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Evidence of Wealth Effect of Corporate Spin-Offs in China

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Abstract- Is corporate spin-offs less attended as a wealth-generating asset restructuring in the People's Republic of China (China)?. Was the wealth effect of China's corporate spin-off occurring in the State Capital Economy? Although China's Initial Public Offering (IPO) incidences and volumes are vigorous, China's corporate spin-offs started late and lack extensive applications. In July 2020 alone, a total of seventy-five companies completed IPO in mainland China and abroad despite the outbreak of the COVID-19 pandemic. This paper aimed to provide evidence on the wealth effect of the combination of China corporate spin-off announcements, parent and subsidiary. We took twenty-four Chinese listed companies that have been successfully spin-off as a whole to explore the corporate spin-off wealth effect on their market value, and the empirical results of positive returns were convincing. Compared with the prior corporate spin-off researches in China, this paper is more comprehensive as we examined the shareholders' wealth effect of the corporate spin-off announcements from the years 2000 to 2018 in the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE).

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Evidence of Wealth Effect of Corporate Spin-Offs in China

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Abstract- Is corporate spin-offs less attended as a wealth-generating asset restructuring in the People's Republic of China (China)?. Was the wealth effect of China's corporate spin-off occurring in the State Capital Economy? Although China's Initial Public Offering (IPO) incidences and volumes are vigorous, China's corporate spin-offs started late and lack extensive applications. In July 2020 alone, a total of seventy-five companies completed IPO in mainland China and abroad despite the outbreak of the COVID-19 pandemic. This paper aimed to provide evidence on the wealth effect of the combination of China corporate spin-off announcements, parent and subsidiary. We took twenty-four Chinese listed companies that have been successfully spin-off as a whole to explore the corporate spin-off wealth effect on their market value, and the empirical results of positive returns were convincing. Compared with the prior corporate spin-off researches in China, this paper is more comprehensive as we examined the shareholders' wealth effect of the corporate spin-off announcements from the years 2000 to 2018 in the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZSE). This paper adopted window size of 1 day, 5 days, 10 days, 20 days, and 50 days before and after the announcement of a corporate spin-off and Shanghai Securities Composite Index to simulate Market Model. Using matched control samples, we observed that companies experienced spin-off had a higher significant wealth gain in the short term period of corporate spin-off announcements compared with companies in control samples. Besides, precision weighted cumulative average abnormal return, and the averaged buy-hold abnormal return showed this study's robustness. The results displayed that there was no significant difference between the value of precision weighted cumulative average abnormal return and normal cumulative average abnormal return. The cumulative average abnormal return showed that shareholders would gain about 1.84% share price increasing on 1 day before and after the announcement of the corporate spin-off; 2.76% on the 5-days before and after the announcement; 2.62% on 10-days before and after the announcement; 7.28% on 50-days before and after the announcement. The study evidences that corporate spin-off listing does generate wealth in asset restructuring in a State Capital Economy progressively, overarching the body of spin-off literature globally which were mostly on Private Capital Economies.

Keywords: corporate spin-offs' wealth effects; state capital economy; matched control samples; precision weighted cumulative average abnormal return.

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I. Introduction

Chinese corporate spin-offs were fewer comparatively to other countries as a wealth-generating asset restructuring viz a viz the incidences of Chinese IPOs. The wealth effect of China's corporate spin-offs occurred in the Hong Kong Stock Exchange (HKSE), the SSE and the SZSE[1]. IPOs in China are active and the yearly number of IPOs in China touched three hundred and thirty-two in the year 2019 out of which two hundred and two companies were listed at SSE and SZSE. The remaining one hundred and thirty companies were listed in HKSE and overseas[2]. Seventy-five companies from mainland China were successful in their IPO exercise during the month of July 2019 alone amid the ongoing COVID-19 pandemic. In recent years, with the upsurge of overseas listed companies planning to return to the A-shares[3] market, corporate spin-off as a means of operation has been refocused by companies. With the increasingly close relationship between Chinese and foreign capital markets, the increasing familiarity of Chinese companies with the spin-offs listing model and the deepening of the negative synergy brought by merger and acquisition, Chinese listed companies[4] began to try to restructure assets by spin-off listing, making it one of the essential trends of asset restructuring of listed companies. Therefore, it is of great practical significance to explore the influence of Chinese companies on their own and their subsidiaries' value after they choose to spin-offs. Besides, researching spin-offs in China is helpful to measure whether spin-offs are customarily beneficial for Chinese

[1] SSE, SZSE and HKSE are among the largest stock exchanges in the world. SSE and SZSE are at mainland China. Large State-Owned Enterprises are normally listed in SSE. SSE's IPOs are distributed across the Main Board and the Science and Technology Innovation Board. SZSE host many technology driven IPOs including Huawei and Tencent. SZSE has the Small and Medium Enterprises Board and the Growth Enterprises Board. HKSE is a preferred place for mainland companies to get an international listing.

[2] Domestic Chinese stock markets are not completely open to foreign investors. Chinese companies are relying on overseas exchanges to attract international investors.

[3] Domestic shares denominated in Renminbi and traded in the SSE and SZSE.

[4] Mostly State-Owned Enterprises or a dominance of Corporatized Government Agencies or which the State has controlling shares.

domestic companies and advance the development of the China stock market.

