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# Dissecting the Long-Term Performance of the Chinese Stock Market

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## ABSTRACT

Domestically listed Chinese (A-share) firms have lower stock returns than externally listed Chinese, developed, and emerging country firms during 2000 to 2018. They also have lower net cash flows than matched unlisted Chinese firms. The underperformance of both stock and accounting returns is more pronounced for large A-share firms, while small firms show no underperformance along either dimension. Investor sentiment explains low stock returns in the cross-country and within-A-share samples. Institutional deficiencies in listing and delisting processes and weak corporate governance in terms of shareholder value creation are consistent with the underperformance in stock returns and net cash flows.

THE CHINESE ECONOMY HAS GROWN significantly over the past 40 years. For example, while in 1980, China's gross domestic product (GDP) was around 11% of that of the United States measured in constant dollars, by the end of 2018, China was the world's largest economy in purchasing power parity

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(PPP) terms and was about 23% larger than the ecnomy of the United States.[1] In the post-WWII era, the Asian economies of Taiwan and South Korea also grew significantly with per-capita GDP in PPP terms rising from levels similar to African countries in 1950 to surpass Spain and Italy (South Korea) and Germany, France, and the UK (Taiwan) by the end of 2018. The path of China's growth in per capita GDP, starting in 1980, closely tracks those of Taiwan and South Korea starting in 1960. Despite being a much larger economy, China has performed better at the 38-year mark along the growth trajectory than these two economies. It seems likely that the impressive growth of such a large economy has far exceeded expectations of most investors and pundits worldwide.[2] Given economic growth significantly above expectations, it might be expected that the stock market will also have outperformed.

The Chinese stock market started in 1990 with the establishment of two domestic stock exchanges (the "A share" market): the Shanghai Stock Exchange (SSE hereafter) and the Shenzhen Stock Exchange (SZSE). The number of listed firms has been growing since then, with today more than 4,000 firms listed in the two exchanges. The A-share market is the second largest in the world in terms of total market capitalization, trailing only the U.S. equity markets. Due to stringent listing requirements in the domestic market, among other reasons, a large number of Chinese firms are listed externally, mostly in the Hong Kong Exchange (HKEX), which follows regulations similar to those in the United States and is open to global investors. The second most popular external IPO destination for Chinese firms is the United States.[3]

Despite the performance of the Chinese economy being arguably above expectations, listed firms in the domestic A share market have performed rather poorly, while externally listed Chinese firms have performed much better. Matched (by industry and size) *unlisted* Chinese firms have also significantly outperformed A share firms in terms of *net cash flows* (= EBITDA – Income Taxes – Changes in Working Capital – Capital Expenditure, scaled by Total

[1] GDP in 1980 comes from the IMF. According to the Maddison project, China's GDP was around 25% of that of the United States in constant dollars terms in 1980 (see http://www.ggdc.net/maddison/oriindex.htm). For 2018 GDP in PPP terms, see https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/index.aspx.

[2] For example, the *Economist* (2018) comments in a lead article "China has grown rich beyond anybody's imagining." See Figures IA.1 and IA.2 in the Internet Appendix for the comparisons of per capita GDP growth of these three economies, as well as the cumulative returns of the stock indices.

[3] At the end of 2020, around 70% of the total market capitalization of HKEX is composed of firms from Mainland China. Shortly after the news broke out in April 2020 that Luckin Coffee, a U.S. listed Chinese firm, committed accounting fraud, the "Holding Foreign Companies Accountable Act" was introduced. Signed into law in December 2020, the Act requires that all (foreign) companies listed on U.S. stock exchanges submit to audits reviewable by the U.S. Public Company Accounting Oversight Board, and specifies that noncomplying firms can be delisted after three years. Since 2020, Luckin Coffee and a number of Chinese state-owned enterprises (SOEs) have been delisted from the United States, while some other Chinese firms, including Alibaba and JD.com, have conducted secondary offerings in the HKEX (see, for example, "Countdown Starts on Chinese Company Delistings After Long U.S.-China Audit Fight," *Wall Street Journal*, October 2, 2021).

Assets). These two groups of firms both operate in mainland China and are subject to the same institutional and economic factors as A share firms, apart from stock market listing.

During the period of 1992 to 2018, China's GDP grew by a factor of eight in real terms, much faster than other large economies. By contrast, the Shanghai Composite Index has been one of the worst performing indexes among large equity markets, and its performance is similar to the Nikkei from Japan. The Shanghai Composite rose sharply after its establishment but fell dramatically subsequently in real terms; this was in part due to high inflation in the early 1990s. Moreover, many securities laws and regulations were introduced and implemented after 2000, and the pace at which new firms were added to the exchanges (SSE and SZSE) slowed down after 2000.

For these reasons, we focus on the period from January 1, 2000 to the end of 2018 for most of the firm-level analyses in the paper. The Chinese economy grew by a factor of 4.8 in real terms over this period, still much faster than the rest of the large economies, including India, Brazil, Japan, and the United States. Firm-level, cross-country regressions indicate that A share firms underperform a large set of listed firms from both developed and developing countries by 15.0% per annum. In contrast, externally listed Chinese firms' performance is on par or better than the same set of listed firms from other countries during 2000 to 2018. In terms of cumulative, "buy and hold" returns, the performance of the A share market is the worst among the group of large countries. The cumulative returns of the A share market are lower than those of five-year bank deposits or three- and five-year government bonds in China, and investors in the domestic stock market earned essentially zero net return in real terms.

We find that A-share listed firms have much higher levels of investment (Capital Expenditure, scaled by Total Assets) than that of matched unlisted Chinese firms and listed firms from other developed and developing economies. However, A-share firms' net cash flows are lower than those of unlisted Chinese firms and listed firms from other countries. Similar results obtain when comparing large A-share firms and matched externally listed Chinese firms. These results suggest that A-share firms suffer investment inefficiencies. Interestingly, the underperformance of A-share firms in both stock returns and accounting measures, relative to other groups of firms, is more pronounced for large-cap (largest 30%) firms, while small-cap (smallest 30%) firms, on the other hand, do not underperform in terms of stock returns or accounting measures as compared to the same groups of firms.

The observations above raise several questions. First, what factors explain the operating performance gap of A-share firms relative to matched unlisted Chinese firms and listed firms from other countries? Second, why are the long-term returns of the world's second largest stock market lower than those of externally listed Chinese firms and listed firms from developed and emerging markets? Third, what can explain the substantial performance gaps between small- and large-cap stocks within the A-share market? In this paper, we seek to shed light on these questions by analyzing both stock and accounting

returns. This approach allows us to depict a more complete and nuanced picture of how the performance gaps of the A share market vary across firms, and the factors that explain such performance gaps relative to existing papers. As a component of our empirical strategy, we are the first in the literature to build a comprehensive data set of externally listed Chinese firms.

We start by developing a simple model with an infinite horizon and risk-neutral investors to study possible explanations for the low returns and cash flows of A-share firms. There are two types of listed firms, namely, "A-share" firms and externally listed firms. The two types of firms have the same discount rate, which comes from the return on an alternative asset. The A-share firms operate in an environment with weak institutions, are poorly governed, and have a low growth rate of cash flows, while the externally listed firms operate in a strong institutional environment, are well governed, and have a high growth rate of cash flows. We consider three versions of the model. In the first, investors have common beliefs about the likelihood of market-wide institutional reforms and the governance improvements. When such reforms occur, A-share firms' growth rate of cash flows rises to the high level, increasing these firms' valuations. The prospect of such reforms pushes stock prices of A-share firms higher than they would be otherwise, and reduces returns to below the cost of capital. Thus, the first version of the model is consistent with the lower returns of A-share firms relative to externally listed Chinese firms. When we also calibrate the model with growth data for the two groups of firms during the sample period, we find that the "jump" in returns and valuations after the reforms can be substantial.

The second version of the model is behavioral, in the sense that investors have heterogeneous beliefs about the likelihood of reforms and face short-sale constraints, similar to Scheinkman and Xiong (2003) and Simsek (2021). We show that there is an equilibrium in which only optimistic investors, that is, investors who believe that the reforms will occur with a higher probability invest in the representative stock. Realistic investors, in contrast, value the stock less than the alternative asset and only hold the latter. Similar to the case with common beliefs, as long as reforms do not occur, low returns on the stock, as priced by the optimistic investors, will persist.

The third version of the model considers the role of "financial repression,"—whereby the policy maker sets interest rates for household savings artificially low in support of lending and investment in other sectors of the economy. Prior research shows that financial repression, which is widespread in developing economies, has adverse effects on economic efficiency and growth (e.g., McKinnon (1973), Shaw (1973), Roubini and Sala-i-Martin (1992)). In this version, we assume that repression policies lower the return on the risk-free asset compared to what the market rate would be absent such policies. Given segmented markets, this return is also lower than the risk-free return in external markets, where foreign firms and externally listed Chinese firms are listed. The stock returns of domestically listed firms will again be lower

than those of externally listed firms as long as financial repression and capital controls are in place.[4]

Based on the first two versions of the model, we develop two hypotheses that can explain the poor performance of A-share firms relative to the other groups of firms. First, a weak institutional domestic environment and weak corporate governance can explain poor performance in terms of both stock returns and accounting measures. Second, domestic investors' behavioral biases can explain low stock returns in the A-share market.

With respect to the first hypothesis, we argue that problematic listing and delisting processes lead to adverse selection of firms in the A-share market. Each listed firm must be approved by the China Securities Regulation Commission (CSRC, equivalent to the Security Exchange Constitution [SEC] in the United States) and must show profits in two or three consecutive years leading up to the IPO application year to satisfy CSRC's listing standards. Note that one of the stated purposes of establishing the stock market was to promote the privatization of SOEs by helping them raise funds through capital markets. Hence, SOEs, firms from government-supported industries, and those with connections to the regulators are more likely to be listed, whereas privately owned firms, especially those in new growth industries without high current profitability, face much higher hurdles.

Among firms that are able to list in the A-share market, their performance falls sharply following IPO. In particular, average return on assets (ROA) drops from 13% pre-IPO to just above 6% post-IPO, which is larger than the drop in ROA of listed firms from other markets. Our evidence also suggests that large A-share firms engage in earnings management prior to issuance, and that the extent of earnings management activity pre-IPO is greater than that for U.S. firms, other emerging market firms, and externally listed Chinese firms. The net cash flows of A-share firms are also lower than those of matched unlisted firms. These results indicate that the best-performing firms within an industry are not always the ones that enter the A-share market. Rather, listed firms prop up their performance to clear the IPO hurdle, but such performance is not sustainable post-IPO.

Further, once listed, firms are rarely delisted from the exchanges in China, and the "shell" of a listed firm is valuable (e.g., Liu, Stambaugh, and Yuan (2019)) given the difficult listing process. After two consecutive years of losses, A-share firms are labeled "ST" (special treatment) but remain listed and continued to be traded on the exchanges. Compared to delisted firms from the United States, including delisted Chinese firms, ST firms in China experience a similar or greater drop in performance (ROA and return on equity [ROE]) during the five-year period preceding the ST designation than U.S. firms prior to delisting. Thus, by not removing poor-performing firms from the A-share market, they exacerbate the adverse selection problem.

[4] We provide some preliminary evidence consistent with the predictions of this version of the model in Section III below, where we compare real interest rates in China and other economies.

Our first hypothesis also suggests that weak corporate governance, in terms of motivating firm management to increase value for all shareholders, is consistent with the underperformance of A-share firms. As noted above, these firms enjoy higher levels of investment than their counterparts in other countries (post-IPO) but observe lower net cash flows, consistent with low investment efficiency, which can result from weak corporate governance. Multivariate analysis shows that the ratio of A-share firms' annual net cash flows over assets is significantly lower than that of matched unlisted Chinese firms and is also lower than that of listed firms from other countries. Lower net cash flows are also associated with more related-party transactions (RPTs) for A-share firms, a proxy commonly used in the literature for tunneling by controlling shareholders.[5]

Following prior literature (e.g., Gompers, Ishii, and Metrick (2003), Cremers and Nair (2005)), we create a governance index that includes ownership concentration, insider ownership, and board structure (board size and CEO's role). We find that this governance index is correlated with (future) stock and accounting returns in the cross-country sample of listed firms. Within the sample of A-share firms, we add two dimensions—state ownership and the extent of insider tunneling, based on the RPT variable—to create an A-share governance index. The latter governance index can explain variation in stock returns and accounting performance across A-share firms.

Some of the results above are also consistent with our second hypothesis based on investor behavioral biases, as illustrated by Xiong and Yu (2011), among others. The authors study prices and trading of a set of put warrants written on A-share stocks during 2005 to 2008. The boom in the stock market pushed most of these warrants deep out-of-the-money, yet they traded at significantly inflated prices and their returns are uncorrelated with those of the underlying stocks. The authors conclude that the prices cannot be justified by rational expectations of the representative investor and highlight the effects of short-sale constraints and heterogeneous beliefs in driving the warrant bubble.

If a significant fraction of A-share investors do not fully understand the institutional background of reforms or the effects of insider activities of listed firms, but remain optimistic about firm prospects, stock prices can be higher and returns lower than when investors have rational expectations. Insider activities include earnings management around IPOs, the process leading up to firms receiving ST status and subsequent restructuring, and large-scale investment projects. As a result, the price of stocks around important events and of poorly governed firms is inflated, leading to lower subsequent returns.

We follow prior literature (e.g., Mei, Scheinkman, and Xiong (2009), Baker, Wurgler, and Yuan (2012), Jia, Wang, and Xiong (2017)) and construct investor sentiment measures at the market and firm level. We find that higher sentiment levels are associated with lower subsequent stock returns in both the cross-country sample and the A-share sample. We next pool all institutional

[5] Cheung, Rau, and Stouraitis (2006), Fisman and Wang (2010), Jiang, Lee, and Yue (2010), and Li et al. (2020), among others, all find evidence of tunneling activities among listed Chinese firms.

factors, including deficiencies in the IPO process (proxied by the drop in ROA around IPO), the governance indexes (in both the cross-country sample and the A-share sample), and the behavioral factors into a unified framework to examine stock returns in both the cross-country and the A-share samples. Investor sentiment (at the market level) is the dominant factor in explaining the underperformance of A-share stocks in the cross-country sample. The cross-country governance index and the post-IPO performance decline are also contributing factors. Within the A-share sample, both the A-share governance index and investor sentiment (based on turnover at the stock level) are important factors in explaining the variation in returns. Moreover, the A-share governance index can also explain differences between large and small firms in both stock and accounting returns.

The normative implication of our results is that the CSRC should reform the IPO procedure to move toward a market-oriented process and encourage the listing of privately owned firms, particularly those in growth industries. The CSRC should also enforce delisting of poorly performing firms.[6] Most importantly, the regulators need to continue improving the investor base by encouraging more institutional investors in the market to eliminate investor biases and increase firms' investment efficiency by strengthening corporate governance. Taken together, these measures can improve the mixture of firms in the market and in turn resource allocation and returns to all shareholders.

Our paper extends the literature on the benefits of foreign listing in developed markets for firms from emerging markets (e.g., Doidge, Karolyi, and Stulz (2004, 2007)). As Coffee (1999, 2002) points out, listing in a developed market, such as the United States, provides a "bonding" mechanism for firms from emerging markets, where corporate governance is generally weak. We confirm these results by documenting the performance gaps between domestically and externally listed Chinese firms. We demonstrate that deficiencies in the domestic market, including problematic IPO and delisting processes and weak corporate governance, as well as investors' behavioral biases contribute to the gaps between domestic and externally listed Chinese firms.

Our work also contributes to a growing literature on the Chinese equity markets. Liu, Stambaugh, and Yuan (2019) show that the Fama-French three-factor model, with appropriate adjustments, can explain most reported anomalies in the A-share market. Hu et al. (2019) find a significant size effect but no robust value effect. Hu, Pan, and Wang (2021) find that while large stocks underperform other groups of stocks in the A-share market and their counterparts in the United States, small A-share stocks actually deliver higher

[6] The CSRC initiated a pilot program using a registration system similar to those used in Hong Kong and the United States to select and list firms from a set of technology industries in the SSE in 2019. The Science and Technology Innovation Board (STAR) also includes strict implementation of the delisting of poor-performing firms and firms found to have committed accounting fraud. This registration system was extended to the Growth Enterprise Market (GEM) board of the SZSE in 2020, the newly established Beijing Stock Exchange in 2021, and the rest of the boards, including the Main Boards of both SSE and SZSE, in February 2023. See the CSRC's website, http://www.csrc.gov.cn/pub/zjhpublic/zjh/201901/P020190130725847011706.pdf, for more details.

returns. Carpenter, Lu, and Whitelaw (2021) examine the informativeness of stock prices for future profits, and the responsiveness of future investments on current profits and market prices for the period 1995 to 2016 using *cross-sectional* tests. They find that both price informativeness and investment responsiveness in the A-share market have reached levels similar to those in the United States.

Similar to Hu et al. (2021), we also document the contrast between large and small stocks in terms of stock returns. In addition, we examine the factors that can explain the gaps in operating performance between these two groups of firms. In contrast to Carpenter et al. (2021), we examine the performance gaps in accounting and stock returns between A-share firms and other groups of firms, including externally listed firms and matched unlisted Chinese firms. We also provide a unified framework to examine two sets of factors—institutional deficiencies and investors' behavioral biases—in both the model and empirical tests. We show that weak corporate governance can explain the difference along both dimensions. Finally, we also show that rational expectation asset pricing factors—such as risk-free rates and firms' (risky) discount rates, risk as proxied by stock betas and volatilities of stock returns, and firm valuation as proxied by market-to-book (M/B) ratios—cannot explain the underperformance of the Chinese A-share market relative to markets from large advanced and emerging markets or relative to externally listed Chinese firms.

The paper is organized as follows. In Section I, we introduce our data sets and study the performance of the A-share market as well as other equity markets around the globe. In Section II, we develop a model that generates different sets of predictions on stock returns and cash flows. In Section III, we empirically test the predictions of the model and examine the reasons for the poor performance of the A-share market and firms. Section IV concludes. Appendix A contains definitions of the variables used in empirical tests, while Appendix B details the procedures used to identify externally listed Chinese firms. The Internet Appendix reports additional results.[7]

## I. Data and an Evaluation of Markets and Firms

### *A. Data Sources and Sample Construction*

Our study requires country-level data, which we obtain from the World Bank, and variables describing the institutional environment, including investor protection and legal institutions from the law and finance literature (e.g., La Porta et al. (2002, LLSV), Djankov et al. (2008, DLLS)). Exchange-level data come from the World Federation of Exchanges, including variables that describe stock market characteristics. We extract annual data on stock returns (adjusted for splits) and financial information for firms listed in stock exchanges worldwide from Worldscope (part of Datastream). We also extract

[7] The Internet Appendix is available in the online version of the article on *The Journal of Finance* website.

financial variables from Datastream, including firm size (assets), ROA, ROE, leverage (book debt/total assets), and total accruals, among others. For listed firms in the United States and a few other countries, we extract information from Compustat and CRSP. For governance variables on listed firms around the globe, we extract information from BoardEx and Risk Metrics. Finally, we follow Baker, Wurgler, and Yuan (2012) and construct measures of investors' behavioral biases, including sentiment variables and IPO returns.[8] Our cross-country data set includes more than 113,000 unique firms listed in 157 exchanges accross 106 countries over the period 1991 to 2018, of which 3,695 firms are currently or were formerly listed in the Chinese A-share market.

We obtain additional information on Chinese firms from several other sources. For stock prices and split-adjusted returns of Chinese listed firms, we use data compiled by the Chinese Capital Market Research Group (see, e.g., Wang, Hu, and Pan (2017)). The Chinese Industrial Enterprises Database (CIED), released by the National Bureau of Statistics, provides comprehensive coverage for (mostly unlisted) firms from manufacturing industries with annual sales over RMB 5 million, for the period 1998 to 2013. We collect information related to the ownership structure and governance of Chinese listed firms (including those listed in HKEX) from WIND and CSMAR, which extract this information from firms' annual reports.

Table I, Panel A, presents the number of firms listed in SSE and SZSE and the number of externally listed Chinese firms. We focus on the period 2000 to 2018 in most of our firm-level analyses. Column (2) shows that while 70% of all listed firms were SOEs in 2000, this ratio dropped to 30% by 2018. Column (4) further shows that the number of externally listed Chinese firms increased to over four times its initial level over the period 2000 to 2018. In addition, the mean total assets of externally listed Chinese firms are around $10.61 billion in 2018, which is larger than the mean of A-share firms of $2.78 billion as shown in column (3). Table I, Panel B, presents the distribution of Chinese firms sorted by listing region/country. The number of Chinese firms listed in Hong Kong and in the United States is 1,138 and 515, respectively.[9] Total assets of firms listed in HKEX are larger on average than that of Chinese firms listed in the United States. Table I, Panel C, presents the distribution of Chinese firms listed in the other countries.

