

## **Initial Returns and Long-Term Performance of IPOs in China 2001–2011**

### **Evidence on the Influence of the Institutional and Economic Context from the Shanghai Stock Exchange**

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#### **Abstract**

In this article, we analyze initial public offerings on the Shanghai Stock Exchange (SSE) from 2001 to 2011 to investigate underpricing and long-term performance in the Chinese IPO market. Multi-linear OLS regressions are applied to 332 IPOs of A-shares for which the necessary data were extracted from the SSE factbooks and other sources. We analyze the overall sample as well as two sub-samples. Initially, we test whether the massive underpricing reported in previous studies continued in the years after reforms were implemented in China. In our sample, we observe an initial return of 93.42 %, on average. Although this value seems very high compared to Western markets, it is relatively low compared to those reported in previous studies of the Chinese IPO market. Moreover, underpricing decreased over the years. To obtain a deeper understanding of the Chinese IPO market we look for explanatory variables which can explain initial returns. Our regression analyses reveal that the issuers' size, the lottery success rate, and the date of the IPO are significant variables for explaining initial returns. All in all, these findings are in line with previous literature affirming the emerging state of the market, although interestingly, we do not observe a significant link between the underwriters' reputation, the issuers' industry, the lock-up period and the initial return. We consider these results as an indication that the market has gained in balancing issuers' and investors' interests. This conclusion is supported by the observation of a high but decreasing degree of long-term underperformance of the IPOs. In summary, the Chinese IPO market seems to have developed in recent years but remains in an emerging state. Further development depends on political willingness to improve the market-orientation of the capital markets.

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## **Initial Returns und langfristige Rendite von Börsengängen in China 2001–2011**

Ergebnisse zum Einfluss des institutionellen und wirtschaftlichen  
Kontext von der Börse in Shanghai

### **Zusammenfassung**

In dem vorliegenden Beitrag werden Börsengänge an der Börse in Shanghai in den Jahren 2001–2011 untersucht, um Underpricing und langfristige Rendite am Chinesischen IPO-Markt zu analysieren. Mit Hilfe eines multilinearen Regressionsmodells werden 332 Börsengänge betrachtet. Es erfolgt sowohl die Analyse des Gesamtsamples als auch zweier Subsamples. Als erstes Ergebnis lässt sich ein durchschnittlicher Initial Return von 93,42 % festhalten, das damit zwar im internationalen Vergleich hoch, im Vergleich zu älteren Studien für China jedoch niedrig ausfällt. Ferner nimmt das Underpricing über den Betrachtungszeitraum hinweg ab. Bezogen auf die Erklärungsfaktoren erweisen sich das Emissionsvolumen, die Zuteilungsquote („Lottery Success Rate“) und der Zeitpunkt der Emission als durchgängig signifikant. Diese Ergebnisse bestätigen frühere Befunde in der Literatur und belegen, dass der IPO-Markt in China noch in der Entwicklung steht. Die Reputation des Underwriters, die Branche des Emittenten sowie die Lock-up-Periode als nicht signifikant, was darauf hindeutet, dass der Markt zunehmend in der Lage ist, den Interessenausgleich zwischen Emittenten und Investoren zu bewirken. Dies wird dadurch bestätigt, dass die langfristige Performance der Emission zwar deutlich negativ ist, sich im Zeitablauf aber verbessert hat. Insgesamt zeigt sich, dass der IPO-Markt in Shanghai sich zwar fortentwickelt hat, aber immer noch in einer Entwicklungsphase steht. Die weitere Entwicklung wird stark auch vom politischen Willen zu einer marktwirtschaftlichen Öffnung des Kapitalmarktes abhängen.

*Keywords:* Initial Public Offering (IPO), Underpricing, Initial Returns, China

*JEL Classification:* G12

## **I. Motivation, Contribution, and Introduction**

### *1. Why an (Additional) Analysis of IPOs in China?*

The pricing of initial public offerings (IPO) is an established issue in both theoretical and empirical studies. A variety of theoretical models aim to explain why the offering price of shares sold to the public for the first time often differs significantly and systematically from the opening price at the stock exchange a short time later. Underpricing occurs when the offering price is lower than the opening price. Under this scenario, investors who purchase underpriced shares at the offering price will gain

an initial return. Most of the theoretical models take specified information asymmetries among the three players involved (issuer, underwriter, and investors) as a starting point. In this context, systematical underpricing can be understood as a solution to problems that arise when information is distributed asymmetrically. In general, empirical findings support the theoretical models. Despite the extensive literature on IPOs, additional research is needed. The existing literature theoretically and empirically indicates that the economic and institutional context is of importance in the pricing of IPOs. The economic and institutional context incorporates all formal and informal rules and regulations as well as the structure and state of the economy during the process of an IPO and during the trading of shares at the stock exchange. To obtain a deeper understanding of the influences of the economic and institutional background, it is appropriate to study a market that has undergone significant reforms in recent years, such as the Chinese capital market.

There are additional reasons why the Chinese capital market merits attention. Overall, the Chinese economy is growing rapidly and steadily. This development is the result of political reforms that established a “socialistic market economy.” The opening of the Chinese economy was not reflected in the adequate development of the capital market. The financial sector continues to be characterized as underdeveloped. Thus, the capital market must still be classified as emerging. In emerging markets, high underpricing of IPOs is frequently observed. The literature includes empirical studies on the Chinese IPO market, but those studies focus on the 1990s to ca. 2005. Therefore, our analysis completes these empirical findings because it includes IPOs from 2001 to 2011.

The general question that this article attempts to answer is which factors explain underpricing in China’s IPO market. This question is addressed by focusing on features of the issuer and the context. Therefore, we examine a sample of 357 IPOs on the Shanghai Stock Exchange from 2001 to 2011. To obtain a better understanding of the results, we also examine the long-term performance (1 year/3 years) of these IPOs. The specific contribution of this article is threefold.

- First, we extend the results of older studies.
- Second, we analyze whether a degree of initial returns remains, which would indicate a developing state of the Chinese IPO market.
- Third and most importantly, we seek to obtain deeper insight into the recent changes in the economic and institutional context in China.

As a starting point, certain information on Chinese IPOs and Chinese stock markets must be provided because there have been many developments in recent years. In addition, there are still crucial differences compared to Western markets. This information is provided in the next section. In the subsequent chapter, we provide a brief report on the existing literature with respect to empirical findings regarding Chinese IPOs. Second, we introduce considerations from the literature to formulate hypotheses for the empirical analysis, which will follow in the third chapter. In the third chapter, the sample is first described. Then, the methodology of the multi-factor linear regression that will be applied to the data is discussed. The last chapter presents the results. This section also includes an analysis of the long-term performance of Chinese IPOs. The article ends with conclusions.

## 2. Stock Exchanges and IPOs in the People's Republic of China

With respect to the growth and state of China's economy, Chinese capital markets are underdeveloped.<sup>2</sup> Political forces attempt to balance market orientation and communism, and in general, they apply a similar approach to the regulation of capital markets. Despite significant reforms in the regulation of capital markets in recent years, IPO transactions are still heavily restricted by political interventions.<sup>3</sup> Firms require government permission to go public. Whether Chinese capital markets can become internationally competitive under these conditions remains an open question. Nevertheless, Chinese capital markets have undergone dynamic development in the last two decades.

Although stock exchanges in China have roots in the 19th century, their modern history starts in 1990, when the *Shanghai Stock Exchange* was re-opened after the political and economic reforms from 1978 onward (*Su* (2003), *Hsü* (2000), *Ma* (2004)). The *Shenzhen Stock Exchange* was opened in 1991. A major consideration for establishing a capital market was to improve the capital structure of state-owned enterprises, which were in a poor state, particularly compared to the new privately held companies. The opening of the stock exchanges was accompanied by

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<sup>2</sup> In this article, we only analyze the capital market of the People's Republic of China, i.e., the stock exchanges of Hong Kong and Taiwan are not included.