The fundamental purpose of corporate restructuring is to promote the healthy development of the company, enhance its competitiveness, and increase shareholders' value. The corporate spin-off is a kind of company restructuring action that separates a subsidiary or a division from the parent company by establishing a new independent company where the parent company's shareholders retain a proportionate equity interest. With the in-depth development of global economic integration, the adjustment of industrial structure and the increasingly fierce market competition, corporate restructuring as a part of the action and reformation of modern enterprises have become more and more critical. In 2007 alone, the restructuring scale of China's listed companies reached about 450 Billion Renminbi. However, China's domestic corporate restructuring mainly involves merger and acquisition and asset replacement. Corporate divestiture is not common in China capital market[5].

In Private Capital Economies, the commonly used restructuring spin-offs are appositely involved. In the United States, from 1993 to 2003, more than 1700 companies participated in spin-off. In Europe, from 1984 to 2004, more than 90 billion euros were involved in corporate restructuring by spin-offs (Guo & Wang, 2010). Even in Asia and other emerging markets such as Malaysia, China's capital market had a lower level of development in corporate spin-offs. In these countries, corporate spin-offs as a corporate restructuring method can help companies focus on their core business and abandon the business departments with poor performance, eliminating the negative synergy effect among different divisions in corporations and reduce the debt burden.

Since the China Securities Regulatory Commission (CSRC)[6] released regulations on corporate spin-offs on 13th December 2019, twenty-two A-share companies have planned to spin-offs their subsidiaries for domestic listing in China mainland. Among them, the Growth Enterprise Market (GEM)[7] and the Science and Technology Innovation Market (STAR)[8] are the primary listing destinations. Twelve companies choose to spin off their subsidiaries in GEM for listing, and seven companies intend to spin off their subsidiaries in STAR for listing (Xinhua News Agency, 2020). A recent decade of years initiative of listed enterprises to spin-offs their subsidiaries have raised many Chinese researchers to analyze the valuation creation effect of spin-offs based on the Chinese market.

Globally, relevant studies have found that the spin-offs have conveyed positive information about the value of the company to the market, and the market has positively responded to the information. Before and after the announcement of the spin-offs, the parent company's stock has experienced an excessively abnormal return (Berger & Ofek, 1995; Comment & Jarrell, 1995; Feldman, et al., 2014; Vijh, 1999). In the Asia context, the Malaysian study done by (Yoon, Annuar, & Yoon, 2019) has proved that market Model analysis showed that spin-offs in Malaysia generally caused statistically significant positive short term cumulative average abnormal returns (CAAR).

Based on the researches of the market's response to the parent company's share price after the spin-off listing, scholars had some inconsistent conclusions (Li, et al., 2004; Zhang, 2013). The different decisions showed that the Chinese investment market reacted dissimilarly to the announcement of corporate spin-offs. Consequently, To deeply research the value information of the company and the relevant market reaction behind the corporate spin-offs listing in the Chinese capital market, this paper analyzed the change of abnormal return on equity of Chinese enterprises that have successfully achieved the spin-offs on and around the announcement date. Furthermore, this paper examined the corporate spin-offs announcement effect on shareholders' value after in China, an emerging market in a State Capital Economy. In this paper, the event study method is adopted to analyze the abnormal return of the parent company's equity earnings during the announcement of the corporate spin-off. In an attempt to determine the linkages between corporate spin-offs announcement with shareholders' prices, we employed window period based on the timeline of Chinese companies' spin-offs and infer the presence of CAAR, as such, testing the H_0: CAAR=0 also know as the residual error as the indicator of whether share prices respond to an event. In addition, this study also finds control samples referring to those corporates not experience spin-offs in the same industry with similar market capacity for comparison. Since differing t methodology used will result in a variety of estimations, this paper utilizes precision weighted CAAR value (PWCAAR) and the averaged buy-and-hold abnormal return (ABHAR) to provide evidence that estimation results are robust.

Researching spin-offs in China such as this study helps decide whether the spin-offs are suitable for Chinese domestic companies and help to analyze the degree of development of the China stock market.

II. Literature Review

Scholars in related fields have done much in-depth research on the economic consequences of the

[5] Spin-offs were rare since the listing of Tong Ren Tang technology in HKSE in 2000.

[6] CSRC is a ministerial level public institution directly monitored by the State Council of China whose functions, an equivalent of the US Securities and Exchange Commission in US and or other Securities Commision in the Private State Economies.

[7] A board at HKSE for growth companies since 1999.

[8] A board at SSE, an equivalent of NASDAQ-style launched in 2019

spin-off mostly on the backdrop of Private Capital Economies. Schipper and Smith (1986) found that the stock price of the parent company had an average abnormal return of 1.83% after the announcement of the spin-off. The study of Slovin, Sushka, and Ferraro (1995) showed that the stock price of competitors of spun-off listed subsidiary had an abnormal return of -1.1%, but the sample size of this study was small. Allen and McConnell (1998) studied 188 spin-off samples from 1978 to 1993 and found the cumulative abnormal return of the parent company within three days of the announcement period was 2.12%. After increasing the sample size, Prezas, Tarimcilar, and Vasudevan (2000) found that the subsidiary did have short-term abnormal excessive returns. The study of Otsubo (2009) shows that if the relationship between the parent company and the subsidiary company maintained after the spin-off, the stock price of the parent company will have a positive effect. However, this positive effect will change when subsequent events occur.