[8] We thank Jay Ritter for providing data on IPO first-day returns and the number of IPOs for 17 large countries/markets. We use these data to construct the investor sentiment measures for these 17 markets.

[9] Prior to the announcement of the STAR pilot program in the SSE, HKEX announced amendments to the Main Board listing rules in April 2018. These amendments include allowing listings of (i) biotech firms that do not meet the Main Board financial eligibility tests and (ii) companies with weighted voting-right structures. For more details, see http://en-rules.hkex.com.hk/net_file_store/new_rulebooks/u/p/Update_119_Attachment_1.pdf.

**Table I**

## The Distributions of Firms Listed in China and Other Countries by Year

This table presents the distributions of sample firms listed in China's A-share market, externally listed Chinese firms, and firms listed in other countries over each year of the sample period. Panel A shows the distributions of A-share firms (listed in the Shanghai and Shenzhen exchanges) and externally listed Chinese firms (firms headquartered in mainland China and listed in external markets, including Hong Kong, the United States, Singapore, and other foreign exchanges). Columns (2) and (5) report the number of A-share state-owned enterprises (SOEs) and the number of externally listed Chinese SOEs. State ownership information comes from WIND under the data item "ultimate controller." We define firms ultimately controlled by central SASAC (State-owned Assets Supervision and Administration Commission of the State Council), Ministry of Finance, local SASAC, and other government agencies as SOEs. Columns (3) and (6) report the average book assets (in $billion) of A-share firms and externally listed Chinese firms, respectively. See Appendix B for the procedure we use to identify externally listed Chinese firms from various data sources. Panel B presents the number of externally listed Chinese firms by listing country. Panel C presents the number of firms listed in other large countries by year, including the United States, India, and all other countries in our sample as a group. Total assets are winsorized at the 1% and 99% levels.

Panel A. Number of A-Share Listed Firms and Externally Listed Chinese Firms

| | A-Share Listed Firms | | | Externally Listed Chinese Firms | | |
|---|---|---|---|---|---|---|
| Year | # Listed Firms (1) | # of Listed SOEs (2) | Average Assets ($ Billion) (3) | # Listed Firms (4) | # of Listed SOEs (5) | Average Assets ($ Billion) (6) |
| 2000 | 1,062 | 744 | 0.24 | 306 | 172 | 4.41 |
| 2001 | 1,143 | 751 | 0.32 | 355 | 203 | 5.50 |
| 2002 | 1,205 | 816 | 0.42 | 405 | 227 | 6.59 |
| 2003 | 1,267 | 820 | 0.50 | 463 | 247 | 2.34 |
| 2004 | 1,356 | 821 | 0.52 | 533 | 268 | 2.28 |
| 2005 | 1,352 | 784 | 0.57 | 637 | 282 | 3.77 |
| 2006 | 1,435 | 813 | 0.72 | 749 | 311 | 5.11 |
| 2007 | 1,548 | 834 | 1.19 | 870 | 328 | 5.53 |
| 2008 | 1,603 | 843 | 1.37 | 943 | 337 | 5.41 |
| 2009 | 1,751 | 865 | 1.58 | 1,002 | 348 | 5.56 |
| 2010 | 2,106 | 903 | 1.62 | 1,053 | 372 | 7.36 |
| 2011 | 2,341 | 901 | 1.72 | 1,065 | 387 | 9.01 |
| 2012 | 2,470 | 927 | 1.82 | 1,089 | 401 | 9.46 |
| 2013 | 2,515 | 926 | 2.02 | 1,124 | 418 | 10.30 |
| 2014 | 2,632 | 879 | 2.21 | 1,167 | 439 | 11.18 |
| 2015 | 2,823 | 1,081 | 2.38 | 1,219 | 439 | 11.46 |
| 2016 | 3,118 | 1,103 | 2.50 | 1,256 | 482 | 12.32 |
| 2017 | 3,495 | 1,150 | 2.46 | 1,267 | 438 | 11.69 |
| 2018 | 3,591 | 1,078 | 2.78 | 1,336 | 438 | 10.61 |
| # of Unique Firms and Average Total Assets | | | | | | |
| | 3,695 | 1,372 | 1.59 | 1,770 | 490 | 8.35 |

(*Continued*)

**Table I**—*Continued*

Panel B. Summary of Externally Listed Chinese Firms

| | Hong Kong | | United States | | Singapore | | Others | |
|---|---|---|---|---|---|---|---|---|
| Year | # of Firms (1) | Average Assets ($ Billion) (2) | # of Firms (3) | Average Assets ($ Billion) (4) | # of Firms (5) | Average Assets ($ Billion) (6) | # of Firms (7) | Average Assets ($ Billion) (8) |
| 2000 | 245 | 0.10 | 55 | 2.79 | 2 | 2.20 | 4 | 22.20 |
| 2001 | 286 | 0.89 | 62 | 3.11 | 3 | 1.73 | 4 | 22.74 |
| 2002 | 326 | 1.26 | 70 | 3.32 | 5 | 0.90 | 4 | 24.67 |
| 2003 | 363 | 1.42 | 83 | 3.58 | 10 | 0.95 | 7 | 14.26 |
| 2004 | 402 | 1.76 | 98 | 3.87 | 20 | 0.70 | 10 | 12.79 |
| 2005 | 439 | 2.88 | 148 | 3.06 | 34 | 0.65 | 11 | 11.54 |
| 2006 | 479 | 4.67 | 183 | 2.98 | 61 | 0.83 | 17 | 9.71 |
| 2007 | 531 | 5.51 | 235 | 2.70 | 74 | 1.38 | 20 | 11.32 |
| 2008 | 547 | 5.93 | 294 | 2.26 | 73 | 1.67 | 19 | 10.77 |
| 2009 | 590 | 6.72 | 308 | 2.51 | 74 | 1.89 | 20 | 9.91 |
| 2010 | 657 | 6.57 | 294 | 3.10 | 70 | 2.54 | 22 | 10.31 |
| 2011 | 700 | 8.07 | 269 | 4.11 | 64 | 3.51 | 22 | 11.68 |
| 2012 | 743 | 8.38 | 254 | 4.68 | 61 | 4.10 | 21 | 12.87 |
| 2013 | 797 | 9.08 | 238 | 5.27 | 59 | 4.77 | 20 | 14.84 |
| 2014 | 862 | 9.74 | 220 | 6.09 | 59 | 5.23 | 16 | 22.65 |
| 2015 | 931 | 10.17 | 212 | 6.43 | 51 | 3.48 | 16 | 22.73 |
| 2016 | 975 | 11.21 | 208 | 6.53 | 49 | 3.83 | 15 | 22.11 |
| 2017 | 1,015 | 12.69 | 191 | 7.75 | 40 | 4.66 | 12 | 30.23 |
| 2018 | 1,109 | 11.22 | 227 | 8.01 | n/a | n/a | n/a | n/a |
| # of Unique Firms and Average Total Assets | | | | | | | | |
| | 1,138 | 7.76 | 515 | 2.70 | 83 | 2.81 | 34 | 14.93 |

Panel C. Summary of Firms Listed in Other Large Countries

| | United States | | India | | Others | |
|---|---|---|---|---|---|---|
| Year | # of Firms (1) | Average Assets ($ Billion) (2) | # of Firms (3) | Average Assets ($ Billion) (4) | # of Firms (5) | Average Assets ($ Billion) (6) |
| 2000 | 9,996 | 3.72 | 419 | 0.76 | 32,392 | 1.28 |
| 2001 | 9,466 | 4.28 | 514 | 0.81 | 34,926 | 1.07 |
| 2002 | 9,149 | 4.82 | 736 | 0.86 | 35,541 | 1.51 |
| 2003 | 8,948 | 5.51 | 807 | 1.06 | 36,656 | 2.72 |
| 2004 | 8,832 | 5.88 | 904 | 1.15 | 38,104 | 3.01 |
| 2005 | 8,739 | 6.18 | 965 | 0.70 | 40,412 | 3.47 |
| 2006 | 8,584 | 6.61 | 1,107 | 0.71 | 47,311 | 4.07 |
| 2007 | 8,332 | 7.14 | 1,314 | 0.91 | 48,893 | 5.24 |
| 2008 | 8,122 | 7.07 | 1,735 | 1.00 | 49,349 | 5.74 |
| 2009 | 8,032 | 7.63 | 2,070 | 1.04 | 49,469 | 6.16 |
| 2010 | 8,052 | 8.18 | 2,243 | 1.24 | 49,430 | 6.53 |
| 2011 | 8,099 | 8.52 | 2,536 | 1.27 | 49,479 | 6.92 |
| 2012 | 8,553 | 9.06 | 2,965 | 1.23 | 49,609 | 7.39 |

(*Continued*)

**Table I**—*Continued*

Panel C. Summary of Firms Listed in Other Large Countries

| | United States | | India | | Others | |
|---|---|---|---|---|---|---|
| Year | # of Firms (1) | Average Assets ($ Billion) (2) | # of Firms (3) | Average Assets ($ Billion) (4) | # of Firms (5) | Average Assets ($ Billion) (6) |
| 2013 | 8,700 | 9.34 | 3,597 | 1.34 | 50,052 | 7.60 |
| 2014 | 8,499 | 9.57 | 3,950 | 1.26 | 50,392 | 7.74 |
| 2015 | 8,197 | 9.66 | 3,996 | 1.92 | 50,650 | 7.87 |
| 2016 | 7,964 | 10.23 | 4,021 | 2.05 | 50,601 | 8.30 |
| 2017 | 7,784 | 10.76 | 4,060 | 2.25 | 50,689 | 8.64 |
| 2018 | 6,665 | 10.8 | 4,156 | 2.27 | 34,688 | 8.48 |
| # of Unique Firms and Average Total Assets | | | | | | |
| | 18,689 | 7.41 | 4,819 | 1.51 | 92,350 | 5.75 |

### *B. The Performance of the Chinese Stock Market and Listed Firms*

Panel A of Figure IA.3 in the Internet Appendix shows the performance of the SSE Composite index, created in July 1992, and the stock indices of other large countries from 1992 to 2018. We normalize the indices to one at the end of 1992, and account for inflation by adjusting nominal returns in local currencies with year-end CPIs to obtain cumulative monthly buy-and-hold returns (BHRs) in real terms until the end of 2018. Despite the fact that the Chinese economy grew faster than the other large economies (see Figure IA.1 in the Internet Appendix), the BHRs of the SSE index are substantially lower than those of other emerging countries like Brazil and India, lower than those of the United States, and roughly the same as the Nikkei Index of Japan.[10] The SSE index observes negative real returns during most of the 1990s, in part due to high inflation, with the CPI reaching 27% in 1994. The number of listed firms increased sharply from 13 in 1991 to 1,062 in 2000, after which the intensity with which new firms were added to the exchanges slowed down. Major securities laws and regulations were introduced in the late 1990s and fully implemented after 2000. Given our interest in studying a relatively steady number of firms listed in the A-share market for an extended period, we conduct most of our firm-level analyses over the period 2000 to 2018.

Figure 1 plots the BHRs of the five largest markets and of externally listed Chinese firms for the period 2000 to 2018. BHRs are calculated as cumulative

[10] The A-share market is at almost the same level in 2017 as in 2014, in part because the Chinese "national team," composed of China Securities Finance Corp., Central Huijin Investment, the State Administration of Foreign Exchange, and other government rescue funds, entered the market to buy shares following the market crash in June and July of 2015 (Huang, Miao, and Wang (2019)). By the end of 2019, the stock holdings of Central Huijin Investment amounted to RMB 3.02 trillion (http://www.huijin-inv.cn/huijin-inv/Investments/index.shtml).

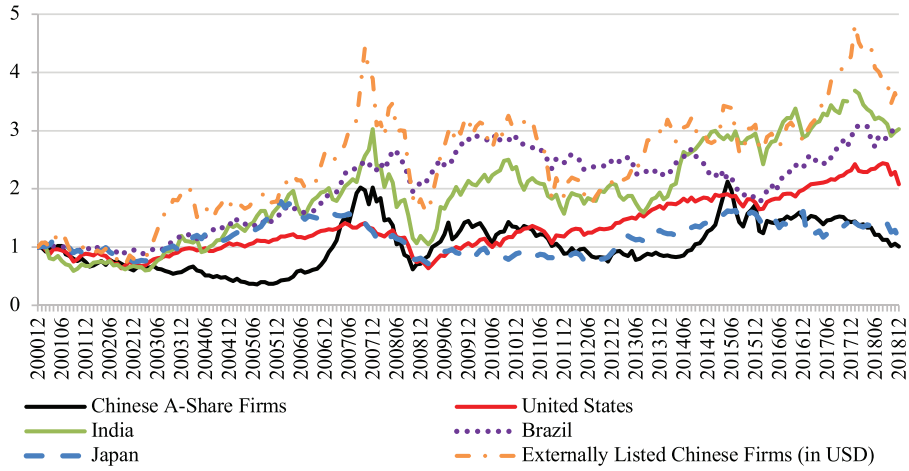


**Figure 1. Buy-and-hold monthly returns of stocks listed in large countries and externally listed Chinese companies (2000 to 2018)**. This figure plots the value-weighted buy-and-hold returns (BHRs) of the stocks listed in the markets of China (A-share), the United States, India, Brazil, and Japan, externally listed Chinese firms, and the 30% smallest A-share firms. BHRs are calculated by cumulating value-weighted monthly returns of all stocks listed in the country. Lagged one-year market capitalization is the weight, except for externally listed Chinese firms, for which the weight is the lagged one-year market capitalization in U.S. dollars. The returns are calculated at month-end, adjusted for stock splits, and include cash dividends. Nominal returns are denominated in local currencies and adjusted for local inflation to convert to real returns. Inflation is measured by the month-average CPI rate of the listing country. The number of unique firms in the sample for China, the United States, India, Brazil, Japan, and externally listed Chinese firms is 3,695, 12,200, 4,819, 535, 4,648, and 1,770, respectively. (Color figure can be viewed at wileyonlinelibrary.com)

monthly stock returns (cash dividends included), averaged across all listed firms in a country by month, with the firm's market capitalization at the end of the previous year as the weight. Inflation is again accounted for by using the value of local currencies in 2000 as the benchmark. If an investor invested RMB 1 in a value-weighted portfolio consisting of listed stocks in the Chinese A-share market in 2000, the real value of her portfolio would be RMB 1.01 at the end of 2018.[11] This is remarkably lower than the BHRs of other large emerging markets like India and Brazil, both of which see their initial investments in 2000 more than tripled in real terms by the end of 2018. The BHR of the Chinese market is even lower than that of Japan, which suffered prolonged economic problems during the sample period. Notably, as shown in Figure 2, the underperformance of the A-share market is driven by large firms; the smallest 30% A-share firms (in terms of market capitalization) outperform listed firms in the other markets in the second half of the sample period, especially since 2014.

[11] Few A-share firms pay cash dividends, and the dividend yield of these firms is below 1% over most of our sample period. In 2018, the average dividend yields for firms in China, Brazil, and the U.S. firms are 0.8%, 2.2%, and 4.1%, respectively.

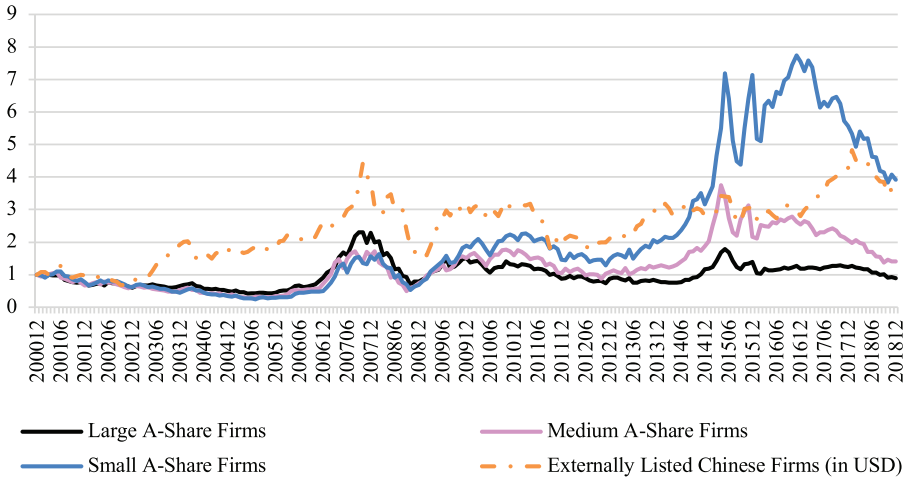


**Figure 2. Buy-and-hold monthly returns of large, medium, and small-cap stocks listed in the A-share market**. This figure plots the value-weighted average buy-and-hold returns BHRs of small, medium, and large A-share firms and externally listed Chinese firms, with lagged one-year market capitalization as the weight. Small and large firms are determined by the 30$^{th}$ and 70$^{th}$ percentiles of lagged one-year market capitalization by year. (Color figure can be viewed at wileyonlinelibrary.com)

An arguably better comparison group for firms listed in the A-share market is the Chinese firms listed in external exchanges. Since their operations and revenues are from (mainland) China, these firms share the same macroeconomic and institutional environment (apart from the stock market) as their counterparts listed in the two domestic exchanges. Figure 1 shows that the BHRs of this group of firms are around 344% in real terms by the end of 2018. The majority of these firms are listed in the HKEX and the U.S. stock market, including technology and e-commerce companies such as Baidu, Alibaba, Tencent, and JD.com. The BHRs of externally listed Chinese firms are among the best-performing stocks in the world over the sample period, significantly outperforming firms in the A-share market regardless of which currency (HKD, USD, or RMB) is used to calculate stock prices and returns.[12]

We next compare the real returns from investing in Chinese stocks versus other investment channels such as bank deposits and government bonds. Since all large banks in China are majority-owned by the government, the deposit rates are effectively risk-free rates. In Figure IA.4 in the Internet Appendix, we cumulate the real deposit rates and plot the cumulative returns from rolling

[12] We replot Figure 1 (see Panel B of Figure IA.3 in the Internet Appendix) after converting foreign currencies to RMB to obtain stock prices and returns for externally listed Chinese firms. Since the RMB has appreciated against most currencies over the sample period, this conversion shrinks the gap between the A-share market and foreign markets, but the A-share market remains the worst-performing of the group. Note that the Chinese capital account is by and large closed, so ordinary Chinese retail investors have limited access to external/foreign markets.

over bank deposits. Apart from the stock market peaks, the cumulative annual stock returns are lower than the cumulative returns on five-year deposits and government bonds in most of the other years over the 2000 to 2018 period.

To explore factors that may affect stock performance, we estimate cross-sectional linear regression models using exchange- and country-level variables; we then add firm-level variables. The set of variables include: (i) country-level macroeconomic factors such as GDP growth, GDP per capita, and the ratio of the amount of credit from financial institutions to GDP, (ii) stock market characteristics such as liquidity and risk, (iii) investor protection measures developed by the law and finance literature (e.g., LLSV, DLLS) such as the anti-self-dealing index, the prevalence of tax evasion, and the effectiveness of judicial procedures ("time to collect on a bounced check"), and (iv) firm-level financial and accounting variables. All explanatory variables are lagged by one year. The goal of the regression models is to use listed firms from other countries as benchmarks to capture the performance (as measured in annual stock returns) of listed firms from China.[13]

To account for possible biases in stock prices (and returns) due to microstructure problems in trading, we employ weighted least squares (WLS) regressions of firm-level annual stock returns on country-, exchange-, and firm-level variables.[14] We exclude countries with fewer than 20 stocks in a given year. Almost 100,000 firms from 80 countries enter the regressions with firm-level controls. Table II presents the results. The key variable of interest is *A-share Listed*, an indicator that takes the value of one if the firm is listed in the SSE or SZSE.

From columns (1) and (3) of Panel A, the negative coefficients on the *A-share Listed* indicator show that A-share stocks underperformed those from other countries by 14.6% per annum over the period 1991 to 2018 and by 16.0% per annum over the period 2000 to 2018 (both significant at the 1% level). In columns (2) and (4), we add firm-level variables and find that younger firms and firms with higher profitability (ROA) have higher returns. The magnitudes of the negative coefficients on *A-share Listed* are similar to those reported in columns (1) and (3) and are statistically significant at the 5% or 1% level.

[13] Due to IPO underpricing, we follow the literature (e.g., Aggarwal, Krigman, and Womack (2002), Loughran and Ritter (2002)) and use the closing price on the first trading day (instead of the offer price) to calculate returns in the IPO year. For firms that are delisted from an exchange, we follow Shumway (1997) to set the delisting return (i.e., the return in the year following delisting) to −30%. We also set the delisting return to −100% or zero,. The results are qualitatively unchanged under alternative assumptions about delisting returns.

