This paper examines a striking disparity between security returns and investors' actual returns in the stock market of the world's largest emerging economy, China. Between 1990—the year the modern-day stock market was established—and 2020, the market-wide annualized buy-and-hold return is 11%. Investors' actual return (or dollar-weighted return), however, is only 5.8% per annum, or 5.2 percentage points lower. Figure 1 and Table 1 show that in 10 out of the 20 years between 2001 and 2020, investors' actual returns (calculated with 1990 as the beginning year) are even lower than the annualized deposit rate of 4%. The return gap between the buy-and-hold return and investors' actual return is, with only two exceptions, above 3 percentage points and, in 12 out of 20 years, as high as 6 percentage points or above.

Dichev (2007) first proposes the concept of dollar-weighting of stock returns to measure investors' actual returns. It accounts for the timing and magnitude of capital in and out of stocks—e.g., due to equity issuances and dividend payouts—and is calculated as the internal rate of return (IRR) of these cash flows. Although security and investors' actual returns are typically assumed to be the same, Dichev's novel study points out the possibility of significant differences between the two. His findings in developed markets help put the Chinese numbers into perspective. The historical buy-and-hold returns for the US (NYSE) and 19 other developed stock markets are around 10% and 12%, respectively, and their dollar-weighted returns are about 1.5 percentage points lower.[1] Thus, while buy-and-hold returns are similar in China, the Chinese disparity is 3.5 times the developed markets.

[1] Dichev (2007) finds that the return disparity is 5.3 percentage points for NASDAQ between 1973 and 2002. As discussed later, markets with high volatilities and immediately after bursts of bubbles are likely to have larger return disparities. Thus, we expect the return disparity for NASDAQ to be larger, especially in 2002, after the internet bubble and with the NASDAQ index dropping by two-thirds. Table A1 in the Appendix presents the NASDAQ's return disparity for 2001–2020 (calculated with 1973 as the beginning year). In 14 out of the 20 years, the return disparity is below or equal to 3 percentage points, and, equally importantly, the dollar-weighted return is never below 4%.

Similar to Dichev (2007), in computing dollar-weighted returns, we treat all the secondary market investors as one big investor who buys the new shares at the closing prices of the first trading day—in line with the standard approach to calculating buy-and-hold returns. Our dollar-weighted return thus measures the actual returns of the secondary market investors in aggregate.[2]

Given that stock investors are key providers of capital in the modern economy and that a well-functioning secondary market is necessary to attract investors into the primary market, the vast difference between security and investors' returns raises a number of important questions. What drives the return discrepancies? What are the wealth implications for investors? What do firms do with the funds raised by selling overvalued equity, and what is the implication for economic efficiency?

From the investor's perspective, a dollar-weighted return substantially lower than the buy-and-hold return implies either poor timing of capital outflows, or equity issuances that occur at temporarily high prices. Figure 2 plots the equity raised in China during 1990–2020 against the Shanghai Index, the most commonly used Chinese stock market index. Chinese firms issue a vast amount of equity at market peaks. For example, when the Shanghai index reached an all-time high of over 6000 in 2007, listed firms—through both IPOs and secondary offerings—issued 838 billion RMB or 35% of the beginning-of-year market capitalization.[3]

[2] Recent studies document return heterogeneity across Chinese investor groups. Most notably, large individual investors and institutional investors are much more informed and sophisticated than most retail investors, based on return predictive power (An, Lou, and Shi, 2022; Jones et al., 2022), and there are large wealth transfers to large individual investors from other retail investors during the 2014–15 boom-bust episode (An, Lou, and Shi, 2022). Since account-level trading data are only available for short periods (3–4 years), it is not possible to trace the exact return of each group of investors. However, considering the informational advantage of large retail and institutional investors, the extremely low long-run dollar-weighted returns represent an upper bound of the return experience of a typical retail investor.

[3] This phenomenon is exemplified in the case of CITIC Securities, one of the largest security firms in China. Since its IPO in 2003, the firm had two equity issuances totaling 29.6 billion RMB, 25 billion of which occurred in 2007 when the price was 132 RMB. The share price dropped by half in 2008 and was 165 RMB at the end of 2020 (adjusted for dividends and stock splits), yielding less than 2% per annum for the shares bought at the 2007 issuance. Thus, despite a buy-and-hold return of 21.3%, investors' actual return is only 10.2%.

If investors are fully rational and the stock market is efficient, all securities would be fairly priced, leaving little room for listed companies to time the market. These conditions, however, cannot be taken for granted in less developed markets. In China's case, several institutional characteristics typical of emerging markets facilitate the timing of equity issuances. First, as we explain in Section 2, investor irrationality and short-sale constraints result in high volatility, high turnover, and often irrationally high prices, thus providing ample opportunities for market timing. Moreover, China's investor protection is rather weak, ranking 102nd out of 137 on the World Bank's investor protection index. Studies have documented that firms engage in aggressive earnings management, stock price manipulation, or even fraudulent accounting prior to equity issuances (e.g., Chen and Yuan, 2004), thus proactively creating opportunities for timing.

To understand the wealth implications for investors, we construct a new measure to quantify the loss of wealth suffered by investors. Note that the dollar-weighted and buy-and-hold returns would be the same if each cash flow yields the same return as the buy-and-hold return. Thus we measure the wealth loss as the difference between the actual end-of-period market value of the shares that investors have bought into at issuances and a hypothetical market value that assumes these shares have earned the buy-and-hold return. This measure thereby converts return differences into values. The wealth loss of the Chinese market during 1990–2020 amounts to 18.7 trillion RMB (2.9 trillion USD), equivalent to half of the combined corporate earnings of listed companies during the period, or about one-quarter of the stock market capitalization at the end of 2020.

Our analysis demonstrates that pre-issuance stock volatility, price run-up, and earnings management before equity issuances are all positively related to investors' wealth loss. Funds raised by issuing overvalued equity exacerbate agency problems and are used in wasteful investments and acquisitions. Specifically, investments and M&As are less sensitive to growth opportunities for firms that are more prone to market timing. Further, timing of equity issuances is associated with worse operating performance as measured by both ROA and operating cash flow.

Our paper makes several contributions to the literature. First, we extend the work of Dichev (2007) on the disparity between security and investor returns in several significant ways. We not only discover a strikingly large return disparity in an emerging market context but also provide evidence that such a large magnitude is due to market timing of equity issuances facilitated by a set of emerging market characteristics that is exemplified in the Chinese market, such as weak institutions and governance, and speculative trading. Equally importantly, we show that market timing of equity issuances is not a zero-sum game but has real consequences, i.e., inefficient capital allocation.

Second, we propose a new measure to quantify the impact of market timing on investors' wealth. In contrast to the existing approach of identifying market timing based on underperformance *relative* to a market or matching portfolio, our measure captures the *absolute* amount of wealth loss suffered by investors, which offers a new perspective on stock market performance.

Third, our findings provide new insights into the Chinese stock market. The underperformance of the Chinese market, which is inconsistent with the country's extraordinary economic growth, has attracted wide attention (Allen et al., 2021). We show that Chinese investors' actual return is much worse than what is already considered to be low. Our analysis also suggests that funds obtained through the timing of equity issuances aggravate agency problems and result in inefficient allocation of capital, which may contribute to the underperformance of the Chinese stock market.

The rest of this paper proceeds as follows. Section 2 introduces the institutional background of the Chinese stock market. Section 3 defines our key empirical measures, develops hypotheses, and describes the sample. Section 4 presents the empirical findings. Section 5 discusses a few extensions of our analysis. Section 6 concludes the paper.

2. Institutional Background

2.1 Emerging Market Characteristics Facilitating Timing of Equity Issuances

It has long been documented that emerging markets have weak investor protection and corporate governance (La Porta et al., 1998), poor quality of earnings and audit (e.g., Michas, 2011), higher volatility (e.g., Bekaert and Harvey, 1997), and limited room for short selling (Eling and Faust, 2010). Three features in the Chinese market exemplifying these emerging market characteristics facilitate market timing of equity issuances.

The first is high volatility and turnover. Unlike developed markets, trading in the Chinese market is dominated by retail investors, accounting for 99.8% of all trading accounts and more than 80% of the trading volume. Moreover, Chinese retail investors are younger and less experienced than a typical US investor and tend to engage in intensive speculative trading (Xiong and Yu, 2011; Mei, Scheinkman, and Xiong, 2009; Hong et al., 2014). As a result, the Chinese market has unusually high volatility and turnover. Between 1991 and 2020, the average annual volatility is around 30%, twice that of the US. The annual turnover is around 500%, three times that in the US (World Bank and WIND). Speculative trading may not have a price impact if rational institutional investors are present and they can trade both long and short. Neither condition, however, is guaranteed in China. Regarding institutional investors' trading behavior, the results are somewhat mixed. Ng and Wu (2007) show that institutional investors have short holding periods—as low as four months—and their trading is speculative, whereas recent studies indicate that institutional investors have some informational advantage (Jones et al., 2022; An, Lou, and Shi, 2022). Importantly, they cannot easily short because of restrictions that we discuss next.

Second, the short-sale constraint is often binding. Short selling was not introduced until March 31st, 2010 and was only allowed for 90 out of the 1,807 stocks that satisfy the size, liquidity, and volatility requirements. Although the list has since been expanded several times and now includes 1600 stocks, it covers less than half of the listed stocks (Shanghai Stock Exchange, 2020; Shenzhen Stock Exchange, 2020). Moreover, the cost of short selling can be prohibitively high. According to Chang, Luo, and Ren (2014) and D'Avolio (2002), the stock-lending fee in China is over 8%, much higher than the 0.25% fee in the US.

The third feature is weak investor protection. The World Bank investor protection index scores China 4.5 out of 10, with a ranking of 102nd out of 137 countries. Chinese security law imposes only mild penalties for corporate misconduct, rendering it ineffective in preventing such behavior ex ante (Deng, Gan, and He, 2012).[4] Moreover, US-style class action lawsuits are generally not possible.[5] As a result, there is evidence that firms engage in aggressive earnings management prior to IPOs and secondary offerings (Chen and Yuan, 2004), thus proactively creating opportunities for timing of equity issuances.