Vijh (1999) paid attention to the long-term performance after the spin-off and studied 628 spin-offs samples from 1981 to 1995, and found that the performance of subsidiaries within 3 years after spin-offs was not worse than the corresponding benchmark earnings, which was contrary to the previous research results on IPO and SEO. However, Madura and Nixon (2002) found in their study that the long-term performance of parent companies and subsidiaries declined after the spin-off, which was consistent with the results of Ritter's (1991) study on the long-term performance of IPO. The research of Perotti and Rossetto (2007) shows that the spin-off listing is a valuable tool in the financial market, especially in the highly informed environment and uncertain industries. Vijh (2002) studied the factors affecting the price return of spun-off listed shares and found that when the assets of spun-off listed subsidiaries were larger than those of non-spun-off listed companies, the abnormal return during the announcement period was 4.92%; When the assets of spun-off listed subsidiaries were smaller than those of non-spun-off listed subsidiaries, the abnormal return during the announcement period is only 1.19%. This result is inconsistent with the asymmetric information hypothesis but consistent with the earnings spin-offs hypothesis.

Hogan and Olson (2004) compared the differences between the returns of the stock market spin-offs in the standard period and the bubble period. They found that the average return of subsidiaries on the first day of listing was 8.75% during 1990-1998, and 47.76% during the bubble period of 1999-2000. This study shows that the volatility of the stock market also has an impact on the earnings of spin-offs. Benveniste et al. (2008) further deepened their understanding of the influencing factors of short-term abnormal return of spin-offs through their research on the discount of spin-offs. They found that the return of the subsidiary on the first day of its IPO significantly correlated with the return of the parent company during the inquiry period of the subsidiary's stock issue, but not with the return of the parent company during the same period.

For the case of Asia, (Yoon & Ariff, 2007) conducted research of eighty-four Malaysian spin-off companies and found that the cumulative abnormal returns on the day before the spin-off announcement were statistically significant at 22.7% and 66.9% during the 151-day window. (Nadisah & Arnold, 2016) reported that the parent company had a spin-off effect in a very short time, which was 4.99%, but the long-term abnormal returns were not statistically significant. (Yoon, Annuar, & Yoon, 2019) reported that while the average mean reported for (-50,50) window period for all samples was 2.16%, parent companies under normal market conditions achieved more than 2.95% and -0.81% during the financial crisis. For spin-offs during normal market conditions, (Yoon, Annuar, & Yoon, 2019) explained that the statistical significance results reported were more substantial for window period (-20, 20) and (-50,50) when robust statistical tests were used taking event-induced volatility or cross-sectional correlation bias into consideration.

The corporate spin-off listing of listed companies in China is still in the initial stage, and there are not many related kinds of research. The successful spin-off of Beijing Tongrentang Co., Ltd. (Tongrentang) initiated relevant empirical research. The research of Huachuan and Xiaoke (2003) confirmed that spin-off listing could bring positive premium effects to shareholders' wealth of the parent company, while the premium effect of the subsidiary in the initial stage of the listing was negative and turned positive in the later stage.

Subsequently, Li Qingyuan et al. (2004) found through empirical research that during the announcement period of the board resolution, the shareholders of the tradable shares of the Tongrentang obtained 25.61% of CAR, while the competitors of Tongrentang and Tongrentang Technology both obtained significantly negative CAR. The research of Yong et al. (2011) shows that the short-term stock price of listed companies after spin-off has abnormal returns. Haiyun (2011) found that the stock price of listed companies had a significant positive effect before and after the announcement of the resolution of the board of directors, followed by the report of the resolution of the general meeting of shareholders. The short-term stock price effect around the listing announcement was negative, while the long-term impact was positive. The research of Yongze et al. (2012) shows that the overall efficiency of enterprises improved after spin-off, which indicates that spin-off listing is an effective means of value creation. Li et al. (2012) found that in general, the spin-off is conducive to improving the stock price and

performance of parent-subsidiary companies. However, not all subsidiaries can be successful after the spin-off.

III. Empirical Framework

This study used twenty-four typical spin-off announcements from companies listed in the Shanghai Stock Exchange or Shenzhen Stock Exchange between the year 2000 to 2018. Announcement dates were obtained by screening official publications, parent companies' corporate announcements, and article clippings, whichever is earlier. Trade-days' prices of the companies exclude non-trading days, holidays or any days the stock exchange was not operational.

In order to construct Beta estimate of different companies, we utilised the Shanghai Composite Index. We favor the Shanghai Composite Index reflects as it is able reflect China's market condition with the composition of all company stocks listed on SSE.

The abnormal return is used to assess the impact of the event. In the event window $(-T_1,+T_2)$, the abnormal return rate of the company *i* share on the *t*-th day is AR_{it}, that is:

$$AR_{it} = R_{it} - \widehat{R_{it}} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}, t_1 < t < t_2 \# \quad (1)$$

