Post IPO-Performance: A Comparative Analysis between the US and China.

This paper discusses and analyses the post-IPO long-term performance of firms in a cross-country analysis of the United States and China. Using data on 84 US IPOs and 53 Chinese IPOs, I find that the firms that go public in the US outperform the firms that go public in China. Large impact on the long-term post-IPO performance is the industry in which the firm operates, with non-technology firms significantly outperforming tech-firms.

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1. Introduction

Today’s modern and globalized economy enables firms to obtain capital in various ways. One possibility that gained popularity over the years is to become a public company through an initial public offering (IPO). By engaging in an IPO, a firm becomes available to invest in by the public, which enables the firm to obtain a large amount of capital and enable faster growth or expansion.

A widely studied IPO that happened recently is the IPO of Alibaba in September 2014, which broke the record of having the largest IPO in the world. Alibaba managed to sell 368 million shares on the New York Stock Exchange, which enabled the firm to raise $25 billion (Forbes, 2014). However, looking at Alibaba one year after its IPO, the performance is not as great as its IPO. According to Reuters (2015), the stock-price of Alibaba has declined nearly 30% since its launch on the NYSE. Alibaba took the record of the largest IPO in the world from the Agricultural Bank of China (ABC), which raised $22.1 billion when it entered the Hong Kong Stock Exchange in 2010. After a steady increase of the stock-price in the three years after IPO, 2015 saw a significant decrease in the stock-price. These two examples of IPOs illustrate the magnitude of IPOs and the fact that a successful IPO does not guarantee a successful performance after the IPO.

The literature regarding IPOs and the post-IPO performance is rather extensive. However, the vast majority of researchers focus on one country and identify what factors influence the performance of public firms after the IPO. To the best of my knowledge, this is the first paper that directly compares the post-IPO performance in the United States and China. The primary aim of this paper is to analyse the differences between the performance of public firms after listing on the main stock exchanges of the US and the main stock exchanges of China. By analysing the three-year post-IPO performance, I look for the differences and causes that explain the differences between the IPO markets, and see where these differences come from.
The first reason why comparing these two countries is interesting and relevant, is because they are the number one and two economies of the world. Furthermore, whereas the US has been the frontrunner of economic development, China is still considered being a developing country, experiencing large growths since the establishments of their IPO market. Therefore, analysing the differences between the two different types of economies might provide more insights on how these types of economies influence the IPO markets and the performance of firms that enter these markets.

The most famous country to perform an IPO is the United States, with the New York Stock Exchange and the NASDAQ as its main stock exchanges. In 2014, the US reached a new high regarding new issues since 2001 with 273 offerings that totalled an aggregate of $85 billion (Business Insider UK, 2015). However, part of this new high is the IPO of Alibaba, which realized an offering of $25 billion, which significantly inflated the average IPO proceeds. When comparing this to the Chinese IPOs in 2014, we notice the following: Greater China stock exchanges 268 IPOs, with total funds raised of $43.4 billion. Even though the amount of IPOs in China is almost equal to the amount of IPOs launched in the US, the amount that was raised by these IPOs differ significantly. Even after correcting for Alibaba’s massive IPO, the US IPOs tend to raise substantially more funds as compared to China.

The point of focus in this paper is to compare the long-term performance of the firms after the IPO in the US and China. More specifically, I will look whether the economic factors, i.e. the involvement of venture capital and underpricing and firm-specific characteristics, such as firm industry and age of the firm. The results of this paper indicate that the US IPO firms outperform the firms that launched their IPO in China.

The rest of this paper is structured as follows: Section two provides a literature review covering the ideas and conclusions of existing literature regarding the IPO markets and post-ipo performance. Section 3 will discuss the data and the
methodology used for the analysis. Section 4 will display the results and section 5 will conclude.

2. Literature Review

2.1. Long-term underperformance

The post-IPO performance of firms is an extensively researched topic. Many academics have pointed out that the stock performance of firms decline as after the IPO (Khurshed et al., 1993, Rudd, 1993, Ritter, 2007). This decrease in stock performance is denoted as the long-term underperformance. Several explanations for this finding exist, which, according to Khurshed et al. (1999), can be placed into three groups.