[4] For example, the maximum penalty for insider trading is only 600,000 RMB, or less than 100,000 USD. Source: http://www.zqrb.cn/stock/gupiaoyaowen/2020-03-01/A1583072192601.html (in Chinese).

[5] The new Securities Law, enacted in March 2020, explicitly introduced class action lawsuits. Unlike in the US, where lawyers play the main role, class action lawsuits in China need to be facilitated by government-funded investor protection agencies. Source: http://www.csrc.gov.cn/pub/shenzhen/xxfw/mtzs/202004/t20200415_373868.htm (in Chinese).

2.2 Equity Raising Events

There are four ways through which Chinese firms can raise equity in the stock market: initial public offerings (IPOs), rights offerings (ROs), seasoned equity offerings (SEOs), and private placements. Unlike the US and other developed markets, SEO is not the main mechanism for Chinese firms to raise equity after IPO. It was introduced only in 1998, and firms must meet a profitability requirement and endure a lengthy approval process that is not transparent (Oh, Park, and Zhang, 2019). Thus, only 219 SEOs occurred during the period 1998–2020.

Listed firms have relied on rights offerings and private placements. Before SEO was introduced, rights offerings were the only vehicle for issuing seasoned equity. After 2006, the China Securities Regulatory Commission (CSRC), the Chinese equivalent of SEC, officially approved private placements as a viable method of equity issuance. There is no profitability threshold, and the approval procedure is relatively simple (Oh, Park, and Zhang, 2019). During 2006–2020, private placements accounted for 90% of all secondary offerings (by value).

3. Empirical Measures and Hypothesis Development

3.1 Measuring Investors' Actual Returns and Wealth Loss due to Market Timing

Following Dichev (2007), we measure investors' actual returns by computing dollar-weighted returns. Specifically, we consider a stock investment as a sequence of equity capital flows from the perspective of stock investors. Equity issuance events—IPOs, ROs, SEOs, and private placements—are cash outflows from investors to the firm, whereas dividends and a liquidation value equal to the end-of-period market value are cash inflows.[6] The dollar-weighted returns are then calculated as the internal rate of returns (IRR) of the stock investment project.

To suit our objective of studying voluntary equity issuances, we make two modifications to Dichev's method. First, Dichev (2007) assumes, at IPO, all shares, not just new shares issued at IPO, are sold to the public. This assumption would overstate investors' wealth loss, since shares issued at IPO are a fraction of the total shares outstanding. Thus, we use new IPO shares in computing IPO cash flow.[7]

Second, in measuring cash flows to and from investors, Dichev (2007) relies on changes in market value net of price appreciation, due to limited data availability. We employ a detailed database, WIND, which provides information on equity issuances and allows us to exclude non-issuance events that could change the number of shares, such as executive stock compensation. The issuance data also allows us to explore the effect of Chinese institutional details—specifically lockup periods—on dollar-weighted returns.

While the dollar-weighted return nicely captures investors' actual return, it does not gauge the dollar amount of losses suffered by investors. The key challenge is that, for each issuance, it is not clear what the "fair price" should be. The literature on market timing relies on underperformance *relative* to a market or matching portfolio (Sloan and You, 2015; Spiess and Affleck-Graves, 1995). Such an approach, however, may not fully capture the *absolute* wealth lost. Specifically, if a firm issues equity when the entire market is overvalued, even though it causes

[6] We do not include repurchases. They were not allowed before 2005 and remained extremely rare until 2018 when the regulators amended the Company Law to make the procedure for repurchases clear. Even after 2018, repurchases are not a significant alternative to dividends. The 15-year repurchases during 2006-2020 sum up to only 0.36% of the stock market capitalization in 2020.

[7] If we follow Dichev's method, the dollar-weighted return is 5.6%, very similar to 5.8% reported earlier. Moreover, all our later multivariate results also remain qualitatively the same.

substantial losses for investors during a subsequent market decline, as long as its stock does not underperform the market, no losses would be identified.

To this end, we propose a new measure of wealth loss. We start from the observation that, from the investor's point of view, the buy-and-hold and dollar-weighted return would be the same if each cash flow yields the same return as the buy-and-hold return. Investors' losses, in other words, are driven by the fact that the shares they have bought into fail to earn the long-term buy-and-hold return, because issuance prices are too high. Thus, we can measure losses by comparing the end-of-period market value of shares issued with a hypothetical market value assuming each capital contribution earns the long-run buy-and-hold return. Denote V_i^M as the end-of-period market value of shares issued by firm *i* and V_i^H as the hypothetical market value. We have:

$$V_i^H = \sum_{t=0}^{T-1} CF_{it} * (1 + bhr_i)^{T-t},$$

$$V_i^M = \sum_{t=0}^{T-1} CF_{it} * (1 + irr_i)^{T-t}, \tag{1}$$

where *t* is time and is between 0 (IPO date) and T. irr_i and bhr_i are, respectively, the annualized IRR and buy-and-hold return of stock *i* over [0, T]. Then we have:

$$Wealth\ Loss_i = V_i^H - V_i^M. \tag{2}$$

Wealth Loss thus converts the return differences into values: the set of cash flows comprising capital contribution at equity issuances and ending market value V_i^H generates the buy-hand-hold return, whereas the set of cash flows containing capital contribution at equity issuances and ending market value V_i^M yields the dollar-weighted return.

Our measure of wealth loss does not rely on the relative performance against the market or a matching portfolio and thus better captures the *absolute* amount of wealth loss. Such a loss arises from two sources. One is a wealth transfer between new and old shareholders. The other reflects, as our later analysis indicates, the deadweight loss due to inefficient post-issuance investments and acquisitions.

We calculate dollar-weighted returns and investors' wealth loss at both the market and the firm levels. At the market level, we treat the whole stock market as one large company and include all capital-raising events, both IPOs and secondary offerings, during 1990–2020. At the firm level, the calculation is done during the period between the firm's IPO and 2020.

Neither dollar-weighted returns nor wealth loss is scale-free. For example, a return difference of 5 percentage points means more to a firm with a buy-and-hold return of 5% than to a firm with a buy-and-hold return of 30%.[8] An obvious remedy is to normalize by the buy-and-hold return. However, this approach is not applicable in cases where the buy-and-hold return is zero or negative, which accounts for about 20% of the sample. In contrast, wealth loss can be easily scaled by the market value of shares issued or the firm's market capitalization.[9] Thus we use wealth loss to measure market timing in our multivariate analyses.

At the firm level, investors' wealth loss is firm-specific and time-invariant. Given a price history, it is determined by both the amount issued and the timing of the issuances. It can thus be

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[8] A simple numerical example illustrates the point. Suppose there are two firms, firm 1 and firm 2, and two time periods, from t=0, the IPO date, to t=2. The buy-and-hold returns per period are 5% and 30%, respectively. At t=0, both firms issue 100 shares at $10. Now we show the same degree of market timing at t=1 results in a lower return difference for firm 1, which has a lower buy-and-hold return. The degree of timing is determined by the number of shares issued and the extent to which the issuance price is above the level implied by the long-term buy-and-hold return—call this price deviation. Suppose the two firms issue the same number of shares with the same price deviation: 20 shares at prices that are two times the price implied by the buy-and-hold return, which is $21 for firm 1 and $26 for firm 2. The resulting return differences are 9.1 percentage points for firm 1 and 11.2 percentage points for firm 2. On the other hand, wealth loss is 16.7% of the ending market value of the issued equity for both firms. Simulation shows that, within reasonable parameter ranges and given the number of shares issued, %wealth loss is constant for the same level of price deviation.

[9] The more theoretically appropriate one is to normalize by issued equity. However, normalizing by total market capitalization has the practical advantage of providing an intuitive understanding of the magnitude of wealth loss. Thus, in our main analysis, we normalize by total market capitalization. Our later regression results are robust to normalizing by issued equity.

thought of as a firm-specific variable that captures the firm's timing propensity. We later relate firms' timing propensity to their post-issuance investments, acquisitions, and operating performance.

3.2 Hypothesis Development

We first examine factors that facilitate market timing of equity issuances. When volatility is high, stock prices can rise far above the fundamentals, resulting in opportunities for market timing. Moreover, previous studies report a positive relationship between price run-ups and issuances (Loughran and Ritter, 1995; DeAngelo, DeAngelo, and Stulz, 2010; Sloan and You, 2015). We thus hypothesize:

Hypothesis 1. *Investors' wealth loss is positively associated with pre-issuance stock return volatility and price run-ups.*

In addition to taking advantage of price fluctuations, firms can use aggressive accounting to inflate earnings and boost stock prices, thus proactively creating opportunities for market timing (Teoh, Welch, and Wong, 1998). Due to China's weak investor protection, firms are even more likely to manipulate their earnings prior to issuances (Chen and Yuan, 2004). Hence, we have:

Hypothesis 2. *Investors' wealth loss is positively associated with pre-issuance earnings management.*

We next investigate what firms do with the funds they raise and the implications for economic efficiency. There is an extensive literature examining the impact of the stock market on real activities. This literature, using both aggregate and firm-level data, has yielded mixed conclusions. Blandard, Rhee, and Summers (2003) and Morck, Shleifer, and Vishny (1990) find that, given a firm's fundamentals, market valuation appears to play a limited role, which stands in contrast to the results in Barro (1990). Subsequent firm-level studies report that stock market overvaluation alleviates financial frictions and affects the investments of equity-dependent and financially constrained firms (Baker, Stein, and Wurgler, 2003; Campello and Graham, 2013). On the other hand, the agency theory predicts that free cash flow may be used for empire building. Arguably, managers command greater investment discretion in deploying cash flows obtained from selling overpriced equity. In addition to fixed investments, stock overvaluation has been shown to result in wasteful acquisitions (Jensen, 2005; Schleifer and Vishny, 2003).

In the Chinese setting, where prices are prone to overvaluation and governance is weak, we conjecture that the opportunity to issue overpriced equity is likely to translate into wasteful investments and acquisitions. If so, post-issuance investments should be less responsive to growth opportunities, implying worse subsequent operating performance. The opposite is true, however, if financially constrained firms take advantage of overvaluation. Similar arguments can be made about acquisitions. Thus, we hypothesize:

Hypothesis 3.

(3a) Agency theory: Post-issuance investments and acquisitions are positively related to market timing, and, for firms with greater timing propensity, less sensitive to growth opportunities.