Where, AR_{it} is the abnormal return of company share i at day t,$\hat{\alpha}_i$ is the expected mean return cannot be explained by the market in the period, $\hat{\beta}_i$ is the estimated sensitivity of company i's share to the market return. R_{mt} is the market portfolio yield on at matched day t. $\hat{\beta}_i$ and $\hat{\alpha}_i$ are determined by regressing 60 trading days share return R_{it} with matched SSE market return R_{mt}. The estimated window started 110 daily trading days before (t_{-110}) the spin-offs announcement date $(t = 0)$ and end 51 trading days before (t_{-51}) the announcement date by Ordinary Least Square. To eliminate the influence of the interference event on the individual stock's abnormal returns, the abnormal returns of all samples are averaged to reduce the impact of the interference events on the stock's return. To compute the average of abnormal returns:

$$AAR_t = \frac{1}{n}\sum_{i=1}^{n} AR_{it} \# \quad (2)$$

The cumulative abnormal return of all sample companies is the average abnormal return AAR_t on the *t*-th day and the cumulative average abnormal return rate $CAAR(\tau_1,\tau_2)$ within the time (τ_1,τ_2), that is:

$$CAR_i(\tau_1,\tau_1) = \sum_{\tau_1}^{\tau_2} AR_{it}, \tau_1, \tau_2 \in (t_1,t_2) \# \quad (3)$$

The cumulative average abnormal return is the average of the cumulative abnormal return of sample stocks, indicating the average impact of the event on the overall corporate samples. Sum cumulative abnormal returns in the entire event window $(-T_1,+T_2)$ summed and then average according to the total number of samples to obtain the cumulative average abnormal return, which is represented by $CAAR(\tau_1,\tau_2)$ defined as the average cumulative abnormal return of all sample stocks in the event window $(-T_1,+T_2)$.

$$CAAR(\tau_1,\tau_2) = \frac{1}{n}\sum_{i=1}^{n} CAR_i(\tau_i,\tau_2) \# \quad (4)$$

There is no uniformly objective regulation on the length of the estimation window; too short an estimation window may cause the deviation of the estimation result, and too long estimation window may cause the change of the estimation structure. To comprehensively analyze the wealth effect of the announcement, this paper follows the convention of other spin-off works that its 1, 5, 10, 20, and 50 days before and after the announcement as event window. For measuring AAR, this paper will mainly focus on window period of 20 days before and after the announcement.

Finally, for comparison, we applied the same procedures to a sample of matched control sample, which is selected based on few criterion, identical industry codes, similarity of size, and closeness of revenue and age. These non-spin-off samples' window period are synchoronous to their counterparts and they are computed to show comparison between the sample groups.

IV. Methodology

An event study is usually the first step in a series of analyses to determine the determinants of the stock market's response to different types of events. Traditionally, the purpose of event research is to determine whether the abnormal effect of a single event or event sample is significantly different from zero, so it is not a purely accidental result. This assessment will be conducted through hypothesis testing.

In this paper, there are two hypothesis tests for *CAAR* and *AAR*. Based on the general principle of inferential statistics, the first hypothesis test refers to that the *null hypothesis* (H_0) considers *CAAR* is equal to zero in the event window, indicating that there is no shareholders' wealth effect arising from spin-off announcement. The null The second hypothesis test refers that the *null hypothesis* (H_0) maintains there is no AAR within the event window, whereas the alternative hypothesis suggests (H_1) the presence of AAR within the event window. Therefore, the following statistical tests will adopt a two-tailed test to test the existence of CAAR where, H_0: *CAAR=0;* H_1:*CAAR≠0 and AAR, where* H_0: *AAR=0;* H_1: *AAR≠0.*

For robustness, we adopted both parametric and non-parametric significant tests. We first calculate conventional Cross-Section T-Test, t_{CAAR_t} (Csect T) as benchmark, show as:

$$t_{CAAR} = \sqrt{N}\frac{CAAR}{S_{CAAR}} \quad (5)$$

$$t_{AAR_t} = \sqrt{N}\frac{ARR_t}{S_{AAR_t}} \quad (6)$$

We then the examine Standardized Residual Test (Patell Z) by Patell (1976,1979) shown as following equation (7) and equation (8). This widely used test statistic in event studies standardize each AR_{it} with the standard deviation of the prediction error correction before calculating the test statistics.

$$z_{Patell,t} = \frac{ASAR_t}{S_{ASAR_t}} \quad (7)$$

$$z_{Patell} = \frac{1}{\sqrt{N}}\sum_{i=1}^{N}\frac{CSAR_i}{S_{CSAR_i}} \quad (8)$$

Specifically to address cross-sectional correlation, we then computed Kolari and Pynnonen (2010) modified version of Patell test known as Kolari and Pynnonen Adjusted Standardised Residual Test (Adj. Patell Z). Using the standardized abnormal return rate, $\bar{r}$ defined as the mean value of the cross-correlation of the sample of the estimated period abnormal return rate:

$$AdjZ_{Patell} = Z_{Patell,t}\sqrt{\frac{1}{1+(N-1)\bar{r}}} \quad (9)$$

$$AdjZ_{Patell} = Z_{Patell}\sqrt{\frac{1}{1+(N-1)\bar{r}}} \quad (10)$$

Then, Boehmer, Musumeci, and Poulsen (1991) standardized cross-sectional method, which is robust to event-induced variance. BMP Test, $Z_{BMP,t}$ (StdCSect Z) is defined as:

$$Z_{BMP,t} = \frac{ASAR_t}{\sqrt{N}S_{ASAR_t}} \quad (11)$$

$$Z_{BMP} = \sqrt{N}\frac{\overline{SCAR}}{S_{\overline{SCAR}}} \quad (12)$$

Lasty, we used Kolari and Pynnonen Adjusted Standardised Cross-Sectional Test, that are advantagerous in both addressing cross-sectional correlation and event-induced variance. The $AdjZ_{BMP}$ (Adj.Std.Csect Z) are specified as:

$$AdjZ_{BMP,t} = Z_{BMP,t}\sqrt{\frac{1-\bar{r}}{1+(N-1)\bar{r}}} \quad (13)$$

$$AdjZ_{BMP} = Z_{BMP}\sqrt{\frac{1-\bar{r}}{1+(N-1)\bar{r}}} \quad (14)$$

For robustness, we deployed the skewness-adjusted t-test, introduced by Hall (1992) which corrects the cross-section t-test of the abnormal return distribution. This test is applicable to average abnormal return and cumulative average abnormal return. The skewness adjusted test statistic for *CAAR* is given by:

$$t_{skew} = \sqrt{N}\left(S + \frac{1}{3}\gamma S^2 + \frac{1}{27}\gamma^2 S^3 + \frac{1}{6N}\gamma\right) \quad (15)$$

For non-parametric tests, we use Corrado Rank Test (Rank Z) by ranking the returns in the event window relative to the period, including the estimation window and the event window. Corrado and Zivney's (1992) rank test applied a re-standardized event window yield and was shown to be robust to induced fluctuations and cross-correlation. The rank statistic is specified as:

$$t_{rank,t} = \frac{\bar{K}_t - 0.5}{S_{\bar{K}}} \quad (16)$$

$$t_{rank} = \sqrt{L_2}\left(\frac{\bar{K}_{T_1,T_2} - 0.5}{S_K}\right) \quad (17)$$

Similarly, we also utilized the generalized version of the sign test proposed by (Cowan, 1992), Cowan Generalised Sign Test, $Zgsign$ (Gen. Sign Z) is specified as:

$$Z_{gisgn}\frac{(w - N\hat{p})}{\sqrt{N\hat{p}(1-\hat{p})}} \quad (18)$$

Finally, rank tests revised by (Kolari & Pynnonen, 2011) that are used to address cross sectional correlation and event induce variance, the Generalized Rank T test, t_{grank} (Gen. Rank T) and Generalised Rank Z test, Z_{grank} (Gen. Rank Z) are specified as:

$$t_{grank} = \frac{\overline{K_0}}{S_{\bar{K}}}\left(\frac{L_1 - 1}{L_1 - \left(\frac{\overline{K_0}}{S_{\bar{K}}}\right)^2}\right)^2; \text{ and; } Z_{grank} = \sqrt{\frac{12N(L_1+2)}{L_1}}\overline{K_o} \quad (19)$$

V. Findings

Based on the research method and statistical tests, cumulative average abnormal returns of samples, as well as control samples and p-value of significance test statistics, can be calculated for 1 day *(-1, 1)*, 5 days *(-5, 5)*, 10 days *(-10, 10)*, 20 days *(-20, 20)* and 50 days *(-50, 50)* before and after the announcement date. Results of cumulative average abnormal returns and test statistics for various tests are presented in Table 2. Results of samples experienced spin-off were presented in Panel A to report wealth effect measurements. Panel B reported the results of control samples under the same period that did not spin-off.

Table 2: Statistics of market model cumulative average abnormal returns for all spin-offs (N=24)

Interval Days	CAAR Value	Sign +ve:-	PW CAAR	ABHAR	Parametric Tests						Non-Parametric Tests			
					Csect T	Patell Z [1]	Std-CSect Z [2]	Adj. Patell Z [3]	Adj.Std-CSect Z [4]	Skew. Corr. T [5]	Gen. Sign Z [6]	Rank Z [7]	Gen. Rank T [8]	Gen. Rank Z [9]
Panel A														
(-50, 50)	7.28%	12:12	7.07%	2.50%	0.317	2.042 *	1.197	2.061 **	1.414	1.143	0.293	-0.240	0.905	0.916
(-20, 20)	2.68%	14:10	2.38%	2.42%	0.412	1.063	0.919	1.073	1.317	0.965	1.111	-0.235	0.744	0.754
(-10, 10)	2.62%	13:11	2.74%	2.60%	0.358	1.741 *	1.176	1.757 *	1.266	0.901	0.702	0.458	1.218	1.229
(-5, 5)	2.76%	13:11	2.53%	3.00%	1.236	2.202 **	1.645 *	2.222 **	1.288	1.419	0.702	0.674	1.620	1.635 *
(-1, 1)	1.84%	13:11	1.72%	1.88%	1.832 *	2.893 ***	1.740 *	2.920 ***	1.644	2.248 **	0.702	0.695	1.358	1.380
Panel B														
(-50, 50)	-12.40%	13:11	3.68%	-492.32%	-0.543	1.108	1.044	1.378	1.715	-0.837	0.642	-0.574	1.745 *	1.809 *
(-20, 20)	-3.59%	14:10	2.29%	-21.53%	-0.453	1.155	0.961	1.167	1.374	-0.650	1.042	-0.599	1.194	1.241
(-10, 10)	1.90%	15:9	2.59%	-0.01	0.633	1.606	1.467	1.623 *	1.355	0.545	1.451	0.015	1.114	1.159
(-5, 5)	1.31%	12:12	1.05%	1.02%	0.847	0.876	0.970	0.885	0.709	0.927	0.225	-0.391	0.400	0.417
(-1, 1)	-0.05%	8:16	0.37%	-0.12%	-0.039	0.602	0.404	0.608	0.649	-0.023	-1.410	-1.223	-0.324	-0.336