The first group they identify is based on behavioural factors and expectations. One hypothesis that belongs to this group is the price support hypothesis, which states that underwriters keep the initial trading prices artificially high to create a favourable situation for the underwriter (Rudd (1993). However, once the underwriters distantiate from the IPO firm, the prices will adjust downwards to reflect the true market value. Another often-discussed factor, belonging to the first group, is the behavioural hot-market view. This view states that firms tend to go public in favourable times. By listing on an exchange when the market is reacting (over) enthusiastic on the firm will drive the IPO price upwards. However, as market conditions return to a normal level, the performance of firms will be lower than the initial expected growth. (Ritter, 2007). This is amplified by the information asymmetry hypothesis, which states that investors initially overpay for the stocks but that the expected long-term returns decrease as more information becomes available to the investors. Consequently, the stock price decreases with the decrease in initial investor sentiment (Rayan and Servaes, 1991).

The second group is based on the agency cost hypothesis, which roots can be found in the theory of Jensen en Meckling (1976). The theory proposes issues that arise when ownership and management of a company are being separated.
Management’s reduction in equity stake and degree of monitoring results in suboptimal performance. This is in line with Mikkelson et al. (1997), who found that the greatest reduction in operating performance happened in firms in which management equity stake reduction was also the highest. In other words, the higher the retained equity-stake of management, the lower the underperformance.

The third and last group explains under-performance as a mis-measurement, which consists of two factors. Firstly, the measurement of long-term performance is subject to the chosen benchmark. An imperfect benchmark may cause the results to show underperformance while a more suitable benchmark may exist that would suggest otherwise (Fama and French, 1996). For example, Brav et al (1998) show that IPO firms perform similarly to non-issuing firms when they are matched on the basis of firm size and book-to market ratios. Secondly, unrelated to the first point, mis-measurement may refer to the failure to control properly for risk or issues with measuring performance over a longer period.

The next section will provide an overview of the current literature on the institutional differences between the US and China regarding the IPO markets. Even though this will not be part of the empirical section of the paper, it does provide important information regarding the settings in which these IPOs take place and what effect this may have on the performance of the IPO firms.

2.2. Institutional differences between the US and China.

The IPO market in the United States was the most active in 2014 regarding new issues since 2000 (Skadden, 2015). Especially since the recovery from the financial crisis in 2010, more and more firms have exercised an IPO, with 2014 having the most issues with 275 offerings that totalled an aggregate of $55 billion. According to Skadden, the increase in new issues was mainly caused by a strong merger and acquisition market and positive, favourable valuations on the stock markets. The largest increase in IPOs in the US over the last years is caused by the healthcare and technology sector (Skadden, 2015). The US IPO market
and the US economy in general have been among the frontrunners in terms of development and consequently the US is currently having a strong and rather stable economy. Moreover, along with the developed economy, also the institutional environment in the US is stable, resulting in minimal political and institutional risks involved with doing an IPO as well as investing in IPOs.

The Chinese IPO market, on the other hand, is rather different from the IPO market in the United States. Regarding the development, China is still an emerging market, which is illustrated by the fact that the Shanghai Stock Exchange was established in 1990, as opposed to the New York Stock Exchange, which launched over 200 years ago. Moreover, the government plays a large role in the processes regarding the IPO market (Chan et al, 2004). The Chinese government maintains a share issue quota, which determines the value of new shares, since this is part of the national investment and credit plan, with the goal of supporting the regional or industrial development goals and keeping the balance among industries. Consequently, the Chinese officials have significant power regarding whether or not to allow a firm to perform an IPO in China (Chan et al, 2004). Other characteristics of the Chinese stock-exchange that are unique in comparison to mature markets is the fact that Chinese officials, through the CSRC (China Securities Regulatory Commission, determine the offer price for the IPOs, which is usually done weeks before the firm goes public, with commonly no space for feedback with regards to adapting the offer price (Su and Fleisher, 1999). As a result of these features of the Chinese IPO markets, firms face significant uncertainty when applying for an IPO.