<sup>3</sup> For example, the Chinese Government abandoned all IPO projects in December 2012 due to the bearish market conditions (*Li* (2012)). The IPO-market was not reopend until January 2014.

permission to private households to invest in shares. Therefore, a special category of shares was established. These “A-shares” are denominated in Renminbi (RMB) and could not be directly purchased by foreign investors until October 2014. In addition, the issue of “B-shares,” which could be bought and traded only by foreigners until 2001, was permitted for selected companies. B-shares are listed in Shanghai and Shenzhen in US Dollars as well as in Hong Kong in RMB (*Ma (2004)*). The issue of B-shares was originally intended to provide state-owned companies with foreign exchange. Despite a gradual weakening of their formal differentiation, differences between A-shares and B-shares remain (*China Securities Regulatory Commission (2012)*, *Doukas/Wang (2013)*). The third category of shares issued by Chinese firms consists of “H-shares,” which are listed and traded outside China (including Hong Kong). According to the definitions of the China Securities Regulatory Commission, 2,234 A-shares and 108 B-shares were listed as Chinese Stock at the end of 2011, whereas 171 H-shares were reported (*China Securities Regulatory Commission (2012)*).

Initially, the government was eager to retain control over all enterprises that went public (*Cheung/Ouyang/Tan (2009)*). Consequently, only a small portion of the enterprises’ capital was qualified as tradable “public shares,” whereas the majority of a company’s shares were categorized as non-tradable. Non-tradable shares are held by the state or regional authorities (*Su (2003)*). Since 2006, it has become possible for a listed firm to be held by a private majority. On average, at the end of 2011, more than 88% of the shares of companies listed on the Shanghai Stock Exchange were owned by private investors (*Shanghai Stock Exchange (2012)*). Of this private portion, 26.55% was owned by individuals, and 73.45% was owned by institutional investors (*China Securities Regulatory Commission (2012)*).

Based on the number of listed companies, the Shenzhen Stock Exchange (2011: 1,411 companies) is clearly larger than the Shanghai Stock Exchange (2011: 931 companies). However, with a market capitalization of 14,800 billion RMB, Shanghai has more than twice the value of Shenzhen (6,600 billion RMB) (*China Securities Regulatory Commission (2012)*, *National Bureau of Statistics of China (2012) (Section: Financial Intermediation)*). Both stock exchanges were liquid IPO markets over the period analyzed. Shenzhen is profiled as a market for SMEs, whereas Shanghai should be developing toward becoming an internationally oriented market (*PricewaterhouseCoopers LLP (2012)*). With respect to

market capitalization both stock exchanges are among the Top-10 worldwide (*China Industrial Map Editorial Committee* (2012)).

In China, investors cannot place orders directly with the market. All trading at Chinese stock exchanges is executed by “Securities Companies.” There are two types of Securities Companies: “Brokerage Securities Companies,” which are engaged only in brokerage, and “Comprehensive Securities Companies,” which are allowed to offer additional services, including the underwriting of initial public offerings (*China Securities Regulatory Commission* (2012)).

Trading is regulated by the rules of both stock exchanges. In addition to rules that are common to all stock exchanges, there are limitations on daily volatility, which is restricted to 10 % in general but to 5 % in special cases. A transaction tax is also applied with the intention to reduce volatility. The highest tax rate charged on transactions is 5 % of the turnover; since 2005, the tax rate has been only 0.1 %. A third element to reduce volatility is that all transactions are settled one day after the deal at the earliest. Immediate settlement is prohibited.

Stock exchanges in China are supervised by both a central governmental institution (“*China Securities Regulatory Commission* (CSRC)”) and self-regulatory institutions that are part of the respective exchanges (*Tian* (2011), *China Securities Regulatory Commission* (2012)). CSRC sets the regulative norms for all stock exchange activities. Its rights are defined in the Securities Law of the People’s Republic of China (Securities Law), which regulates the issuance and trading of securities. To go public, companies must be profitable, have a “... complete and clearly defined organization,” and remain in a “... sound financial condition.” To issue shares, companies must be organized in the legal form of a *Joint Stock Company*, which is equivalent to a corporation but provides shareholders with an unlimited liability (*China Securities Regulatory Commission* (2012)).

To be listed on the Chinese stock exchanges in the most liquid “Main-Board Segment,” companies must meet additional requirements (*Wang* (2005), *China Securities Regulatory Commission* (2012), *Shenzhen Stock Exchange* (2011a), *Shanghai Stock Exchange* (2008b)):

- the common stock must be at least 30 million RMB;
- the accumulated profits of the last three years must equal at least 30 million RMB;

- the accumulated cash flows of the last three years must equal at least 50 million RMB (or the accumulated turnover must equal at least 300 million RMB);
- the value of intangible assets must not exceed 20 % of total assets.<sup>4</sup>

If the nominal value of the shares offered exceeds 50 Mio. RMB, the issuer must engage an issuing syndicate, which consists of several Comprehensive Securities Companies under the management of a lead underwriter. Securities companies who act as lead manager must be verified by the CSRC. An IPO must be applied for at the stock exchange. The exchange submits the documents to the CSRC, which makes the decision about the IPO.

Until 2001, admission was granted according to the Administrative Quota System. This system was based on a sovereign issuing schedule that was agreed upon in advance for each year. The idea was to foster IPOs only in industries of strategic importance and to allocate new capital equally to all provinces. Eventually, the decision as to whether a company should be allowed to go public was made only by political considerations. Because this system obviously lacked flexibility and was prone to corruption, it was replaced by the Securities Offering Review and Approval System in 2001. The new system seems to offer some flexibility and more independent decisions, although the government can provide “recommendations.” Formally, the decision is made by the independent Public Offering Review Committee (Review Committee). This committee consists of representatives of the CSRC and of the exchanges as well as external experts. According to *Tian* (2011), political influence remains high. Thus, in reality, restrictions on the annual issuing volume and issuers remain.

Before 1999, the issuing price was fixed by the CSRC by means of simple P/E-formulas, which were slightly adjusted several times.<sup>5</sup> This procedure resulted in massive underpricing (*Cheung/Ouyang/Tan* (2009)). In 1999, the process of bookbuilding was introduced to increase demand-oriented pricing. After a period in which bookbuilding was experimentally

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<sup>4</sup> The requirements and the application for an IPO have been changed from December 2013 onwards when the market was reopened after a 13-month ban. New rules do not rely only on a company’s valuation and profitability anymore but also on full disclosure.

<sup>5</sup> The formulas applied P/E-ratios that were defined for several industries based on the net profits of the issuing company.



used and combined with certain formulas, it was established as standard in 2005 (*Cheung/Ouyang/Tan* (2009), *China Securities Regulatory Commission* (2012), *Wang* (2012), *Song et al.* (2014)).

New shares were allotted by a simple lottery until 1999. Through 1993, potential investors had to buy application forms, whose number was limited. The winners of the lottery could buy a certain number of shares at the offering price. The probability of success was known in advance because the number of forms sold was published. From 1993–1999, the number of lots was unlimited. Therefore, the lottery success rate was uncertain in advance (*Su* (2003)). From 1999 onward, a number of adjustments and reforms were gradually applied to the allotment procedure. *Gannon and Zhou* (2008) speak of the allotment as “the most creative area of the Chinese primary market.” Since May 2002, new shares are placed to secondary market investors based on their market value. Investors with existing secondary market positions are eligible to subscribe for the new shares after share placement to strategic investors and legal persons. An existing market value of RMB 10,000 gives the rights to buy 1,000 new shares. In the event of oversubscription, the lottery mechanism based on market value will be used; in the event of undersubscription, the residual shares will be sold to the general public through on-line offering (*Gannon/Zhou* (2008)). Despite these reforms, the allotment ratio of investors is still referred to as the “lottery success rate.”

A very important reform was taken in the years 2005–2006 when the differentiation between tradable shares and non-tradable shares (NTS) was disestablished (*Beltratti/Bortolotti/Caccavaio* (2011)). Since the stock exchanges were opened in 1990/1991 controls over the typical listed Chinese firm remained firmly in State hands, largely due to the peculiar structure of listed firms. At the beginning of 2005, about two thirds of the Chinese stock market was composed of NTS. NTS entitled the holders to exactly the same rights as holders of ordinary shares except for public trading. Typically, these shares belonged to the State or to domestic financial institutions ultimately owned by central or local governments. In 2005, the Chinese authorities announce that NTS were eliminated by the end of 2006. Among other effects, this reform increased the liquidity and therefore the efficiency in the stock market.