[14] Asparouhova, Bessembinder, and Kalcheva (2013) show that microstructure issues in trading lead to noise in observed stock prices, which leads, in turn, to biases in panel regressions analyzing returns. Similar to Ben-Rephael et al. (2021), we take the WLS approach in linear regressions when the dependent variable is the firm's stock return, with the firm's lagged market capitalization as the weight. To measure stock returns, we also use log (1+ return) and rerun all the regressions and obtain qualitatively similar results (see Panels A to D, Table IA.I in the Internet Appendix). Following Hou, Karolyi, and Kho (2011), we winsorize the sample and drop penny stocks (stocks with small unit prices) from all markets and run OLS regressions on stock returns, and again obtain qualitatively similar results (Table IA.I, Panel E) as in Table II. We use OLS regressions in the other tests in which the dependent variable is an accounting measure, such as investment, cash flows, ROA, or changes in ROA.

**Table II**

## Underperformance of the A-Share Market: Stock Returns

This table examines the stock performance of A-share firms, firms listed in other countries, and externally listed Chinese firms. The dependent variable is annual stock returns in percentage points, including cash dividends and adjusted for stock splits and inflation. For firms that are delisted from an exchange, we set the delisting return (stock return in the year after the firm is delisted) to −30%. In Panel A, the independent variable of interest is *A-share Listed*, a dummy variable that takes the value of one if the stock is listed in the SSE or SZSE, and zero otherwise. The coefficients on *GDP Growth*, *Market Turnover, EBIT of Listed Firms/GDP*, and *Consumption Volatility* are multiplied by 100. In Panel B, the dummy variable of interest is *Externally Listed Chinese Firms*. In Panel C, we exclude returns in the IPO year (year 0) and year +1 from the regression sample. All control variables are lagged one year. Exchanges that have fewer than 20 stocks in any given year are excluded from the sample. We control for year and industry fixed effects based on the Datastream level-2 industry classifications. Panel D reports cross-country regressions of stock returns: column (1) includes all A-share firms, column (2) excludes A-share SOEs, column (3) excludes the largest 30% A-share firms by lagged-one-year market capitalization, and column (4) (5) focuses on the smallest (largest) 30% A-share firms only. We employ WLS regressions where we use lagged one-year market capitalization as the weight. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels.

Panel A. The Cross-Country Sample

| | 1991 to 2018 | | 2000 to 2018 | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| A-Share Listed | −14.588*** | −13.399*** | −15.969*** | −14.948** |
| | (−6.044) | (−4.732) | (−5.291) | (−2.389) |
| GDP Growth | 1.548*** | 0.626* | 0.465 | 0.535 |
| | (6.533) | (1.744) | (1.399) | (1.322) |
| Log (GDP Per Capita) | −2.852*** | −1.402 | −1.968** | −1.967* |
| | (−2.598) | (−1.422) | (−2.119) | (−1.966) |
| M2/GDP | 1.809 | 4.744** | 1.663 | 5.848** |
| | (0.963) | (2.375) | (0.822) | (2.509) |
| Market Turnover | 6.408** | 3.059 | 1.091 | 2.518 |
| | (2.311) | (1.402) | (0.522) | (1.106) |
| Credit from Financial Institutions/GDP | −1.879 | −6.711** | 0.528 | −8.271** |
| | (−1.033) | (−2.093) | (0.168) | (−2.344) |
| EBIT of Listed Firms/GDP | −0.008 | 0.007 | −0.029* | −0.032* |
| | (−0.552) | (0.625) | (−1.873) | (−1.809) |
| Consumption Volatility | −2.003* | −0.540 | 0.386 | 1.253 |
| | (−1.833) | (−1.435) | (0.445) | (1.277) |
| Anti-self-dealing Index | −2.498 | 7.710** | 5.494* | 8.172** |
| | (−0.633) | (2.062) | (1.653) | (2.099) |
| Tax Evasion | −0.603 | −0.812 | −1.448 | −1.170 |
| | (−0.611) | (−0.822) | (−1.392) | (−1.052) |
| Time to Collect on a Bounced Check | 1.354 | 3.583*** | 2.933** | 2.781* |
| | (1.286) | (2.766) | (1.969) | (1.922) |
| Log (Total Assets) | | 0.006 | | −0.410 |
| | | (0.029) | | (−1.577) |
| Leverage | | 5.381 | | 8.209* |
| | | (1.263) | | (1.752) |

(*Continued*)

**Table II**—*Continued*

| Panel A. The Cross-Country Sample | | | | |
|---|---|---|---|---|
| | 1991 to 2018 | | 2000 to 2018 | |
| | (1) | (2) | (3) | (4) |
| ROA | | 30.767*** | | 32.336*** |
| | | (4.088) | | (4.011) |
| Log (1+ Firm Age) | | –9.125*** | | –7.377*** |
| | | (−9.213) | | (−8.452) |
| Sales Growth | | −0.003 | | −0.005 |
| | | (−0.453) | | (−0.698) |
| Return Volatility | | 5.077* | | 3.437 |
| | | (1.862) | | (1.370) |
| Differences in coefs. of "A-Share Listed" in Panel A and "Externally Listed Chinese Firms" in Panel B | −23.982*** | −16.880*** | −24.615*** | −18.373*** |
| Year and Industry FE | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 7.45 | 8.43 | 4.06 | 5.17 |
| Observations | 686,886 | 683,609 | 495,651 | 495,651 |

| Panel B. Performance of Externally Listed Chinese Firms | | | | |
|---|---|---|---|---|
| # of Unique Externally Listed Chinese Firms: 1,679 | | | | |
| | 1991 to 2018 | | 2000 to 2018 | |
| | (1) | (2) | (3) | (4) |
| Externally Listed Chinese Firms | 9.394*** | 3.481 | 8.646 | 3.425 |
| | (3.786) | (0.676) | (1.511) | (0.577) |
| Year FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes | Yes |
| Firm Controls | No | Yes | Yes | Yes |
| $R^2$ (%) | 7.32 | 4.43 | 3.97 | 5.06 |
| Observations | 686,886 | 683,609 | 495,651 | 495,651 |

| Panel C. Performance of Listed Firms: Excluding IPO Years | | | | |
|---|---|---|---|---|
| | 1991 to 2018 | | 2000 to 2018 | |
| | (1) | (2) | (3) | (4) |
| A-Share Listed | −12.832*** | | −7.324** | |
| | (−4.644) | | (−1.990) | |
| Externally Listed Chinese Firms | | 3.836 | | 3.934 |
| | | (1.277) | | (1.033) |
| Year FE | Yes | Yes | Yes | Yes |
| Industry FE | Yes | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |

(*Continued*)

**Table II**—*Continued*

Panel C. Performance of Listed Firms: Excluding IPO Years

| | 1991 to 2018 | | 2000 to 2018 | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| $R^2$ (%) | 13.92 | 14.57 | 10.77 | 11.92 |
| Observations | 646,631 | 646,631 | 465,589 | 465,589 |
| Differences in coefficients of A-Share Listed in Panel A and Panel C | 0.567 | | 7.624 | |
| Differences in coefficients of A-Share Listed and Externally Listed Chinese Firms | | −16.668** | | −11.258** |

Panel D. Stock Returns of A-share Firms: Alternative Samples

| | All Sample (1) | Drop SOEs (2) | Drop Large (3) | Small Only (4) | Large Only (5) |
|---|---|---|---|---|---|
| A-Share Listed | −14.948** | −12.746*** | −10.102 | 2.221 | −15.523*** |
| | (−2.389) | (−3.634) | (−1.413) | (0.245) | (−2.603) |
| Country/Firm Controls | Yes | Yes | Yes | Yes | Yes |
| Year and Ind FE | Yes | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 5.81 | 5.01 | 5.08 | 5.07 | 4.95 |
| Observations | 495,651 | 486,426 | 486,176 | 476,668 | 475,292 |

In Panel B, we compare externally listed Chinese firms with firms from other countries. The variable of interest is *Externally Listed Chinese Firms*, an indicator that takes the value of one if the firm is headquartered in mainland China and listed in external exchanges, such as those in the United States and Hong Kong. These Chinese firms outperform firms from other countries. For example, during the period 2000 to 2018, they outperform other firms by 8.65% per year (column (3)), although the result is not statistically significan.[15] We also find that the differences between the coefficients on the A-share Listed and Externally Listed Chinese Firms indicators are all statistically significant (see the bottom of Panel A). These findings provide evidence that the underperformance of firms in the A-share market is not simply due to their being based in China.

In Panel C, we exclude the IPO years (year 0 and year +1 post-IPO) and rerun the tests on stock returns. We continue to find significant negative coefficients on the A-share Listed indicator and significant differences in the

[15] In Table IA.II of the Internet Appendix, we find that Hong Kong listed Chinese firms outperform listed firms from the other countries by around 5.96% per annum (no firm controls, statistically insignificant) during 2000 to 2018.

coefficients when compared with Externally Listed Chinese Firms. These results indicate that the underperformance of the A-share market is related not only to the IPO process but also to listed firms' activities post-IPO. We investigate these activities in Section III below.

Our results also reveal considerable heterogeneity in stock market performance across subsets of A-share firms. In Panel D of Table II, we find that the coefficient on the A-share indicator falls from 14.95 percentage points for the full sample (column (1), the same as column (4) in Panel A) to 12.75 points after dropping SOEs (column (2)). This result suggests that both non-SOEs and SOEs contribute to the underperformance of A-share firms. After dropping the largest 30% firms (by lagged one-year market capitalization), we find that the coefficient on the A-share indicator remains negative (column (3)), but loses its statistical significance, indicating that the underperformance of A-share firms is mainly due to the poor performance of the largest firms. The smallest 30% A-share firms outperform firms listed in other countries by 2.22 percentage points per annum (statistically insignificant, column (4)), while the largest 30% A-share firms underperform other groups of firms by 15.52 percentage points per annum (significant at the 1% level, column (5)). Overall, our findings corroborate previous results on the performance gap between small and large A-share firms (Hu, Pan, and Wang (2021)).

Another group that has outperformed A-share listed firms is matched unlisted firms. For each listed firm in its IPO year, we match the firm to an unlisted firm from the same (manufacturing) industry based on the Datastream level-2 industry classifications from the CIED database; the ratio of the book assets of the listed firm to that of the matched unlisted firm is within the range [80%, 120%], and we select as the matched firm the one that is closest in size to the listed firm. Of the 2,080 manufacturing listed firms in our sample over the period 1998 to 2013, 1,570 have both an IPO date and nonmissing asset size in the IPO year. We find one matched unlisted firm for 1,407 distinct A-share firms; very large manufacturing firms and nonmanufacturing firms from the A-share sample do not have a matched unlisted firm. A-share firms generate significantly lower net cash flows than their matched unlisted firms (see Table VII below for more details).

As a final piece of evidence, we study the correlations between five-year stock returns and future GDP growth for the 20 largest economies over the 1991 to 2018 period. The relationship between stock market performance and economic performance is determined by a large set of factors and possibly their interaction effects. Hence, we do not expect positive and significant correlations between (long-run) stock market returns and (future) GDP growth rates for all of the economies studied here. As shown in Table III, the stock market appears to be a leading indicator for the economy in many developed countries. The correlation between the two is also positive and significant in large emerging economies such as India, Russia, and Brazil. The correlation for the A-share market, however, is $-1.3\%$ with a $p$-value of 0.637. Thus, the performance of the stock market is unrelated to the future performance of the economy in China. Interestingly, the correlation between the returns of

**Table III**

## Correlations between (Five-Year) Stock Returns and Future GDP Growth Rates

This table reports Pearson correlations between stock returns and future GDP growth rates for the 20 largest economies according to the 2018 IMF rankings of GDP in PPP terms. We also include South Africa as a large emerging economy. We estimate the correlation coefficients for the period 1991 to 2018, or for a period starting from the year (after 1991) in which stock returns data become available in our data set and ending in 2018. Correlations are estimated using cumulative stock returns of a five-year interval and cumulative GDP growth in the *next* five-year interval (so we obtain stock returns for years $t$ to $t+4$, $t+1$ to $t+5$, and so forth, and GDP growth for years $t+1$ to $t+5$, $t+2$ to $t+6$, …), until the end of 2018, on a rolling basis. Country-level stock returns are calculated as the value-weighted returns of individual stocks listed in a country, with lagged one-year market capitalization as the weight. For South Korea and Iran, we estimate the correlation coefficients using the stock market indices (KOSPI Korea and TEPIX Iran). We calculate value-weighted returns for externally listed Chinese firms and estimate their correlations using China's GDP growth rate in year $t+1$. The last three rows present results on the differences in the correlation coefficients of China A-share firms versus developed countries as a group, other emerging countries as a group, and externally listed Chinese firms as a group. We use the OECD classification to define developed and emerging countries; emerging economies include China, Brazil, the Russian Federation, India, Mexico, Indonesia, Turkey, Iran, Thailand, Saudi Arabia, and South Africa.

| IMF GDP (PPP) Ranking | Country | Sample Period | Correlation | *p*-Value |
|---|---|---|---|---|
| 1 | China A-Share | 1991 to 2018 | −0.013 | 0.637 |
| 2 | United States | 1991 to 2018 | 0.286*** | 0.001 |
| 3 | India | 1991 to 2018 | 0.185*** | 0.001 |
| 4 | Japan | 1991 to 2018 | 0.380* | 0.072 |
| 5 | Germany | 1991 to 2018 | 0.532*** | 0.008 |
| 6 | Russian Federation | 1996 to 2018 | 0.386*** | 0.001 |
| 7 | Indonesia | 1991 to 2018 | 0.531** | 0.011 |
| 8 | Brazil | 1995 to 2018 | 0.429*** | 0.001 |
| 9 | United Kingdom | 1991 to 2018 | 0.479** | 0.029 |
| 10 | France | 1991 to 2018 | 0.587*** | 0.004 |
| 11 | Italy | 1991 to 2018 | 0.446* | 0.072 |
| 12 | Mexico | 1991 to 2018 | 0.489** | 0.013 |
| 13 | Turkey | 1991 to 2018 | 0.195 | 0.396 |
| 14 | South Korea | 1991 to 2018 | 0.366 | 0.147 |
| 15 | Spain | 1991 to 2018 | 0.600*** | 0.0032 |
| 16 | Saudi Arabia | 1995 to 2018 | 0.350** | 0.035 |
| 17 | Canada | 1991 to 2018 | 0.521*** | 0.009 |
| 18 | Iran | 1997 to 2018 | 0.056 | 0.280 |
| 19 | Thailand | 1991 to 2018 | 0.469*** | 0.001 |
| 20 | Australia | 1991 to 2018 | 0.116 | 0.656 |
| * | South Africa | 1991 to 2018 | 0.656*** | 0.001 |
| Externally Listed Chinese Firms | | 1998 to 2018 | 0.410** | 0.024 |
| HK Listed Chinese Firms | | 1998 to 2018 | 0.555** | 0.048 |
| Difference | Average Correlation | China | Other Groups – China | *p*-Value |
| Developed | 0.437*** | −0.013 | 0.450*** | 0.001 |
| Emerging | 0.375*** | −0.013 | 0.388*** | 0.001 |
| Externally Listed Chinese Firms | 0.410** | −0.013 | 0.423** | 0.015 |

externally listed Chinese firms and China's subsequent GDP growth over the 1998 to 2018 period is 41% and statistically significant ($p$-value = 0.024). These results again highlight the differences between A-share firms and externally listed Chinese firms, in that the A-share firms are not representative of the economy as a whole, while the latter behave much more like listed firms from other emerging markets.[16]

## II. A Model of Institutional Reforms, Investor Heterogeneity, Financial Repression, and Testable Hypotheses

Above we show that the A-share market has underperformed externally listed Chinese firms and listed firms from other (emerging) markets in terms of stock returns. We further show that the A-share market has underperformed matched unlisted Chinese firms' accounting returns. In this section, we develop a simple model to provide testable predictions with respect to factors that can help explain poor stock returns and operating performance of A-share listed firms.

We start by setting up a baseline model that shows that the possibility of comprehensive institutional and governance reforms can lead to low stock returns until the reforms are implemented. In the second version of the model, behavioral factors are introduced by assuming that there are two groups of investors who differ in their beliefs. A realistic group of investors have rational expectations, while an optimistic group of investors overestimate the probability of reforms. If the optimistic group is the marginal holder of the representative firm's stock, the firm will have a high valuation and low returns. Finally, we consider the effects of repressed risk-free interest rate within China. Such a rate lowers the relevant opportunity cost for holders of stocks. For externally listed stocks and listed firms from other markets, the opportunity cost can be higher, and hence, the returns on these stocks are also higher.

In our infinite-horizon model with discrete periods, all investors are risk-neutral. Initially, the institutional environment and corporate governance are in a low state and the growth rate of cash flows per period is $g_L$. The cash flow just before $t$, $C_{Lt}$, is drawn from a distribution with mean $EC_{Lt}$ and is paid to shareholders, so it plays no role in valuation. At date $t$, an announcement that market-wide institutional and governance reforms will be implemented between $t$ and $t+1$ occurs with probability $\pi$. All valuations at date $t$ are calculated after the announcement time. If reforms are announced and implemented at $t$, then the growth rate of cash flows between $t$ and $t+1$ is $g_H$, so $EC_{Ht+1} = EC_{Lt}(1+g_H)$, and the growth rate remains at $g_H$ in perpetuity. If no reforms are announced and implemented at $t$, then the growth rate of cash flows remains

[16] An interesting question that arises is to what degree does the underperformance of A-share firms relative to externally listed Chinese firms extends to other emerging countries. To shed light on this question, we collected a sample of externally listed Indian firms (most of which are listed in Europe) and find that their BHRs are not significantly different from those of domestically listed Indian firms, while their operating performance is worse than that of domestically listed firms. See Figure IA.5 and Table IA.III of the Internet Appendix.

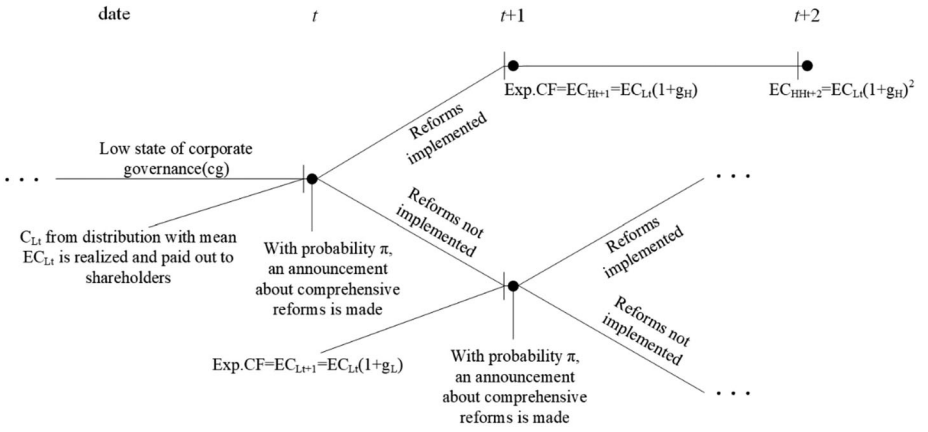


**Figure 3. Timeline of the model**. This figure plots the timeline of our model, which has an infinite number of discrete periods. Market-wide institutional and corporate governance reforms are implemented with probability $\pi$ each period. The firm's cash flows just before time $t$, $C_{Lt}$, are drawn from a distribution with mean $EC_{Lt}$, and are paid to shareholders. If reforms are announced and implemented at $t$, then the growth rate of cash flows between $t$ and $t$+1 is $g_H$, which implies $EC_{Ht+1} = EC_{Lt+1}\ (1+g_H)$, and the growth rate remains at $g_H$ in perpetuity. If no reforms are announced at $t$, the growth rate remains at $g_L$, $EC_{Lt+1} = EC_{Lt+1}\ (1+g_L)$, and there is an announcement about comprehensive reforms in $t$+1. The process repeats itself until reforms are implemented.

at $g_L$, in which case $EC_{Lt+1} = EC_{Lt}(1+ g_L)$, and with probability $\pi$ there is an announcement about comprehensive reforms at $t$+1. The process repeats itself until reforms are implemented. Figure 3 illustrates the timeline of the model.

### *A. The Baseline Model with Common Investor Beliefs*

We assume that there is a technology in perfectly elastic supply, such that an investment of one unit of capital results in a return of $1 + r$. The wealth of investors and the value of the representative firm's stock are such that this alternative asset is always held by some investors. The opportunity cost of capital for funding the representative firm's risky project is then given by $r$, where by assumption $r > g_H > g_L$. In the baseline version of the model, all investors have homogeneous beliefs about the likelihood $\pi$ that there will be comprehensive institutional and governance reforms.