Aside from the influence of the Chinese government, the Chinese market is subject to severe corruption. Noteworthy is the fact that in November 13th 2015, Yao Gang, vice president at China Securities Regulatory Commission (CSRC), has been arrested on corruption probe (Forbes, 2015). Yao Gang has the nickname King of IPOs as he oversaw the issuance of IPOs of A-shares for thirteen years. Even though this event happened at the end of 2015 and therefore is after the sample period used in this paper, it still visualizes the level of corruption and political risk that is involved in the economy of China. This obviously has a large impact on several aspects that occur around the IPO. Firstly, the expectations of
investors will be lowered since the political risk will put pressure on the stock price. Secondly, investors will demand higher rates or return on their investments.

Additionally, in China there is a substantial amount of former state-owned firms that have been taken public through an IPO. However, since it is common for such firms that the state is still involved after the IPO, it is questionable whether the reaction of the market and the performance of the firm is similar to normal firms going public. Fan et al. (2014) find evidence of a negative relationship between politically connected CEOs on the performance of Chinese firms after an IPO. They state that those firms tend to have boards consisting of multiple current or former government bureaucrats. These boards show significantly lower degrees of professionalism as opposed to boards consisting of people that are selected merely on their professional competencies. Furthermore, Fan et al. mention that these board compositions or politically connected CEOs tend to have alterative agendas that are not align with the organizational goals. As a result of this unprofessionalism, the authors find that these firms have lower operating and stock-return performance than firms without the involvement of politically connected individuals.

The next section provides an overview of the literature regarding market factors that may influence the long-term performance of IPO firms. These factors are also the focus of the empirical section of this paper.

2.3. Differences in market mechanisms between the US and China

2.3.1. Venture Capital

A phenomenon that has obtained increased attention in recent literature is venture capital. Venture capitalists are firms that invest capital in other firms, mainly start-ups and young and small firms, in order to enable these firms to operate on a larger scale in turn for a share of the profits. According to Cumming and MacIntosh (2003), in partial exits, average annual rates of returns to VC are 84% in IPOs as opposed to only 20% in acquisitions. Even though their data stems from over a decade ago, it visualises the appeal of VCs and the impact they
have on the post-IPO performance of firms that went public. The rise in venture capital has come along with the increase in new firms and Internet start-ups. The online development and possibilities have created a globalized market. One idea is all that is needed in order to reach the whole world with a new product or service. Think of Facebook, created by one teenager who managed to create a multibillion company within a couple of years. As a result of these modern-day possibilities, investment firms are eager to keep an eye open and to find such gems. Consequently, the subject of venture capital is now more relevant than ever.

The literature regarding the involvement of venture capital in the IPO process is positive, implying that being backed by Venture Capital is beneficial in terms of improved long-term performance. Krishnan et al (2009) wrote an extensive paper discussing the relationship between venture capital and the organizational structure and performance of an IPO-firm. They find that firms that are backed by venture capital outperform their non-VC backed counterparts. Moreover, they find that a venture capitalist’s reputation is also an important aspect. One reason for this is that reputable venture capitalists tend to select more efficient companies to invest in. However, also when controlling for this selectivity, they find that pre and post-ipo performance of firms with more reputable venture capitalists backing them significantly outperforms firms that are backed with less reputable venture capitalists. Krishnan et al. (2009) find that more reputable VCs more frequently retain their shares and board seats, even after the IPO lock-up period (lasting usually 180 days). This more thorough and long-term guidance leads to more effectiveness and higher performance.

The finding of a positive relationship is in line with earlier work of Kini and Pain (1995), who also conclude that venture capital has a significantly positive effect on long-term performance. Furthermore, they found that venture capital signals quality to investors, which increases the possible funds that can be obtained by performing an IPO. Moreover, they find that the post-IPO performance of VC-backed firms is superior since venture capitalists provide efficient monitoring mechanisms, which especially in young and risky firms tend to prove very
beneficial. However, venture capitalists tend to lower their stake in the firms when the firms are performing steady, which they find to be after a couple years. Consequently, the performance levels of VC-backed and non-VC-backed firms tend to converge towards a similar level after the IPO-period. This is amplified by the investors who react to the disappearance of the venture capitalists, thereby even further converging to non-VC levels.