(3b) Financial constraint: The negative impact of market timing on the sensitivity of investments and acquisitions to growth opportunities is weaker among financially constrained firms.

Hypothesis 4.

(4a) Agency theory: Market timing of equity issuance is negatively related to post-issuance operating performance.

(4b) Financial constraint: Market timing of equity issuance is positively associated with post-issuance operating performance among financially constrained firms.

3.3 Data and the Sample

We obtain equity issuance data from WIND. This database provides detailed information on equity issuance including total proceeds, the number of shares offered, and for secondary offerings, the equity-raising method. Accounting data, daily stock prices, number of shares outstanding, and dividend dates, are from the China Stock Market and Accounting Research (CSMAR) database.

We require at least one year of post-issuance data, to avoid annualizing large absolute short-term returns. Thus, our sample contains 3,869 IPOs and 5,488 secondary offerings during 1990–2019. In our multivariate analyses, we consider 2,258 firms with at least one secondary offering. Table 2 presents the amount of equity issuances during 1990–2020. Table 3 displays summary statistics of the pre- and post-issuance characteristics. Variable definitions are in Table A2 in the Appendix.

4. Empirical Findings

4.1 Dollar-Weighted Returns and Investors' Wealth Loss: Magnitudes

For each year during 1995–2020, we compute the buy-and-hold return, the dollar-weighted return, and wealth loss between 1990 and that year. Figure 1 and Panel A of Table 1 demonstrate that the market-level dollar-weighted return has been consistently lower than the buy-and-hold return, except for 2007, the all-time market peak.[10] By the end of 2020, the buy-and-hold return is 11%, whereas the dollar-weighted return is 5.8%. Between 1990 and 2020, wealth loss for investors is 18.7 trillion RMB (2.9 trillion USD), or 23% of the Chinese stock market capitalization at the end of 2020.

[10] Buy-and-hold return at the market level is value-weighted. As discussed in Section 5.3, before the split-share structure reform started in 2005, about two-thirds of the shares were state-related and non-tradable. Thus, the literature has commonly used tradable shares in calculating value-weighted returns, an approach that we follow.

These results are not due to one bad year—their persistence is equally striking. In 10 out of the 20 years during 2001–2020, dollar-weighted returns (calculated with 1990 as the beginning year) are even below the annualized deposit rate of 4%. The return gaps are, with only two exceptions, above 3 percentage points, or twice the international level as reported in Dichev (2007); in 12 out of the past 20 years, they are above 6 percentage points, or four times the international level. Correspondingly, in 17 out of the 20 years, investors' wealth loss is above 10% of total market capitalization.

Panel B of Table 1 reports the results at the firm level. We note that at the firm level, the difference between buy-and-hold and dollar-weighted returns does not account for IPO timing.[11] The average return difference at the firm level is 4.9 percentage points, while wealth loss over the end-of-2020 market capitalization is 35%.

So far, we have reported striking return disparity and investors' wealth loss, fixing the starting year of 1990. A natural question arises: to the extent that institutions may have improved over time, would the return disparity and investors' wealth loss be reduced? To reflect possible regime shifts, we repeat our calculation using every five years between 1995 and 2015 as the beginning year, while fixing 2020 as the ending year. Panel C of Table 1 shows that there is not any consistent pattern that the return disparity (as % of the buy-and-hold return) has declined. This result may not be surprising, since institutional characteristics most relevant for market timing, namely high volatility, short-sale constraint, and investors' protection, have not changed significantly during our sample period.

[11] Firm-level average buy-and-hold return is lower than that at the market level, for two reasons. One is that we include only firms with at least one equity issuance; the other reason is that large firms tend to have higher returns, and the market-level return is value-weighted.

4.2 Cross-Sectional Determinants of Investors' Wealth Loss

To test Hypotheses 1–2, we estimate the following equation:

$$\%Wealth\ Loss = \alpha + \beta\ Vol + \gamma\ Runup + \delta\ EarningMgmt + \theta\ X + \epsilon, \quad (3)$$

where *%Wealth Loss* is *Wealth Loss* in Equation (2) normalized by market cap. *Vol* is the standard deviation of daily stock returns. *Runup* is the cumulative buy-and-hold returns over the 6 months prior to issuance. *EarningMgmt* is measured in two ways. One is total accruals, or the difference between net income and operating cash flow, normalized by the beginning-of-year assets (Aharony, Lee, and Wong, 2000; Allen et al., 2021; Jiang, Lee, and Yue, 2010). The other is discretionary accruals, constructed as the residual of a linear regression of total accruals on firm characteristics (Kothari, Leone, and Wasley, 2005). *X* contains control variables including firm size (log of assets), leverage (debt over assets), age (log of the number of years listed), a dummy for state-owned enterprises (SOEs),[12] and industry dummies. All independent variables are measured at the year prior to issuance and, if a firm has multiple issuances, they are taken as the average across issuances. Hypotheses 1–2 predict that β, γ, and δ are all positive.

Regarding the estimation technique, recall that *%Wealth Loss* in Table 1 is right-skewed with the median only about one-third of the mean, suggesting that the ordinary least squares (OLS) estimators may not be efficient. Therefore, in addition to OLS, we also estimate Equation (3) using median regressions.

Columns (1) and (2) of Table 4 show that, consistent with Hypotheses 1 and 2, stock return volatility, price run-up, and earnings management, as measured by total accruals, all have a significantly positive impact on wealth loss, at the 1% or 10% levels. Similar results are obtained

[12] Following Chen, Chen, Schipper, Xu, and Xue (2012), SOE is defined as firms with the state as its ultimate controlling shareholder. This information is reported in the CSMAR database.

when earnings management is measured by discretional accruals (columns (3) and (4) of Table 4). Interestingly, we do not find the wealth loss of SOEs to be significantly different from other firms. The effects are economically significant: point estimates in column (2) imply that for a one-standard-deviation increase in volatility and price run-up, *%Wealth Loss* increases by 4.7 and 6.8 percentage points, respectively. A one-standard-deviation increase in earnings management, as measured by total accruals and discretionary accruals, increases *%Wealth Loss* by 1.3 and 1.1 percentage points, respectively.

4.3 Market Timing and Post-issuance Investments and M&As

We now investigate how capital raised by selling overvalued equity is used. We first estimate the following equation:

$$\begin{aligned} Inv = \alpha + \beta_1\, FundQ + \beta_2\, \%Wealth\ Loss + \beta_3\, FundQ * High\ Wealth\ Loss \\ + \beta_4\, FundQ * High\ Wealth\ Loss * FinConstraint + \gamma\, X + \epsilon. \end{aligned} \tag{4}$$

Since it is difficult to know how long it takes for firms to invest the proceeds, we examine investments during a three-year time period [*t*, *t+2*], where *t* is the year of issuance. *Inv* is log of one plus the ratio of three-year cumulative post-issuance capital expenditures over pre-issuance assets (Kim and Weisbach 2008). *FundQ* is our measure of growth opportunities, Fundamental Q, which excludes the non-fundamental component of Tobin's Q. *FundQ* is calculated as the predicted value based on coefficients from industry-year regressions of Tobin's *Q* on lagged sales growth and profitability (ROA) (e.g., Goyal and Yamada, 2004; Mortal and Reisel, 2013). *High Wealth Loss* is a dummy variable indicating *%Wealth Loss* above the top quintile. *FinConstraint* is financial constraints, for which we have two measures. One is firm size, which has been shown to be a reliable measure of financial constraints in the international setting (Beck, Demirguc-Kunt, and Maksimovic, 2005). The other is RZ index (Rajan and Zingales, 1998).[13] X contains the usual set of controls, including cash flow (operating cash flow over assets), firm size, SOE dummy, the amount of equity raised, and industry dummies.[14] All independent variables are averaged over the three-year period [*t*, *t+2*]. If a firm has multiple equity issuances, we take the average across issuances. The agency theory predicts $\beta_2 > 0$ and $\beta_3 < 0$ (Hypothesis 3a); the financial constraint hypothesis predicts $\beta_4 > 0$ (Hypothesis 3b).

There is a potential endogeneity concern. Our wealth loss contains information about post-issuance stock return which arguably may be affected by post-issuance investments. To address this concern, we use the instrumental variable (IV) method. Variables we have identified earlier as cross-sectional determinants of wealth loss (Equation (3)), including volatility, price run-up, and earnings management, can naturally serve as instruments.

For both OLS and IV estimation, *%Wealth Loss* enters with a positive and significant sign at the 1% level (columns (1) and (3) of Table 5). Consistent with the agency theory, the interaction between *FundQ* and *High Wealth Loss* is negative and significant at the 1% level in IV estimation (column (4)). The results are economically significant. The point estimates in column (3) imply that a one standard deviation increase in *%Wealth Loss* leads to a 10.2 percentage point increase in investment, which is 38% of the mean investment rate.

[13] The literature has employed a number of measures based both on firm-level characteristics, such as the well-known KZ, WW, and SA indices, and on industry characteristics, as in RZ index. There are, however, controversies surrounding whether firm-level variables, such as size, age, credit rating, and dividend payouts, can really capture financial constraints (Farre-Mensa and Ljungqvist, 2016). Moreover, in an emerging market setting, the applicability of some of the firm-level measures is limited. For example, due to the short history of emerging markets, variation in firm age, as measured by post-IPO age, is by definition small. In the case of China, given that the approval process favors large SOEs (especially during the early years), IPO age poorly measures the real age. Furthermore, the underdevelopment of the bond market means credit ratings are not available for most firms.

[14] As is standard in models with three-way interactions, we also control for *FinConstraint* and its interactions with *FundQ* and *High Wealth Loss.*

Columns (5)–(8) of Table 5 demonstrate that the coefficient on the three-way interaction between *FundQ*, *High Wealth Loss*, and *FinConstraint* is not significant (i.e., $\beta_4 \approx 0$), inconsistent with the financial constraint hypothesis.

Finally, the SOE dummy is not significant across all specifications. Moreover, when we interact the SOE dummy with *%WealthLoss* and with *FundQ * High Wealth Loss*, the interactions are also insignificant (unreported), suggesting market timing affects the investment behavior of SOEs and privately owned firms similarly.