*[1](Patell, 1976) Standardised Residual Test [2]BMP Test by (Boehmer, Musumeci, & Poulsen, 1991) [3]Kolari and Pynnnen Adjusted Standardised Residual Test and [4]Kolari and Pynnnen Adjusted Standardised Cross-Sectional Test by (Kolari & Pynnonen, 2010) [5](Hall, 1992) Skewness Corrected Test [6]Cowan Generalised Sign Test by (Cowan, 1992) [7](Corrado& Zivney, 1992) Corrado Rank Test [8]Generalised Rank Z test and [9]Generalised Rank Z test by (Kolari & Pynnonen, 2011) respectively. ***, **, * denotes p-values at significance level 1%, 5% and 10%, respectively*

Panel A presented cumulative average abnormal return computed based on SSE spin-off samples. Through Table 2, the cumulative average abnormal return kept positive from 1.84% to 7.28% in the very long window period (-50,50), indicating that the wealth effect from the announcement of the spin-off was sustainable in general. Based on the significance test statistics of the parametric and the non-parametric, H0: CAAR=0 was rejected for window period (-1,1) and (-5,5) for both traditional and robust tests showing at least significant 10% p-value. Cumulative average abnormal returns for window period (-1,1) are significant at a 1% confidence level under Patell Test a and Adj. Patell Test. As the window period becomes longer, the results are less significant. Panel B presented the cumulative average abnormal return of control samples. It was obvious that control samples did not show positive returns from -0.05% to -12.40% neither in short term nor in long term. In general, test statistics of most significance tests cannot reach a confidence level as low as 10%. Furthermore, based on the results of precision weighted CAAR and averaged buy-and-hold abnormal return, there is no significant difference between CAAR and precision-weighed CAAR, proving that the methodology of the benchmark model has no effect on the regression and our results are robust. However, the difference between ABHAR and CAAR is huge which can provide supportive evidence. A possible reason for this is that Chinese investors are not so mature that can be influenced by the volatility of share prices.

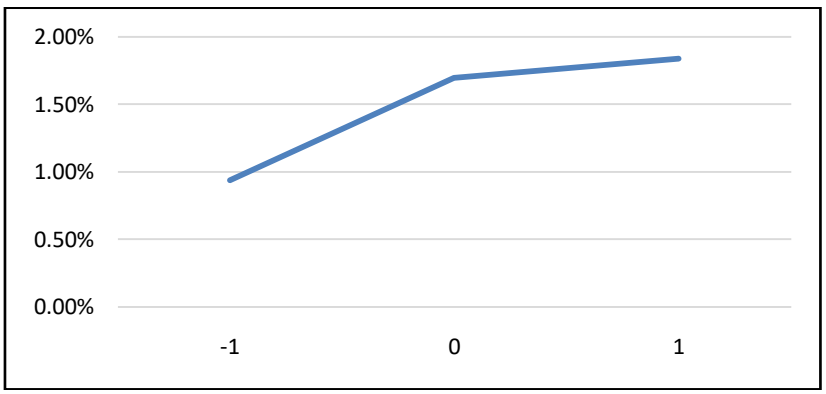

Figure 1: Daily CAAR in 1 Days before and after the Event Day (-1,1)

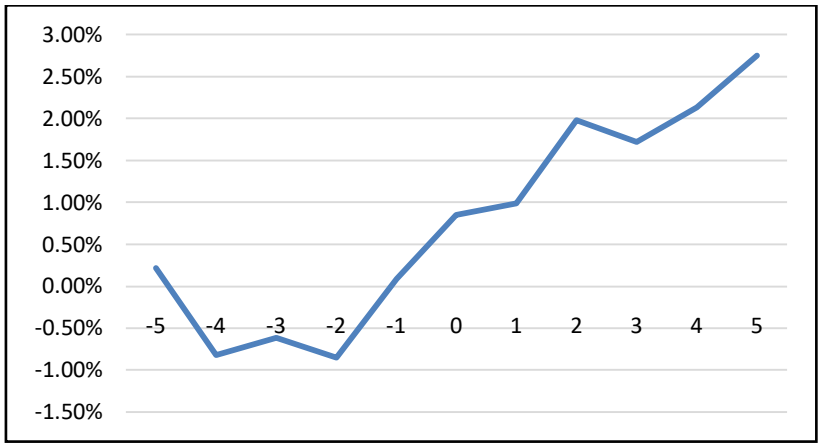

Figure 2: Daily CAAR in 5 Days before and after the Event Day (-5, 5)

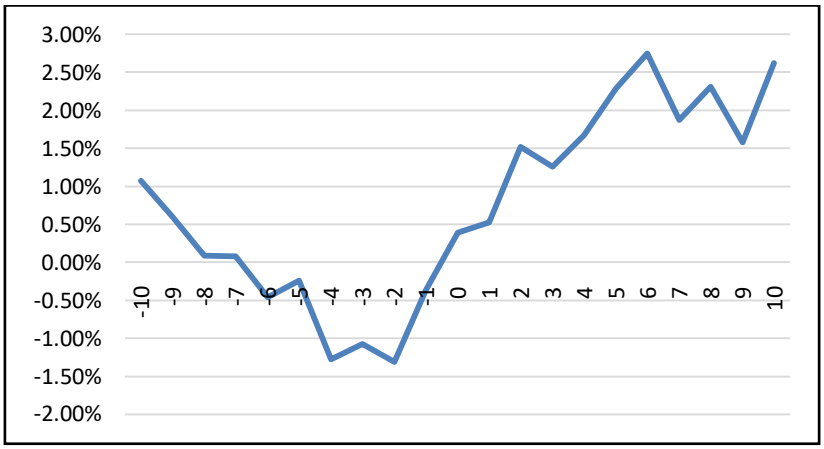

Figure 3: Daily CAAR in 10 Days before and after the Event Day (-10, 10)