2.3.2. IPO underpricing

The underpricing and long-term performance of IPOs are commonly referred to as the two anomalies of IPOs, since they are the two most extensively researched aspects of IPOs. IPO underpricing is the phenomenon of a large positive gain to a new issue after the first day of trading relative to the offer price. However, there is hardly any research, which examines the relationship between underpricing and long-term performance. Lee and Hovey (2009), however, find that higher initial IPO returns on day 1 in China are valued more highly by investors and provide superior earnings and returns in the long-run. They find the same results for the day-ten returns and the day-21 returns. Moreover, since underpricing measures the return on the first day, it is part of the long-term performance of the IPO firm. Consequently, there should be a high correlation between underpricing and long-term performance.

2.3.3. Technology firms and firm age

The literature on the effects of firm industry and firm age is rather extensive. However, in relation to IPOs, there are not many papers that provide significant information on its effects on post-IPO performance. Xiong and Bharadwaj (2011) stress the importance of the absorptive capacity of young tech-firms, stating that the flexibility that such firms tend to have over non-technology firms can provide for a competitive advantage that can help tech firms to more easily cope with the transitioning from a private firm towards a public firm. On the other hand, however, investors may be reluctant to take the risk of investing in a younger firm, since such firms mostly still have to prove themselves (Fazli, 2015). Fazli also states that this effect is being mitigated by the level of internationalisation. Being active in multiple countries can partly
offset the disadvantage of being young with regards to investors willingness to invest. Investors tend to see being active in multiple countries as a positive signal, and as a safer choice then a young firm that solely operates in one country.

3. Data and Methodology

3.1. Data

Concerning the data, I decided to incorporate IPOs of the NYSE and NASDAQ in the US and the Shanghai Stock Exchange and the Hong Kong Stock Exchange in China. I choose these stock-exchanges, since they are the two largest stock-exchanges in their country. After selecting these stock exchanges in the database of Bureau van Dijk, for the period 2007-2012, I obtained a sample for 107 US IPOs and 84 Chinese IPOs. Reason for taking 2012 as the last year is to able to calculate the stock performance of these IPOs for the three years after the IPO date. However, after obtaining all additional data needed for my analysis, I had to reduce my sample size to 87 US IPOs and 53 Chinese IPOs after deleting observations with missing data.

3.2. Variables

3.2.1. Dependent variable

The dependent variable of my research is the long-term performance of IPOs, which is measured as follows, as originally developed by Ritter (1997):

\[
Long \ Term \ Performance \equiv \frac{P_3 - P_o}{P_o}
\]

Where \( P_t \) is the adjusted stock price after three years, and \( P_o \) is the offer price of the share. In the same fashion, I have obtained the post-IPO performance at the 1, 2 and 3-year mark. For the first year performance, \( P_t \) is the average first year adjusted stock-price and \( P_o \) is also the offer price, which is shown below:

\[
First \ Year \ Performance \equiv \frac{P_t - P_o}{P_o}
\]
For the second year performance, $P_2$ is the average adjusted stockprice of the second year and $P_1$ is the average stock performance of the first year:

\[(3) \quad \text{Second Year Performance} \equiv \frac{P_2 - P_1}{P_1} \]

In the same fashion as the second year, the third year performance is calculated by the following equation, in which $P_3$ is the average third year adjusted stock-price and $P_2$ the second year average adjusted-stock price:

\[(4) \quad \text{Third Year Performance} \equiv \frac{P_3 - P_2}{P_2} \]

Note that the stock-prices used are the adjusted stock-prices. These values are taken from the database Datastream, and are the stockprices adjusted for dividend pay-outs. Consequently, there is no issue with firms that pay-out large amounts of dividends that would impact the share-price, since the dividend gain is added to the capital gain.