Following the announcement of comprehensive reforms at date $t$, the value of the firm reaches the high state, $V_{Ht,}$ where it remains in perpetuity.

$$V_{Ht} = \frac{EC_{Lt}\,(1+g_H)}{r-g_H}\ . \tag{1}$$

If there is no announcement of reforms at date $t$, then institutions and corporate governance are still in the low state, in which case the representative

firm's expected value is given by

$$V_{Lt} = \frac{EC_{Lt+1} + \pi V_{LHt+1} + (1-\pi)V_{LLt+1}}{1+r}. \tag{2}$$

The first term in the numerator of equation (2), $EC_{Lt+1}$, is the expected cash flow at date $t$ given no announcement of comprehensive reforms at the start of the period. The second term indicates that, with probability $\pi$, an announcement will be made at date $t$+1,with the expected value of the firm just after the announcement equal to

$$V_{LHt+1} = \frac{EC_{Lt}(1+g_L)(1+g_H)}{r-g_H}.$$

The third term in equation (2) indicates that, with probability $1-\pi$, an announcement is not made at date $t$+1, in which case the end-of-period value is $V_{LLt+1}$. All three terms are the values at date $t$+1 discounted back to date $t$ by dividing by $1+r$. Solving (1) and (2) recursively (as shown in Section II of the Internet Appendix), we have

$$V_{Lt} = EC_{Lt}\left(1 + \frac{\pi(1+g_H)}{r-g_H}\right)\left(\frac{1+g_L}{r-g_L+\pi(1+g_L)}\right). \tag{3}$$

When reforms do not occur, the ex post current-period return $R_L$ is given by

$$R_L \equiv 1 + r_L = \frac{EC_{Lt+1} + V_{LLt+1}}{V_{Lt}} = (1+r) - (g_H - g_L)\left(\frac{\pi(1+r)}{r-g_H+\pi(1+g_H)}\right), \tag{4}$$

with the second step in equation (4) derived in the Internet Appendix. When reforms do occur, the ex post current-period return $R_H$ is given by

$$R_H \equiv 1 + r_H = \frac{EC_{Ht+1} + V_{HHt+1}}{V_{L,t}} = (1+\mathrm{r})\,\frac{(1+g_H)}{(1+g_L)}\frac{(r+\pi-g_L(1-\pi))}{(r+\pi-g_H(1-\pi))}, \tag{5}$$

when the second step in equation (5) is again derived in the Internet Appendix.

PROPOSITION 1: *The ex post return without the announcement of reforms, $R_L$, and the return with the announcement, $R_H$, satisfy $R_L < 1+r < R_H$, where $r$ is the opportunity cost of capital. Moreover, the return in the low state, $R_L$, is decreasing in $\pi$.*

PROOF: Derivations using equations (4) and (5) and the assumption $r > g_H > g_L$ are given in the Internet Appendix.

Thus, in the homogeneous beliefs case, if there is no announcement of reforms (so the end-of-period growth rate of cash flows of the representative firm remains low), the return on the stock is below the opportunity cost $r$. This can be interpreted as the situation in the A-share market. In contrast, if reforms are announced and implemented, investors realize a "jump" in return, from $R_L$ to $R_H$ in the current period, as compared to the no-announcement state.

**Table IV**
**Model Calibration (Version with Common Beliefs)**

This table presents calibration results based on the first version of the model (with common investor beliefs on the likelihood of institutional and governance reforms) and Proposition 1. The probability of implementing reforms, $\pi$, takes three values: 0.02, 0.05, and 0.1. $EC_L$ is mean cash flows when institutions and corporate governance are in a low state. We normalize $EC_L$ to be one. $g_L$ is the growth rate of cash flows per period when institutions and governance are in a low state. $g_H$ is the growth rate of cash flows between $t$ and $t+1$ when reforms are announced and implemented in $t$. We use annualized nominal stock returns of A-share firms and externally listed Chinese firms during 2000 to 2018 to proxy for $g_L$ and $g_H$. $r$ is the opportunity cost of capital for funding the representative firm's risky project. $V_{LH}$ and $V_L$ represent firm value before and after the implementation of reforms, and $R_H - R_L$ represents the jump in returns that investors realize in the current period when reforms are announced and implemented.

| | *r = 0.12* | | | *r = 0.15* | | |
|---|---|---|---|---|---|---|
| Model Input | (1) | (2) | (3) | (4) | (5) | (6) |
| $\pi$ | 0.02 | 0.05 | 0.10 | 0.02 | 0.05 | 0.10 |
| $EC_L$ | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| $g_H$ | 0.10 | 0.09 | 0.09 | 0.10 | 0.09 | 0.09 |
| $g_L$ | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| $R$ | 0.12 | 0.12 | 0.12 | 0.15 | 0.15 | 0.15 |
| Derived Valuation | | | | | | |
| $V_{Ht}$ | 52.33 | 34.78 | 34.78 | 21.55 | 17.76 | 17.76 |
| $V_{LHt+1}$ | 54.48 | 36.21 | 36.21 | 22.43 | 18.49 | 18.49 |
| $V_{Lt}$ | 21.34 | 21.76 | 25.46 | 11.47 | 12.20 | 13.56 |
| Stock Return | | | | | | |
| $R_H$ | 2.75 | 1.79 | 1.53 | 2.16 | 1.67 | 1.51 |
| $R_L$ | 1.09 | 1.09 | 1.08 | 1.13 | 1.13 | 1.12 |
| $R_H - R_L$ (in percentage points) | 166% | 70% | 45% | 103% | 55% | 39% |
| $V_{LH} - V_L$ (in %) | 155% | 66% | 42% | 95% | 51% | 36% |

Following this jump, the representative firm's stock will earn a return of $r$, its opportunity cost, every period thereafter. When the probability of reforms is higher, investors will be even more disappointed if such reforms do not occur, leading to an even lower stock return.

We next calibrate the model with reasonable parameters and cash flow levels from historical data (for A-share firms and externally listed Chinese firms) and derive the valuation differences between $V_{LH}$ and $V_L$, which maps to the cumulative return differences between A-share firms and Chinese firms listed externally over the 2000 to 2018 period, as well as the jump from $R_L$ to $R_H$. In Table IV, we consider three scenarios for the probability of the implementation of institutional and governance reforms $\pi$, namely, 0.02, 0.05, and 0.1. The opportunity cost of capital is assumed to be 12% or 15% per annum. We use the annualized nominal stock returns of A-share firms (4%) and externally listed Chinese firms (10%) over the 2000 to 2018 period to proxy for the growth rates $g_L$ and $g_H$, and we normalize $EC_L$ to one. Looking at the case in which the likelihood of market-wide reforms is 2% and the opportunity cost of capital

is 12%, we find that firm value jumps from a low value of 21.34 ($V_L$) to a high value of 54.48 ($V_{LH}$) when reforms occur, for an increase of 155%. The associated stock return rises from an $R_L$ equal to 1.09 (below the opportunity cost) to an $R_H$ equal to 2.75 (high return), a substantial increase of 166%.

There were several governance reforms in China during the sample period. We briefly discuss the Split-Share Reform (SSR), which took place from 2005 to 2007, in the context of the model and the calibration exercise here. The key aspect of the reform was the floating of nontradable shares, which were mostly held by various government agencies. In Tables IA.IV to IA.VI of the Internet Appendix, we find that stock prices rose in anticipation of the reform, especially for firms with a larger fraction of nontradable shares. However, during the postreform period (2008 to 2010), we do not find the average growth rate of A-share firms' cash flows to be significantly different from that in the prereform period (2000 to 2004; see Table IA.VII of the Internet Appendix), which was significantly below that of Chinese firms listed in Hong Kong. Hence, as predicted by Proposition 1, stock prices fell back to prereform levels, since investors realized that the growth rates in firms' cash flows did not improve sufficiently to warrant a large and permanent jump in stock prices.

### *B. A Behavioral Model with Heterogeneous Investor Beliefs*

Following Scheinkman and Xiong (2003) and Simsek (2021), we next assume that there are two types of investors. A fraction $\alpha$ of investors hold the optimistic (OP) view that comprehensive institutional and governance reforms will occur at date $t$ with probability $\pi_H$. The remaining $(1-\alpha)$ of investors are realistic (RL) and believe that reforms will occur with probability $\pi$ as before, where $\pi_H > \pi$. Investors therefore hold different beliefs about the likelihood of reforms, and they agree to disagree about their beliefs. The other features of the model are the same as in the baseline case.[17]

For there to be an equilibrium with two types of risk-neutral investors with different beliefs, there need to be short-sale constraints; we assume no short-sales on any asset. The nature of the equilibrium depends on which group is the marginal holder of the stock of the representative firm. Accordingly, we specify the wealth of the two groups and the total value of the firm's stock. The wealth of the optimistic (realistic) group at date $t$ is $W_{OPt}$ ($W_{RLt}$) and the total value of the representative firm's stock is $S_t$. For shares of the representative firm's stock and the alternative asset to be held in equilibrium, it needs to be the case that

$$W_{OPt} + W_{RLt} > S_t. \tag{6}$$

We assume that the condition in (6) is satisfied in this version of the model, so that there is always some investment in the alternative asset, and the

[17] We can also model investor optimism in other ways—for example, OP investors holding the belief that the growth rate in cash flows, following implementation of the comprehensive reforms, is greater than $g_H$—and obtain similar results on valuations and returns.

marginal holder of the firm's shares must be indifferent between holding the stock and the alternative asset. This means that the return on the alternative asset, $r$, is also the opportunity cost of capital and the discount rate for the firm's valuation. There are two possible equilibria, as follows.

$$B.1.\ Case\ (i): W_{OPt} < S_t.$$

In this case, the marginal holder of the asset is the RL group of investors. Firm value in the high and low states is denoted by $V_{Ht}$ and $V_{Lt}$, respectively, as in equations (1) and (2). The OP group will put all of their wealth in the stock when institutions and corporate governance are in the low state, because their valuation is

$$V_{Lt}^{OP} = \frac{EC_{Lt+1} + \pi_H V_{LHt+1} + (1-\pi_H) V_{LLt+1}}{1+r} > V_{Lt}, \tag{7}$$

since $\pi_H > \pi$ and $V_{LHt+1} > V_{LLt+1}$. The OP group would also like to short the alternative asset and invest the proceeds in the stock but are unable to do so due to the short-sales constraint. The best they can do is hold none of the alternative asset. If investors expect $W_{OPt} < S_t$ to continue to hold in the low state going forward, then equations (3) to (5) will continue to hold and the equilibrium will be the same as in Proposition 1 of the previous section.

$$B.2.\ Case\ (ii): W_{OPt}\ S_t.$$

In this case, the OP group is the marginal holder of the stock. These investors will hold both types of assets and the price of the stock in the low state will be given by $V_{Lt}^{OP}$ in equation (7). The RL group will put all their wealth in the alternative asset. They would also like to short the stock and invest the proceeds in the alternative asset but cannot do so because of the short-sales constraint.

If $W_{OPt} \geq S_t$ is expected to continue to hold, then the equilibrium will be specified as in equations (3) to (5), with $\pi$ replaced by $\pi_H$. Given $\pi_H > \pi$ and $R_L$ is decreasing in $\pi$, we then have $R_L^{OP} < R_L$, so that the return in the low state will be lower the more optimistic is the OP group. These arguments lead to the following result.

PROPOSITION 2: *(i) If* $\mathrm{W_{OPt}} < \mathrm{S_t}$ *holds at date* t *and is expected to be satisfied in the low institutional and governance state going forward, then equilibrium prices and returns will be the same as in* Proposition 1 *(ii) If* $W_{OPt} \geq S_t$ *holds at date* t *and is expected to be satisfied in the low state going forward, OP investors hold the stock and alternative asset, while RL investors hold just the alternative asset. The ex post current-period return following the announcement of institutional and governance reforms is* $R_H^{OP}$, *while the return in the absence of an announcement is* $R_L^{OP}$, *where* $R_L^{OP} < 1 + r < R_H^{OP}$, r *is the opportunity cost of risky capital, and* $R_L^{OP}$ *is decreasing in* $\pi_H$.

Proposition 2 (ii) shows that, for the RL investors, their valuation of the stock is below that of the alternative asset. With short-sale constraints binding, they

would not hold the stock, and hence, in equilibrium, the stock price is set at a high level by the OP group. As a result, if no reforms are announced, the return on the stock, $R_L^{OP}(\pi_H)$, which is determined by the OP investors, is again below the opportunity cost $(1 + r)$. This can be interpreted as the situation in the A-share market. In addition, the more optimistic the belief on the likelihood of an announcement of institutional and governance reforms (i.e., the higher $\pi_H$), the lower the ex post return, as the degree of disappointment is greater.

We have shown that our model can deliver low stock returns via two channels: common beliefs on the likelihood of reforms together with the realization of the no-reform state (Proposition 1), and "irrationally exuberant" beliefs of optimistic investors on the probability of the good state occurring followed by the arrival of the bad state (Proposition 2). Both versions of the model can be extended to consider two types of firms. For example, the two types can be large and small A-share firms with different growth rates of cash flows following the implementation of institutional and governance reforms. If large firms have a greater increase in the growth rate of cash flows than small firms following reforms, then they will have lower stock returns in the bad state. Similarly, we can extend the behavioral version of the model to consider different belief structures on the two types of firms. The extent to which the low returns of A-share firms can be explained by institutional and governance factors on the one hand or behavioral factors on the other hand is an empirical question.

### *C. A Model of Financial Repression*

So far, we consider a representative firm listed in the domestic market, where the opportunity cost of capital is $r$. We next consider the situation in which externally listed Chinese firms and foreign listed firms, including those from developed and some emerging markets, operate in environments with strong institutions and a different opportunity cost of capital, $r_{EX}$. For simplicity, we consider the special case of $\pi = 0$ and homogeneous beliefs. All firms have the same level of corporate governance, and their cash flows grow at rate $g$. The opportunity cost $r_{EX}$ comes from the return on the alternative asset—which for simplicity we assume to be the risk-free asset, but more generally affects all opportunity costs—that is available in the markets outside the domestic market. We also assume that there are capital controls, so that the external and internal markets are segmented. Moreover, there is financial repression in the domestic market due to government policies to subsidize SOEs and strategic sectors, which leads to the following relation between the domestic opportunity cost of capital, $r$, and its counterpart in the external markets:

$$r < r_{EX}. \tag{8}$$

This version of the model provides a third reason why the return on internally listed firms can be below that on foreign firms and externally listed Chinese firms: externally listed firms earn return $r_{EX}$, while internally listed

firms earn

$$1 + r < 1 + r_{EX}. \tag{9}$$

The next proposition summarizes our analysis in this subsection.

PROPOSITION 3: *With financial repression policies and segmented capital markets, where the opportunity cost of capital in the external markets,* $r_{EX}$*, is greater than that in the domestic market,* r*, the return on domestically listed firms will be below that on externally listed firms.*

For the more general case in which $\pi > 0$ and beliefs are heterogeneous, similar results will hold, provided that there is financial repression and capital markets are segmented. In particular, there will be a lower return on domestic stocks compared to external stocks.

### *D. Empirical Hypotheses*

Based on the different versions of the model analyzed in the previous sections, we develop three hypotheses for the gaps in stock returns and accounting performance of A-share listed firms relative to firms from other markets and externally listed Chinese firms. First, in both the baseline case (Proposition 1) and the calibration exercise, common beliefs on the prospect and the realization of comprehensive institutional and governance reforms drive firms' cash flows and returns. Accordingly, the "institutional deficiencies" hypothesis posits that institutional imperfections in the A-share market, due to problematic IPO and delisting processes and weak corporate governance, can explain poor performance in terms of both stock returns and accounting measure compared to other groups of firms.

Second, given heterogeneous investor beliefs on the likelihood of comprehensive institutional and governance reforms, and given short-sales constraints when optimistic investors have sufficient wealth (so that they can hold all of the stock and some of the alternative asset, as in Proposition 2 (ii)), stock returns are determined by these optimistic investors. Such investors' biases can be proxied by sentiment factors, with higher sentiment levels denoting more optimistic views. The "behavioral biases" hypothesis thus posits that differences in investor sentiment can explain both low returns in the A-share market relative to other markets, and differences in return patterns within the A-share market.

Third, as part of macro policies informed by the traditional growth model, the Chinese government kept bank deposit and lending rates low to boost investment and growth in manufacturing and other strategically important sectors. The government also implemented tight capital controls, with limited capital flowing between the domestic and external markets.[18] The "financial

[18] An example of limited capital flows is the Shanghai- and Shenzhen-Hong Kong stock connects, with the volume of flows constituting less than 2% of total trading volume in these markets as measured in December 2020.

repression" hypothesis (Proposition 3) posits that persistently low interest rates in China as compared to other markets lead to a lower opportunity cost of capital and in turn lower stock returns in the A-share market as compared to the external markets.

## III. Empirical Analysis—Examination of Factors Contributing to the Poor Performance of A-Share Listed Firms

In this section, we examine potential reasons for the poor performance of A-share firms relative to listed firms from other markets, externally listed Chinese firms, and matched unlisted firms, in terms of both stock returns and accounting measures such as net cash flows and ROA. First, in Section III.A, we study the "institutional deficiencies" hypothesis, and, in particular, the role of the IPO and delisting mechanisms as well as corporate governance. Next, in Section III.B, we examine the "behavioral biases" hypothesis and pool the factors above together to gauge their ability to explain the gaps between A-share firms and other groups of firms. In Section III.C, we study the "financial repression" hypothesis by comparing real interest rates in large economies. Finally, in Section III.D, we explore potential determinants of the performance gaps between small and large A-share firms, as well as other asset pricing factors behind the underperformance of A-share firms, and we conduct a number of robustness checks.

### *A. Tests of the Institutional Deficiencies Hypothesis*

#### *A.1. The IPO Process*

Prior research shows that firms "time" their IPOs, in that insiders tend to sell their stocks to the public when the firms' operating performance is strongest. Interestingly, A-share firms experience a larger post-IPO drop in performance than firms listed in other countries. For example, average ROA of A-share firms falls from a high of 13% in the year before the IPO to 6% in the year after the IPO, while the average ROA of firms listed in the United States (India) falls from 4.9% (12.1%) to 4.5% (9.9%) over the same [−1, +1] event window.

Table V, Panel A, presents OLS (ordinary least squares) regression results comparing changes in operating performance around IPOs for A-share firms and firms listed in other countries. The dependent variables are the change in ROA and change in ROS in the IPO event period. Consistent with the univariate results, the decrease in A-share firms' ROA is 2.4% greater than firms from other countries over the [−1, +1] window; results are similar when we consider the longer [−2, +2] window. We also observe a greater decrease in A-share firms' ROS in both sets of event windows. The larger drops in ROA and ROS could result from A-share firms raising more capital in their IPOs, and in turn increasing the size of their assets. We control for the change in cash holdings scaled by book assets during the period [−1, 0] to proxy for the

**Table V**

## Operating Performance around IPO: China versus Other Countries

This table presents OLS regression results for changes in ROA and ROS around IPO for listed firms in our cross-country sample. We calculate the changes in ROA and ROS from year $t-1$ to year $t+1$, and from year $t-2$ to year $t+2$; year $t$ represents the IPO year. Panel A reports results of the sample of A-share firms and firms listed in other countries. Panel B reports results of the sample of A-share firms and externally listed Chinese firms. The independent variable of interest is the *A-share Listed* indicator. We control for industry-median ROA or ROS measured in year $t-1$ or $t-2$, and the change in cash holdings from year $t-1$ to $t$, scaled by book assets in year $t-1$. $t$-Statistics calculated from standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variable definitions.

