Do Chinese Investors Underact to Goodwill

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***Abstract*—This paper mainly studies the goodwill of intangible assets, and holds that both goodwill and sales include enterprise value information. The results show that goodwill can predict the future return of China's stock market, indicating that investors in China's stock market do not respond adequately to the information contained in goodwill. In addition, this paper also finds that the company's organizational structure not only affects the company's M & A behavior, but also affects the predictability of the company's future stock returns. Specifically, in China, goodwill can predict the future stock returns of non-state-owned enterprises, but can't predict the future stock returns of state-owned enterprises, and this difference is not due to the scale of the company.**

***Index Terms*—Goodwill, China's market, cross-sectional stock return predictability, state-owned enterprises.**

I. Introduction

Goodwill is an important intangible asset. It refers to the difference between the investment cost of the merged enterprise and the book value of the net assets of the merged enterprise in the process of business combination. However, as shown in previous literature, investors ignore the importance of goodwill. For example, the research of Liu, Yin and Zheng (2020) [1] show that goodwill can negatively predict the future stock returns in the United States, which indicates that American investors do not respond adequately to the information contained in goodwill. However, previous literature has only studied the problems of the United States. It is unknown whether investors in other countries have not responded adequately to goodwill. Therefore, it is worthy to study whether goodwill can negatively predict the future return of stocks in other countries.

This paper studies China's stock market for the following three reasons: first, China's market scale is very large, and its GDP ranks second in the world[1]. Given such a large scale, whether Chinese investors have adverse reactions to goodwill will have an important impact on the world financial market. Second, Chinese investors are different from American investors. Specifically, the US stock market is mainly composed of institutional investors, while the Chinese market is mainly composed of individual investors. From this perspective, the behavior of Chinese investors may be different from that of American investors. Thus, even investors in the U.S. underreact to goodwill, it is not necessarily true that Chinese investors also underact to goodwill. It is an empirical question that worth to be investigated. Third, Chinese companies are different from American companies. In China, a large number of companies are state-owned companies, so the practice of M & A may be different from that of non-state-owned companies. As shown by Zhou, Guo, Hua, and Doukas (2015) [2], state-owned companies do behave differently in M&A compared with non-state-owned firms. Thus, goodwill for state-owned companies may contain different information as goodwill for non-state-owned companies. Therefore, it is worth considering that the organizational form of the company may affect goodwill to forecast the future earnings of the stock. To investigate this point, I did a subsample analysis.

In this paper, I first check the cross-sectional stock return predictability of goodwill in China's stock market, following Liu, Yin, and Zheng (2020) [1]. To get the information that whether the value of goodwill can support high sales, I scale goodwill by total sales of the firms (termed as goodwill-to-sales or GTS in the later part of this paper). A larger value of GTS suggests that a high value of goodwill did not generate enough sales, indicating that goodwill is higher compared with its fair value. Since M&A may have different patterns in different industries, I adjust the GTS by its industry mean and standard deviation. Then I sort and group stocks according to the adjusted GTS and check the later performance of stocks in different groups. If the future returns are significantly lower for stocks with high adjusted GTS (termed as GTS_adj), it suggests that Chinese investors underreact to the information contained in goodwill.

From the data, I find that goodwill significantly predicts the future stock returns in China. For example, an equal-weighted long-short portfolio that buys stocks from the lowest GTS_adj quintile and sells stocks from the highest GTS_adj quintile earns a three-factor-adjusted monthly return of 0.49% (t-statistic = 2.18), the four-factor adjusted rate of return is 0.50% per month (t-statistic=2.12), and the five-factor adjusted rate of return is 0.41% per month (t-statistic=1.59).