In order to correct the results for fluctuations in the market, I created the variable Market-adjusted Long-term Performance, which will be used in the regressions. This equation is almost the same as in equation 1, except the value is subtracted by the values of the stock exchange in the same period:

\[(5) \quad \text{Market – adjusted Long – term Performance} = \frac{(P_3 - P_0)}{P_0} - \frac{(M_3 - M_0)}{M_0} \]

Where the M values represent the value of the stock exchange where the firm is listed. For an IPO that took place on the NYSE, $M_3$ is the average value of the NYSE after three years of the IPO, and $M_0$ is the value of the NYSE at day of the IPO.
3.2.2. Independent variables

First independent variable is the venture capital, which is a dummy variable that has a value of 1 in case of a firm that is backed by VC and a value of 0 in case that no venture capital is involved. Since this information could not be found in existing databases, I found this information by thoroughly going through reports of the IPO firms.

Underpricing is calculated similarly to the long-term performance, namely by the following equation:

\[(6) \text{Market} - \text{adjusted under} - \text{pricing} = \frac{(P_t - P_o)}{P_o} - \frac{(M_1 - M_0)}{M_0}\]

Where \(P_t\) is the trading price at the end of the first day of trading and \(P_0\) is the offer price of the share. \(M_1\) is the value of the stock market index at the end of the first day of trading of the IPO stock, and \(M_0\) is the value of the stock market index at the beginning of the first day of trading of the new stock. Consequently, similarly to the calculation of the market-adjusted long-term post-IPO performance, the amount of underpricing is also corrected for the corresponding stock exchange. Underpricing of IPOs in the US are corrected for market fluctuations using the NASDAQ and the NYSE and underpricing in China is corrected by means of the Shanghai Stock Exchange and the Hong-Kong stock exchange.

Another independent variable is technology, which, similar to venture capital, has a value of 1 in case of a tech-firm and a value of 0 if the firm operates in a different industry. Finally, a country dummy is included in the final equation, which has a value of 0 when the IPO took place in the United States and 1 if the IPO took place in China.

From all the variables discussed above and the inclusion of the country dummy, I obtained the following regression equation:

\[(7) \quad MA.\ LTP = \beta_0 + \beta_1COUNTRY + \beta_2VC + \beta_3UP + \beta_4TECH + \beta_5AGE + e\]
Where MA.LTP is the dependent variable, representing the market-adjusted long-term performance. COUNTRY represents the dummy variable which indicates whether the IPO took place in the US or in China. UP represents the IPO underpricing. TECH represents a dummy, which indicates whether the firm operates in the technology sector or another sector. Lastly, AGE represents the age of the firm when launching the IPO.

This equation will be used in section 4, where I will provide my analysis and show the results it created. The next part will provide the descriptive statistics of my independent variables.

3.3. Descriptive statistics

Table 1 below shows the descriptive statistics of the independent variables, consisting of two panels.Panel A shows the variables for the US IPOs and Panel B shows the variables for the Chinese IPOs.

Table 1

Descriptive statistics of independent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A: US (n=84)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture Capital</td>
<td>0.61</td>
<td>1</td>
<td>0.49</td>
<td>0</td>
<td>1</td>
<td>84</td>
</tr>
<tr>
<td>Underpricing</td>
<td>0.15</td>
<td>0.05</td>
<td>0.24</td>
<td>-0.20</td>
<td>0.98</td>
<td>84</td>
</tr>
<tr>
<td>Technology</td>
<td>0.43</td>
<td>0</td>
<td>0.50</td>
<td>0</td>
<td>1</td>
<td>84</td>
</tr>
<tr>
<td>Age until IPO</td>
<td>7.14</td>
<td>5</td>
<td>10.44</td>
<td>0</td>
<td>72</td>
<td>84</td>
</tr>
<tr>
<td><strong>Panel B: China (n=52)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venture Capital</td>
<td>0.25</td>
<td>0</td>
<td>0.44</td>
<td>0</td>
<td>1</td>
<td>52</td>
</tr>
<tr>
<td>Underpricing</td>
<td>0.24</td>
<td>0.11</td>
<td>0.38</td>
<td>-0.27</td>
<td>1.66</td>
<td>52</td>
</tr>
<tr>
<td>Technology</td>
<td>0.12</td>
<td>0</td>
<td>0.32</td>
<td>0</td>
<td>1</td>
<td>52</td>
</tr>
<tr>
<td>AGE</td>
<td>9.37</td>
<td>6</td>
<td>14.64</td>
<td>0</td>
<td>98</td>
<td>52</td>
</tr>
</tbody>
</table>