Panel A. A-Share Listed Firms versus Firms Listed in Other Countries

| | ΔROA [−1, +1] (1) | ΔROS [−1, +1] (2) | ΔROA [−2, +2] (3) | ΔROS [−2, +2] (4) |
|---|---|---|---|---|
| A-Share Listed | −0.024*** | −0.021** | −0.040*** | −0.036*** |
| | (−3.022) | (−2.069) | (−7.656) | (−2.983) |
| ROA ($t-1$) or ($t-2$) | −0.223*** | | −0.364*** | |
| | (−2.996) | | (−9.191) | |
| ROS ($t-1$) or ($t-2$) | | −0.255*** | | −0.241*** |
| | | (−3.102) | | (−19.733) |
| Log (Total Assets) | 0.005*** | 0.003** | 0.002** | 0.001 |
| | (8.132) | (2.203) | (2.181) | (0.005) |
| Sales Growth | −0.028*** | | −0.016* | |
| | (−8.647) | | (−1.932) | |
| EBIT Growth | | −0.015*** | | −0.022*** |
| | | (−5.970) | | (−13.355) |
| Δ Cash Holdings [−1,0] | −0.002 | 0.055*** | 0.054 | 0.114 |
| | (−0.100) | (2.622) | (1.255) | (1.628) |
| Leverage | 0.084*** | −0.001 | 0.112*** | −0.025 |
| | (8.990) | (−0.143) | (7.282) | (−1.281) |
| Log (1+Firm Age) | 0.008*** | 0.004 | 0.009*** | 0.009 |
| | (5.722) | (0.860) | (3.291) | (1.267) |
| GDP Growth | −0.099 | −0.066 | −0.067 | −0.142 |
| | (−1.269) | (−0.417) | (−0.709) | (−1.055) |
| Log (GDP Per Capita) | −0.001 | 0.008*** | 0.001 | 0.005 |
| | (−0.145) | (2.623) | (0.541) | (1.103) |
| Year/Ind FE | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 5.33 | 1.59 | 4.39 | 2.82 |
| Observations | 35,604 | 28,022 | 26,603 | 20,544 |

Panel B. A-share Listed Firms vs. Externally Listed Chinese Firms

| | ΔROA [−1, +1] (1) | ΔROS [−1, +1] (2) | ΔROA [−2, +2] (3) | ΔROS [−2, +2] (4) |
|---|---|---|---|---|
| A-Share Listed | −0.021* | −0.018*** | −0.030** | −0.025** |
| | (−1.649) | (−2.869) | (−1.982) | (−1.990) |
| Year/Industry/Firm Location FEs | Yes | Yes | Yes | Yes |
| Other Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 55.21 | 31.43 | 37.63 | 22.16 |
| Observations | 4,173 | 4,173 | 2,398 | 2,398 |

proceeds raised in the IPO. Inclusion of this variable does not change the main results.[19]

Panel B of Table V reports results comparing changes in the same operating performance measures between A-share firms and externally listed Chinese firms. We include firm location fixed effects in these specifications. A-share firms again see a much greater decrease in ROA and ROS than firms listed externally. Both of these groups of firms are based in China where they face the same economic environment, and so, the sharper fall in operating performance of A-share firms is likely to be related to institutional deficiencies of the domestic market.

As discussed in the Introduction, firms must show profits in two or three consecutive years preceding their application to list in the A-share market.[20] As a result of the performance hurdles, firms in growth industries without high current profitability are underrepresented in the A-share market, which is dominated by large firms from mature industries. Indeed, matched unlisted firms have higher net cash flows than their A-share listed counterparts, while there is no difference in performance between externally listed firms and their matched unlisted firms. These observations suggest that it is not the best-performing firms from their respective industries that are selected to enter the A-share market.

Prior research shows that firms engage in earnings management prior to IPO to boost their performance. Hence, one possible reason for the substantial drop in the operating performance of A-share firms is that they manage accruals upwards before their IPO, and when accruals show a reversal, so does operating performance. Following Aharony, Lee, and Wong (2000), in Table VI, we compare measures of earnings management around IPO for listed firms in China and firms listed in other countries for which pre-IPO financial data are available in the [−1, +1] window around IPO. We examine two earnings measures, Total Accruals and Operating Cash Flows, where we define Total Accruals as Net Income – Operating Cash Flows (OCF), and OCF is given by EBITDA – Income Taxes – Change in Working Capital. Each measure is scaled by contemporaneous Sales (or revenue).

[19] In Internet Appendix Table IA.VIII, we separate A-share firms (and firms from other countries) into five cohorts by the year of their IPO. For example, Cohort 2000-2003 indicates firms that conducted as IPO during the period 2000 to 2003. A-share firms in all five groups show similar declines in ROA and ROS during the post-IPO period, and greater declines than firms from other countries, suggesting that the deterioration in the performance is not specific to firms listed in certain years.

[20] The CSRC specifies requirements to list on the Main Boards of the A-share market, including: (i) firms have positive earnings in three consecutive years prior to IPO and have accumulated total net income of RMB 30 million or more; and (ii) firms have accumulated cash flows (net) from operations, investment, and financing of RMB 50 million or more, or have total revenues of at least RMB 300 million in the three years prior to IPO. Smaller firms listed in the "SME Board" (small and medium-sized enterprises) are required to show positive profits for three consecutive years, and the "GEM Board" (Growth Enterprise Market) requires positive profits for two consecutive years. See http://www.gov.cn/flfg/2006-05/18/content_283660.htm for more details.

**Table VI**

## Earnings Management around IPO: China versus Other Countries

This table reports OLS regression results for changes in earnings management measures in the [−1, +1] window around IPO for A-share firms and firms listed in other countries, where year 0 denotes the IPO year. Panels A and B compare *Total Accruals*/*Sales* and *OCF*/*Sales* of A-share firms and firms listed in other countries. We construct *Total Accruals* as Net Income – Operating Cash Flows, *Operating Cash Flows (OCF)* are calculated as EBITDA – Income Taxes – Change in Working Capital. We use the same country- and firm-level controls as we use in Table V. ***, ** and * denote the statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variable definitions.

Panel A. Cross-Country Sample: Total Accruals/Sales

| | All | Large | Medium | Small |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| A-Share Listed | −0.025 | −0.103** | −0.078 | −0.042 |
| | (−0.789) | (−2.010) | (−0.944) | (−0.382) |
| Year/Ind FE | Yes | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 6.78 | 11.78 | 9.65 | 9.88 |
| Observations | 18,757 | 8,657 | 3,141 | 6,959 |

Panel B. Cross-Country Sample: OCF/Sales

| | All | Large | Medium | Small |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| A-Share Listed | 0.043 | 0.023 | 0.083 | −0.010 |
| | (1.038) | (0.536) | (0.891) | (−0.398) |
| Year/Ind FE | Yes | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 7.05 | 6.83 | 8.82 | 8.52 |
| Observations | 19,040 | 8,826 | 3,169 | 7,045 |

Table VI employs similar specifications as in Table V to estimate changes in the earnings management measures around IPO. Panel A shows that the largest 30% of A-share firms observe a 10.3% greater decrease in total accruals from the year before IPO to the year after IPO (significant at the 5% level) relative to firms listed in other countries. In contrast, Panel B shows that large A-share firms experience a 2.3% (but statistically insignificant) greater *increase* in OCF than firms from other countries over the same [−1, +1] window.

These findings suggest that the deterioration in operating performance of large A-share firms post-IPO is not driven by mean reversion of ROA alone—if the decline in ROA were due to mean reversion, both OCF and total accruals would decline post-IPO. Instead, our evidence on total accruals and OCF suggests that high operating performance of large A-share firms pre-IPO comes

mainly from accruals and not cash flows, with the subsequent decline likewise associated with a decline in accruals and not cash flows from operations. In summary, the results suggest that large A-share firms manipulate their earnings prior to IPO in order to meet the high hurdles for listing in the A-share market, and when the effects of such manipulation fade, their performance declines.

In Internet Appendix Table IA.IX, we examine IPO returns (over one-day and one-month horizons) for "dual-listed" stocks—those listed in both the A-share market and HKEX. These firms operate in mainland China and face the same fundamentals, and thus, differences in their IPO returns are driven mainly by differences in market conditions. Interestingly, IPO returns in the A-share market are higher than those in HKEX. These results are consistent with the behavioral biases hypothesis, in that A-share investors do not appear to fully understand firms' earnings management around IPOs, and hence, prices of IPO stocks in the secondary market are inflated. Recall from Table II, Panels C and D, that when we drop IPO-year observations, we continue to find that A-share firms underperform firms listed in other countries and externally listed Chinese firms. Hence, our results reject the view that the gap in stock returns of A-share firms relative to externally listed Chinese firms is due to lower IPO returns of the latter group.

### *A.2. The Delisting Process*

An important feature of the A-share market is that firms are rarely delisted; on average only five stocks (or 2.7%) are delisted from the Chinese exchanges each year over the 2000 to 2018 period, and less than half of the delistings are due to poor (operating) performance; other reasons for delisting include mergers and acquisitions, privatization, etc. Many more firms are delisted in other markets. For example, over the 2000 to 2018 period, the (annual) average percentages of delisted firms in the United States and Brazil are 32.8% and 13%, respectively, and in the United States, about one-third of the delistings (or 10.6% of the listed firms, $0.322 \times 0.328 = 10.6\%$), are due to poor performance.[21]

Ideally, we should compare the operating performance of firms approaching their delisting dates in China and in other countries, but the small number of delistings in China makes a statistical comparison difficult. After two consecutive years of losses, firms listed in the A-share market receive a "ST" (special treatment) designation but remain listed and continue to be traded in the exchanges. Accordingly, we compare firms that receive the "ST" status in China with delisted firms in the United States. Over the 2000 to 2018 period, 572

[21] According to CRSP, firms in the United States can be delisted from an exchange for the following reasons: merger, moving to another exchange, liquidation, dropped by the exchange, ticker expiration, and becoming foreign listed. We require that each firm has financial information over the five consecutive years before the delisting date in the United States, or before the first ST designation date in the A-share market.

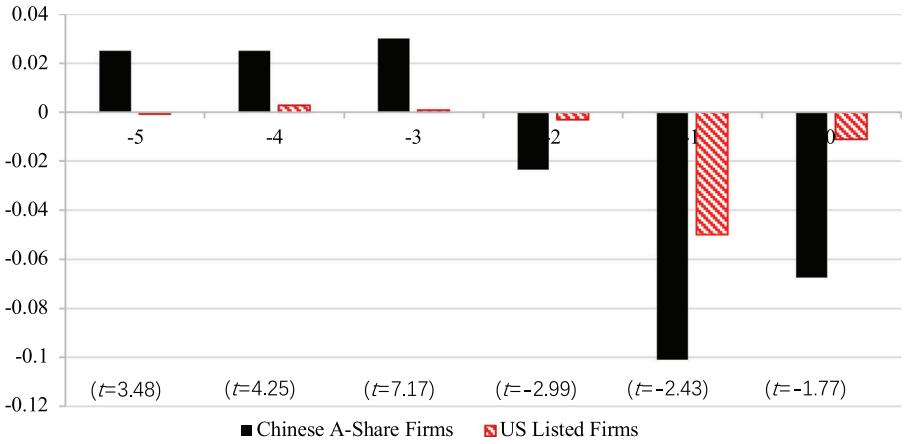


**Figure 4. Operating performance of "ST" firms in China and delisted firms in the United States**. This figure plots the operating performance of permanent ST A-share firms in the [−5,0] window before receiving the special treatment (ST) status for the first time, and the operating performance of delisted U.S. firms in the same event window. Year 0 denotes the year when a firm receives ST status (A-share firms) or the year a U.S. firm is delisted. Operating performance is measured as the weighted averaged ROA across firms, with lagged one-year total assets as the weight. *t*-Statistics for the difference in ROA between A-share and U.S. firms are reported for each year. (Color figure can be viewed at wileyonlinelibrary.com)

Chinese firms receive the ST status. For many of these firms, the ST designation is dropped after they reemerge from restructuring a few years later. In our sample, 65 firms are *permanent* ST firms, that is, firms for which ST status continues to apply through the end of our sample period. During the same period, 2,550 firms are delisted from U.S. exchanges due to poor performance. We compare permanent ST firms with the delisted U.S. firms and define the delisting year (in the United States) or the year of the first ST designation (in China) as year 0.

Figure 4 shows that the ST firms perform significantly better than the U.S. delisted firms during the [−5, −3] event window. ST firms' performance then deteriorates rapidly, with their average ROA falling below zero in year −2 and remaining negative over the two years leading up to the ST year. Moreover, ST firms' performance is significantly worse than that of U.S. delisted firms over the [−2,0] window.[22] Thus, if these ST firms were listed in the United States, they would have been delisted given their precipitously declining performance.[23]

[22] Among the firms delisted from the United States, the 78 headquartered in China perform worse (in terms of ROA) than the other firms. Lee, Li, and Zhang (2015) study a sample of 146 Chinese firms listed in the United States through reverse mergers and find no evidence that they have worse performance than similar firms trading on the same exchange.

[23] On March 21, 2016, the SSE announced the decision to terminate the listing of ST firm *Boyuan* due to accounting fraud, disclosure of false information, and failure to correct this mis-

In sum, many more firms should have been delisted from the A-share market over the sample period. Poor performing firms are often kept alive in China, because investors prefer to restructure these firms than to go through the lengthy and unpredictable IPO process. As Liu et al. (2019) and Lee et al. (2023) show, the market values of the smallest firms (in terms of market capitalization) in the A-share market include a significant component that reflects the potential to become "shells" in reverse mergers. A listed firm can discard its ST status when it starts to realize positive earnings after a reverse merger. The CSRC has recently tightened the requirements on firms that seek to be listed through a reverse merger. Dropping the ST firms from the sample would increase the BHRs of the (remaining) A-share firms over the 2000 to 2018 period, but doing so would not significantly shrink the gap in returns with other groups of listed firms (see Figure IA.6 and Table IA.X in the Internet Appendix).[24] Overall, we conclude that deficient IPO and delisting processes exacerbate the adverse selection of firms in the A-share market.

### *A.3. Investment, Cash Flows, and Corporate Governance*

Another possible explanation for the poor performance of China's A-share market is that corporate investment yields low returns post-IPO. As noted above, we measure investment as Capital Expenditure/Total Assets and investment returns by net cash flows, or (EBITDA – Change in Working Capital – Income Taxes – Capital Expenditures)/Total Assets. Figure 5 plots the weighted average investment and net cash flows of A-share firms and other groups of listed firms by calendar year, where firms' book assets are used as weights. As Panel A shows, A-share firms have the highest level of investment compared to firms listed in other large countries, with a value-weighted average of around 4.4% per year versus a value-weighted average of 4.2% for the United States and 3.7% for India, for example. Domestically listed firms also consistently invest more than their externally listed counterparts.

Panel B compares the value-weighted average net cash flows of A-share firms with the net cash flows of other groups of listed firms. Over the sample period, the value-weighted average net cash flows of A-share firms and listed firms from India and Brazil are 1.5%, 3.8%, and 2.8%, respectively. A-share firms have lower net cash flows than externally listed Chinese firms, and then listed firms from India and Brazil, in most years. Indeed, starting in 2007, A-share firms have the lowest level of net cash flows among the five large countries.[25]

conduct. This is the first case of forced delisting from the domestic exchanges since the inception of the equity market in 1990.

[24] In August 2011, the CSRC issued the "Decision to revise the provisions of firms' asset restructuring and related financing," which requires that the firm be in operation for at least three years and have made earnings no less than RMB 20 million in the most recent two consecutive fiscal years for the reverse merger to be deemed successful.

[25] Bai, Hsieh, and Song (2016) show that a portion of China's RMB 4 trillion stimulus over the 2008 to 2010 period in response to the global financial crisis was used to fund investment projects of large listed firms, with local governments acting as the financing intermediaries.

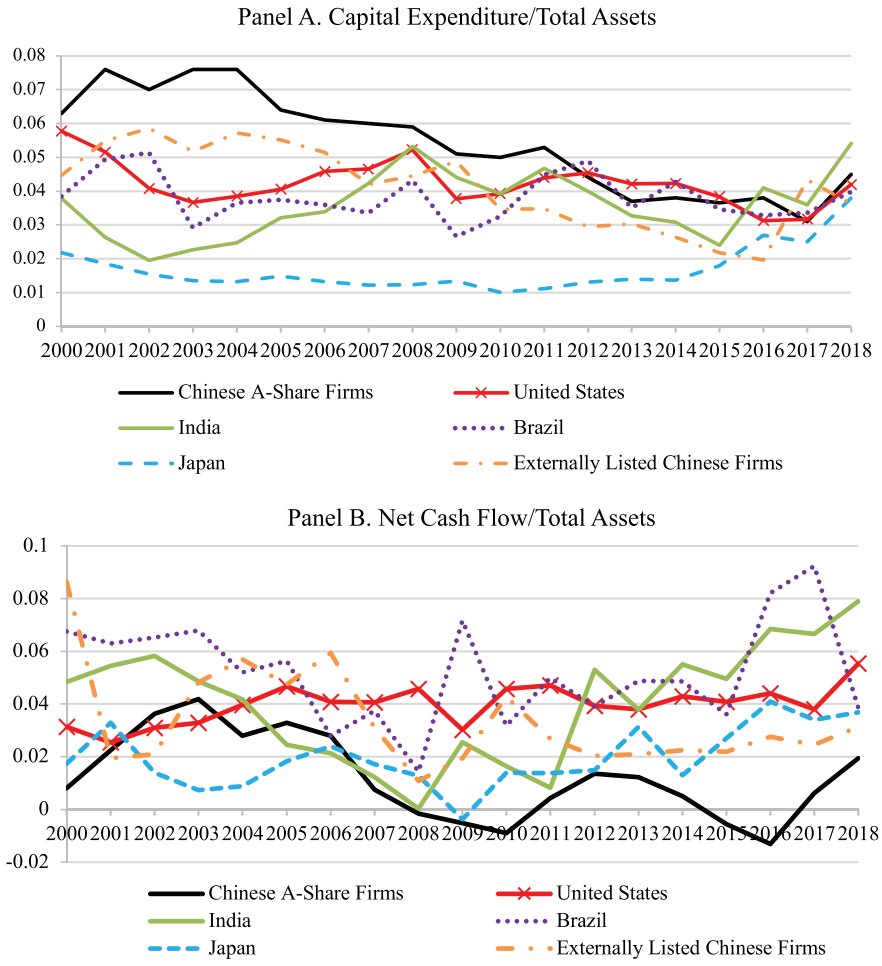


**Figure 5. Investment and net cash flows of A-share firms, externally listed Chinese firms, and firms from other large countries**. This figure plots the weighted-average investment and net cash flows of A-share firms, firms listed in other large countries, and externally listed Chinese firms by calendar year. Panel A plots the weighted-average investment of listed firms, where *Investment* is measured as Capital Expenditures/Total Assets. Panel B plots the weighted-average net cash flows of listed firms, where *Net Cash Flow* is calculated as (EBITDA – Change in Working Capital – Income Taxes – Capital Expenditures)/Total Assets. [Both the investment and net cash flow measures are value-weighted averages across firms with year-end total assets as weights.] The sample is restricted to firms that have nonmissing data on investment, net cash flows, and book assets. The number of unique firms in the sample for China, the United States, India, Brazil, Japan, and externally listed Chinese firms is 3,695, 10,529, 3,708, 321, 4,183, and 1,487, respectively. (Color figure can be viewed at wileyonlinelibrary.com)

A-share firms double the scale of their capital expenditures one-year post-IPO (from 3% to 7% of total assets), and they maintain similarly high levels in subsequent years, resulting in a substantial drop in net cash flows over the same period. By contrast, firms from the other four countries and externally listed Chinese firms experience a much smaller increase in capital expenditures post-IPO and maintain higher levels of net cash flows as compared to A-share firms.

In a multivariate OLS regression setting, Table VII, Panel A, shows that A-share firms invest more than firms listed in other countries (by 0.55% of assets each year, significant at the 1% level, column (1)). Relative to the mean investment level of firms from other countries (3.4%), this result implies that A-share firms invest 16.2% more per annum than do their counterparts. However, A-share firms underperform firms from other countries in terms of net cash flows by 0.77% per annum (significant at the 1% level; column (3)). Thus, relative to the value-weighted average net cash flows of firms from the other countries (3.05%), A-share firms observe 25.2% lower net cash flows.

Table VII, Panel B, presents results comparing net cash flows of different subgroups of A-share firms to listed firms from other countries. Most subsets of A-share firms, including non-SOEs (column (2)), small and medium firms (column (3)), and the largest firms only (column (5)), all underperform firms from other countries in terms of net cash flows, with the extent of the underperformance greatest for the largest firms. Small firms, in contrast, do not underperform listed firms from the other countries—the negative coefficient is the smallest in magnitude and statistically insignificant.

Table VII, Panel C, compares the operating performance of A-share firms and matched unlisted firms. As stated in Section I above, we find one matched unlisted firm for each of the 1,407 A-share firms operating in manufacturing industries, while very large manufacturing firms and nonmanufacturing firms do not have a matched unlisted firm. A-share firms have higher levels of investment (by 2.2% of assets per annum, significant at the 10% level), but significantly lower OCF (by 4.07% of assets, significant at the 5% level) and net cash flows (by 3.63% of assets, significant at the 5% level). Given the (value-weighted) mean OCF-to-assets and net cash flows-to-assets ratios of 6.5% and 1.5%, respectively, for A-share firms, these differences are again economically significant.[26]

Panel D compares the performance between A-share firms and (industry- and size-) matched externally listed Chinese firms. We find little difference in investment between the two groups of firms, while A-share firms have higher operating and net cash flows than externally listed firms, although the differences are statistically insignificant. In Panels D1 through D3, we

[26] We also find that small- and medium-sized A-share firms underperform their matched unlisted counterparts (see Table IA.XI in the Internet Appendix) in terms of net cash flows. The same is true for large listed firms, but the coefficient is not statistically significant, possibly due to the fact that listed firms in the financial services industry or really large listed firms (from all industries) do not have a matched unlisted firm.