## II. Literature and Hypotheses

The academic literature includes empirical studies on the pricing of initial public offerings in China. Table 1 presents the results of these studies in chronological order according to the analyzed period. Although the methodologies of these studies differ, two trends are clear: First, underpricing tends to decrease over time. Second, only a few studies examine recent years; more recent studies are of interest because of the regulatory reforms that have been implemented in the Chinese IPO market. Therefore, it seems very worthwhile to perform an empirical analysis of the initial returns of Chinese IPOs in recent years to examine whether the initial returns were affected by the changes in the institutional context.

*Table 1*  
**Studies of the Initial Returns of A-Shares**

| Authors              | N    | Period    | IR (%) |
|----------------------|------|-----------|--------|
| Su/Fleisher (1999)   | 308  | 1987–1995 | 948.59 |
| Mok/Hui (1998)       | 87   | 1990–1993 | 289.20 |
| Liu/Li (2000)        | 781  | 1991–1999 | 139.40 |
| Chen/Firth (2000)    | 277  | 1992–1995 | 350.47 |
| Chen et al. (2004)   | 701  | 1992–1997 | 298.00 |
| Tian (2011)          | 1377 | 1992–2004 | 247.00 |
| Cheung et al. (2009) | 1191 | 1992–2006 | 133.61 |
| Kim et al. (1998)    | 45   | 1993      | 594.00 |
| Gu (2003)            | 68   | 1994      | 214.15 |
| Su (2003)            | 587  | 1994–1999 | 128.20 |
| Wang (2005)          | 747  | 1994–1999 | 271.90 |
| Chan et al. (2004)   | 570  | 1995–1998 | 178.00 |
| Yu/Tse (2006)        | 343  | 1995–1998 | 123.59 |
| Kimbrow (2005)       | 691  | 1995–2002 | 132.00 |
| Chi/Padgett (2005)   | 668  | 1996–2000 | 129.16 |
| Li (2006)            | 314  | 1999–2001 | 134.62 |

*(Continued on the next page)*

(Table 1 – Continued)

| Authors            | N   | Period    | IR (%) |
|--------------------|-----|-----------|--------|
| Ti (2003)          | 354 | 1999–2002 | 132.49 |
| Guo/Brooks (2008)  | 286 | 2001–2005 | 93.49  |
| Lin/Tian (2012)    | 674 | 2001–2009 | 110.90 |
| Gannon/Zhou (2008) | 47  | 2003      | 76.14  |
| Gao (2010)         | 217 | 2006–2008 | 157.00 |
| Song et al. (2014) | 948 | 2006–2011 | 66.00  |

In addition to empirical studies of the Chinese market, there is a substantial theoretical and empirical literature on the pricing of IPOs in general (see *Ritter* (2003) for an overview). Because we are performing our study in an established field, we must use a confirmative design for the empirical analysis. To formulate hypotheses, we concentrate on explanations of underpricing that seem particularly applicable to the economic and institutional context of China, which is characterized by extensive regulation and political influence and a small proportion of private investors.<sup>6</sup>

A very prominent modeling of underpricing was introduced by *Rock* (1986). This model uses information asymmetries between informed investors and uninformed investors as a starting point. The group of informed investors consists of institutional investors, whereas uninformed investors are private households. Informed investors only buy shares if the shares are underpriced. Uninformed investors subscribe to all new issues because they know only the distribution of initial returns in general and not the return of a single issue. This scenario results in adverse selection. Because the uninformed investors know that they will end up with a disproportionately high allotment of overpriced shares (“Winner’s Curse”), they will stay away from this market if they are not compensated for their information disadvantage. It is assumed that the informed investors are not able to buy all the new shares due to budget restric-

<sup>6</sup> E.g., we do not apply prominent signaling models (*Allen/Fallhuber* (1989), *Grinblatt/Hwang* (1989), *Welch* (1989)) to our analysis because seasoned equity offerings are also heavily regulated in China. Therefore, even firms of good quality cannot be certain that they will have access to the capital market a second time.

tions, thus necessitating the participation of uninformed investors. To compensate uninformed investors, a systematic underpricing is needed, i.e., the mean of the initial returns of all new issuances must be greater than zero. Eventually, both groups of investors gain the return of the risk-free asset. The model of *Rock* (1986) can be characterized as an equilibrium-type model to explain underpricing. *Rock's* basic model has been modified by several authors, including to increase its suitability for empirical tests. In one adjustment, *Beatty* and *Ritter* (1986) assumed a direct causal link between ex-ante uncertainty about the fair price of a single new issue and the underpricing of this issue. To attract uninformed investors, the pricing of each single issuance – not only the average – must reflect the information disadvantage. Because it is difficult to measure ex-ante uncertainty, *Beatty* and *Ritter* (1986) proposed firm size as a measure of uncertainty: it is more difficult and disproportionately more costly to obtain information about small firms. Therefore, the IPOs of smaller companies are more prone to information asymmetries. More concretely, *Beatty/Ritter* use the proceeds of the IPO as a proxy for the extent of information asymmetry. Based on *Rock* (1986), *Beatty* and *Ritter* (1986), we can formulate the following hypothesis:

*H1*: The higher the proceeds from the IPO, the lower the initial return.

*Carter* and *Manaster* (1990) extend the model of *Rock* (1986), *Beatty* and *Ritter* (1986) by incorporating the behavior and information generation of informed investors. In this model, the appointment of an underwriter with a good reputation is a mean to reduce information asymmetries between informed and uninformed investors. The basic consideration is that well-regarded underwriters look for less risky IPO transactions because they must maintain their reputation to gain profits on average over the long term. If the risk is lower, the underpricing should also be lower. Because Chinese regulations also affect the appointment of underwriters, it seems appropriate to test the following hypothesis:

*H2*: The higher the reputation of the underwriter, the lower the initial return.

According to *Welch* (1992), potential investors pay attention not only to their own information but also to whether other investors are purchasing newly issued shares. If an investor observes that no other investors want to buy, he may stay away from the issue despite having favorable information. Eventually, an information cascade can develop in which no investors participate in the IPO. To avoid such a situation, issuers may be

willing to accept underpricing, which can serve as an incentive for investors to buy early. By buying early, investors can generate an information cascade in the opposite direction in which all later investors subscribe to new shares irrespective of their own information. Because we cannot measure the flow of information between investors directly, we need a proxy to test this model. If one assumes that a demand-generating cascade is developed by an initial underpricing, this effect can be measured by the allotment of offered shares. In China, the allotment is expressed by the “lottery success rate.” If there is high demand resulting from a positive information cascade, the demand will greatly exceed the supply of new shares. Thus, the probability for investors to get some of the new shares is low; we see a high degree of oversubscription. Therefore, we can propose the following hypothesis:

*H3:* The lower the lottery success rate, the higher the initial return.

When we analyze IPOs in China, we are examining an emerging market. In addition, the regulatory changes from 1999 onward must be considered. Thus, it seems appropriate to assume that initial returns can be explained to some degree by a lack of experience in the pricing matters of IPOs (*Kunz/Aggarwal (1994)*). Perhaps more importantly, the regulatory reforms that increased the openness of the market to a balance between demand and supply should increase the accuracy of pricing over time. Thus, initial returns should decrease over time:

*H4:* The less recent the IPO, the higher the initial return.

Considering the regulatory changes, we have observed that there is still some political influence in the Chinese IPO market. Previously, industries of strategic importance were privileged to go public. Although the “Administrative Quota System” has been formally abolished, there may be still industry-related effects in the market. Therefore, we will test a corresponding hypothesis:

*H5:* The industry of the issuer affects the extent of initial return.