The table shows that in the United States, more than half of the firms that launched an IPO did so with the help of at least one venture capitalist. China, on
the other hand, only 25% of the firms in the sample was backed by venture capital at the time of the IPO. This is in line with the theory, which suggests that venture capitalists are more careful in China with regards to the institutional risks that are present in the Chinese IPO market. Further, IPO underpricing is on average 15% in the US, as opposed to 24% in China. This is also in line with the current literature, which states that underpricing is more severe in emerging markets than it is in mature markets. Furthermore, the US subsample consists for 43% of firms that are operating in the technology sector. Compared to the 12% of the firms in China that operate in the technology sector, it shows that a significantly higher amount of the firms that go public in the US is working in the technology sector. Moreover, these tech-firms tend to be younger when launching an IPO, which may explain the age difference between the US and China. Whereas the average age before the IPO in the US is seven years, it is over nine years in China.

4. Results

4.1. Univariate analysis of Post-IPO performance in the US and China

Table 2

Univariate analysis comparing long-term performance of the US and China

<table>
<thead>
<tr>
<th></th>
<th>Panel A: US</th>
<th>Panel B: China</th>
<th>Difference</th>
<th>T statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term (3 years) Performance</td>
<td>18,78%</td>
<td>-5,82%</td>
<td>24,60%</td>
<td>-2,7874(0,0471**)</td>
</tr>
<tr>
<td>Market-Adjusted performance</td>
<td>14,66%</td>
<td>0,91%</td>
<td>13,75%</td>
<td>1,5388(0,1262)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>84</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Panel A: US</th>
<th>Panel B: China</th>
<th>Difference</th>
<th>T statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-Year Performance</td>
<td>21,10%</td>
<td>7,11%</td>
<td>13,99%</td>
<td>1,3651 (0,1745)</td>
</tr>
<tr>
<td>Market-Adjusted Performance</td>
<td>18,51%</td>
<td>7,37%</td>
<td>11,14%</td>
<td>1,1105 (0,2688)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>84</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Panel A: US</th>
<th>Panel B: China</th>
<th>Difference</th>
<th>T statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second-Year Performance</td>
<td>2,65%</td>
<td>-17,13%</td>
<td>19,78%</td>
<td>-2,4873 (0,0141**)</td>
</tr>
<tr>
<td>Market-Adjusted Performance</td>
<td>-0,45%</td>
<td>-6,49%</td>
<td>6,04%</td>
<td>-0,8878 (0,3762)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>84</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<th>Panel B: China</th>
<th>Difference</th>
<th>T statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Third-Year Performance</td>
<td>12,21%</td>
<td>9,79%</td>
<td>2,42%</td>
<td>-0,3483 (0,7282)</td>
</tr>
<tr>
<td>Market-Adjusted Performance</td>
<td>-2,11%</td>
<td>4,49%</td>
<td>6,6%</td>
<td>1,0185 (0,3103)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>84</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 shows the average post-IPO performance of the US and Chinese firms. What stands out is the superior stock performance of the US firms as opposed to the Chinese firms. Whereas the stock performance of the US firms increased with 18,78% after three years, the Chinese firms obtained a decrease in performance of 5,82%. This difference is statistically significant at the 5% level, as shown by the p-value of 0,0471. However, when adjusting these values for movements in the corresponding stock exchanges, the US Performance increase is lower with 13,66% and the Chinese performance decrease is replaced with a small performance increase of 0,91%. However, the p-value of this finding is 0,1262, therefore lacking statistical significance. As a means of checking for robustness, I have winsorized the long-term performance at the 2% level. Regarding the US long-term performance, the results are rather similar to the results found in table 2, with a market-adjusted performance increase of 13,87% in the US. For China however, winsorizing at the 2% level causes the market-adjusted long-term performance to drop to -0,62%, therefore indicating a marginal decrease in performance. However, the corresponding p-value with this equality of means test is 0,1346, lacking statistical significance.