**Table VII**

## Comparing Investment and Cash Flows of A-Share Firms with Other Groups of Firms

This table reports OLS regression estimates from comparing investment and net cash flows of A-share firms with other groups of firms. The dependent variables are: *Investment*, measured as Capital Expenditures/Total Assets, *Operating Cash Flows*, calculated as (EBITDA – Change in Working Capital – Income Taxes)/Total Assets, and *Net Cash Flows*, calculated as (Operating Cash Flows – Capital Expenditures)/Total Assets. All dependent variables are reported in percentage points. The independent variable of interest is *A-share Listed*, a dummy variable that takes a value of one if the firm is listed in the Shanghai or Shenzhen stock exchanges in mainland China, and zero otherwise. Panel A reports estimates from comparing A-share firms and listed firms from other countries in our sample. Firm controls are *Log (Total Assets), Leverage, ROA, Sales Growth*, and *Log (Firm Age)*. Control variables are lagged one year. Panel B reports cross-country regressions of net cash flows, column (1) includes all A-share firms, column (2) excludes A-share SOEs, column (3) excludes the largest 30% A-share firms by lagged one-year market capitalization, and column (4) (5) studies the smallest (largest) 30% A-share firms only. In Panels A and B, we include *GDP Growth* and *GDP Per Capita* as country-level controls. Panel C reports estimates from comparing A-share firms and size- and industry-matched unlisted Chinese firms. We employ nearest-neighbor matching and require the ratio of the total assets of the A-share firm and to its matched unlisted firm be within the [80%, 120%] range. Panel D reports estimates from comparing A-share firms and size-space and-industry-matched externally listed Chinese firms. We follow the same matching procedure as in Panel C. In Panels D1 to D3, we divide the matched sample of A-share firms and externally listed Chinese firms into small, medium, and large groups based on the $30^{th}$ and $70^{th}$ percentiles of lagged one-year market capitalization of A-share firms. We control for lagged one-year firm characteristics and include year and industry fixed effects in all specifications. In Panels C and D, we also include province-level firm location fixed effects. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variable definitions.

Panel A. Comparing A-Share Firms with Firms from Other Countries

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | 0.551*** | −0.221 | −0.766*** |
| | (4.352) | (−0.733) | (−2.645) |
| Log (Total Assets) | −0.186*** | 0.867*** | 1.088*** |
| | (−8.197) | (9.733) | (10.728) |
| Leverage | 0.207 | 4.014*** | 4.123*** |
| | (1.386) | (6.110) | (5.499) |
| Log (1+Firm Age) | −0.423*** | 0.345*** | 0.813*** |
| | (−10.004) | (4.028) | (7.384) |
| Sales Growth | 0.010*** | −0.007** | −0.017*** |
| | (6.548) | (−2.201) | (−4.112) |
| ROA | 1.121*** | 56.399*** | 54.981*** |
| | (4.173) | (45.021) | (44.013) |
| Year/Industry FE | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes |
| $R^2$ (%) | 11.27 | 28.18 | 26.79 |
| Observations | 545,946 | 546,798 | 546,798 |

(*Continued*)

**Table VII**—*Continued*

Panel B. Net Cash Flows of A-Share Firms: Alternative Samples

| | Full Sample (1) | Drop SOEs (2) | Drop Large (3) | Small Only (4) | Large Only (5) |
|---|---|---|---|---|---|
| A-Share Listed | −0.766*** | −1.110*** | −1.148* | −0.252 | −2.052*** |
| | (−2.645) | (−2.833) | (−1.762) | (−0.277) | (−6.398) |
| Country/Firm Controls | Yes | Yes | Yes | Yes | Yes |
| Year and Ind FE | Yes | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 26.79 | 26.62 | 30.07 | 30.21 | 30.44 |
| Observations | 546,798 | 528,617 | 533,236 | 516,620 | 512,926 |

Panel C. A-Share Firms vs. Matched Unlisted Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | 2.220* | −4.070** | −3.633** |
| | (1.815) | (−2.253) | (−1.990) |
| Year/Ind/Location FEs | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes |
| $R^2$ (%) | 11.77 | 13.23 | 6.18 |
| Observations | 19,218 | 18,639 | 18,638 |

Panel D. A-Share Firms vs. Matched Externally Listed Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | 0.0402 | 0.391 | 0.382 |
| | (0.311) | (1.325) | (1.366) |
| Year/Ind/Location FEs | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes |
| $R^2$ (%) | 19.20 | 11.10 | 4.43 |
| Observations | 17,886 | 17,353 | 17,353 |

Panel D1. Large A-Share Firm and Matched Externally Listed Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | 0.404** | −0.072 | −0.653** |
| | (2.198) | (−0.029) | (−1.980) |
| Year/Ind/Location FEs | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes |
| $R^2$ (%) | 43.32 | 27.93 | 11.07 |
| Observations | 2,546 | 2,316 | 2,316 |

Panel D2. Medium A-Share Firm and Matched Externally Listed Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | 0.504** | 0.597 | −0.193 |
| | (2.225) | (1.152) | (−0.402) |

(*Continued*)

**Table VII**—*Continued*

Panel D2. Medium A-Share Firm and Matched Externally Listed Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| Year/Ind/Location FEs | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes |
| $R^2$ (%) | 20.54 | 11.54 | 5.03 |
| Observations | 5,073 | 4,970 | 4,970 |

Panel D3. Small A-Share Firm and Matched Externally Listed Chinese Firms

| | Investment (1) | Operating Cash Flows (2) | Net Cash Flows (3) |
|---|---|---|---|
| A-Share Listed | −0.684*** | 0.374 | 0.962* |
| | (−3.375) | (0.633) | (1.709) |
| Year/Ind/Location FEs | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes |
| $R^2$ (%) | 15.32 | 10.52 | 4.64 |
| Observations | 9,834 | 9,639 | 9,639 |

split the A-share firms into three subgroups—large, medium, and small firms using lagged market cap as the sorting variable—and compare their performance with their counterparts. In Panel D1, we see that large A-share firms have higher investment and lower net cash flows than matched large externally listed firms (both significant at the 5% level), consistent with investment inefficiencies of A-share firms relative to those listed in external exchanges.

Medium A-share firms also underperform their counterparts (higher investment and lower net cash flows), while small A-share firms outperform small externally listed firms in terms of net cash flows. These results highlight the heterogeneity among A-share firms in terms of operating performance. We explore possible differences among these firms' stock returns relative to other groups of firms below.

As we discuss above, low net cash flows and investment efficiency may reflect poor corporate governance. To capture the strength of corporate governance, we first follow prior literature (e.g., Gompers, Ishii, and Metrick (2003), Cremers and Nair (2005)) and create a governance index for the cross-country sample of listed firms, G-index-I, which is based on four distinct measures: (i) degree of ownership concentration, (ii) degree of executive ownership, (iii) board size, and (iv) an indicator for whether the CEO is also the Chairman of the Board ("CEO duality"). Greater ownership concentration, higher executive ownership, smaller board size, and a dual CEO (and Chairman) are all associated with stronger incentives for value creation by management. A higher G-Index-I score indicates better governance. Table VIII, Panel A,

**Table VIII**

## Summary Statistics for Corporate Governance Measures

This table presents summary statistics to the governance index for A-share firms and for other markets, as well as for the components of the G-Index. Panel A reports results for the governance measure, G-Index-I, for the cross-country sample. The G-Index-I ranges from zero to seven. It is the sum of the scores on the following four dimensions: CEO duality, board size, ownership concentration, and executive holdings. The score for CEO duality takes a value of one if the firm's CEO and chairman is the same person, and zero otherwise. The score on board size ranges from zero to two: it takes a value of two if the firm's board size (measured by the number of directors) is smaller than the 30$^{th}$ percentile, one if between the 30$^{th}$ and 70$^{th}$ percentiles, and zero if larger than the 70$^{th}$ percentile. The scores on ownership concentration and executive holdings both range from zero to two: they take a value of two if the variable is larger than the 70$^{th}$ percentile, one if between the 30$^{th}$ and 70$^{th}$ percentiles, and zero if smaller than the 30$^{th}$ percentile. Percentile points are determined by country and year. We report the value-weighted average G-Index-I for each group, with lagged one-year market capitalization as the weight. The G-Index-I is available for firms listed in 75 countries in our sample. Panel B reports summary statistics for the governance measure for A-share firms, G-Index-A, and its components. G-Index-A ranges from zero to six and is the sum of scores on the following six dimensions: CEO duality, state ownership, executive holdings, board size, ownership concentration, and related-party transactions (RPT). We add one to the G-Index-A for each of the following conditions if met: (i) the firm's CEO and chairman is the same person, (ii) the firm's state holdings (central SASAC, local SASAC, and other government agencies) are less than 40%, (iii) the proportion of shares held by the firm's executives exceeds the 70$^{th}$ percentile of the year, (iv) board size is below the 30$^{th}$ percentile, (v) the proportion of shares held by the firm's largest five shareholders exceeds the 70$^{th}$ percentile, and (vi) the firm does not have net cash outflows in RPT in the year. In the bottom of Panel B, we compare the average G-Index-A for large and small A-share firms and for SOEs and non-SOEs. ***, **, and * denote the statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variables definitions.

Panel A. Governance Measure and Its Components for the Cross-Country Sample (G-Index-I)

| Country | Component | Mean | Median | StDev | Max | Min |
|---|---|---|---|---|---|---|
| Chinese A-share | CEO Duality | 0.208 | 0 | 0.406 | 1 | 0 |
| | Ownership Concentration | 0.539 | 0.546 | 0.152 | 0.891 | 0.201 |
| | Executive Holdings | 0.104 | 0.001 | 0.186 | 0.681 | 0 |
| | Board Size | 16.8 | 16 | 4.029 | 54 | 1 |
| | **G-Index-I** | **2.271** | **2** | **1.527** | **7** | **0** |
| Hong Kong | CEO Duality | 0.022 | 0 | 0.146 | 1 | 0 |
| | Ownership Concentration | 0.312 | 0.250 | 0.321 | 1 | 0 |
| | Executive Holdings | 0.277 | 0.147 | 0.286 | 0.717 | 0.0001 |
| | Board Size | 9.7 | 9 | 2.938 | 22 | 4 |
| | **G-Index-I** | **3.069** | **3** | **1.150** | **7** | **0** |
| United States | CEO Duality | 0.090 | 0 | 0.286 | 1 | 0 |
| | Ownership Concentration | 0.066 | 0.057 | 0.068 | 1 | 0 |
| | Executive Holdings | 0.102 | 0.061 | 0.443 | 1 | 0 |
| | Board Size | 9.7 | 9 | 3.573 | 33 | 1 |
| | **G-Index-I** | **2.406** | **2** | **0.863** | **7** | **0** |
| Other Countries | CEO Duality | 0.208 | 0 | 0.406 | 1 | 0 |
| | Ownership Concentration | 0.116 | 0 | 0.211 | 1 | 0 |
| | Executive Holdings | 0.438 | 0.478 | 0.262 | 0.923 | 0 |
| | Board Size | 8.7 | 8 | 4.455 | 34 | 1 |
| | **G-Index-I** | **2.365** | **2** | **0.788** | **7** | **0** |

(*Continued*)

**Table VIII**—*Continued*

Panel B. Governance Measure and Specific Components for A-Share Firms (G-Index-A)

| | Component | Mean | Median | StDev | Max | Min |
|---|---|---|---|---|---|---|
| | **G-Index-A** | **2.482** | **2** | **1.181** | **6** | **0** |
| China A-share | State Ownership | 0.116 | 0 | 0.211 | 1 | 0 |
| | RPT Net Out Amt | 0.007 | 0 | 0.117 | 0.524 | −0.475 |

***Comparing G-Index-A for A-Share Firms***

| | | | | | | |
|---|---|---|---|---|---|---|
| Small | 2.722 | Large | 2.235 | Difference | 0.487*** | *t*-statistic 7.76 |
| SOE | 2.211 | Non-SOE | 2.845 | Difference | 0.699*** | *t*-statistic 62.56 |

presents summary statistics for this index across 75 economies and markets.[27] The value-weighted average G-Index-I score for A-share firms is substantially lower than those for Hong Kong listed firms, U.S. firms, and the average across the other markets in our sample.

Another indicator of poor corporate governance is the extent of tunneling by firms' controlling shareholders. Following the literature, we capture tunneling activity using the direction and amount of RPTs. Information on RPTs comes from CSMAR, which provides the type, amount, direction, and date of all such transactions of A-share firms based on CSRC's mandatory disclosure requirements. In particular, we use loan-based RPTs (e.g., Fisman and Wang (2010)), which involve cash transactions in and out of the listed firms, to construct *RPT Amount Out* as the aggregate money outflow from loan-based RPTs for each firm-year. We scale this measure by the firm's book assets of the same year. We then regress A-share firms' investment and cash flows on the one-year lagged RPT variable. Internet Appendix Table IA.XII presents the results. As can be seen, RPT outflow adversely affects firms' investment, OCF, and net cash flows in the following year. In addition, a greater RPT cash outflow is associated with lower stock returns in the following year, indicating that investors are aware of its adverse effect on firms.

Following recent literature on corporate governance in China (see, e.g., Jiang and Kim (2020) for a survey), we also create an A-share governance index for domestically listed firms, G-Index-A, which is based on the four components of G-Index-I as well as the level of state ownership and the degree of insider tunneling, which is based on the RPT variable.[28] Lower state ownership and lower insider tunneling are both related to stronger governance.

[27] For the literature on corporate boards, see Adams, Hermalin, and Weisbach (2010) for a review. For the literature on managerial ownership and performance, see, for example, Coles et al. (2012). The literature also considers dimensions of corporate governance that can increase value for nonshareholder stakeholders of listed firms. See, for example, Allen, Carletti, and Marquez (2015), for a theoretical comparison of stakeholder- and shareholder-based governance mechanisms. Data on institutional ownership are not available for most emerging economies and thus institutional ownership is not included in our governance index.

[28] The two governance indexes, G-index-I and G-index-A, and their components, are available for download from: https://shanchenyu1017.wixsite.com/chenyushan.

Higher values of the G-Index-A indicate better governance for A-share firms. Table VIII, Panel B, presents summary statistics for the A-share governance index. Among A-share firms, small-capitalization firms have a higher governance index than the large-capitalization firms, while non-SOEs have higher governance scores than their SOE counterparts.

## *B. Tests of the Behavioral Biases Hypothesis*

### *B.1. Measures of Investors' Behavioral Biases*

To shed light on the role of investors' behavioral biases, we employ three sets of measures. First, we follow Baker, Wurgler, and Yuan (2012) and construct two market-level measures of investor sentiment that we apply to the cross-country sample: $Sentiment_1$ is constructed from the idiosyncratic risk premium (PVOL) and stock turnover (TURN), which are available for 58 countries, and $Sentiment_2$ is also based on the number of IPOs and IPO returns in a given year, Ln (# IPO) and RIPO, respectively, which are available for 17 countries.[29] We report summary statistics for the sentiment measures and their components for China, Hong Kong, the United States, and all other countries as a group in Table IX, Panel A.

Second, following Jia, Wang, and Xiong (2017), we use the monthly AH premium, which captures the degree of A-share investors' optimism relative to investors based in HKEX. To construct the AH premium, we calculate the price ratio of the A-share stock and its H-share-listed counterpart for 99 firms listed in both the A- and H-share markets, and then take the value-weighted average across firms using the total market value of each pair's A and H shares as the weight.[30] Table IX, Panel B, reports summary statistics for the market-level AH premium. The results are similar to those reported in Jia et al. (2017), who cover an earlier period. Prior literature (e.g., Mei, Scheinkman, and Xiong (2009)) also shows that A-share investors' speculative motive generates a speculative component in A-share prices, which is positively related to the A-share turnover rate. Accordingly, our third investor behavior measure is the stock-level turnover of A-share firm. Summary statistics for this measure are also reported in Panel B of Table IX.

[29] We have data on the annual number of IPOs and IPO first-day returns for 17 economies: China, the United States, Japan, the United Kingdom, Canada, Australia, France, Italy, Germany, South Korea, Hong Kong, Singapore, Brazil, Taiwan, Thailand, Malaysia, and Indonesia. PVOL is the log ratio of the equal-weighted average M/B ratios of stocks with high idiosyncratic volatility and those with low volatility (as determined by the $30^{th}$ and $70^{th}$ percentiles of the distribution of volatility). TURN is the detrended log turnover over the year.

[30] We compare the time series of the AH premium that we construct to the Hang Seng Stock Connect China AH Premium Index and find that they track each other closely over the 2016 to 2020 period (see Figure IA.7 in the Internet Appendix).

**Table IX**

## Summary Statistics for Investors' Behavioral Biases Measures

Panel A presents summary statistics for the two (market-level) sentiment measures and their components. $Sentiment_1$ is estimated as the first principal component of: volatility premium (PVOL) and market turnover (TURN), which are available for 58 countries in our sample. $Sentiment_2$ is estimated as the first principal component of: # of IPOs (Ln (# IPO)), IPO first-day returns (RIPO), PVOL, and TURN, which are all available for 17 countries. We report the value-weighted average $Sentiment_1$ and $Sentiment_2$ for each group of firms, with lagged one-year market capitalization as the weight. Panel B reports summary statistics for the investor behavior measures for A-share firms: the annualized market-level AH premium and individual stock-level turnover. We calculate *AH Premium* as the ratio of the A-share price in USD to the H-share price in USD*100 using stocks cross-listed in the A- and H- share markets. To obtain the market-level measure, we take value-weighted average across firms with the total market value of each pair's A and H shares as weights. Annual stock-level turnover is estimated as annual trading volume divided by the number of shares. Appendix A provides detailed variable definitions.

Panel A. Summary Statistics of Sentiment Variables and Their Components

| Country | Component | Mean | Median | StDev | Max | Min |
|---|---|---|---|---|---|---|
| Chinese A-share | PVOL | 0.385 | 0.305 | 0.253 | 0.937 | −0.002 |
| | Ln (# IPO) | 4.773 | 4.732 | 0.774 | 6.078 | 2.708 |
| | RIPO | 1.366 | 1.149 | 1.170 | 4.235 | 0.000 |
| | TURN | 0.208 | 0.135 | 0.358 | 0.959 | −0.353 |
| | $Sentiment_1$ | 0.723 | 0.322 | 0.966 | 1.688 | −1.242 |
| | $Sentiment_2$ | 0.966 | −0.174 | 1.252 | 3.137 | −1.600 |
| Hong Kong | PVOL | 0.477 | 0.426 | 0.267 | 0.921 | 0.011 |
| | Ln (# IPO) | 3.823 | 4.094 | 1.112 | 5.075 | 0.000 |
| | RIPO | 0.389 | 0.107 | 0.735 | 2.647 | 0.007 |
| | TURN | 0.114 | −0.084 | 0.726 | 2.585 | −0.698 |
| | $Sentiment_1$ | 0.456 | 0.042 | 1.121 | 2.412 | −2.353 |
| | $Sentiment_2$ | 0.964 | −0.151 | 1.454 | 3.153 | −1.594 |
| United States | PVOL | 0.574 | 0.568 | 0.373 | 1.110 | −0.248 |
| | Ln (# IPO) | 4.644 | 4.673 | 0.639 | 5.940 | 3.045 |
| | RIPO | 0.157 | 0.139 | 0.106 | 0.564 | 0.057 |
| | TURN | 0.028 | −0.037 | 0.416 | 1.024 | −0.601 |
| | $Sentiment_1$ | −0.311 | −0.442 | 0.916 | 1.988 | −1.650 |
| | $Sentiment_2$ | −0.500 | −0.300 | 1.511 | 5.797 | −1.718 |
| Other Countries | PVOL | 0.123 | 0.197 | 0.469 | 1.144 | −1.238 |
| | Ln (# IPO) | 3.101 | 3.113 | 1.105 | 5.313 | 0.000 |
| | RIPO | 0.258 | 0.182 | 0.295 | 1.433 | −0.094 |
| | TURN | −0.004 | −0.038 | 0.272 | 1.205 | −0.750 |
| | $Sentiment_1$ | 0.280 | 0.056 | 1.068 | 3.366 | −3.102 |
| | $Sentiment_2$ | 0.106 | 0.018 | 1.160 | 4.116 | −2.872 |

Panel B. Summary Statistics of Investor Behavior Measures for the A-Share Sample

| | Mean | Median | StDev | Min | Max |
|---|---|---|---|---|---|
| Market-Level AH Premium | 1.328 | 0.843 | 1.33 | 0.062 | 6.604 |
| Stock-Level Turnover | 3.148 | 2.487 | 2.383 | 0.271 | 12.178 |

### *B.2. Comparisons between Institutional Factors and Behavioral Factors*

Tables V to VII and Figures 4 and 5 show that the institutional deficiencies hypothesis—problematic IPO and delisting mechanisms, low investment efficiency, and tunneling by controlling shareholders—can help explain why A-share firms have lower net cash flows than firms listed in other large countries, externally listed Chinses firms, and matched unlisted Chinese firms. Some of the results are also consistent with the behavioral biases hypothesis, that is, with A-share investors failing to fully understand the extent and performance implications of earnings management activities around IPOs, inefficient investment decisions, and problematic listing and delisting processes, so that the pricing of IPO stocks, poorly governed firms, and ST firms is irrational, leading to lower subsequent returns. The investor sentiment indexes can also help explain the gap in stock returns between A-share firms and other groups of listed firms. We now compare their relative quantitative impact in explaining differences in stock returns of firms listed in the A-share and other markets.