Chinese investors seem to be particularly affected by lock-up risks (*Mok/Hui (1998), Tian (2011)*). The lock-up risk results from changes in the overall market situation between the allotment of the shares and the listing at the stock exchange because investors are not able to trade the purchased shares in this period of time. In China, the listing of companies that go public is arbitrarily administered by the CSRC. Obviously, investors do not know the lock-up period in advance. But issuers or un-

derwriters may be able to estimate the lock-up period. To avoid a problem of Winners' Curse investors must be compensated for the resulting risk, which occurs via an underpricing that reflects the prospective lock-up period (*Chan et al. (2004)*):

*H6*: The longer the lock-up period, the higher the initial return.

To test these six hypotheses and additional control variables, a sample from the Shanghai Stock Exchange was used. The next chapter introduces the data, descriptive insights, and methodological considerations.

### III. Data, Stylized Facts, and Methodology

#### 1. *IPOs and Underpricing at the Shanghai Stock Exchange 2001–2011: Some Stylized Facts*

The sample consists of the IPOs in Shanghai from 2001 to 2011, which are published annually in the SSE Fact Book. Because rules and regulations are implemented nationwide, they do not differ between Shanghai and Shenzhen. Therefore, we can assume that the results are representative for A-Shares at the Chinese market. The SSE Fact Books report 407 IPOs between January 1, 2001 and December 31, 2011. Because in some cases not all relevant data points are released, the sample ultimately consists of  $n = 357$  useable IPOs.<sup>7</sup>

To proceed with the descriptive analysis, it must first be stated that the initial public offerings in the sample are not steadily distributed over the studied period.<sup>8</sup> Illustration 1 shows the number of IPOs, the average price-earnings ratio, and the average lottery success rate per year.

The majority (74.79 %) of the IPOs falls within the years 2001 to 2004. The price-earnings ratio calculated by the issuing price equals, on average, 25.89. This value is high compared to Western market averages, particularly considering that the P/E ratio increases further when the shares are traded later at a higher price due to underpricing (*Chang et al. (2008)*).

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<sup>7</sup> All cases with more than one missing data point and all IPOs that were part of M&A transactions have been eliminated.

<sup>8</sup> Contrary to the findings of *Ti (2003)*, *Chi and Padgett (2005)*, we found October, rather than February, to be the month with the lowest number of IPOs. The “Golden Week” seems to have more influence than the “New Year.”

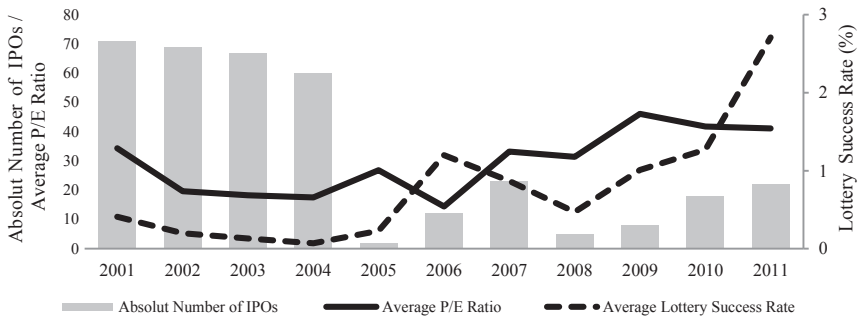


Figure 1: IPOs at the Shanghai Stock Exchange 2001–2011

The investors' probability of obtaining an allotment of shares is still referred to as the "lottery success rate" in China, even though the lottery procedure has not been used since 2000 (*Shanghai Stock Exchange* (2012)). The average of the lottery success rate equals 0.52% over the studied period. The lottery success rate increased significantly in recent years.

On average, there is a time span of 17.55 days between issuing and first trading (lock-up period). For comparison, *Mok and Hui* (1998) reported a lock-up period of more than 200 days in the early 1990s; thus, we can conclude that the timing of the listing procedure has improved in the last 20 years (*Ti* (2003)). Nevertheless, lock-up risks remain important because the range of the lock-up period is 113 days.

Issuing prices are quite low in China. On average, a newly issued share costs 9.05 RMB (1.45 USD). The lowest (highest) issuing price in the sample equals 2 RMB (45 RMB). Illustration 2 presents the proceeds as the product of the issuing price and the number of issued shares. In addition, Illustration 2 shows the accumulated "Money left on the table." This latter variable estimates the additional proceeds the issuers would have obtained if the shares had been issued and sold at the opening price. This figure also expresses the initial increase in wealth for investors who bought new shares at the issuing price and sold them on the stock exchange. Over the total period 2001 to 2011, "Money left on the table" equaled 646.11 billion RMB (approx. 103.67 billion USD). This result is not surprising and strongly suggests that underpricing is still an important aspect of Chinese IPOs that merits closer investigation.

On the basis of the literature (particularly *Barry/Jennings* (1993), *Agarwal et al.* (2008), and *Chambers/Dimson* (2009)), we calculated the

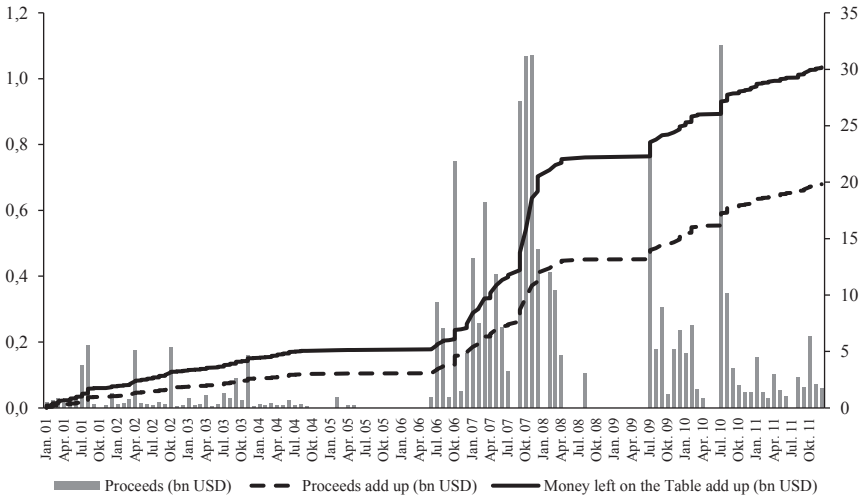


Figure 2: Issuing Volumes and “Money Left on the Table” 2001–2011

initial return  $IR_i$  as the difference between the first price at the stock market (opening price)  $OP_i$  and the offering price  $IP_i$  over  $IP_i$ .

$$IR_i = \frac{OP_i - IP_i}{IP_i} = \frac{OP_i}{IP_i} - 1$$

Underpricing is indicated if  $IR_i > 0$ . If  $IR_i < 0$ , overpricing is present. In the sample of 357 IPOs on the Shanghai Stock Exchange from 2001 to 2011, underpricing clearly prevails. In only 5 % of all cases were the initial returns negative, which indicates overpricing. On average, the initial return was 93.42 %. Thus, initial returns in China are clearly higher than in other emerging markets, for which *Jenkinson* and *Ljungqvist* (2001) estimated an average value of approximately 60 %. However, it is also clear that initial returns tend to decrease over time (Table 2).

Illustration 3 presents the distribution of initial returns categorized in intervals of 40 %. A total of 71.1 % of all IPOs have initial returns of 0 to 120 %. These results are in line with the literature. *Cheung et al.* (2009) reported an average initial return of 90.54 % for the years 2001–2006 in China. Our sample obtains a respective value of 103.76 %, which is a similar value. For other studies, please consult Table 1. If computed based on the closing price of the first day of trading instead of the opening price, the initial return is 96 %. This increase may result from the low lottery success rate, i.e., the high demand for new shares.