Next, I test whether the mechanism of goodwill is different among state-owned companies and non-state-owned companies. I repeat the analysis for state-owned companies and non-state-owned companies separately. I find that goodwill can only predict future stock returns among non-state-owned companies. For example, the excess return for the long-short strategy that buy stocks with lowest GTS_adj and sell stocks with highest GTS_adj earns a monthly return of 0.82% (with t-statistics of 3.79) for non-state-owned companies, but it is only 0.31% (with t-statistics of 1.15) for state-owned companies. The results are consistent with the conclusion in Zhou, Guo, Hua, and Doukas (2015) [2] that state-owned companies usually behave more cautiously in M&A in China. Thus, the information content in goodwill is higher among non-state-owned companies.

One concern of the results in the subsample analysis is that

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[1] According to the International Monetary Fund (IMF), the GDP of China is $14.3 trillion, which is the second highest in the world.

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the size of state-owned companies may be different compared with non-state-owned companies. In general, state-owned companies are larger compared with non-state-owned companies. Thus, the difference of the predictability of goodwill may be driven by firm size, rather than the different M&A behaviors.

To this concern, I divide all firms into large companies or small companies according to the median size of each month, and check the predictability of goodwill separately for the subsamples. I show that the results are independent with firm size. For example, for large state-owned companies, the three-factor adjusted rate of return is 0.42% (t-statistic=1.17), the four-factor adjusted rate of return is 0.43% (t-statistic=1.16), the five-factor adjusted rate of return is 0.24% (t-statistic=0.7). For large non-state-owned companies, the three-factor adjusted rate of return is 1.0% (t-statistic=3.24), the four-factor adjusted rate of return is 1.0% (t-statistic=3.08), the five-factor adjusted rate of return is 0.8% (t-statistic=2.8). In small state-owned companies, the three-factor adjusted rate of return is 0.23% (t-statistic=1.24), the four-factor adjusted rate of return is 0.23% (t-statistic=1.23), the five-factor adjusted rate of return is 0.34% (t-statistic=1.64). In small non-state-owned companies, the three-factor adjusted rate of return is 0.60% (t-statistic=2.41), the four-factor adjusted rate of return is 0.62% (t-statistic=2.37), the five-factor adjusted rate of return is 0.48% (t-statistic=1.55). It can find that only non-state-owned companies have the results regardless of the size of the companies. All the results are consistent with my main results.

Literature Review: Intangible assets have a great impact on the company, for example, Barth and Kasznik (1999) [3] find that companies with more intangible assets are more likely to buy back shares and get more positive returns. Lim, Macias and Moeller (2020) [4] find that there is a strong correlation between intangible assets and financial leverage. Eisfeldt and Papanikolaou (2013) [5] find that the average rate of return of the company with more organizational capital is higher than that of the company with lower organizational capital. There is ample evidence to show that goodwill as the most important intangible assets, its size or its impairment has a great impact on the company, for example, Li, Shroff, Venkataraman and Zhang (2011) [6] prove that target overpayments can predict future impairment of goodwill. Bens, Heltzer and Segal (2011) [7] verify that the stock market has a significant and negative reaction to unexpected goodwill write-off. Chauvin and Hirschey (1994) [8] find that the accounting goodwill has a positive impact on the profitability and market value of non-manufacturing enterprises.

The above research shows that goodwill is very important, but Henning, Lewis and Shaw (2000) [9] find that investors do not treat the remainder of the goodwill as an asset. Liu, Yin and Zheng (2019) [1] prove that the investors neglect goodwill, it is clearly to realize that investors still underestimate it. Some research suggests that the reason of investors underestimate goodwill is probably because it is hard to predict. For example, Ramanna and Watts (2012) [10] verify that estimates of goodwill's current fair value rely on untestable assumptions. Gu and Lev (2011) [11] study and determine that the root cause of goodwill write-off is the overpricing of stock during the acquisition. Hayn and Hughes (2006) [12] find that the existing disclosure reports can't provide sufficient information for the report users to predict the future write off of goodwill. Shleifer and Vishny (2003) [13] propose an M&A model based on the stock market's miscalculation of the merged enterprises. Other studies have found that goodwill is harder to predict, especially after changing standards, such as Li and Sloan (2017) [14] which shows that SFAS142, a new standard, leads to relatively inflated goodwill balances and premature impairment. Ramanna (2008) [15] points out that unverifiable discretionary power will be increasingly used by opportunists. Frankel, Seethamraju and Zach (2008) [16] find that the impact of goodwill on contract efficiency is reduced by the recent changes in GAAP. Seetharaman, Balachandran and Saravanan (2004) [17] review some problems existing in goodwill. And Lee (2011) [18] finds that after the adoption of sfas142 standard, the ability of goodwill to forecast future cash flow and the performance of goodwill reporting is improved.