Specifically, we regress annual stock returns on (i) the cross-country sample governance index, G-Index-I, (ii) inefficiency in the IPO process as measured by the change in ROA around IPO in the [−1, +1] window (recall Table V), (iii) the two market-level investor sentiment variables, (iv) the A-share governance index, G-Index-A, which also includes tunneling as measured by RPT outflows and the size of the state's ownership stake, and (v) two variables measuring investor biases among A-share investors, namely, the AH premium and stock-level turnover. To facilitate comparisons, we standardize the coefficients on the continuous variables (investor sentiment variables, change in ROA, etc.) by scaling the raw values using the variables' respective standard deviation. To ease comparison with Table II, we continue to use WLS regressions, with stock returns in percentage points as the dependent variable, and include firm controls.

As another measure of firms' investment efficiency, we follow Qian and Zhu (2018) and use firms' return on invested capital (ROIC), defined as net operating profits (Net Income + After Tax Interest Expenses) scaled by (lagged) invested capital (= Long-Term Debt + Minority Interests + Preferred Equity + Common Equity). While net cash flows offer a cash-flow-based measure of investment returns (scaled by assets), ROIC indicates the net profits earned on a given level of debt and equity capital raised. Since both net cash flows and ROIC can be regarded as outcomes of the governance variables, we include these variables (in standardized form as controls, and report ROIC in Table X) in the reduced-form regressions of stock returns to see whether their presence affects the impact of the other exogenous factors (governance, IPO processes, sentiment) on future returns.

Table X, Panel A, reports results for the cross-country regressions. We find that firms with stronger corporate governance have higher future returns (column (1)). Moreover, higher investor sentiment predicts lower stock returns in the following year (columns (2) and (3)), consistent with the results in Baker, Wurgler, and Yuan (2012) that sentiment is a contrarian predictor of

**Table X**

## Comparisons of Return Factors: Institutional Features, Corporate Governance, and Investors' Behavioral Biases

This table compares the effects of corporate governance, investor behavior, and earnings management, among other factors, on annual stock returns. Panel A presents results for the cross-country sample; Panel B presents the results for the A-share sample. In both panels, the dependent variable is annual stock returns in real terms. In Panel A, the explanatory variables are the global governance measure, *G-Index-I*, the investor sentiment measures $Sentiment_1$ and $Sentiment_2$, $\Delta ROA[-1,+1]$, the change in ROA from the year prior to IPO to the year after, and contemporaneous investment efficiency, *ROIC*. In Panel B, the explanatory variables are the A-share governance measure *G-Index-A* and two investor behavioral measure, namely, annual stock-level turnover and the industry-level AH premium, both lagged one year. *Stock-Level Turnover* is annual trading volume divided by the number of shares. *AH Premium* is the ratio of the A-share price in USD to the H-share price in USD*100. To obtain the industry-level measure, we take value-weighted average across firms by industry, with the total market value of each pair's A and H shares as the weight. *Firm controls* include firm characteristics, province-level location fixed effects, and SOE and ST indicators. All continuous explanatory variables are normalized by dividing the original value by its standard deviation. We employ WLS regressions where we use lagged one-year market capitalization as the weight. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. Appendix A provides detailed variable definitions.

Panel A. Cross-Country Sample

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| G-Index-I | 1.407** | | | | 1.330** | 1.138** | 1.411** | 1.632*** |
| | (2.414) | | | | (2.291) | (2.225) | (2.425) | (2.826) |
| $Sentiment_1$ | | −4.673*** | | | −4.402*** | | | |
| | | (−4.385) | | | (−2.892) | | | |
| $Sentiment_2$ | | | −8.862*** | | | −7.091*** | | −6.775*** |
| | | | (−6.471) | | | (−3.382) | | (−3.316) |
| ΔROA [−1, +1] | | | | 1.973*** | | | 2.076** | 2.061** |
| | | | | (2.784) | | | (2.473) | (2.455) |
| ROIC | | | | | | | | 5.714*** |
| | | | | | | | | (6.393) |
| A-share Listed | −14.789** | −29.824*** | −2.277 | −23.318** | −15.580** | −9.566 | −14.627** | −3.306 |
| | (−2.355) | (−3.052) | (−0.422) | (−2.289) | (−2.214) | (−1.182) | (−2.337) | (−0.412) |
| Year/Ind. FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Country Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 5.33 | 6.32 | 6.72 | 5.30 | 6.27 | 6.75 | 5.34 | 7.34 |
| Observations | 495,651 | 423,418 | 411,885 | 495,651 | 424,940 | 411,885 | 495,651 | 411,885 |

Panel B. A-Share Listed Firms

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| G-Index-A | 1.445*** | | | | 1.358*** | 1.359*** | 1.341** | 0.914* |
| | (2.885) | | | | (2.556) | (2.795) | (2.355) | (1.906) |
| AH Premium | | −14.024** | | | −0.951 | | | |
| (Industry level) | | (−2.335) | | | (−0.304) | | | |
| Stock-Level | | | −2.475*** | | | −1.617*** | −1.568* | −0.720 |
| Turnover | | | (−3.866) | | | (−2.177) | (−1.892) | (−0.902) |
| Δ ROA [−1, +1] | | | | 0.869** | | | 0.863** | 0.051 |
| | | | | (2.115) | | | (2.093) | (0.133) |
| ROIC | | | | | | | | 8.000*** |
| | | | | | | | | (8.013) |
| Ind./Location FEs | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Country Controls | No | Yes | No | No | No | No | No | No |
| $R^2$ (%) | 52.40 | 4.27 | 52.33 | 52.41 | 53.67 | 53.27 | 53.29 | 54.40 |
| Observations | 36,044 | 28,251 | 34,386 | 36,017 | 28,251 | 34,406 | 34,406 | 31,712 |

country-level market returns. We also find a positive relation between the change in firm earnings around IPO and the firm's stock returns (column (4)), indicating that firms that observe a larger decline in ROA tend to have lower (subsequent) returns.

When we include multiple sets of factors, we find that the investor sentiment factor is of first-order importance for the stock returns of listed firms around the globe. For instance, a one-standard-deviation increase in $Sentiment_1$ (based on volatility and turnover) is associated with a 4.40 percentage point drop in returns (column (5)), while a one-standard-deviation increase in $Sentiment_2$ (based on volatility, turnover, and IPO activities) is associated with a 6.78 percentage point decrease in returns (column (8)). An increase in the governance index and a decrease in the ROA decline around IPO are also positive determinants of stock returns. For instance, column (8) shows that a one-point increase in the G-Index-I (which has a standard deviation of 0.947 in the cross-country sample) is associated with a 1.63 percentage point increase in annual stock returns (significant at 1% level) when the other factors and ROIC are included.

Table X, Panel B, focuses on the stock returns of the A-share sample. As can be seen in column (6), a one-point increase in the G-Index-A (which has a standard deviation of 1.181 in the A-share sample, as reported in Table VIII, Panel B) is associated with a 1.36-percentage-point increase in annual stock returns, while a one-standard-deviation increase in stock-level turnover (2.38) is associated with a 1.62-percentage-point decrease in returns. Column (2) shows that the AH premium, a sentiment measure that varies by industry and year, is associated with lower stock returns, but its explanatory power weakens substantially when G-Index-A enters the model and when year fixed effects are taken into account (column (5)). The magnitude of the impact of the decrease in ROA around IPO becomes much smaller when G-Index-A and stock-level turnover are included (column (7)). Overall, these results show that both corporate governance and investor sentiment are important determinants of annual stock returns for A-share firms. Finally, the relationship between ROIC, which measures investment efficiency, and stock returns is positive and statistically significant in both panels (column (8)), but its presence does not diminish the effects of the institutional and behavioral factors.

For robustness, we rerun the cross-country tests in Table X, Panel A, using both a portfolio-sorting approach (double-sorting on the governance index and $Sentiment_1$) and portfolio regressions (including both sentiment variables as well as controlling for the Fama-French five factors as well as country and firm controls); see Tables IA.XIII and IA.XIV in the Internet Appendix. For the A-share sample and tests reported in Table X, Panel B, we also use monthly returns in conducting the portfolio sorts and an alternative AH premium measure in running the cross-sectional regressions.[31] We continue to find that

[31] We use abnormal turnover and the residual AH premium as alternative measures of investors' behavioral biases. We report the results in Internet Appendix Tables IA.XV and IA.XVI. We also run OLS regressions (on the same sample as in Table IA.I, Panel E in the Internet Appendix) to estimate the same specifications as in Table X and find qualitatively similar results (see Table IA.XV, Panels B and C).

governance and sentiment factors are key determinants of returns both in the cross-country sample and within the A-share firm sample.

Next, we follow prior literature (e.g., Core, Guay, and Rusticus (2006)) and examine whether the governance indexes can explain variation in the accounting performance of listed firms. In Table XI, Panel A, higher values of G-Index-I are associated with higher investment, OCF, and net cash flows (coefficients all significant at the 1% level) in the cross-country sample. In Panel B, we drop the largest 30% of A-share firms from the sample. The positive relationships between the cross-country governance index and investment, OCF, and net cash flows remain strong, but the underperformance of A-share firms in cash flows is weaker and statistically insignificant. These results confirm that the inferior accounting returns of A-share firms is due mainly to large firms. In Panel C, an increase in the value of G-Index-A is associated with higher levels of investment and OCF (significant at the 1% level) for A-share firms. It is also associated with higher levels of net cash flows for the full sample period, but the result is statistically insignificant (column (3)). The coefficient on the G-Index-A becomes statistically significant (at the 10% level, column (4)) in regressions conducted on the second half of the sample period, when the governance gap between small and large firms is greater (see Figure IA.8 of the Internet Appendix).

The implications of Tables X and XI are that both institutional deficiency factors and investor behavior factors are important determinants of stock returns. Among the former, corporate governance is of particular importance in explaining low stock returns of A-share firms, as well as for firms' accounting performance. Hence, enhancing governance can have a positive effect on the performance of A-share listed firms. Improvement of the structure of the market's investor base can also help reduce the adverse effects of investor's behavioral biases on stock returns. Encouraging domestic and foreign institutional investors to more actively engage in corporate governance, monitoring investment and other key firm activities, can advance both goals.

### *C. Tests of the Financial Repression Hypothesis*

To examine the financial repression hypothesis, we extract real interest rates for the largest 20 economies as measured by 2018 GDP in PPP terms from the IMF. From Table IA.XVII in the Internet Appendix, we find that real interest rates in China over the 2000 to 2018 period are substantially lower than those in large emerging markets such as Brazil and India, and are lower than those of emerging markets as a group (difference in means is significant at the 1% level). The average real rates in China are also lower than those in developed markets, including the United States, Japan, and Hong Kong, but the differences are not statistically significant. To the extent that the opportunity cost of capital (as proxied by real interest rates) has been much lower in China than in other large emerging markets over the past two decades, this can also help explain why stock returns have been lower in the A-share market.

**Table XI**

## Corporate Governance and Operating Performance

This table reports results on the role of corporate governance in explaining firms' operating performance. Panel A reports results for the cross-country sample. The dependent variable is annual operating performance as measured by investment, OCF, and net cash flows. The independent variable of interest is *G-Index-I*. Firm controls are the same as in Table VII, Panel A. Both *G-Index-I* and firm controls are lagged one year. Panel B reruns the analysis of Panel A after excluding the largest 30% A-share firms from the cross-country sample. Panel C examines the relationship between governance and operating performance for A-share firms. Firm controls include *Log (Market Capitalization)* and *Market-to-Book Ratio*. Columns (1) to (3) employ the full sample period, 2000 to 2018, whereas column (4) employs the subsample period 2010 to 2018. The dependent variables are the same operating performance measures as above. The independent variable of interest is the governance measure for A-share firms, *G-Index-A*. *G-Index-A* is constructed at firm-year level. Both *G-Index-A* and controls are lagged one year. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variable definitions.

Panel A. Governance and Operating Performance in Cross-Country Sample

| | Investment (1) | OCF (2) | Net Cash Flows (3) |
|---|---|---|---|
| G-Index-I | 0.136*** | 0.893*** | 0.723*** |
| | (3.492) | (10.352) | (6.145) |
| A-Share Listed | 0.393** | −0.325*** | −0.705** |
| | (2.075) | (−2.683) | (−2.465) |
| Country/Firm Controls | Yes | Yes | Yes |
| Ind/Year FE | Yes | Yes | Yes |
| $R^2$ (%) | 11.07 | 35.58 | 34.13 |
| Observations | 454,499 | 454,499 | 454,499 |

Panel B. Governance and Operating Performance in Cross-Country Sample: Dropping Large A-Share Firms

| | Investment (1) | OCF (2) | Net Cash Flows (3) |
|---|---|---|---|
| G-Index-I | 0.134*** | 0.943*** | 0.771*** |
| | (3.233) | (10.429) | (6.195) |
| A-Share Listed | 0.101 | −0.199 | −0.073 |
| | (0.513) | (−0.542) | (−0.162) |
| Country/Firm Controls | Yes | Yes | Yes |
| Ind/Year FE | Yes | Yes | Yes |
| $R^2$ (%) | 11.09 | 35.56 | 34.13 |
| Observations | 443,505 | 443,505 | 443,505 |

Panel C. Governance and Operating Performance in A-Share Sample

| | Investment (1) | OCF (2) | Net Cash Flows (3) | Net Cash Flows (2010-2018) (4) |
|---|---|---|---|---|
| G-Index-A | 0.387*** | 0.448*** | 0.066 | 0.136* |
| | (11.452) | (4.812) | (0.823) | (1.782) |
| Year/Ind/Province FE | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 12.52 | 10.23 | 2.32 | 2.31 |
| Observations | 31,085 | 29,885 | 29,885 | 19,153 |

Matched unlisted Chinese firms and externally listed firms in the United States and Hong Kong operate in environments with similarly low real opportunity costs as A-share firms but have much higher levels of net cash flows (matched unlisted firms) and stock returns (externally listed firms). These comparisons indicate that while low interest rates are consistent with low stock returns in the A-share market as compared to firms from other emerging markets, they cannot fully explain the higher stock returns of externally listed firms or the poor accounting performance of A-share firms relative to matched unlisted firms.

### *D. Additional Tests and Robustness Checks*

In this section, we first explore heterogeneity across A-share firms by examining different subsamples (Section III.D.1). Next, we consider the role of discount rates in explaining the gap in stock returns between A-share firms and firms listed other markets (Section III.D.2). We also examine whether different risk measures (Section III.D.3) and valuation variables (Section III.D.4) can explain the underperformance in stock returns of A-share firms.

#### *D.1. Further Exploring Heterogeneity within the A-Share Sample*

Recall from Table II, Panel D, Table VII, Panel B, and Table XI, Panel B, that the underperformance of A-share firms in terms of both stock and accounting returns is concentrated among large-capitalization firms. In Table XII, Panel A, we include large and SOE indicators in the A-share sample and continue to find that large firms underperform other A-share firms in terms of both stock returns and net cash flows. While SOEs also underperform non-SOEs in terms of stock returns (column (1)), their accounting performance is no different from that of non-SOEs (coefficients in the cash flow regressions are both positive but statistically insignificant). Indeed, the gap between large firms and small- and medium-sized A-share firms in terms of net cash flows is significantly greater than that between SOEs and non-SOEs (the difference between coefficients is significant at the 1% level); the large-firm gap in stock returns is also greater than the SOE gap in stock returns, but the difference is not statistically significant.

Figure 2 above shows that the return gap between large and small A-share firms grows much larger during the second half of the sample period. Figure IA.8 in the Internet Appendix shows that the gap in G-index-A for the two groups also widens overtime (i.e., between 2005 and 2018).[32] These results indicate that greater improvement in the governance of small firms following the SSR contributes to the larger return gap between large and small firms from 2009 to 2018, providing further direct evidence in support of Proposition 1.

[32] From Table IA.XVIII, Panel A in the Internet Appendix, the difference in the average values of the G-index-A between the large and small firms in 2004 was 0.058 (statistically insignificant), while it increased to 0.375 by the end of 2007 (significant at the 1% level), when the SSR was completed. Small firms thus emerged from the SSR with better governance than large firms.

**Table XII**

## Summary of Additional Tests and Robustness Checks

This table reports results on heterogeneity in the cross-country sample and in the A-share sample in terms of stock returns and operating performance. Panel A compares the underperformance of the largest 30% A-share firms and SOEs within the A-share firm sample. Panel B decomposes the performance gaps of A-share firm across (i) newly listed firms (firms that conduct IPO within the past two years), (ii) incumbent firms, and (iii) ST firms across three groups of A-share firms, namely, all A-share firms, SOEs, and non-SOEs. We first allow all A-share firms to enter the cross-country regressions and estimate the coefficient on the A-share indicator (row 1), we then allow incumbent firms and incumbent plus newly listed firms to enter the regressions (rows 2 and 3). In Panel C, we take the difference in the regression coefficients on the A-share indicator in Panel B to measure the marginal contribution of each of the three groups of firms to the overall performance gap. The contribution of the ST firms (newly listed firms) is measured as the difference in coefficients in row 1 and row 3 (rows 2 and row 3) of Panel B. We divide the performance gap of each group of firms by the total A-share performance gap to obtain the relative contribution (in percentages) of each group. When the dependent variable is stock returns, we employ WLS regressions in which we use lagged one-year market capitalization as the weight; when the dependent variable is an operating performance measure, we use OLS regressions. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variables definitions.

Panel A. Performance of Large A-Share Firms and SOEs

| | Stock Returns (1) | Investment (2) | OCF (3) | Net Cash Flows (4) |
|---|---|---|---|---|
| Large | −6.353*** | 0.459*** | −0.276 | −0.766*** |
| | (−3.952) | (6.032) | (−1.342) | (−3.752) |
| SOE | −2.793* | 0.074 | 0.138 | 0.132 |
| | (−1.842) | (1.053) | (0.935) | (0.915) |
| Year/Industry/Province FE | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 52.48 | 16.01 | 10.23 | 4.55 |
| Observations | 36,044 | 35,879 | 34,459 | 34,459 |
| Differences in Coefs. of "Large" and "SOE" | −3.560 | 0.385*** | −0.414 | −0.898*** |
| | (−1.601) | (3.717) | (−0.405) | (−3.592) |

Panel B. Decompose Underperformance of A-Share Firms: Regression Coefficients of the A-Share Indicator

| | All Firms (1) | SOEs (2) | Non-SOEs (3) |
|---|---|---|---|
| All A-share Firms (Incumbent + Newly Listed + ST) | −14.948** | −12.778*** | −12.746*** |
| | (−2.389) | (−3.645) | (−3.634) |
| Incumbent Only | −7.274** | −7.596** | −5.373* |
| | (−2.192) | (−2.038) | (−1.655) |
| Incumbent + Newly Listed | −11.893*** | −9.91*** | −10.167*** |
| | (−2.965) | (−2.834) | (−2.929) |

Panel C. Decompose Underperformance of A-Share Listed Firms (in Percentages)

| | All Firms (1) | All Firms (in %) (2) | SOEs (3) | SOEs (in %) (4) | Non-SOEs (5) | Non-SOEs (in %) (6) |
|---|---|---|---|---|---|---|
| Firms in ST Status | 3.055 | 20.44% | 2.868 | 22.44% | 2.579 | 20.23% |
| Incumbent Firms | 7.274** | 48.66% | 7.596** | 59.45% | 5.373* | 42.15% |
| Newly Listed Firms | 4.619 | 30.90% | 2.314 | 18.11% | 4.794 | 37.61% |

An alternative hypothesis explaining the return gap between large and small A-share firms is that the degree of investor bias toward large firms is greater, leading to lower returns of large stocks. Interestingly, stock-level turnover, our measure of investor sentiment, is higher for small stocks, but they have higher returns. In Table IA.XVIII, Panel B, of the Internet Appendix, the large-stock indicator remains negative and statistically significant after controlling for turnover (in the return regressions of A-share firms). This result suggests that sentiment alone cannot explain the underperformance of these stocks, while G-Index-A remains positive and significant in all specifications, suggesting that corporative governance is a key factor.