Table 2  
Underpricing on the Shanghai Stock Exchange 2001–2011

|                | 2001   | 2002   | 2003   | 2004   | 2005   | 2006  | 2007   | 2008  | 2009   | 2010  | 2011   | 2001–2011 |
|----------------|--------|--------|--------|--------|--------|-------|--------|-------|--------|-------|--------|-----------|
| <i>N</i>       | 71     | 69     | 67     | 60     | 2      | 12    | 23     | 5     | 8      | 18    | 22     | 357       |
| <i>IR</i>      | 148.0% | 132.7% | 70.1%  | 69.9%  | 79.7%  | 37.9% | 101.2% | 41.0% | 46.3%  | 36.1% | 29.1%  | 93.4%     |
| <i>Median</i>  | 134.6% | 117.6% | 67.1%  | 63.1%  | 79.7%  | 35.4% | 83.8%  | 40.0% | 39.5%  | 35.4% | 29.7%  | 78.7%     |
| <i>STD</i>     | 89.3%  | 77.9%  | 41.0%  | 48.4%  | 46.5%  | 19.1% | 57.2%  | 22.2% | 41.3%  | 23.8% | 26.2%  | 73.9%     |
| <i>IR Min.</i> | 9.0%   | 8.0%   | 10.0%  | 0.0%   | 47.0%  | 9.0%  | 33.0%  | 21.0% | -19.0% | 0.0%  | -20.0% | -20.0%    |
| <i>IR Max.</i> | 417.0% | 430.0% | 188.0% | 258.0% | 113.0% | 79.0% | 258.0% | 77.0% | 111.0% | 92.0% | 77.0%  | 430.0%    |

*N* = Number of tested IPO Companies; *IR* = Initial Return; *STD*: Standard Deviation

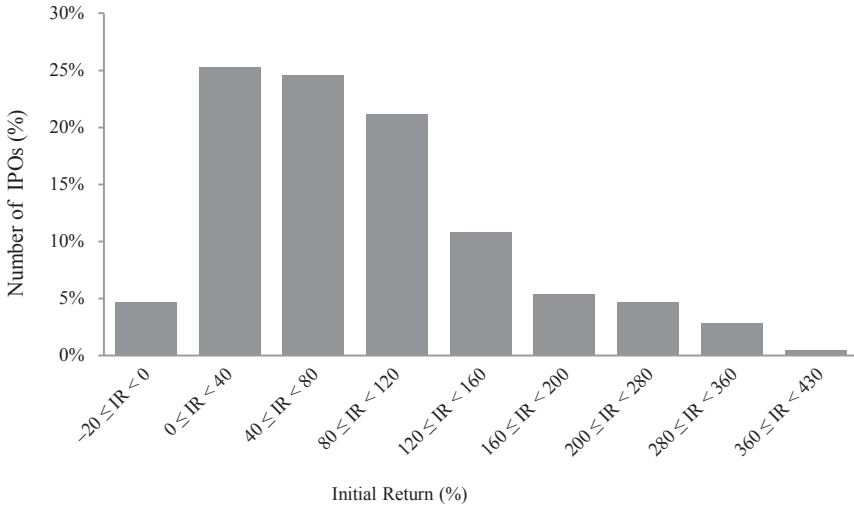


Figure 3: Histogram of Initial Returns 2001-2011

### 2. Multi-factor Linear Regression

The descriptive analysis delivers initial insight, but it is not suitable to test the hypotheses that were formulated in Chapter 2. To obtain a deeper understanding of the factors that influence the extent of the underpricing in China, a multi-linear regression is applied in which the initial return is the dependent variable and the independent variables are defined according to the hypotheses:

- volume of the issue,
- reputation of the lead managing bank,
- lottery success rate,
- date of issuance,
- industry of the issuer, and
- lock-up period.

The control variables are the issuing price and the price-earnings ratio.

A Kolmogorov-Smirnov Test shows that we should not assume the initial return to be normally distributed. However, by taking the logarithm of  $1 + IR$ , a normal distribution can be secured for all our samples. Therefore, the regression is designed to explain the log-normal distributed initial returns.

The independent variables are defined as follows:

Hypothesis 1 reflects a probable impact of the firm size and the extent of underpricing. The data source does not reveal any information on the issuers' total assets, turnover, number of employees, etc. However, according to *Beatty and Ritter (1986)*, we can use the logarithm of proceeds from the IPO as a proxy for the uncertainty reflected in firm size ( $LOG(PROC)$ ).

The reputation of the lead manager must be operationalized to test hypothesis 2. The operationalization is performed in a typical manner (*Song et al. (2014)*): *REPUNDERW* is defined as a dummy that equals 1 if the IPO is conducted by a lead manager with a high reputation and 0 if the lead manager has a lesser reputation. It is assumed that the top five lead managers have the highest reputation. An underwriter with a good reputation should be able to attract more business than competitors with lesser reputations. This way to measure the underwriters' reputation may be prone to a circular argument because a high market share can be seen as result of a good reputation in turn. On the other hand a high market share offers economic advantages for the respective firm in any case which will not be put at stake by an airy pricing of new issues. In our sample, we measure the ranking of underwriters by the number of IPOs conducted. The top five lead managers are the following: 1. CITIC Securities, 2. China International Capital Co. Ltd., 3. Guotai Junan Securities Co. Ltd., 4. Guang Fa Securities, and 5. Ping An Securities Co. Ltd. The top five lead managers have a combined market share of 26.3%.

The variable *LOTTSUC* equals the lottery success rate and measures the investors' demand with respect to hypothesis 3. This variable can be viewed as an investor's probability of obtaining an allotment of the new shares: the lower the *LOTTSUC*, the higher the demand for the issue.

As we look for a link between underpricing and the development of the institutional context in hypothesis 4, we need a variable to measure the temporal distribution of the IPOs. This variable is defined by *YEAR(L)*, with  $L = 2001-2011$ . The variable is scaled metrically and computes the absolute difference in days between the first IPO in the sample and the respective IPO.<sup>9</sup> Because of the definition of this variable, the IPO of *Yantai Wanhua* on January 5, 2001, defines the benchmark with  $YEAR = 0$ .

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<sup>9</sup> With respect to *Loughran and Ritter (2004)*, we also computed the time variable as a dummy for the respective years. The results did not differ.

To test hypothesis 5, four industry dummies have been defined ( $IND(K)$  with  $K = 0, 1, 2, 3$ ):

- Industrial (which is the reference group with a share of 68 %)
- Miscellaneous ( $K = 1$ )
- Public Utility ( $K = 2$ )
- Real Estate ( $K = 3$ )

Using this kind of dummies is often a compromise if economic arguments are theoretically unclear or if appropriate data is not available. We have to grant that the Shanghai Stock Exchange does not reveal very detailed information on the industry of an issuer. Moreover, the information given is not always consistent. But these limitations should not affect testing hypothesis 5. The core argument of hypothesis 5 is that there is pure political, i.e. not economically rational influence which is related to the industry of potential issuers. Therefore it seems uncritical not to employ more accurate economic characteristics instead of simple sector dummies.

In hypothesis 6, we assume a link between underpricing and the lock-up period because of the lock-up risk.  $TIMEIPO$  measures the lock-up period by counting the days between allotment and first trading on the stock exchange

As control variables, we use the common logarithm of the RMB offering price ( $LOG(OFFPRICE)$ ) and the P/E ratio ( $P/ERATIO$ ), which is calculated with respect to the offering price.

The regression model yields the following equation:

$$\begin{aligned} LOG(1 + IR_i) = & \beta_0 + \beta_1(LOG(PROC)) + \beta_2(REPUNDERW) + \beta_3(LOTTUSUC) \\ & + \beta_4(YEAR(L)) + \beta_5(IND1) + \beta_6(IND2) + \beta_7(IND3) + \beta_8(TIMEIPO) \\ & + \beta_9(LOG(OFFPRICE)) + \beta_{10}(P/ERATIO) + \varepsilon_i \end{aligned}$$

The regression was performed stepwise: initially (model 1), only the control variables were tested. In the second model, all independent variables were included. Because we performed the regressions only with IPOs for which all data needed were available, the number of included cases is  $n = 332$ .

In this sample we found an underpricing of 94.91 %.