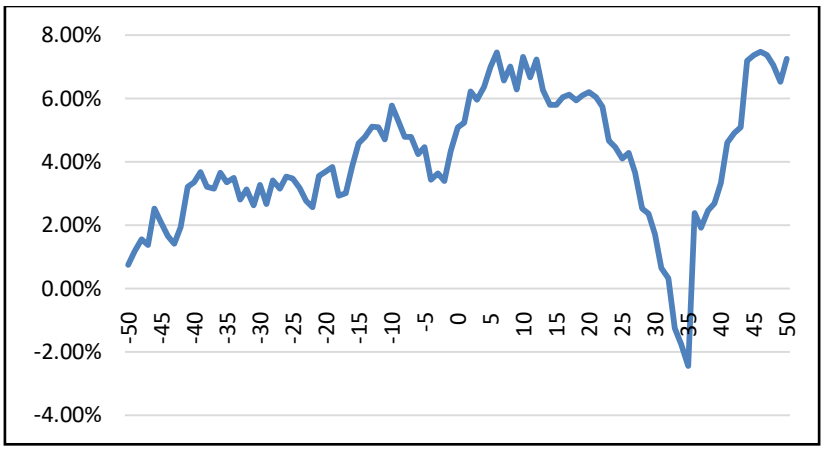

Figure 4: Daily CAAR in 50 Days before and after the Event Day (-50, 50)

From *Figures 1*, *Figures 2*, *Figures 3,* and *Figures 4* in different lengths of event window shown below, estimation of *CAAR* presents an upward trend between 2 days before the event and 6 days after event day, meaning that there is market signaling has been transmitted by spin-offs announcement and wealth effect has been generated for shareholders. But in 50 days before and after the event day, the *CAAR* shows a rapid decreasing trend from the 6th day after the event day to 34th day.

Table 3 shows the average abnormal return of the 20 days before and after the announcement of a corporate spin-off, from which the stock price of the parent companies before and after the announcement of the spin-off has a significantly positive abnormal return. Other event windows' *AAR* results are attached

in the appendix. For 12 days from 20 days before the announcement of the corporate spin-offs to the event day, the abnormal returns are positive, and the status of that positive abnormal return continues to be maintained on the second day after the event day. The average abnormal return of the 1st day before the event day to the 2nd day after the event day was 0.613%. In the 20 days after the announcement of a corporate spin-off, the parent company's stock maintained a positive abnormal return for 12 days. However, from analyzing t-statistics of different tests, there are few significant average abnormal returns for 10 to 20 days before and after event days. Most significant values cluster in an ultra-short-term, which is within 10 days before and after the event day. Therefore, in 20 days before and after the event window, the p-value of the test statistics cannot reject *H0: AAR=0*.

Table 3: Statistics of Chinese market average abnormal return for all spin-offs (N=24)

AAR_{t}	AAR value	Parametric Tests						Non-Parametric Tests			
		Csect T	Patell Z^1	Std-CSect Z^2	Adj. Patell Z^3	AdjStd Csect Z^4	Skw. Corr. T^5	Gen. Sign Z^6	Rank Z^7	Gen. Rank T^8	Gen. Rank Z^9
$AAR_{t=-20}$	0.16%					*					
$AAR_{t=-19}$	0.14%							*			
$AAR_{t=-18}$	-0.91%	**					**		**		
$AAR_{t=-17}$	0.08%										
$AAR_{t=-16}$	0.85%	***	*	**			**		**		
$AAR_{t=-15}$	0.72%							*			
$AAR_{t=-14}$	0.21%										
$AAR_{t=-13}$	0.32%										
$AAR_{t=-12}$	-0.02%				**	**					
$AAR_{t=-11}$	-0.39%										
$AAR_{t=-10}$	1.07%		**				***				
$AAR_{t=-9}$	-0.47%										
$AAR_{t=-8}$	-0.51%										
$AAR_{t=-7}$	-0.01%							*			
$AAR_{t=-6}$	-0.54%										
$AAR_{t=-5}$	0.22%		*								
$AAR_{t=-4}$	-1.04%	**					***				
$AAR_{t=-3}$	0.21%							*			
$AAR_{t=-2}$	-0.24%										
$AAR_{t=-1}$	0.94%		***				*				
$AAR_{t=0}$	0.76%										
$AAR_{t=+1}$	0.14%										
$AAR_{t=+2}$	0.99%	*	**	*			**				
$AAR_{t=+3}$	-0.26%										
$AAR_{t=+4}$	0.41%										
$AAR_{t=+5}$	0.62%					*					
$AAR_{t=+6}$	0.46%							*			
$AAR_{t=+7}$	-0.88%		*								
$AAR_{t=+8}$	0.44%										
$AAR_{t=+9}$	-0.73%		**						*		
$AAR_{t=+10}$	1.04%		***	*			*		*		
$AAR_{t=+11}$	-0.66%	*		*					**		
$AAR_{t=+12}$	0.57%		*								
$AAR_{t=+13}$	-0.97%						*				
$AAR_{t=+14}$	-0.46%										
$AAR_{t=+15}$	-0.01%									***	***
$AAR_{t=+16}$	0.26%										
$AAR_{t=+17}$	0.07%										
$AAR_{t=+18}$	-0.17%										
$AAR_{t=+19}$	0.16%										
$AAR_{t=+20}$	0.10%										