We next divide the A-share sample into newly listed firms (conducted an IPO within the past two years), incumbent firms (conducted in IPO two or more years ago, and not in ST status), and ST firms, and estimate their relative contribution to the performance gaps in returns. We allow each group of firms to enter the cross-country regressions and estimate changes in the regression coefficients. The results are summarized in Table XII, Panels B and C. When only incumbent SOEs enter the regression, the coefficient on the A-share indicator is −7.6 (column (2) in Panel B; significant at the 5% level), meaning that this subset of firms underperforms those listed in other countries by 7.6 percentage points per annum. With newly listed and ST firms added to the SOE subsample, the underperformance increases to 9.91 and 12.78 percentage points, respectively. Turning to the differences in these coefficients, we interpret the relative contribution of incumbent, newly listed, and ST SOEs to the underperformance of all SOEs to be 59.45%, 18.11%, and 22.44% (column (4) in Panel C), respectively, with incumbent firms explaining the majority of the overall effect. Using the same approach, we conclude that incumbent firms also contribute nearly half of the performance gap of all A-share firms (column (2), Panel C), while newly listed non-SOEs contribute a significant share (37.6%, in column (6)) of the underperformance of all non-SOEs, in part due to the more inflated pricing of IPO stocks.[33]

Above we provide evidence on factors contributing to the A-share firms' underperformance relative to listed firms from advanced and emerging markets as well as externally listed and matched unlisted Chinese firms, in terms of both stock returns and net cash flows. A number of additional factors may also help explain the low returns of A-share firms relative to the other groups of listed firms. We briefly discuss some of these factors next.

### *D.2. Firms' Discount Rates*

We show that low real interest rates during the sample period can help explain the return gap between A-share firms and firms from other emerging markets. Another possible explanation for the low stock returns of A-share firms, especially since 2007, is that interest rates may have been rising in

[33] Table IA.XIX in the Internet Appendix shows that the decomposition results are similar for the 1991 to 2018 period.

China. In terms of risk-free rates (bank deposit rates and rates of government bonds), the real demand deposit rate (adjusted for inflation) and one-year deposit rate both declined from 2000 to 2018 and the five-year deposit rate did not increase over the same period. Meanwhile, real interest rates of five-year government bonds in China are higher than those in Japan over most of the sample period and are in line with those of the United States and India.

We next examine whether changes in the discount rates of listed firms due to changes in the risk premium have contributed to low returns. To do so, we take advantage of a subset of A-share firms that are cross-listed in external markets—part of these firms' financing comes from external markets with possibly different levels of risk premia and overall discount rates.[34] We identify 99 firms listed in both the A-share and Hong Kong markets in our sample, and compare the performance of these cross-listed firms with firms listed in the A-share market only. Panels A and B of Table XIII show that the cross-listed firms are not significantly different from the matched firms that are listed only in the A-share market in terms of (i) RPT, as measured by cash outflows from loan-based transactions, and (ii) stock returns. Panel B further shows that cross-listed firms generate similar levels of net cash flows as non-cross-listed firms.

Overall, the fact that cross-listed firms have similar net cash flows and stock returns as matched, non-cross-listed A-share firms suggests that cross-listed Chinese firms face similar discount rates as non-cross-listed A-share firms. This result casts doubt on the view that the underperformance of A-share firms can be explained by higher (risky) discount rates.

### *D.3. Risk as Measured by Stock Betas and Return Volatilities*

A key prediction of efficient markets is that stocks with lower risk should have lower expected returns. Lower risk can be proxied by a lower stock beta. This argument implies that, compared with externally listed Chinese firms, A-share firms may have lower betas. To test this prediction, we use the value-weighted return of all A-share firms as the A-share's market return. For externally listed Chinese firms, we use the value-weighted return of all firms in the listing country or exchange as the market return—for instance, we estimate betas of Chinese firms listed in the HKEX (the United States) using the value-weighted returns of all the firms listed in Hong Kong (the United States) as the market portfolio.[35] Internet Appendix Table IA.XX reports the average

[34] Carpenter et al. (2021) find that Chinese investors require a higher cost of capital than U.S. investors, due to relatively higher economic risks, fewer diversification opportunities, and greater capital controls.

[35] This approach is consistent with how funds flow in the Shanghai- and Shenzhen-Hong Kong Stock Connects. For "south-bound" domestic investors, their funds (after converting from RMB into HK dollars) are pooled with capital in HKEX; once the trades are cleared and settled, these investors can retrieve their funds (in RMB). A similar approach is taken for "north-bound" foreign investors (with foreign funds pooled with domestic capital). For more details, see http://www.sse.com.cn/lawandrules/sserules/hkexsc/c/c_20190228_4728030.shtml.

**Table XIII**
## Performance of Cross-Listed A-Share Firms

This table compares stock returns and operating performance of firms cross-listed in the A-share and Hong Kong markets, and non-cross-listed A-share firms. Panel A compares RPT activities of cross-listed and non-cross listed A-share firms. The dependent variables are *RPT Amt Out* and *Stock Returns (in percentage points)*. Columns (1) and (3) show regression results of the full sample of A-share firms, while columns (2) and (4) show results of a matched sample of cross-listed and non-cross-listed A-share firms. Each cross-listed firm is matched with one non-cross-listed A-share firm in the same industry and with the closest book assets in the IPO year; 99 firms cross-listed in HKEX are matched following this procedure. Panel B presents results on operating performance. Explanatory variables are lagged by one year. In Panel A, columns (3) and (4), we employ WLS regressions, where the dependent variable is the stock return, and we use lagged one-year market capitalization as the weight. We employ OLS regressions in columns (1) and (2) of Panel A, and all columns in Panel B. *t*-Statistics calculated using standard errors clustered by industry and year are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels. Appendix A provides detailed variables definitions.

Panel A. Cross-Listing, RPT, and Stock Returns

| | RPT Amt Out | | Stock Returns | |
|---|---|---|---|---|
| | Full Sample (1) | Matched Sample (2) | Full Sample (3) | Matched Sample (4) |
| Cross-Listed | −0.026** | 0.001 | 1.588 | −0.954 |
| | (−2.445) | (0.266) | (0.972) | (−0.609) |
| Year/Industry/Location FE | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 4.67 | 17.66 | 46.72 | 62.23 |
| Observations | 33,028 | 2,306 | 38,505 | 2,423 |

Panel B. Cross-Listing and Operating Performance for Matched Sample

| | ROA (1) | ROE (2) | Net Income Growth (3) | Operating Cash Flows (4) | Investment (5) | Net Cash Flows (6) |
|---|---|---|---|---|---|---|
| Cross-Listed | −0.006 | 0.033 | −0.041 | −0.007 | 0.007 | −0.008 |
| | (−1.513) | (0.372) | (−0.592) | (−1.542) | (1.552) | (−1.637) |
| Year/Industry/Location FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| $R^2$ (%) | 56.10 | 1.92 | 14.01 | 32.20 | 58.41 | 9.48 |
| Observations | 2,438 | 2,463 | 2,463 | 2,162 | 2,451 | 2,162 |

betas by industry. The differences in betas for A-share and externally listed firms are statistically indistinguishable for most industries. An exception is the consumer services industry, which accounts for less than 10% of all stocks. The fact that the stock return betas of most A-share firms are similar to those of externally listed firms suggests that the outperformance of externally listed Chinese firms cannot be explained by higher betas.

When we control for return volatility in the stock return regressions (Table II), we find that the underperformance of the A-share market remains. Thus, despite having daily limits on price movements, a value-weighted portfolio composed of Chinese stocks has a higher return volatility as compared to stocks from both developed and developing markets (see Figure IA.9 in the Internet Appendix). A-share stocks also have a higher return volatility than externally listed Chinese firms for the majority of the sample period.[36] Thus, lower returns associated with lower risks as predicted by standard asset pricing theories is inconsistent with observed patterns the A-share market.

### *D.4. Valuation*

If investors in the A-share market become more pessimistic about stocks than investors in the other markets, returns of A-share stocks (especially during the second half of the sample period) could be lower due to downward-revised valuations. Bekaert, Ke, and Zhang (2021) document that in the post-2000 era, the price-to-earnings (P/E) ratios of A-share stocks peaked in 2007 and declined in subsequent years, but their valuations during subsequent years are not at the bottom of the emerging market group including India and Brazil. Bekaert et al. (2021) find that A-share stocks' P/E ratios are also higher than the average P/E ratios for Datastream market indices of emerging markets and developed markets. Our own calculations show that A-share stocks' valuations (as measured by M/B ratios) are also higher than those of externally listed Chinese stocks during most of the post-2007 period (see Figure IA.10 in the Internet Appendix). This indicates that the poor performance of A-share stocks cannot be explained by investors assigning low valuations to these firms.

## IV. Conclusion

Over the 2000 to 2018 period, China's domestic (A-share) stock market, the second largest in the world in terms of market capitalization, is one of the worst-performing markets in terms of BHRs. By contrast, externally listed Chinese firms, most of which are listed in Hong Kong and the United States, perform much better. The operating performance of A-share listed firms as measured by net cash flows is also inferior to matched unlisted Chinese firms. The underperformance of A-share firms is concentrated among large-capitalization companies.

In this paper, we seek to shed light on the factors that can explain the performance gaps, in terms of both stock returns and accounting measures, between A-share firms and both externally listed and matched unlisted Chinese

[36] Brunnermeier, Sockin, and Xiong (2022) theoretically examine the Chinese government's intervention in the stock market with the goals of reducing volatility and improving resource allocation. In their model, since investors spend resources to gather information on government policies, they ignore stock fundamentals in the process and government intervention can achieve the exact opposite outcomes relative to its goals.

firms, as well as between A-share firms and listed firms from developed and emerging markets. Better understanding these factors should help regulators improve the efficiency and performance of the Chinese stock market, which, in turn, can promote efficient allocation of resources in the economy and allow for better sharing of risks. An efficient stock market is important for a country in which firms rely heavily on bank financing, is crucial for the aging population save effectively for old age, and can better encourage innovation and the development of new industries (Allen and Gale (2000)).

After demonstrating a variety of stylized facts, we develop a model in which institutional and corporate governance reforms for the A-share market would lead to permanently higher cash flow growth for the representative firm. Risk-neutral investors can have homogeneous or heterogeneous beliefs on the prospect of such reforms. When the reforms occur, prices rise and returns are equal to the opportunity cost of capital. We develop three hypotheses based on different versions of the model. The institutional deficiencies hypothesis posits that if fully rational investors do not witness the announcement and implementation of reforms, stock returns fall below the opportunity cost of capital in the current period. By calibrating the model with cash flow and growth data for A-share and externally listed firms during the sample period, we demonstrate that the jump in returns and valuations after reforms can be sizeable.

The second version of the model considers heterogeneous investor beliefs on the prospect of reforms. We find that when optimistic investors, facing short-sale constraints, hold all of the stock of the representative firm, current-period returns are lower the more optimistic, they are about the ex ante likelihood of the reforms. Hence, the behavioral biases hypothesis predicts that low returns are driven by optimistic investors' irrational expectations about the likelihood of reforms.

Firm-level empirical evidence is consistent with the view that problematic IPO and delisting processes lead to adverse selection of firms that enter and stay in the market. With much higher levels of investment compared to listed firms from other countries, A-share firms generate lower net cash flows, which suggests low investment efficiency. These results support the institutional deficiencies hypothesis, in that institutional and corporate governance reforms would improve listed firms' performance. These results are also consistent with the behavioral biases hypothesis, in that investors fail to fully understand the inefficiencies in investment and the problems associated with the IPO and delisting processes, and thus, the pricing of poorly governed firms is inflated, leading to lower subsequent returns.

When we include both institutional deficiency and investor sentiment factors in tests of returns, we find that (market-level) sentiment is the dominant factor in explaining the underperformance of A-share stocks in the cross-country sample, with the cross-country governance index another key factor. Within the A-share sample, both the A-share governance index and (stock-level) sentiment are important factors in explaining the variation of returns. Moreover, the global governance index can explain the performance gap in net cash flows of A-share firms relative to listed firms from other countries, and the A-share

governance index can explain differences in accounting performance among A-share firms as well as differences in both stock and accounting returns between large and small firms.

Our results have several policy implications. The first is that the CSRC should substantially reduce the financial hurdles for IPOs and encourage more privately owned firms, especially those from growth industries, to enter the market. The CSRC should also strengthen the process for delisting poor-performing firms. These features are reflected in the recently established "Science and Technology Innovation Board" in the SSE and have been expanded to other sectors of the A-share market. These reforms should improve the quality of the firms listed in the market. Importantly, efforts to further improve the structure of the investor base and corporate governance are also needed to improve investment efficiency and rational pricing of stocks. Overall, such reforms would enhance the efficiency of the domestic stock market, and with the market playing a better role in the allocation of resources, would spur economic growth.

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## Appendix A: Data Sources and Variable Definitions

| Variable | Definition |
|---|---|
| ***WORLDSCOPE & DATASTREAM*** | |
| *Stock-Level Variables* | |
| Stock Returns | Monthly/annual stock returns of firms listed in markets other than China, the United States, Brazil, and Hong Kong, adjusted for stock splits and inflation (measured by monthly CPI). |
| *Firm-Level Variables* | |
| ROA | EBIT in year t/Total Assets in year $t$. |
| ROE | Net income in year t/total equity in year $t$. |
| ROS | (Net Sales – Cost of Goods Sold) in year t/Net Sales in year $t$. |
| Operating Cash Flows (OCF) | (EBITDA – Change in Working Capital – Income Taxes)/Total Assets. |
| Net Cash Flows | (Operating Cash Flow – Capital Expenditure)/Total Assets. |
| Leverage | Total Debt in year $t$/Total Assets in year $t$. |
| Earnings Growth | (EBIT in year $t$ – EBIT in year $t-1$)/EBIT in year $t$-1. |
| Sales Growth | (Net Sales in year $t$ – Net Sales in year $t$-1)/Net Sales in year $t$. |
| Firm Age | The number of years since a firm's foundation. |
| Total Accrual | Net Income – Operating Cash Flow (OCF). |
| ROIC | Net Operating Profits (Net Income + After-tax Interest Expenses)/Invested Capital (sum of Long-Term Debt, Minority Interests, Preferred Equity, and Common Equity). |
| $\text{Sentiment}_1$ | The first principal component of: volatility premium (PVOL) and market turnover (TURN), available for 58 countries. |

| Variable | Definition |
|---|---|
| $Sentiment_2$ | The first principal component of: # of IPOs (Ln (# IPO)), IPO first-day returns (RIPO), volatility premium (PVOL), and market turnover (TURN), available for 17 countries. |
| *Country-Level Variables* | |
| EBIT of Listed Firms/GDP | Total EBIT of listed firms in a country over the country's GDP in the same year. |
| ***BoardEx and Risk Metrics*** | |
| G-Index-I | Ranges from zero to seven, and is the sum of the scores on the following dimensions: CEO duality, board size, ownership concentration, and executive holdings. The score on CEO duality takes a value of one if the firm's CEO and chairman is the same person, and zero otherwise. The scores on board size, ownership concentration, and executive holdings range from zero to two, and are determined by the $30^{th}$ and $70^{th}$ percentiles of the corresponding variables. |
| ***CAFR-Chinese Stock Market Research Project*** | |
| Stock Returns | Monthly/annual stock returns of firms listed in the Shanghai or Shenzhen stock exchanges (A-share firms) for 2000 to 2013, adjusted for stock splits and inflation. |
| ***WIND*** | |
| Stock Returns | Monthly/annual stock returns of A-share firms for 2014 to 2018, adjusted for stock splits and inflation. |
| Return Volatility | Annualized return volatility (standard deviation) of A-share and HK listed firms, estimated from daily or weekly stock returns. |
| SOE | Firms that are ultimately controlled by the central State-owned Assets Supervision and Administration Commission of the State Council (SASAC), Ministry of Finance, local SASACs, or other government agents. |
| Stock-level Turnover | Monthly trading volume divided by the number of shares. |
| AH Premium | The firm-level AH premium is calculated as the A-share price in USD divided by the H-share price in USD*100. We then take the value-weighted average across firms with the total market value of each pair's A and H shares as the weight to obtain the market-level, measure. |
| G-Index-A | Ranges from zero to six and is the sum of scores on: CEO duality, state ownership, executive holdings, board size, ownership concentration, and related-party transactions (RPT). We add one to the G-Index-A for each of the following condition that are that are met: (i) the firm's CEO and chairman is the same person, (ii) the firm's state holding is less than 40%, (iii) the proportion of shares held by the firm's executives is larger than the $70^{th}$ percentile, (iv) the firm's largest five shareholders' holdings exceed the $70^{th}$ percentiles, (v) the firm's board size is smaller than the $30^{th}$ percentile, and (vi) the firm does not have net cash outflows in its RPTs. |

| Variable | Definition |
|---|---|
| ***CSMAR*** | |
| RPT Amt Out | The aggregate amount of money a listed firm paid out in RPTs in a given year, scaled by total assets. |
| ***NBS CIED (China Industrial Enterprise Database)*** | |
| | Financial variables for unlisted firms in China over the 1998 to 2013 period. Firm-level variables are constructed in the same way as listed firms. |
| ***COMPUSTAT (Global), CRSP*** | |
| | Daily, weekly, and yearly stock returns and other market and financial information for firms listed in the United States and firms listed in Brazil. |
| ***WORLD BANK*** | |
| GDP Growth | Real GDP growth in constant local currency (adjusted for inflation). |
| GDP Per Capita | The ratio of total GDP to total population in million U.S. dollars. |
| Consumption Volatility | The standard deviation of aggregate annual consumption in one country in trillion U.S. dollars for the sample period. |
| Credit from Financial | Domestic credit provided by the financial sector, including all credits to various sectors on a gross basis, with the exception of credit to the central government. |
| M2/GDP | The ratio of the sum of money and quasi money (M2) to GDP. M2 comprises the sum of currency outside banks, demand deposits, and time, savings, and foreign currency deposits of resident sectors other than the central government. |
| ***IMF Economic Outlook Database and Maddison-Project Website*** | |
| GDP Per Capita in PPP | GDP per capita in purchasing power parity (PPP) terms for China, South Korea, and Taiwan for the period 1960 to 2018. |
| ***BLOOMBERG*** | |
| Stock Index | Major stock index of large countries on yearly basis: SSE Composite Index (China), S&P 500 (U.S.), BSE Sensex (India), IBOV (Brazil), and Nikkei 225 (Japan). |
| ***WFE (World Federation of Exchanges)*** | |
| Stock Turnover Ratio | The annualized ratio of the electronic order book turnover of domestic shares relative to their market capitalization. |
| ***DLLS (Djankov, La Porta, Lopez-de-Silanes, and Shleifer (***(2008)***))*** | |
| Anti-self-dealing index | Average of ex-ante and ex-post private control of self-dealing, ranging from zero to one. A larger value represents better control of self-dealing. |
| Time to collect on a bounced check | Logarithm of the length (in calendar days) of the judicial procedure to collect on a bounced check. |
| Tax evasion | Assessment of the prevalence of tax evasion. A higher score indicates higher tax evasion. The data are for 2002.The score ranges from 0.94 to 8.54. |

## Appendix B: Procedures to Identify Externally Listed Chinese Firms

### Hong Kong Listed Chinese Firms

Data for firms listed in the Hong Kong Stock Exchange are from CSMAR. We include all CSMAR-defined "China Concept Stocks" listed in HKSE to form the sample of Hong Kong listed Chinese firms. "China Concept Stocks" include "H-share" stocks, that is, firms that are registered in mainland China and listed in Hong Kong, "Red Chip stocks," that is, firms that are registered outside China but have major business operations in mainland China, and are listed in Hong Kong, and other stocks listed in Hong Kong for which the major shareholders, and major business operations are in mainland China.

### U.S. Listed Chinese Firms

Data for firms listed in the United States are from Compustat and CRSP. The Compustat variable "LOC" refers to the ISO country code/headquarters of the listed firm. We identify firms "LOC" is equal to "CHN" as U.S. listed Chinese firms.

### Singapore and Other Markets Listed Chinese Firms

Data for firms listed in Singapore or other countries are from Datastream, which contains a "headquarter" variable, which refers to the country in which the listed firm is headquartered. The datastream variable "country" refers to the country in which the firm is listed. We define firms for which "headquarter" is equal to "CHINA" and "country" is equal to country names other than China (such as "SINGAPORE") as Chinese firms listed in Singapore and other external markets.

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## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

**Appendix S1:** Internet Appendix.
**Replication Code.**