We next examine the relationship between market timing and post-issuance acquisitions, by estimating a negative binomial regression:

$$\begin{aligned} Y = \exp\,(\alpha + \beta_1 FundQ + \beta_2\ \%Wealth\ Loss + \beta_3 FundQ * High\ Wealth\ Loss \\ +\beta_4\ FundQ * High\ Wealth\ Loss * FinConstraint + \gamma\ X + \epsilon). \end{aligned} \tag{5}$$

Y is the number of M&As during the three-year post-issuance period [*t*, *t+2*].[15] Other variables are defined in the same way as in Equation (4). Again, the agency theory predicts $\beta_2 > 0$ and $\beta_3 < 0$ (Hypothesis 3a); the financial constraint hypothesis predicts $\beta_4 > 0$ (Hypothesis 3b).

To address the endogeneity concern, we follow Mullahy (1997) and use the generalized methods of moment (GMM) estimator with the same set of instrumental variables as in Equation (5). The results are qualitatively similar to investments (Table 6). Specifically, the coefficient on *%Wealth Loss* is positive and significant at the 1% level, and the interaction between *FundQ* and *High Wealth Loss* is negative and significant at the 5% level ($\beta_3 < 0$). The result is economically significant: a one-standard-deviation increase in *%Wealth Loss* raises the number of M&As by 1.5, based on the point estimates in column (2).

[15] In our data, the outcome variable is over-dispersed, with the variance greater than the mean. Thus, instead of the Poisson model, we use the negative binomial regression model which is robust to over-dispersed count variables.

Columns (5)–(8) show that the three-way interaction between *FundQ*, *High Wealth Loss*, and *FinConstraint* is not significant, i.e., $\beta_4 \approx 0$, inconsistent with the financial constraint hypothesis.

Finally, we note that the SOE dummy is significantly negative, suggesting that SOEs generally make fewer acquisitions post-issuance. However, when we interact SOE with *%WealthLoss* and with *FundQ * High Wealth Loss*, the interactions are not significant (unreported). Thus the effect of market timing on acquisitions is not different between SOEs and privately owned firms.

4.4 Wealth Loss and Post-issuance Performance

To test the relationship between firms' timing propensity and post-issuance performance (Hypotheses 4a and 4b), we estimate the following equation:

$$Y = \alpha + \beta_1 \,\%Wealth\,Loss + \beta_2 \,\%Wealth\,Loss * FinConstraint + \gamma\, X + \epsilon. \qquad (6)$$

Y is measured as ROA and operating cash flow over beginning-of-year assets—both are the 3-year average over [*t, t+2*]. Other variables are defined in the same way as in Equation (5). The agency theory predicts $\beta_1 < 0$ (Hypothesis 4a) and the financial constraint story predicts $\beta_2 > 0$ (Hypothesis 4b).

Endogeneity concerns might arise, given that *Wealth Loss* contains information about post-issuance stock performance, which in turn may reflect profits. In addition, there may be a selection effect, in that weaker firms may be more likely to issue shares at high prices. We shall note that our earlier analyses, however, already address the endogeneity concern by identifying the mechanism of underperformance, specifically, through inefficient investments and acquisitions. In what follows, we perform two analyses to further rule out the endogeneity bias.

We first examine whether there is a pre-existing trend in performance between high and low wealth loss firms. If there is a long-term trend in performance due to selection, one should observe worse performance of high wealth loss firms prior to issuances. Figure 3 shows that there is no pre-existing trend in performance.

Our second approach is to use the instrumental variable (IV) method. IVs are similar to those in Section 4.3, with the exception of earnings management. To the extent that earnings management reflects "borrowing" from future earnings, it may affect future reported earnings. Columns (1) and (2) of Table 7 show that consistent with the agency theory, *%Wealth Loss* enters with a negative sign and is significant at the 1% level. The point estimates imply that a one-standard-deviation increase in *%Wealth Loss* reduces ROA and operating cash flow, respectively, by 1.4 and 2.2 percentage points. Both effects are substantial, given that the sample mean is 4.2% for ROA and 5% for operating cash flow.

In the last four columns, we add the interaction between *%Wealth Loss* and *FinConstraint*. Inconsistent with the financial constraints hypothesis, the interaction term is not significant ($\beta_2 \approx 0$).

To summarize, wealth loss is positively associated with pre-issuance stock return volatility, price run-up, and earnings management (Hypotheses 1 and 2). We find evidence of the agency theory: (i) firms with greater wealth loss invest more and make more acquisitions after issuance, and their investments and acquisitions are less responsive to growth opportunities (Hypothesis 3a), and (ii) firms with greater wealth loss have worse operating performance (Hypothesis 4a). We do not find support for the financial constraint hypothesis. Taken together, our findings suggest that market timing of equity issuances reduces economic efficiency.

5. Discussions

5.1 Rational Explanations of Underperformance Following Equity Issuances

The literature has proposed a few rational explanations of the long-run underperformance following equity issuances. One is a risk-based explanation that argues that equity issuances represent the exercising of growth options, resulting in an endogenous reduction in risk and thus lower expected returns (Carlson, Fisher, and Giammarino, 2006). The second explanation concerns the textbook Modigniali and Miller leverage effect. Third, when (exogenous) discount rates fall, investment increases, and equity issuances ensue (see e.g., Pástor and Veronesi, 2006). Given our findings that investment responds less to growth opportunities, this explanation is not likely to hold. Thus we consider the first two explanations.

We follow Carlson, Fisher, and Giammarino (2010) and compute monthly betas. Table 8 displays the change in market betas before and after secondary offerings. The average beta increases (not decreases) by 0.02 within 24 months after the issuance (p-value = 0.06). Therefore, risk cannot explain the gap between security and investors' returns, which, given the institutional background, may not come as a surprise.

We now show that the return disparity of 5.2 percentage points is too large to be justified by a (mechanical) drop in leverage due to equity issuances. In the Modigliani and Miller framework, the effect of leverage on expected equity return is:

$$\frac{dE(R_E)}{dL} = E(R_A - R_D), \tag{7}$$

where $E(R_E)$ is the expected return of equity, L is the debt-to-equity ratio, and $E(R_A - R_D)$ is the expected excess return of assets over debts. We use historic averages to measure these quantities. The long-run equity return and deposit rate are 11% and 4%, respectively. Their difference, 7%, constitutes an upper bound of $E(R_A - R_D)$. Thus, a drop in expected equity return of 5.2

percentage points implies the reduction in leverage must be at least 0.74 (= 5.2% / 7%), which is much higher than the post-issuance reduction in leverage of 0.2 (from 1.5 to 1.3) in the actual data.

5.2 Volatility-Driven Return Disparities

We examine to what extent the return disparity may be driven purely by volatility, rather than strategic timing. We first perform a simulation analysis, in which there is no timing and issuances are made every month in an equal amount from IPO to time T. Stock prices follow geometric Brownian motion, with an expected continuously compounded return of 10% and a volatility of 30% per annum, both in line with the actual data. T is 30, similar to the length of the period of 1990–2020, and the relative amount of IPO and secondary offerings is matched with that in the actual data. Panel A of Table 9 shows that the dollar-weighted and buy-and-hold returns are the same in both the mean and the median (columns (1) and (2) of Table 9). Indeed, when stock paths are drawn with independent random sampling, issuances are equally likely to be at high or low points (relative to expected movements), resulting in insignificant return disparity.

In reality, the observed stock path is only one realization of the distribution. The Chinese institutional background implies that prices are more prone to overvaluation. Thus, an equal-issuance strategy may still result in wealth loss for investors. To this end, we re-run the analysis using the actual stock prices.[16] Panel B of Table 9 shows that there is now some return disparity. However, its magnitude, 0.3 percentage points at the market level and 0.9 percentage points at the stock level, is incomparable with that in the actual data (5.2 percentage points and 4.9 percentage points, Table 1). Therefore, volatility alone cannot explain the return disparity.

[16] For a given stock, the amount of each issuance is the total amount of secondary offerings divided by the number of months from IPO to the end of 2020. The number of shares for each issuance is the issuance amount divided by the end-of-month stock price. The calculation accounts for stock dividends and splits.

5.3 Lockup Requirements and Dollar-Weighted Returns

In computing security and investors' returns, we adopt the standard approach of using the closing price on the issuance day in calculating returns, implicitly assuming that the closing price is what secondary market investors can get for the shares issued. However, if there are lockup requirements, this approach may not adequately capture the actual returns of secondary market investors.

This may be a concern in the Chinese market, since regulators impose long lockup requirements. Specifically, IPO shares are subject to a lockup period of 3 months for institutional investors and 12 months for strategic investors. For private placements the lockup period is typically 1 year; but for shares sold to controlling shareholders and strategic investors, it is 3 years.

Another lockup consideration is pre-IPO shares. The lockup period is 1 year for institutional investors and 3 years for controlling shareholders, with one exception. That is, for SOEs listed prior to 2005, state-related shares were not tradable until the split-share structure reform during 2005–2007 converted them into tradable shares (see Liao, Liu, and Wang, 2014). The market value of the shares involved is 4.8 trillion RMB (about 738 billion USD), measured at the time when they become tradable. While the reform does not represent voluntary issuances, the focus of our paper, it could nevertheless affect investors' return experiences.

The difficulty in accounting for the lockup period is that we do not observe when shares are sold after they become tradable. Financial media often reports that imminent expiration of lockups puts pressure on stock prices, implying that shares are sold on or shortly after the lockup expiration.[17] Conceivably, if the holders of the shares do not sell immediately, they are likely to

[17] For example, see https://www.caixinglobal.com/2019-10-23/regulators-mull-new-rules-on-stock-sales-following-ipo-lockups-101474228.html.

wait for a better timing; that is, the resell option value is positive. Thus, a simplifying assumption that all shares are sold at the end of the lockup period is a conservative one, which we adopt.

Based on tradable shares, the dollar-weighted return during 1990–2020 is 6.6%, or 4.2 percentage points below the buy-and-hold return. In the interest of brevity, the results are reported in Table A3 in the Appendix. Wealth loss is around 30 trillion RMB (about 4.6 trillion USD), or 37.5% of the Chinese stock market capitalization at the end of 2020. Moreover, in 9 out of the 20 years during 2001–2020, dollar-weighted returns are below the annualized deposit rate of 4%, and in 12 out of the 20 years, the return disparity is above 6 percentage points. Investors' wealth loss is above 10% of market capitalization in 19 out of the 20 years. Taken together, share tradability does not significantly alter investors' return experiences.