When looking at the individual years, it stands out that there is a large amount of variation. The first year after the IPO shows rather large values of 21,10% and 7,11% for the US and China respectively, indicating that IPO firms in both countries tend to perform better in the first year, than they do on average for the three years after the IPO. However, when looking at the second year, the results show that both countries tend to perform weaker in the second year compared to the first year after the IPO. Regarding the US, IPOs obtain only an increase in performance of 2,65%, after 21,10% in the first year. Simultaneously, The Chinese IPO performance in the second year dropped with 17,13%, as opposed to an increase of 7,11% in the first year. However, when adjusted for the stock markets, these values are -0,45% and -6,49% in the US and China respectively, indicating underperformance in the US as well as China. Lastly, the third year shows an increase in performance for both countries. Yet, when corrected for movements in the stock exchanges, the values show -2,11% and 4,49% in the US.
and China respectively, meaning that where the performance of US firms decreased in the third year, the performance of Chinese IPO firms increased in relation to the second year, when corrected for market movements.

The next section provides the multivariate analysis showing the effects of the independent variables on the dependent variable Market-adjusted Long-term Performance, allowing to see whether (part of) the results of table 2 can be explained by the presence of venture capital, the level of underpricing, the technology industry or the age of the firm at the point of the IPO.

4.2. Multivariate analysis of Post-IPO performance in the US and China

The next section provides the multivariate analysis showing the effects of the independent variables on the dependent variable Market-adjusted Long-term Performance, allowing to see whether (part of) the results of table 2 can be explained by the presence of venture capital, the level of underpricing, the technology industry or the age of the firm at the point of the IPO.

Table 3 shows the OLS regression of the dependent variable Market-adjusted Long-term Performance. For this regression, a country dummy is included which allows for taking the full sample into the regression and to see the country effect.

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>-0.2725 (0.0436**)</td>
</tr>
<tr>
<td>Venture Capital</td>
<td>0.0866 (0.4982)</td>
</tr>
<tr>
<td>Underpricing</td>
<td>0.4801 (0.0159**)</td>
</tr>
<tr>
<td>Technology</td>
<td>-0.2261 (0.0991*)</td>
</tr>
<tr>
<td>AGE</td>
<td>0.0020 (0.6834)</td>
</tr>
</tbody>
</table>

Table 3 shows the relationships between the independent variables and the dependent variable for the whole sample, including Chinese as well US IPOs. The main variable, the country dummy variable, shows a statistically significant coefficient of -0.2725, indicating that the US IPOs show significantly higher performance as opposed to their Chinese counterparts. Furthermore, the results show that venture capital has a coefficient of 0.0866, which is rather low and statistically insignificant. Consequently, this finding is not in line with existing literature, which claims that the involvement of venture capital significantly improves the performance of the IPO firm. Furthermore, the independent variable Underpricing shows a coefficient of 0.4801, which is statistically significant at the 5% level with a p-value of 0.0159. This result is no surprise, since underpricing is calculated as the increase in stock-price on the day of the IPO.
launch. A high underpricing would therefore cause higher values of long-term performance, since long-term performance is also measured against the offer price of the IPO. According to the table, being active in the technology sector has a negative effect on the long-term performance. This observation is interesting, since tech-firms tend to be subject to larger risk than non-technology firms and larger risk is used to be associated with higher returns, i.e. higher performance. Lastly, Age is found to have practically no influence on the long-term performance of an IPO firm.

Table 4 below shows the results of the regressions the US and China individually, in order to assess the impacts of the independent variables on each country independently of each other. Note that at first the independent variable underpricing is not taken into consideration, yet it is part of the second part of the table.

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Panel A: US (N=84)</th>
<th>Panel B: China (N=53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Capital</td>
<td>0.1619 (0.3920)</td>
<td>-0.0033 (0.9813)</td>
</tr>
<tr>
<td>Technology</td>
<td>-0.2031 (0.2762)</td>
<td>-0.3552 (0.0722*)</td>
</tr>
<tr>
<td>Age</td>
<td>0.0015 (0.8547)</td>
<td>0.0001 (0.8173)</td>
</tr>
</tbody>
</table>