The coefficient results are presented in Table 3. These results will be discussed in the next chapter. To validate the models, the goodness of fit

*Table 3*  
**Results of the Complete Sample**

| Model  | Unstandardized Coefficients |            | Std. Error | Standardized Coefficients |       | t      | Sig. | Collinearity Statistics |       |
|--------|-----------------------------|------------|------------|---------------------------|-------|--------|------|-------------------------|-------|
|        | B                           |            |            | Beta                      |       |        |      | Tolerance               | VIF   |
| 1      | (Constant)                  | .437       | .030       |                           |       | 14.420 | .000 |                         |       |
|        | P/RATIO                     | .001       | .001       | .069                      |       | 1.214  | .226 | .835                    | 1.197 |
|        | LOG(OPPRICE)                | -.220      | .036       | -.349                     |       | -6.169 | .000 | .835                    | 1.197 |
| 2      | (Constant)                  | .811       | .071       |                           |       | 11.386 | .000 |                         |       |
|        | P/RATIO                     | .003       | .001       | .262                      |       | 5.112  | .000 | .706                    | 1.416 |
|        | LOG(OPPRICE)                | -.159      | .032       | -.251                     |       | -4.971 | .000 | .729                    | 1.372 |
|        | LOG(PROC)                   | -.092      | .015       | -.355                     |       | -5.960 | .000 | .524                    | 1.909 |
|        | LOTTUSC                     | -.007      | .005       | -.061                     |       | -1.256 | .210 | .785                    | 1.273 |
|        | TIM EIPO                    | .000       | .001       | .008                      |       | .164   | .870 | .709                    | 1.410 |
|        | REPUNDERW                   | .047       | .016       | .140                      |       | 2.958  | .003 | .837                    | 1.195 |
|        | YEAR(L)                     | -4.031E-05 | .000       | -.307                     |       | -4.975 | .000 | .489                    | 2.044 |
| IND(1) | .010                        | .019       | .024       |                           | .515  | .607   | .832 | 1.202                   |       |
| IND(2) | -.015                       | .022       | -.032      |                           | -.704 | .482   | .890 | 1.124                   |       |
| IND(3) | .071                        | .047       | .068       |                           | 1.521 | .129   | .934 | 1.070                   |       |

a. Dependent Variable: LOG(1 + IR)

Table 4  
Results of Sub-sample 1 (2001–2004)

| Model         | Unstandardized Coefficients |            | Standardized Coefficients |  | t       | Sig. | Collinearity Statistics |       |
|---------------|-----------------------------|------------|---------------------------|--|---------|------|-------------------------|-------|
|               | B                           | Std. Error | Beta                      |  |         |      | Tolerance               | VIF   |
| 1             |                             |            |                           |  |         |      |                         |       |
| (Constant)    | 1.764                       | .102       |                           |  | 17.318  | .000 |                         |       |
| P/ERATIO      | -5.868E-05                  | .001       | -.004                     |  | -.060   | .952 | .463                    | 2.158 |
| LOG(OFFPRICE) | -.200                       | .035       | -.277                     |  | -5.692  | .000 | .792                    | 1.263 |
| LOG(PROC)     | -.244                       | .021       | -.591                     |  | -11.473 | .000 | .706                    | 1.417 |
| LOTTSUC       | -.029                       | .019       | -.081                     |  | -1.499  | .135 | .641                    | 1.561 |
| TIM EIPO      | .000                        | .001       | -.028                     |  | -.536   | .592 | .691                    | 1.447 |
| REPUNDERW     | .024                        | .016       | .067                      |  | 1.465   | .145 | .888                    | 1.126 |
| YEAR(L)       | .000                        | .000       | -.601                     |  | -9.043  | .000 | .424                    | 2.361 |
| IND(1)        | .008                        | .021       | .017                      |  | .375    | .708 | .955                    | 1.047 |
| IND(2)        | -.024                       | .024       | -.048                     |  | -1.011  | .313 | .814                    | 1.229 |
| IND(3)        | .036                        | .048       | .034                      |  | .746    | .457 | .877                    | 1.140 |

a. Dependent Variable: LOG(1 + IR)

*Table 5*  
**Results of Sub-sample 2 (2005–2011)**

| Model        | Unstandardized Coefficients |            | Standardized Coefficients |  | t      | Sig. | Collinearity Statistics |       |
|--------------|-----------------------------|------------|---------------------------|--|--------|------|-------------------------|-------|
|              | B                           | Std. Error | Beta                      |  |        |      | Tolerance               | VIF   |
| 1            |                             |            |                           |  |        |      |                         |       |
| (Constant)   | .386                        | .070       |                           |  | 5.548  | .000 |                         |       |
| P/RATIO      | .000                        | .001       | -.015                     |  | -.145  | .885 | .520                    | 1.924 |
| LOG(OPPRICE) | -.082                       | .042       | -.180                     |  | -1.935 | .055 | .660                    | 1.515 |
| LOTTUSC      | -.014                       | .005       | -.241                     |  | -2.786 | .006 | .764                    | 1.309 |
| TIM EIPO     | -.004                       | .003       | -.135                     |  | -1.286 | .201 | .523                    | 1.912 |
| REPUNDERW    | .002                        | .022       | .008                      |  | .100   | .921 | .829                    | 1.207 |
| YEAR(L)      | -2.894E-05                  | .000       | -.252                     |  | -2.123 | .036 | .407                    | 2.458 |
| IND(1)       | .015                        | .024       | .055                      |  | .643   | .521 | .794                    | 1.260 |
| IND(2)       | .041                        | .030       | .113                      |  | 1.386  | .168 | .858                    | 1.166 |
| IND(3)       | .109                        | .065       | .130                      |  | 1.671  | .097 | .941                    | 1.063 |

a. Dependent Variable: LOG(1 + IR)



was verified by computing the adjusted R-squared values, which were found to be satisfactory:

- model 1: adj.  $R^2 = 0.102$ ;
- model 2: adj.  $R^2 = 0.375$ .

Furthermore, the significance of both models was checked by applying an F-test. The test confirms the significance:

- model 1:  $F = 20.023$ ,  $p = 0.000$ ;
- model 2:  $F = 21.141$ ,  $p = 0.000$ .

As we are looking for the impact of the institutional and the economic context we should not assume that the factors which drive the initial return remain stable over the analyzed period. Because of that, the sample was divided into two sub-samples. The first consists of 199 IPOs which were observed 2001–2004. The second sub-sample included the remaining 133 IPOs of the years 2005–2011. The idea was to obtain two sub-samples with nearly the same number of observations.

In the first sub-sample we found an underpricing of 116.10%. In the second period the underpricing is lower (63.22%). Both sub-sample models are significant, but the second one has only little explanatory power.

- Sub-sample 1: adj.  $R^2 = 0.630$ ,  $F = 34.691$ ,  $p = 0.000$
- Sub-sample 2: adj.  $R^2 = 0.210$ ,  $F = 4.633$ ,  $p = 0.000$

All the models were tested for multi-collinearity and heteroscedasticity. The error is a random variable with a mean of zero; because of homoscedasticity, the covariance equals zero. In summary, a linear regression can be performed without problems.

#### IV. Results and Discussion

To gain insight from the results of the multi-linear regression, it is important to examine the coefficients of the variables in the first step. Thus, we place the results in a more general framework in which we also consider the long-term performance of IPOs in China. As a result of this process, we are able to draw meaningful conclusions.

##### 1. Test of the Hypotheses

Hypothesis 1 can be confirmed for sub-sample 1:  $LOG(PROC)$  exhibits not only a high standardized regression coefficient ( $\beta = -0.59$ ) but also a

high significance ( $p = 0.000$ ). Insofar as the firm size can be estimated by proceeds, we can conclude that the bigger the firm, the lower the underpricing (*Beatty/Ritter* (1986), *Chan et al.* (2004)). But this result is only due to the years 2001–2004. For the following years hypothesis 1 cannot be confirmed. As we based this hypothesis on the consideration that the proceeds of an IPO are a proxy for information asymmetries it seems that information problems lost importance over the complete period. But it must be considered that average proceeds were clearly higher in the second period (2001–2004: 687,000,000 RNB vs. 2005–2011: 949,000,000 RNB).

Hypothesis 2 posits an influence of the underwriter's reputation on the initial return, which can be confirmed only for the overall sample but not by any of the sub-samples for which we find positive regression coefficients but no significance. This finding implies that additional information is needed to obtain a deeper understanding of the role of underwriters in the Chinese market for IPOs. It may be assumed that the appointment of an underwriter follows more than economic considerations alone.