5.4 Alternative Uses of Funds

Apart from investments and acquisitions, firms may use the proceeds from selling overvalued equity for other purposes, such as for precautionary savings, inventory, and debt reduction. To explore these alternative uses of funds, we follow Kim and Weisbach (2008) and distinguish between stock and flow variables. Stock variables include cash and inventory, whereas the reduction of long-term debt is a flow variable. Post-issuance changes in these variables are measured as below:

$$Y^{stock} = \ln\left(\frac{V_{t+2} - V_{t-1}}{Asset_{t-1}} + 1\right),$$
$$Y^{flow} = \ln\left(\frac{V_t + V_{t+1} + V_{t+2}}{Asset_{t-1}} + 1\right), \tag{8}$$

where Y is the variable of interest, and t is the issuance year. We then estimate the following model:

$$Y = \alpha + \beta\ \%Wealth\ Loss + \gamma\ X + \epsilon. \tag{9}$$

In cases where a firm has multiple issuances, the independent variables are taken as the average across issuances. Table 10 shows the coefficients on *%Wealth Loss* are only positively significant for cash savings, suggesting that some of the funds are kept as precautionary savings.

6. Conclusion

This paper documents a striking disparity between security returns and investors' actual returns in China, the world's largest emerging economy. While the annualized buy-and-hold return (BHR) from 1990 to 2020 is around 11%, investors' actual return is merely 5.8%, or 5.2 percentage points lower than the BHR. The resulting investors' wealth loss amounts to 18.7 trillion RMB, or 2.9 trillion USD, about a quarter of the market capitalization of the Chinese stock market at the end of 2020.

These patterns are highly persistent: return gaps are, with only two exceptions, above 3 percentage points, or twice the international level (see Dichev, 2007); in 12 out of the past 20 years, they are above 6 percentage points, four times the international level. In 10 out of the 20 years during 2001–2020, dollar-weighted returns (calculated with 1990 as the beginning year) are even below the annualized deposit rate of 4%. Investors' wealth loss is above 10% of total market capitalization in 17 out of the 20 years.

The large gap between buy-and-hold and dollar-weighted returns is due to market timing of equity issuances. Our firm-level analysis shows that investors' wealth loss is positively associated with factors that make market timing more profitable, including pre-issuance earnings management, price run-up, and stock volatility. We also show that market timing is not a zero-sum game but has real consequences. Specifically, funds raised by issuing overvalued equity are spent on wasteful investments and M&As, resulting in a loss of economic efficiency.

The Chinese market is unlikely to be alone in its striking return disparity and associated inefficient capital allocation. Underpinning market timing of equity issuances is a set of institutional features that is typical of emerging markets, including weak investor protections, poor earnings and audit quality, high volatility, and limited room for short sale. The Chinese results highlight the grave consequences of these institutional characteristics on investor welfare and economic efficiency. Moreover, since stock investors are key providers of capital in modern market economies, dismal investors' returns are likely to hinder capital market development which in turn results in lower economic growth.[18] A cross-country study of the disparity between security and investors' returns in emerging markets worldwide and its economic consequences is a fruitful direction for future research.

[18] The Chinese stock market regulators are aware of the institutional weakness. A new Security Law was introduced in March 2020, which raises disclosure standards and strengthens investor protection by making class action lawsuits more feasible and imposing more significant liabilities on underwriters in case of misbehavior in equity raising. The effect of these new measures is an interesting topic for future research.

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Figure 1. Cumulative Dollar-Weighted and Buy-and-Hold Returns

This figure shows the cumulative market-level dollar-weighted and buy-and-hold returns and deposit rate from 1990 to each year during 1995–2020.

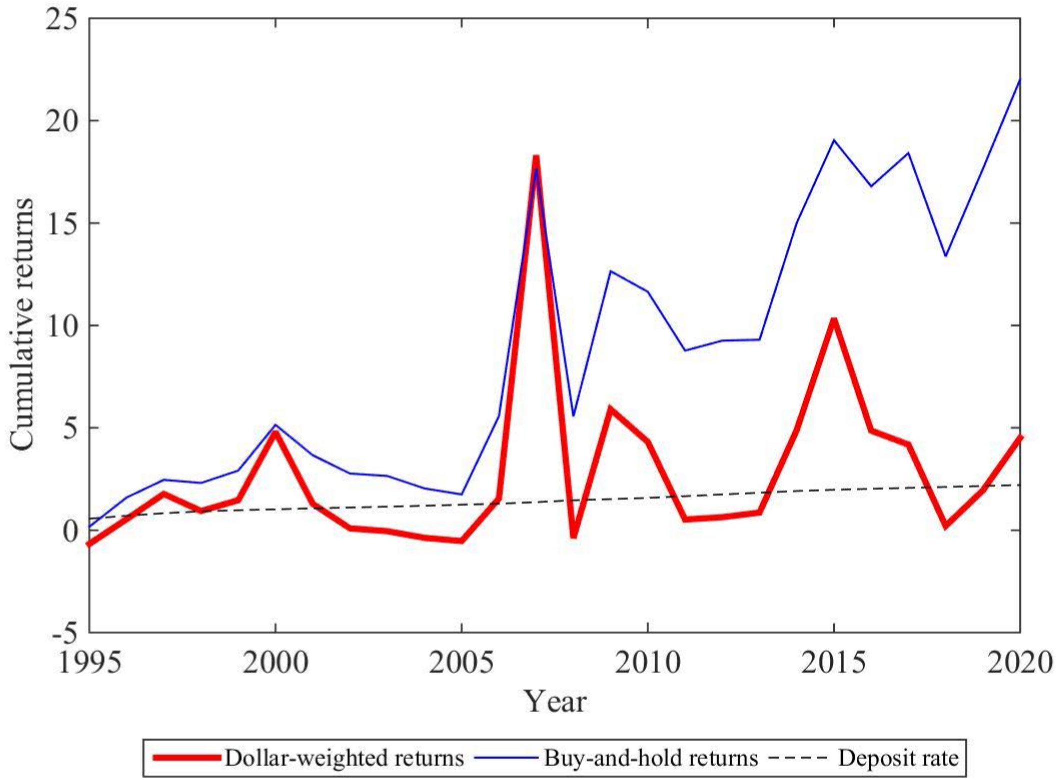

Figure 2. Shanghai Index and the Amount of Equity Raised

This figure plots the aggregate amount of equity raised in the Chinese stock market against Shanghai Index during 1991–2020.

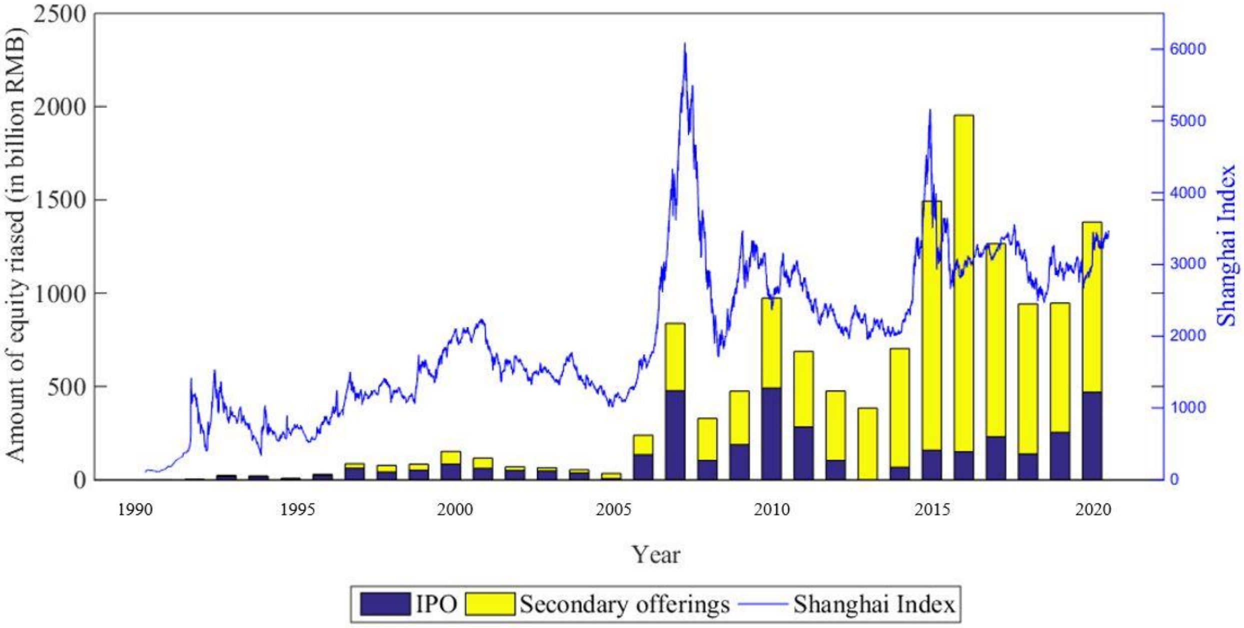

Figure 3. Preexisting Trends in Operating Performance

This figure shows the average ROA and operating cash flow of low- and high-wealth-loss firms around equity issuances. Solid lines are the mean; dashed lines are 95% confidence intervals.