*[1] (Patell, 1976) Standardised Residual Test [2] BMP Test by (Boehmer, Musumeci, & Poulsen, 1991) [3] Kolari and Pynnnen Adjusted Standardised Residual Test ana [4] Kolari ana Pynnnen Adjusted Standardised Cross-Sectional Test by (Kolari & Pynnonen, 2010) [5] (Hall,1992) Skewness Corrected Test [6] Cowan Generalised Sign Test by (Cowan, 1992) [7] (Wilcoxon, 1945) Wilcoxon Test [8] Generalised Rank Z test and [9] Generalised Rank Z test by (Kolari & Pynnonen, 2011) respectively. ***, **, * denotes p-values for general group at significance level 1%, 5% and 10% respectively*

In *Figure 5*, the scale from -20 to -1 on the x-axis refers to the 20 days before the event day, 0 refers to the event day, and 1 to 20 refers to the 20 days after the event day.

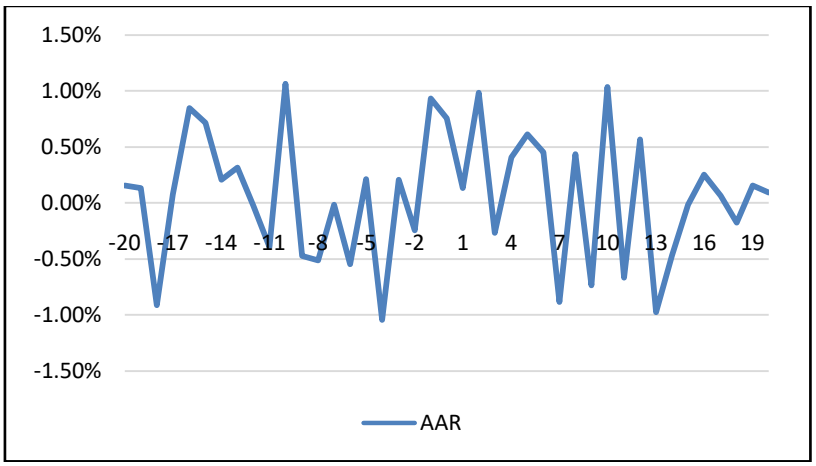

Figure 5: AAR in 20 Days before and after the Event Day (-20, 20)

It can be seen from *Figure 5* that the abnormal returns fluctuated greatly before the spin-off announcement. After the announcement of the spin-off, the information connotation about the future development prospects of the parent company has been disclosed. Therefore, the fluctuation of such abnormal returns is relatively small. From the result of the average abnormal return, it is not enough to explain the market reaction of Chinese enterprises during the announcement of the spin-off. By calculating the daily cumulative average abnormal return and analyzing the change of the cumulative average abnormal return, this study can better understand the spin-offs listing.

The evidence above shows that the parent company's stock has obtained positive abnormal returns before and after the announcement of the corporate spin-off, which can maximize the equity return of the existing shareholders of the parent company. The fact is consistent with the empirical research abroad, and also verifies the signaling models proposed by (Nanda, 1991).

Based on the empirical analysis presented above, the announcement of China's corporate spin-offs can generate positive abnormal returns for shareholder's wealth, but the returns are not significant. Only adopting 20 days before and after the event day *(-20, 20)* cannot prove the increasing wealth of parent companies' shareholders sufficiently.

VI. Conclusion

In China stock market, the parent companies' shares changes in abnormal returns within the event window are analyzed, finding that the parent company's shares have a positive abnormal return in the announcement day of corporate spin-offs in the short term base on the estimation of control samples and robust tests. At the same time, the cumulative average abnormal return on 1 day before and after the announcement of the corporate spin-off is significantly positive, which is 1.84%. The cumulative average abnormal return on 1 day before and after the announcement of the corporate spin-off is about 1.84%. For the 5-days before and after the announcement of a corporate spin-off, the *CAAR* is about 2.76%; For the 10-days before and after the announcement of a corporate spin-off, the *CAAR* is about 2.62%; For the 50-days before and after the announcement of a corporate spin-off, the *CAAR* is about 7.28%. These results are consistent with the results of international research and practice, indicating that the spin-off of Chinese companies can produce wealth value for shareholders. China's corporate spin-off listing testified wealth generation to shareholders in the administrative form of a State Capital Economy at this writing when corporate spin-offs were mostly occurring in Private Capital Economies. Although corporate spin-offs were not utilized frequently as a wealth-generating asset restructuring in China, there was a spin-off wealth effect. The comprehensiveness of corporate spin-off research amongst China's IPOs and other State Capital Economies has much to be desired. The research study of this scope helps to determine whether the spin-offs are suitable for Chinese domestic companies and map the degree of spin-off development in the China stock market.

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