As the coefficient of *LOTTSUCC* is negative and significant for sub-sample 2 we can confirm hypothesis 3 for the years 2005–2011: the lower the lottery success rate, the higher the initial return.

For an emerging market, the timing of an IPO matters, particularly in China, where reforms have been undertaken to improve the efficiency of capital markets. Hypothesis 4 was formulated with respect to this consideration. The results of all three regressions support this hypothesis: the regression coefficient of *YEAR(L)* is positive and highly significant. With respect to the complete sample we can state that each additional day from January 5, 2001, onward decreases the initial return by 0.02 %. As *Li* (2006), *Cheung et al.* (2009), and *Tian* (2011) observed in previous studies, the regulatory reforms have fostered the functioning of the IPO market in China in recent years. This effect is due for all years (2001–2011).

Concerning the influence of the issuers' industry on the initial return we find only one significant coefficient in our analyses. This finding may be because a broad categorization of industries was used. In sub-sample 2 the industry dummy for the real estate sector is significant on a 10 %-level. The respective coefficient is positive which means that the initial return is higher if the issuer comes from the real estate industry. But because there is significance only in one case we should not stress this result too much. All in all, we should assume hypothesis 5 not to be supported. However, this finding is in line with the results presented by *Yu*

and Tse (2006), which might indicate that the initial return is reliable independent of the industry category.

Hypothesis 6 is not supported at all which is contrary to the results of previous studies (Chan et al. (2004), Mok/Hui (1998)) and might be surprising at first glance. The earlier studies observed a far longer lock-up period. In our samples the mean of the lock-up period equals 13.35 days for the years 2005–2011 and 20.54 days for the years 2001–2004. Mok and Hui (1998) report an average period of more than 200 days.

According to the control variables we find significance of the offering price in all samples. We observe that higher offering prices are accompanied by lower initial returns. Significance of the P/E ratio can only be found in the complete sample but not in the sub-samples.

### 2. Long-Term Performance of Chinese IPOs

If we examine the results thus far, we find that the Chinese IPO market has improved to some extent over the last decade in terms of balancing the interests of parties involved, but the initial returns are still high. Regulatory reforms tend to drive the market toward more appropriate pricing. However, the supply of new shares by a more or less regulated procedure is only one part of the story. The offering price might reflect the fair value to some extent, and underpricing might still result in response to excessive demand. To gain a deeper understanding of this aspect, we must examine the long-term buy-and hold-performance of newly issued shares (Ritter (1991)).

The concept of buy-and-hold-abnormal-returns (BHAR) is applied to measure the long-term performance:

$$BHAR_T = \sum_{i=1}^n \frac{1}{n} \left[ \sum_{t=0}^T (R_{i,T} - R_{i,T}^M) \right]$$

where

$BHAR_T$ : Averaged buy-and-hold-abnormal-return in period  $t$  to  $T$

$R_{i,T}$ : Return of share  $i$  at point in time  $T$

$R_{i,T}^M$ : Return of the market portfolio  $i$  at point in time  $T$

$t$ : Date of the IPO of share  $i$

In this analysis, we measure the average difference between the performance of the “new” shares after one (three) years and the performance of

the market portfolio over the same period. The calculation is performed by examining the closing price of the first trading day in relation to the closing price exactly one (three) years later on. The market portfolio is defined by the Shanghai Stock Exchange A-Shares Index (SHASHR) (Su (2003)). For obvious reasons, this calculation could not be performed for all IPOs in our original sample. Shares that were de-listed were eliminated, including shares that were listed for a shorter period than one year (three years).<sup>10</sup> Therefore, the samples consist of  $n = 351$  ( $BHAR_{1yr}$ ) and  $n = 310$  ( $BHAR_{3yr}$ ). The calculations reveal an underperformance of the newly issued shares, which is significant for both periods according to the Wilcoxon test (Table 5):

$$BHAR_{1yr} = -.4603 = -46.03\%$$

$$BHAR_{3yr} = -.6766 = -67.66\%$$

An underperformance of 46.03 % (67.66 %) implies that an investor buying a portfolio of newly issued shares and holding it for one (three) year(s) had an overall return that was 46 % lower than that obtained by investing in the market portfolio.

An examination of individual years reveals that the underperformance of new shares is particularly driven by the IPOs in 2001 to 2006 (see Table 6). According to  $BHAR_{1yr}$ , this period incorporates 78.35 % of all IPOs and displays the worst performance. This performance affects the  $BHAR_{3yr}$  even more strongly, with 88.71 % of all IPOs found in this period. The long-term underperformance over one year improves from 2007 onward, but we have no data available to analyze the underperformance of the respective IPOs over three years. These results are in line with Song et al. (2014), who analyze overvaluation in the overall Chinese IPO market 2006–2011.

The same findings result if we calculate the BHAR with the offering price rather than with the closing price of the first trading day. The expectation that the underperformance diminishes because of the underpricing of the IPOs is fulfilled, but eventually, there is also an underperformance of the issued shares resulting from this calculation. We find  $BHAR_{1yr-Issuing-Price} = -10.81\%$  and  $BHAR_{3yr-Issuing-Price} = -30.99\%$ . Both results are significant.

A prominent explanation for the negative long-term performance of IPOs is provided by the Speculative-Bubble Hypothesis (Camerer (1989),

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<sup>10</sup> Only six companies have a discontinued stock market listing, which means that the analysis of a survivorship bias can be dispensed.

Table 6  
Long-Term Performance

|                    | 2001      | 2002      | 2003      | 2004      | 2005     | 2006     | 2007      | 2008    | 2009     | 2010     | 2011      | 2001-2011  |
|--------------------|-----------|-----------|-----------|-----------|----------|----------|-----------|---------|----------|----------|-----------|------------|
| <i>N</i>           | 71        | 69        | 67        | 60        | 2        | 12       | 23        | 5       | 8        | 18       | 22        | 357        |
| <i>Missing</i>     | 2         | 4         | 0         | 0         | 0        | 0        | 0         | 0       | 0        | 0        | 0         | 6          |
| <i>Missing</i>     | 2         | 4         | 0         | 0         | 0        | 0        | 0         | 0       | 1        | 18       | 22        | 47         |
| <i>BHAR</i>        | -44.6%    | -60.2%    | -64.7%    | -47.9%    | -63.1%   | -77.3%   | -10.2%    | 6.2%    | -7.9%    | -8.4%    | -27.3%    | -46.4%     |
| <i>STD</i>         | 19.3%     | 21.0%     | 21.9%     | 12.1%     | 28.6%    | 96.4%    | 31.7%     | 22.3%   | 27.0%    | 26.6%    | 21.4%     | 33.2%      |
| <i>Median</i>      | -49.4%    | -62.1%    | -70.4%    | -49.1%    | -63.1%   | -67.5%   | -9.4%     | -5.3%   | -13.5%   | -14.8%   | -24.9%    | -49.9%     |
| <i>Min.</i>        | -75.8%    | -97.7%    | -98.3%    | -66.8%    | -83.4%   | -305.3%  | -100.1%   | -14.5%  | -37.2%   | -44.7%   | -71.4%    | -305.3%    |
| <i>Max.</i>        | 0.0%      | 2.3%      | -1.0%     | -18.7%    | -42.9%   | 38.5%    | 64.2%     | 32.9%   | 40.1%    | 71.0%    | 4.0%      | 71.0%      |
| <i>BHAR</i>        | -54.3%    | -48.7%    | -73.7%    | -140.1%   | -172.8%  | -23.6%   | -8.7%     | 4.0%    | -7.0%    | N/A      | N/A       | -68.1%     |
| <i>STD</i>         | 15.4%     | -53.3%    | 31.7%     | 72.7%     | 0.5%     | 74.9%    | 22.3%     | 21.2%   | 50.6%    | N/A      | N/A       | 58.3%      |
| <i>Median</i>      | -54.8%    | 23.7%     | -73.8%    | -143.1%   | -172.8%  | -42.3%   | -9.3%     | -3.4%   | -18.7%   | N/A      | N/A       | -61.1%     |
| <i>Min.</i>        | -80.9%    | -75.4%    | -145.9%   | -258.5%   | -173.1%  | -123.3%  | -60.9%    | -22.3%  | -41.0%   | N/A      | N/A       | -258.5%    |
| <i>Max.</i>        | 29.3%     | 86.4%     | 29.6%     | 277.0%    | -172.4%  | 118.1%   | 45.0%     | 26.3%   | 105.5%   | N/A      | N/A       | 277.0%     |
| <i>1yr Z-value</i> | -7.323*** | -7.214*** | -7.090*** | -6.736*** | -1.342   | -3.059** | -1.612**  | -1.753* | -1.680*  | -3.070** | -4.107*** | -13.858*** |
| <i>(p-value)</i>   | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.1800) | (0.002)  | (0.107)   | (0.080) | (0.093)  | (0.002)  | (0.000)   | (0.000)    |
| <i>3yr Z-value</i> | -7.323*** | -7.214*** | -6.915*** | -4.719*** | -1.342   | -2.981** | -3.406*** | -1.214  | -2.197** | N/A      | N/A       | -8.700***  |
| <i>(p-value)</i>   | (0.000)   | (0.000)   | (0.000)   | (0.000)   | (0.1800) | (0.003)  | (0.001)   | (0.225) | (0.028)  | N/A      | N/A       | (0.000)    |