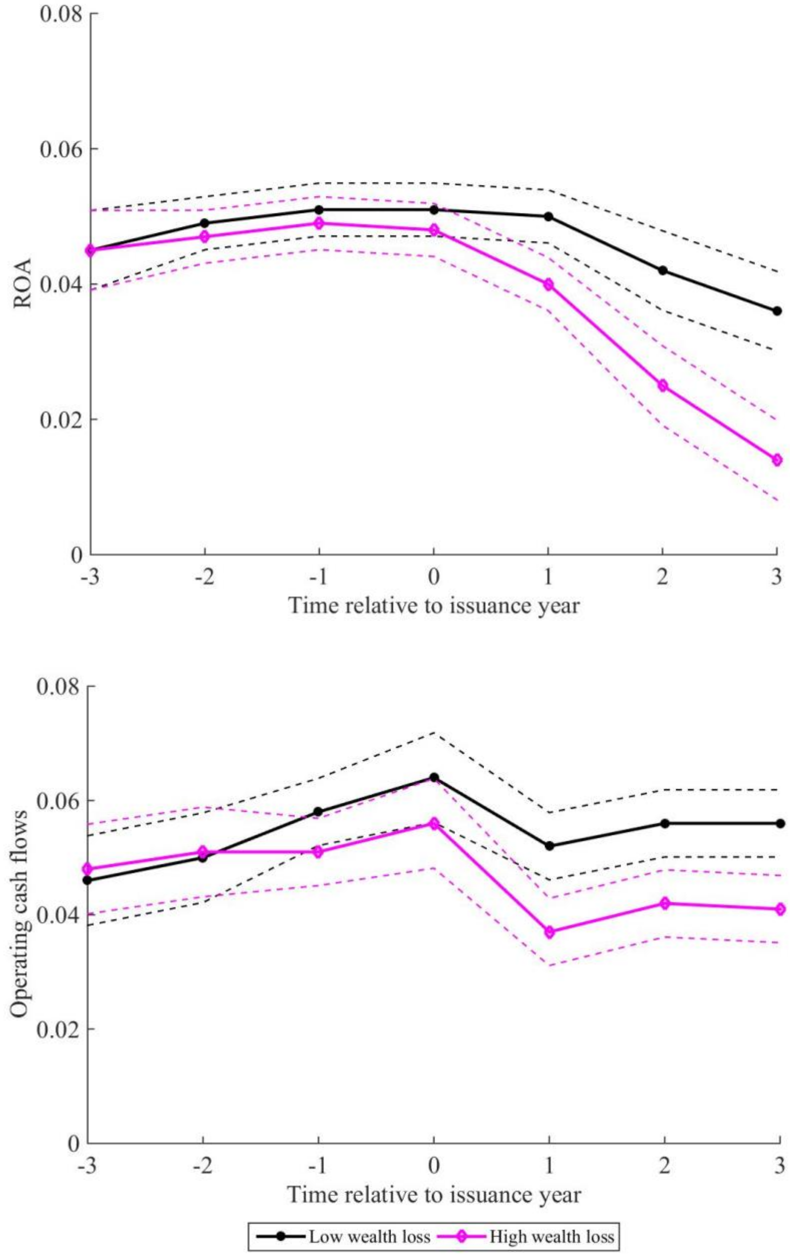

Table 1. Magnitude of Difference between Buy-and-Hold and Dollar-Weighted Returns and Wealth Loss

Panel A presents the annualized market-level BHR, dollar-weighted return, and wealth loss from 1990 to each year during 1995–2020. BHR is the geometric average of cumulative tradable-value-weighted market returns. The measures of dollar-weighted return and wealth loss are described in Section 3.1. Wealth loss is measured in billion RMB in column (4), and normalized by the end-of-year market cap in column (5). Panel B shows the summary statistics of the annualized stock-level BHR and dollar-weighted returns on the sample of firms with secondary offerings. In column (4), %wealth loss is the amount of wealth loss divided by the end-of-period total market cap. Panel C shows the annualized market-level BHR and dollar-weighted return from different starting years to the end of 2020.

Panel A. Market-level results

From 1990 to the end of	Buy-and-hold return	Dollar-weighted return	Difference	Wealth loss	
				Amount	As % market cap
	(1)	(2)	(3)=(1)−(2)	(4)	(5)
1995	3.2%	-19.7%	22.9%	50	63.3
1996	17.2%	7.4%	9.9%	48	19.2
1997	19.4%	15.5%	3.8%	36	7.3
1998	16.1%	8.6%	7.6%	107	19.1
1999	16.4%	10.5%	5.9%	136	17.0
2000	19.9%	19.1%	0.8%	36	2.3
2001	15.0%	7.8%	7.2%	344	25.7
2002	11.7%	0.7%	11.0%	584	49.7
2003	10.5%	-0.4%	10.8%	719	58.3
2004	8.3%	-3.3%	11.5%	839	76.2
2005	7.0%	-4.9%	11.8%	959	68.4
2006	12.5%	6.0%	6.5%	1,118	13.1
2007	18.8%	18.9%	-0.2%	-77	-0.2
2008	11.0%	-2.7%	13.7%	2,777	23.1
2009	14.7%	10.7%	4.1%	2,060	8.5
2010	13.5%	8.7%	4.8%	2,748	10.5
2011	11.5%	2.0%	9.4%	4,772	22.4
2012	11.2%	2.3%	8.9%	5,611	24.6
2013	10.7%	2.7%	7.9%	6,114	25.7
2014	12.2%	7.6%	4.6%	5,885	15.8
2015	12.7%	10.2%	2.6%	4,736	8.9
2016	11.7%	7.0%	4.7%	8,578	16.9
2017	11.6%	6.3%	5.3%	11,557	20.4
2018	10.0%	0.7%	9.3%	16,831	38.8
2019	10.6%	3.8%	6.8%	17,928	30.3
2020	11.0%	5.8%	5.2%	18,666	23.4

Panel B. Firm-level results

	Buy-and-hold return	Dollar-weighted return	Difference	%Wealth loss
	(1)	(2)	(3)	(4)
Mean	7.0%	2.2%	4.9%	34.9
Median	5.0%	1.4%	2.8%	12.8
P25	1.0%	-4.9%	0.4%	1.8
P75	10.0%	7.0%	7.4%	38.5

Panel C. Market-level results from different starting years

Time period	Buy-and-hold return	Dollar-weighted return	Difference	Diff as % BHR
	(1)	(2)	(3)=(1)−(2)	(4)=(3)/(1)
1995–2020	11.5%	5.8%	5.7%	50%
2000–2020	8.6%	5.6%	3.1%	36%
2005–2020	13.6%	6.4%	7.2%	53%
2010–2020	4.9%	4.2%	0.7%	14%
2015–2020	5.6%	3.4%	2.3%	40%

Table 2. Equity Raised in the Chinese Stock Market

This table presents the summary statistics of the amount of equity raised in the Chinese A-share market by year and event. Column (1) shows the total amount of equity raised. Column (2) shows the market capitalization of the A-share market. Columns (4), (6) and (8) show the amount raised from IPO, SEO, RO and private placements, respectively. All amounts are in billion RMB.

Year	Total equity raised	Market cap of tradable shares	Equity raised / lagged market cap	Initial public offerings (IPOs)		Secondary offerings: Secondary equity offerings (SEOs)		Secondary offerings: Rights offerings (ROs) and private placements	
	Amount	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
	(1)	(2)	(3)=(1)/(2)	(4)	(5)=(4)/(1)	(6)	(7)=(6)/(1)	(8)	(9)=(8)/(1)
1991	0	5	n.a.	0	100	0	0	0	0
1992	2	20	45	2	87	0	0	0	13
1993	23	65	119	17	71	0	0	7	29
1994	20	81	31	15	74	1	4	5	22
1995	7	79	9	2	30	0	0	5	70
1996	28	252	36	21	75	0	0	7	25
1997	86	487	34	61	72	0	0	24	28
1998	77	558	16	40	53	3	4	33	43
1999	83	796	15	51	61	6	7	27	32
2000	151	1,560	19	83	55	18	12	51	34
2001	115	1,339	7	61	53	20	18	34	30
2002	69	1,175	5	49	71	15	22	5	7
2003	64	1,235	5	47	74	11	17	6	9
2004	53	1,100	4	36	68	7	13	10	19
2005	33	1,004	3	6	17	27	82	0	1
2006	239	2,367	24	134	56	10	4	94	39
2007	838	9,061	35	477	57	66	8	294	35
2008	329	4,450	4	103	31	46	14	179	55
2009	475	14,946	11	188	40	23	5	264	56
2010	974	19,091	7	491	50	38	4	445	46
2011	687	16,360	4	282	41	29	4	376	55
2012	475	18,014	3	103	22	12	2	361	76
2013	384	19,803	2	0	0	7	2	377	98
2014	703	31,477	4	67	10	0	0	636	90
2015	1,493	41,555	5	158	11	0	0	1,336	89
2016	1,954	39,105	5	150	8	0	0	1,804	92
2017	1,265	44,737	3	230	18	0	0	1,035	82
2018	942	35,247	2	138	15	0	0	804	85
2019	947	48,211	3	253	27	9	1	684	72
2020	1,381	64,230	3	470	34	3	0	909	66
Total	13,898			3,736	27	350	3	9,812	71

Table 3. Summary Statistics of Pre- and Post-issuance Financial Characteristics

This table presents the summary statistics of pre- and post-issuance financial characteristics of firms that have conducted secondary offerings (SEO, RO, and private placements). The variables are measured at the year prior to issuance in Panel A, and measured over a 3-year time window [t, t+2] in Panel B except for *Equity raised.* t is the year of equity issuance. Variable definitions are in the Appendix. If a firm has multiple equity issuances, we take the average across issuances.