Including underpricing

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Panel A: US (N=84)</th>
<th>Panel B: China (N=53)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Capital</td>
<td>0.1238 (0.5187)</td>
<td>0.0209 (0.8736)</td>
</tr>
<tr>
<td>Technology</td>
<td>-0.2219 (0.2359)</td>
<td>-0.2538 (0.1633)</td>
</tr>
<tr>
<td>Age</td>
<td>0.0015 (0.8583)</td>
<td>0.0023 (0.5572)</td>
</tr>
<tr>
<td>Underpricing</td>
<td>0.4253 (0.2733)</td>
<td>0.4964 (0.0021**)</td>
</tr>
</tbody>
</table>

Table 4 shows the OLS regression of the dependent variable Market-adjusted long-term performance for the US and China independently. The table shows that the effects of the independent variables on the market-adjusted long-term performance are rather similar. The table shows that with regards to the US, venture capital has a coefficient of 0.1619, indicating that venture capital seems to substantially influence the long-term performance of IPO firms in the US. This is in line with the theory, which states that venture capital is more frequently present in mature markets and also obtain higher results in such markets. In the
Chinese subsample, the table shows that venture capital has practically no impact on the post-IPO performance of firms in China.

The results regarding tech-firms show a negative relationship with post-IPO performance for both the US as well as for China, with a value of -0.2031 and -0.3552, the latter one being statistically significant at the 10% level. Firms that are active in the technology industry have lower performance, compared with firms that are not active in this industry.

5. Conclusion, limitations and recommendations

This paper analyses the differences and similarities between the post-IPO performance in the United States and China. I find that both countries on average obtain positive long-term returns, with the US having a value of 13.66% and China a value of 0.91%, which is inconsistent with the theory of post-IPO underperformance, which states that firms tend to see a decrease in their performance after entering in an IPO. Even though I find a positive relationship with the presence of venture capital and long-term post-IPO performance, these results are statistically insignificant. I find, however, a negative relationship between being active in the technology sector and long-term post-IPO performance, which is statistically significant for the Chinese IPO market.

This paper has several limitations. First and foremost is the rather small sample size, which disabled me from obtaining multiple statistically significant results. Especially regarding the Chinese subsample, it is rather difficult to generalize the findings since I only have a Chinese sample of 50. Furthermore, the wide variation in the sample also makes it difficult to obtain solid results, since the very successful IPO firms offset very unsuccessful IPO firms. Yet, because the obtained sample is so small, there is a large selection bias that significantly impacts the outcome of the regression analysis. Another issue that I faced was the limited venture capital that is present in China. Where in the US almost 50% of the firms are backed by venture capital, in China only a small portion of the firms that go public do so with the help of venture capitalists. Another limitation
of this paper is that I was only able to correct for changes in the stock exchanges. Due to time constraints, it was impossible to correct against similar firms that did not opt for an IPO. This result would, however, enable the results to more broadly applicable. Comparing the performance of IPO firms with similar firms which did not opt for an IPO, would provide a more clearer insight into whether or not performing an IPO would create benefits as opposed to staying a private firm. Further, a limitation of this paper is the sole empirical focus on market factors and firm characteristics. However, as mentioned in the literature, there are also large institutional differences between the US and China, a large impact being the presence of corruption in China.

This paper contributes to existing literature by providing some theoretical aspects that distinguishes the IPO market of the US from that of China. Unfortunately my empirical analysis, though it indicated the positive impact of venture capital on long-term performance, could not statistically significantly support the hypotheses, due to the sample size that is not large enough.

Future research can continue on this path by analysing the differences between the established US market and the still emerging Chinese market, that is developing rather quickly. Yet it will be advised to incorporate more firms in the sample in order to make subsample comparisons and to be able to effectively generalize the findings. Moreover, as mentioned before, matching the observations with firms that did choose not to become a public firm will shine a more clearer light on the phenomenon of long-term underperformance. Research may also shine more light on the impact of corruption in the Chinese stock-market, and identify the influences this has on investors and on post-IPO performance. Lastly, future research can also pay more attention to the Chinese stock-market, since it has been undergoing major changes after the time-frame of this paper. For example, 2015 showed that China’s economy might not have been in such a large growth as was previously anticipated, which put pressure on the whole country as well as internationally. Consequently, the results on IPOs in China and the comparison with the United States will remain to be an interesting field of research.
References