N= Number of tested IPO Companies; BHAR: Buy-and-Hold-Abnormal>Returns; STD: Standard Deviation; N/A: Not Available; WILCOXON Test: \*10% Significance Level, \*\*5% Significance Level, \*\*\* 1 % Significance Level

*Shiller* (1990)). This hypothesis may be plausible for an IPO market in an emerging, fast-growing economy in which investment in shares is restricted and the lottery success rate is low. We are not able to test this hypothesis empirically with the data available, but these findings complete our framework. In the literature, we find studies on the long-term underperformance of IPOs even in developed markets (e.g., *Ritter* (1991), *Loughran/Ritter* (1995) for the US, *Loughran/Ritter/Rydqvist* (1994) as a meta-analysis of *Aggarwal/Leal/Hernandez* (1993) for Brazil, *Keloharju* (1993) for Finland, *Wasserfallen/Wittleder* (1997) for Germany, *Hin/Mahmood* (1993) on Singapur, *Levis* (1993) on UK). Despite some contradictory evidence (*Meggison et al.* (2000)), a long-term underperformance of IPOs can be observed as a clear pattern.

The long-term performance of IPOs has also been analyzed for the Chinese market. The literature presents mixed evidence over time. Older studies found a positive abnormal return from buying and holding newly issued shares (*Mok/Hui* (1998) for IPOs 1990–1993, *Chi/Padgett* (2002) for IPOs 1996–1997). *Chan et al.* (2004) found a slightly negative long-term performance of 2–10 % for IPOs 1993–1998.<sup>11</sup> Our study analyzes the newest data and obtains the highest underperformance, particularly for the years 2001–2006, which is an interesting result because it fits to a speculative-bubble scenario.

### 3. Conclusions

Our study contributes to the literature in several ways. By examining IPOs on the Shanghai Stock Exchange from 2001 to 2011, we found a massive underpricing, which is in line with the results of previous studies. However, initial returns tend to decrease over time. In the 1990s, initial returns were in the high three digits (see Table 2). For 2001–2011, we estimated average initial returns of 93.42 % for all the 357 cases (94.91 % for the 322 cases which were included in the regressions), with a tendency to decrease toward the end of the analyzed period. This tendency is also reflected by splitting up the overall samples into two periods. In the years 2001–2004 the underpricing was 116.10 % whereas it decreases in the period 2005–2011 to 63.22 %.

Despite the lower and constantly decreasing underpricing, China's IPO market is obviously still in an emerging state, as evidenced by the very

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<sup>11</sup> *Su* (2003) found a negative long-term performance of –7.7 % (IPOs 1190–1995) based on cumulative abnormal returns.

high initial returns. Future studies should examine whether the trend of decreasing initial returns continues over a longer period. It will be interesting to analyze the effects of recent reforms from end of 2013 onwards.

One aim of our study is to contribute to a deeper understanding of the economic and institutional context of IPOs, particularly in China. Thus, the results of the empirical investigation will be discussed.

Initially, we found the firm size (measured by the proceeds of the IPO) to have a significant influence on initial returns in the years 2001–2004. Thus, uncertainty about the issuers' quality is an important factor in underpricing, in agreement with the literature. Larger firm size signals lower risk to investors. In this respect, the Chinese market works like other IPO markets worldwide. Surprisingly we do not find this result for the years 2005–2011. There are different explanations: Smaller firms may have gained especially from the tradable-shares reform by which the influence of the state was reduced (*Beltratti/Bortolotti/Caccavaio* (2011)). On the other hand we have to keep in mind that the average proceeds were higher in the second period. Therefore the impact of the size effect may be repressed. Additionally it may be worth considering that in the period 2005–2011 the political influence dominated the decision to go public. If this is the case it would also explain the lower adjusted  $R^2$  of the second sub-sample.

More easily we can interpret the significance of the lottery success rate in explaining initial returns. Issuers choose a low offering price to generate demand for an issue. This consideration seems to succeed. However, we can also examine this finding from a different angle: the very high demand suggests that initial returns were driven by a speculative bubble as well. This consideration is underlined by the fact that we also found a massive long-term underperformance.

In our sample, only weak significant impact of the underwriters' reputation on the initial returns was found. Despite the fact that the respective coefficient is significant in the overall sample we conclude that the manner in which underwriting firms are appointed to IPO cases in China does not deliver useful information to investors. Because the appointment process follows not only economic but also political considerations we reason that reputation is an important economic concept, particularly in more open markets, but its impact is minimized in politically regulated markets. The choice of underwriters over time may be an appropriate topic for further research. If Chinese capital markets are more open in the future, the choice of underwriters should have an economic impact.



A direct link between the date of an IPO and the initial return could be observed in 2001–2011: the more recent the IPO, the lower the initial return. This finding can be interpreted in two ways. First, market participants gained more experience in pricing matters over time. Second, the regulatory reforms fostered the efficiency of the pricing process, although underpricing remained high. The link between these two interpretations can be observed in the introduction and further development of a Book-building approach. The ultimate conclusion that the institutional context improved over time is supported by two additional results. First, we did not find a significant impact of the issuers' industry. Although the industries were broadly characterized, this result indicates that a politically driven preference for firms of certain industries to go public may have been superseded by different considerations. In addition, we observe that the lock-up period has lost the importance it was given in previous studies. Despite the fact that there is a low effect of the lock-up period in the second sub-sample, this finding suggests that the lock-up period only affects the pricing process on an individual basis.

Although it is tempting to conclude that the institutional context improved over the last decade, we must keep in mind that we also observed a high long-term underperformance of Chinese IPOs. Particularly for the first half of our sample period, we found a massive underperformance of newly listed shares. This underperformance is higher than that reported in the previous literature. In the years examined by previous studies, Chinese stock markets were in an expansion. Therefore, it may be concluded that both initial returns and long-term performance were driven to some extent by a speculative bubble. Accordingly, a gain in terms of short-term and long-term pricing was imposed by the subsequent bearish market. Because both initial returns and the degree of long-term underperformance decreased over time, the Chinese IPO market shows increasingly the patterns of other markets worldwide.

The economic and regulatory framework for IPOs is working well if it balances the interests of issuers and investors. Underpricing may be seen as a kind of entrance fee to the capital market. Nevertheless “money left on the table” is at the expense of the issuers. On the other hand long-term underperformance affects the investors negatively. Taken together, we find that the Chinese IPO market is developing toward the functioning of other markets worldwide, but substantial additional progress is still needed to balance the interests of issuers and investors better. This will require additional reforms. It is unclear whether these reforms will

occur if political leaders continue to adhere to communist principles. After there was a 13-month moratorium of IPOs in the A-shares market from December 2012 to January 2014 some severe reforms were announced to strengthen to market-orientation. But first experiences reflect that there is still a lot of regulation that is driven by politics (*Financial Times* (2014)). Our results might be of actual interest not only for researchers but also for investors as the market for A-shares has been opened for foreign investors in October 2014 (*WSJ* (2014)).

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