Variables	Mean	Median	P 25	P 75	SD
Panel A. Pre-issuance characteristics					
Stock return volatility	0.033	0.032	0.027	0.038	0.009
Price runup	0.214	0.135	-0.025	0.353	0.377
Earnings management					
Total accruals	0.038	0.016	0	0.055	0.056
Discretionary accruals	0.032	0.015	0	0.047	0.044
ln (assets)	21.642	21.489	20.895	22.183	1.166
Leverage	0.605	0.569	0.397	0.754	0.305
Firm age	8.595	7.667	5	11.750	4.600
SOE dummy	0.409	0	0	1	0.492
Panel B. Post-issuance characteristics					
Σ CAPEX	0.270	0.213	0.111	0.357	0.250
M&A count	2.053	1	0	3	2.543
ROA	0.042	0.040	0.019	0.066	0.046
Operating cash flow	0.050	0.047	0.013	0.090	0.067
ln (assets)	22.268	22.109	21.555	22.791	1.131
Equity raised	0.262	0.161	0.076	0.329	0.303
Fundamental Q	2.585	2.540	2.179	2.957	0.597
Δ Cash	0.203	0.129	0.049	0.260	0.325
Δ Inventory	0.159	0.079	0.022	0.182	0.328
Σ Debt reduction	0.043	0.016	0.000	0.052	0.094

Table 4. Cross-Sectional Determinants of Wealth Loss

This table presents the OLS and median regression results for Equation (3) on the sample of firms with secondary offerings. The dependent variable is *%Wealth loss* , defined as the difference between the end-of-period market value of shares issued and a hypothetical market value assuming each cash flow earns the buy-and-hold return since IPO, normalized by the total market cap. *Earnings management* is measured based on total accruals in columns (1) and (2), and based on discretional accruals in columns (3) and (4). More detailed variable definitions are in the Appendix. Standard errors are shown in the parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent variable: %Wealth loss			
	Earnings management measured as total accruals		Earnings management measured as discretionary accruals	
	OLS	Median regression	OLS	Median regression
	(1)	(2)	(3)	(4)
Stock volatility	6.818***	5.508***	6.756***	5.514***
	(0.674)	(0.732)	(0.698)	(0.648)
Price runup	0.285***	0.182***	0.284***	0.183***
	(0.041)	(0.021)	(0.042)	(0.021)
Earnings management	0.379	0.237*	0.273	0.263*
	(0.245)	(0.129)	(0.303)	(0.136)
Leverage	0.227***	0.130***	0.237***	0.130***
	(0.032)	(0.028)	(0.032)	(0.029)
Firm size	-0.057***	-0.022***	-0.059***	-0.023***
	(0.013)	(0.006)	(0.013)	(0.005)
Firm age	0.192***	0.091***	0.190***	0.088***
	(0.023)	(0.013)	(0.024)	(0.012)
SOE dummy	-0.035	-0.002	-0.036	-0.002
	(0.029)	(0.011)	(0.029)	(0.011)
Industry FE	Yes	Yes	Yes	Yes
Observations	2,160	2,160	2,153	2,153

Table 5. Impact of Wealth Loss on Post-issuance Investment

This table presents the OLS and instrumental variable (IV) regression results for Equation (4) on the sample of firms with secondary offerings. The dependent variable is *Post-issuance investment,* measured as log of one plus the ratio of three-year cumulative post-issuance capital expenditures over pre-issuance assets. *%Wealth loss* is the difference between the end-of-period market value of shares issued and a hypothetical market value assuming each cash flow earns the buy-and-hold return since IPO, normalized by the total market capitalization. Financial constraints are measured by pre-issuance firm size in columns (5) and (7), and RZ index in columns (6) and (8). In columns (5)–(8), we also control for *Financial constraints* and its interaction with *%Wealth loss* and *Fundamental Q* . The definitions of other variables are in the Appendix. Standard errors are clustered within industries and shown in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent variable: Post-issuance investment, [t, t+2]							
					Measure of financial constraints			
					Small firm	RZ index	Small firm	RZ index
	OLS		IV		OLS		IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fundamental Q	0.008	0.010	0.003	0.058**	-0.003	-0.005	0.075	0.096
	(0.013)	(0.013)	(0.012)	(0.024)	(0.011)	(0.011)	(0.171)	(0.155)
Cash flow	0.882***	0.881***	1.012***	1.006***	0.852***	0.819***	0.979***	0.791**
	(0.143)	(0.144)	(0.183)	(0.237)	(0.125)	(0.125)	(0.353)	(0.357)
Firm size	0.024**	0.025**	0.019	0.027	0.340***	0.022*	0.282***	0.038
	(0.011)	(0.011)	(0.014)	(0.018)	(0.036)	(0.012)	(0.081)	(0.025)
SOE dummy	-0.005	-0.005	-0.008	-0.005	-0.006	0.001	0.009	0.034
	(0.014)	(0.014)	(0.013)	(0.014)	(0.011)	(0.012)	(0.053)	(0.041)
Equity raised	0.223***	0.224***	0.166***	0.178***	-0.113***	0.208***	-0.099	0.167*
	(0.041)	(0.041)	(0.052)	(0.058)	(0.027)	(0.039)	(0.100)	(0.088)
%Wealth loss	0.055***	0.064***	0.202***	0.700***	0.009	0.065***	1.075	1.209**
	(0.010)	(0.016)	(0.069)	(0.182)	(0.018)	(0.016)	(1.478)	(0.584)
Fundamental Q * High wealth loss		-0.005		-0.258***	0.007	-0.009	-0.550	-0.753
		(0.006)		(0.078)	(0.006)	(0.012)	(1.188)	(0.671)
Fundamental Q * High wealth loss * Financial constraints					-0.052	-0.021	0.506	0.649
					(0.047)	(0.045)	(1.585)	(0.568)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,081	2,081	2,008	2,008	2,081	2,077	2,008	2,004

Table 6. Impact of Wealth Loss on Post-issuance M&As

This table presents the regression results for Equation (5) on the sample of firms with secondary offerings. The dependent variable is the number of M&As during the 3-year post-issuance period. *%Wealth loss* is the difference between the end-of-period market value of shares issued and a hypothetical market value assuming each cash flow earns the buy-and-hold return since IPO, normalized by the total market capitalization. Financial constraints are measured by pre-issuance firm size in columns (5) and (7), and RZ index in columns (6) and (8). In columns (5)–(8), we also control for *Financial constraints* and its interaction with *%Wealth loss* and *Fundamental Q*. The definitions of other variables are in the Appendix. Standard errors are clustered within industries and shown in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent variable: Post-issuance M&As, [*t*, *t*+2]							
					Measure of financial constraints			
					Small firm	RZ index	Small firm	RZ index
	Negative binomial		Mullahy GMM		Negative binomial		Mullahy GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fundamental Q	0.241***	0.234***	0.282***	0.467***	0.223***	0.192**	1.908	1.187**
	(0.081)	(0.079)	(0.071)	(0.140)	(0.083)	(0.075)	(2.044)	(0.552)
Cash flow	-1.251**	-1.243**	-0.684	-0.612	-1.278**	-1.286**	-2.860	-0.458
	(0.561)	(0.557)	(0.536)	(0.605)	(0.561)	(0.562)	(2.055)	(1.114)
Firm size	0.315***	0.314***	0.304***	0.348***	0.791***	0.313***	1.272	0.434***
	(0.041)	(0.040)	(0.034)	(0.042)	(0.123)	(0.040)	(0.856)	(0.090)
SOE dummy	-0.375***	-0.376***	-0.443***	-0.471***	-0.362***	-0.365***	-0.035	-0.536***
	(0.053)	(0.053)	(0.067)	(0.074)	(0.046)	(0.055)	(0.393)	(0.160)
Equity raised	-0.581***	-0.583***	-0.928***	-0.989***	-1.095***	-0.595***	-1.133	-1.296***
	(0.113)	(0.112)	(0.153)	(0.148)	(0.160)	(0.113)	(0.792)	(0.359)
%Wealth loss	0.341***	0.295**	1.210***	3.022***	0.245**	0.320***	4.837	6.913***
	(0.043)	(0.115)	(0.390)	(0.920)	(0.111)	(0.124)	(2.949)	(2.536)
Fundamental Q * High wealth loss		0.026		-0.646**	0.029	0.011	-2.962	-2.265***
		(0.050)		(0.281)	(0.063)	(0.054)	(1.941)	(0.745)
Fundamental Q * High wealth loss * Financial constraints					0.051	0.122	9.085	1.987
					(0.140)	(0.095)	(9.106)	(1.702)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,086	2,086	2,008	2,008	2,081	2,082	2,008	2,004

Table 7. Impact of Wealth Loss on Post-issuance Performance

This table presents the instrumental variable (IV) regression results for Equation (6) on the sample of firms with secondary offerings. The dependent variable is the average ROA during a 3-year period [*t* , *t*+2], or the average operating cash flow (scaled by the beginning-of-year assets) during the same period. %*Wealth loss* is the difference between the end-of-period market value of shares issued and a hypothetical market value assuming each cash flow earns the buy-and-hold return since IPO, normalized by the total market capitalization. Financial constraints are measured by pre-issuance firm size in columns (3)–(4), and RZ index in columns (5)–(6). In columns (3)–(6), we also control for *Financial constraints*. Pre-issuance price runup, volatility, leverage, and age are used as instruments. The definitions of other variables are in the Appendix. Standard errors are clustered within industries and shown in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent variable: Post-issuance performance, [*t* , *t*+2]					
			Measure of financial constraints			
			Small firm		RZ index	
	ROA	Operating cash flow	ROA	Operating cash flow	ROA	Operating cash flow
	(1)	(2)	(3)	(4)	(5)	(6)
%Wealth loss	-0.027***	-0.043***	-0.025**	-0.062***	-0.032**	-0.050***
	(0.008)	(0.011)	(0.010)	(0.017)	(0.013)	(0.016)
%Wealth loss * Financial constraints			-0.004	0.030	0.007	0.011
			(0.012)	(0.019)	(0.015)	(0.011)
Firm size	0.003***	0.009***	0.007***	0.013***	0.003**	0.009***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)
SOE dummy	-0.002	-0.003	-0.001	-0.002	-0.001	-0.002
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
Equity raised	0.017***	0.031***	0.012**	0.025***	0.015***	0.028***
	(0.006)	(0.010)	(0.006)	(0.009)	(0.005)	(0.010)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,041	2,036	2,041	2,036	2,037	2,032

Table 8. Changes in Market Beta around Secondary Offerings

This table presents average changes in market beta around secondary offerings for different types of equity issuance events. Market beta is computed using the market- and stock-level daily returns of each month before and after issuance. t is the month of issuance. Standard errors are calculated by using the bootstrapping method and are shown in parentheses.

	$\beta[t]-\beta[t\text{-}24]$	$\beta[t+12]-\beta[t\text{-}12]$	$\beta[t+24]-\beta[t]$
	(1)	(2)	(3)
All secondary offerings	-0.008	0.052	0.019
	(0.010)	(0.011)	(0.010)
Seasoned equity offerings (SEOs)	-0.083	0.078	0.130
	(0.062)	(0.036)	(0.045)
Rights offerings (ROs)	-0.052	-0.013	0.061
	(0.027)	(0.033)	(0.020)
Private placements	0.004	0.065	0.002
	(0.016)	(0.015)	(0.015)

Table 9. Volatility-Driven Disparity between Buy-and-Hold and Dollar-Weighted Returns

This table reports the simulation results of an equally-distributed issuance strategy in which secondary offerings are made in equal amount at the end of every month after IPO till the end of the period. Panel A compares the buy-and-hold and dollar-weighte returns assuming that stock prices follow a lognormal distribution. Panel B reports the results of the equally-distributed issuance strategy using the actual price realization.

Panel A. Analyses based on simulated stock prices

Assumptions:	
Number of years (T)	30
Expected annualized return	10%
Expected annualized volatility	30%
Amount of IPO	3,700
Amount of secondary offerings	10,000
Number of simulations	1,000

	Mean	Median
	(1)	(2)
Buy-and-hold return	10.0%	10.0%
Dollar-weighted return	10.0%	10.0%
Difference	0.0%	0.0%
p-value (H_0: BHR = DWR)	0.405	0.388

Panel B. Analyses based on actual stock prices

	Buy-and-hold return	Dollar-weighted return	Difference
	(1)	(2)	(3)=(1)−(2)
Market-level results	11.0%	10.7%	0.3%
Stock-level results			
Mean	7.0%	6.1%	0.9%
Median	5.0%	4.6%	0.2%

Table 10. Impact of Wealth Loss on Other Post-issuance Activities

This table presents the OLS regression results for the relationship between %*Wealth loss* and Post-issuance cash saving, inventory change, and debt reduction. %*Wealth loss* is defined as the difference between the end-of-period market value of shares issued and a hypothetical market value assuming each cash flow earns the buy-and-hold return since IPO, normalized by the total market capitalization. The definitions of other variables are in the Appendix. Standard errors are clustered within industries and shown in parentheses. Significance at the 1%, 5%, and 10% levels is indicated by ***, **, and *, respectively.

	Dependent variables: Post-issuance activities, [*t*, *t*+2]		
	Cash saving	Inventory change	Debt reduction
	(1)	(2)	(3)
%Wealth loss	0.056***	0.022	0.005
	(0.018)	(0.022)	(0.005)
Cash flow	0.842***	-0.180	0.019
	(0.098)	(0.106)	(0.040)
Leverage	0.394***	0.494***	0.098***
	(0.062)	(0.107)	(0.010)
Firm size	-0.013	-0.010	-0.008
	(0.010)	(0.010)	(0.005)
SOE dummy	0.013	-0.004	0.003
	(0.022)	(0.029)	(0.003)
Equity raised	0.391***	0.261***	0.010
	(0.038)	(0.065)	(0.018)
Industry FE	Yes	Yes	Yes
Observations	2,014	2,005	2,081

Appendix

Table A1. Differences between Buy-and-Hold and Dollar-Weighted Returns for NASDAQ

This table presents the annualized market-level buy-and-hold and dollar-weighted returns for the NASDAQ market from 1973 to each year during 2001–2020.

From 1973 to the end of	Buy-and-hold return (1)	Dollar-weighted return (2)	Difference (3) = (1) − (2)
2001	11.4%	8.5%	2.9%
2002	9.6%	4.2%	5.5%
2003	10.8%	7.5%	3.2%
2004	10.7%	7.7%	3.0%
2005	10.5%	7.3%	3.2%
2006	10.5%	7.5%	3.0%
2007	10.4%	7.6%	2.8%
2008	8.6%	4.1%	4.5%
2009	9.4%	6.1%	3.4%
2010	9.6%	6.6%	3.0%
2011	9.4%	6.3%	3.1%
2012	9.6%	6.8%	2.8%
2013	10.2%	7.9%	2.3%
2014	10.3%	8.2%	2.1%
2015	10.3%	8.1%	2.1%
2016	10.2%	8.2%	2.1%
2017	10.6%	8.8%	1.8%
2018	10.3%	8.4%	1.9%
2019	10.8%	9.2%	1.7%
2020	11.4%	10.0%	1.4%

Table A2. Variable Definitions

Variable Name	Definition
Pre-issuance price run-up	The cumulative buy-and-hold returns (with dividends) 6 months before equity issuance. Winsorized at the 1% and 99% levels.
Pre-issuance volatility	The standard deviation of daily stock returns over the year before equity issuance. Winsorized at the 1% and 99% levels.
Pre-issuance earnings management	The amount of total accruals and discretionary accruals in year before equity issuance. Total accruals are the difference between net income and cash flow from operating activities. Discretionary accruals are the residual of each industry-and-year regression of the equation below: $TA_{it} = \beta_0 + \beta_1 * \left(\frac{1}{Asset_{it-1}}\right) + \beta_2 * (\Delta REV_{it} - \Delta AR_{it}) + \beta_3 * PPE_{it} + \beta_4 * ROA_{it} + \epsilon_{it}$, where TA_{it} is the total accruals scaled by the beginning-of-year assets, $\Delta REV_{it} - \Delta AR_{it}$ is the change in sales minus the change in account receivables, scaled by the beginning-of-year assets, PPE_{it} is the fixed assets scaled by the beginning-of-year assets, and ROA_{it} is the return on assets (Kothari, Leone, and Wesley 2005). Observations are dropped if there are less than 10 stocks in the industry-year regression group. Total or abnormal accruals are assumed to be 0 if they are negative. Winsorized at the 1% and 99% levels.
Post-issuance investment	Log of one plus the ratio of three-year cumulative post-issuance investment over pre-issuance assets: ln $[(I_t + I_{t+1} + I_{t+2})/Asset_{t-1}+1]$, where t is the year of issuance, and I_t is the amount of cash paid to acquire fixed assets, intangible assets and other long-term assets in year t (Kim and Weisbach, 2008).
Post-issuance M&A	The number of M&A during the 3-year post-issuance period [t, t+2]. Winsorized at the 1% and 99% levels.
Post-issuance ROA	Operating income divided by assets. Averaged over a 3-year time window [t, t+2] and winsorized at the 1% and 99% levels.
Post-issuance operating cash flow	Cash flow generated from operating activities divided by the beginning-of-year assets. Averaged over a 3-year time window [t, t+2] and winsorized at the 1% and 99% levels.
Fundamental Q	The predicted value of Tobin's Q (market value of assets divided by book value of assets) based on coefficients from industry-year regressions of Tobin's Q on lagged values of sales growth and profitability (ROA) for each industry and year. Averaged

	over a 3-year time window [t, t+2], and winsorized at the 1% and 99% levels.
Financial constraints	We used two measures of financial constraints. The first is based on firm size. A firm is defined to be financially constrained if its total assets in the year prior to equity issuance are below industry median. The second is RZ index that maps the US SIC code onto the Chinese industry classification made by the CSRC. We then construct a dummy variable to indicate whether an industry's dependence on external finance is greater than the median across industries.
Leverage	Total liability divided by the beginning-of-year assets. Winsorized at the 1% and 99% levels.
Firm size	Log of total assets. Winsorized at the 1% and 99% levels.
Firm age	Log of number of years the firm has been listed at the time of equity issuance.
Equity raised	Log of one plus the ratio of total amount of equity raised over pre-issuance assets: ln ($Equity\ raised_t/Asset_{t-1}$+1).
SOE dummy	A dummy variable that equals 1 if the state is the ultimate controlling shareholder, and 0 otherwise.
Post-issuance cash saving	Log of one plus the change in cash normalized by assets prior to the issuance: ln [($Cash_{t+2} - Cash_{t-1})/Asset_{t-1}$+1], where t is the year of issuance.
Post-issuance inventory change	Log of one plus the change in inventory normalized by assets prior to the issuance: ln [($Inventory_{t+2} - Inventory_{t-1})/Asset_{t-1}$+1], where t is the year of issuance.
Post-issuance debt reduction	Log of one plus the accumulation of debt reduction since the secondary offering, normalized by assets prior to the issuance: ln [($D_t + D_{t+1} + D_{t+2})/Asset_{t-1}$+1], where t is the year of issuance. D_t is the absolute value of change in long-term debt if the amount of long-term debt decreases from year t-1 to year t, and zero otherwise.

Table A3. Dollar-Weighted Returns and Wealth Loss Accounting for Lockup Periods

This table presents the annualized market-level buy-and-hold return, dollar-weighted return, and wealth loss from 1990 to each year during 1995–2020, after accounting for the lockup requirements for shares issued in IPOs and secondary offerings. The measures of dollar-weighted returns and wealth loss are described in section 3.1. Wealth loss is measured in billon RMB in column (4) and normalized by the end-of-year market cap in column (5).

				Wealth loss	
From 1990 to the end of	Buy-and-hold return	Dollar-weighted return	Difference	Amount	As % market cap
	(1)	(2)	(3)	(4)	(5)
1995	3.2%	-20.0%	23.2%	56	71.1
1996	17.2%	5.8%	11.4%	62	24.6
1997	19.4%	12.2%	7.2%	75	15.3
1998	16.1%	6.5%	9.6%	146	26.2
1999	16.4%	8.8%	7.6%	185	23.2
2000	19.9%	17.2%	2.7%	125	8.0
2001	15.0%	7.3%	7.7%	375	28.0
2002	11.7%	0.6%	11.1%	592	50.4
2003	10.5%	-0.7%	11.1%	723	58.6
2004	8.3%	-3.5%	11.7%	826	75.1
2005	7.0%	-5.2%	12.2%	941	67.1
2006	12.5%	5.4%	7.0%	1,165	13.7
2007	18.8%	17.6%	1.2%	558	1.7
2008	11.0%	-3.9%	14.9%	2,853	23.7
2009	14.7%	10.1%	4.7%	2,428	10.1
2010	13.5%	6.4%	7.1%	4,387	16.7
2011	11.5%	-3.4%	14.8%	9,435	44.3
2012	11.2%	-2.2%	13.3%	11,894	52.0
2013	10.7%	-1.8%	12.4%	14,322	60.3
2014	12.2%	6.3%	5.9%	11,987	32.2
2015	12.7%	8.8%	3.9%	11,339	21.4
2016	11.7%	6.1%	5.6%	17,403	34.3
2017	11.6%	6.3%	5.3%	20,352	35.9
2018	10.0%	2.1%	7.9%	28,515	65.7
2019	10.6%	4.7%	5.9%	29,720	50.2
2020	11.0%	6.6%	4.4%	29,913	37.5