The study contributes to the literature in several ways. First, this paper shows that goodwill can not only predict future stock returns in the U.S., but also predict future returns in China. It confirms the importance of goodwill and the fact that investors underreact to the information contained in goodwill. Second, this paper also proves that the organizational structure of the company will affect the prediction ability of goodwill and the welfare of investors. Through the regression analysis of the data of SOE and non-SOE, it shows that the results of non-SOE are more significant. This paper shows that goodwill can predict future stocks return only among non-SOE.

The rest of this paper proceeds as follows: Section II discusses the accounting of goodwill. Section III describes the data and sample selection. Section IV presents main results. Section V concludes the paper.

II. The Accounting of Goodwill in China

According to Li (2007) [19], it is not difficult to see that before the new standards are issued in 2006, there were contradictions in the expression of goodwill in the old principles, and the treatment of goodwill was very vague. However, with the continuous expansion of the market, mergers and acquisitions are more and more frequent, and goodwill are followed a trend which is growing. China promulgated the "accounting standards for business enterprises" on February 15, 2006, which has a clear specification and significant changes on the accounting treatment of goodwill.

According to the new standards, goodwill is an intangible asset that can't be identified. Its existence depends on and is closely related to enterprises. At the same time, enterprises can't transfer their goodwill value alone. According to the new accounting standards for business enterprises No.6 - intangible assets, goodwill can be recognized as an asset, which can be displayed in the balance sheet.

The new Chinese standard for accounting standards for Business Enterprises No. 20 - business combination stipulates that "The difference between the merger cost and the fair value share of the target's identifiable net assets

obtained in the merger shall be recognized as goodwill" is consistent with "At the transaction time, the excess of the merger cost over the equity share of the purchasing enterprise in the fair value of identifiable assets and liabilities acquired shall be regarded as goodwill and recognized as an asset" which is defined by IASB No. 22 - mergers and acquisitions. According to the new accounting standards for business enterprises, the accounting treatment of business combination should be divided into business combination under the same control and business combination under different control.

Business combination under the same control means that for a long period of time, the enterprises participating in merger and acquisition are ultimately controlled by the same organization or organizations before and after the merger and acquisition activities. For the merger of such enterprises, the new standard stipulates that the difference between the cost incurred by the merger due to the merger and the fair value of the net assets of the target can only be adjusted as capital reserve and retained earnings, not as goodwill.

Business combination under different control means that the enterprises participating in merger and acquisition are not ultimately controlled by the same organization or organizations before and after the merger and acquisition activities. For the merger of such enterprises, the new standard stipulates that the fair value of the cost paid by the enterprise purchaser to purchase the enterprise minus the identifiable net assets of the target is the goodwill. However, this value may produce positive and negative values. The new standard adopts different accounting methods for positive goodwill and negative goodwill. If the combination cost is greater than the fair value share of the identifiable net assets, the difference is recognized as goodwill. If the former is less than the latter, the difference is included in the current profit and loss, not in the goodwill.

The new standard points out that there are four major categories of merger costs. The first type is the merger of enterprises, which is achieved through only one transaction. The merger cost is the cost paid by the purchaser to obtain the control of the target on the acquisition date. The second type is that the business combination is gradually realized through multiple transactions, and the cost of the combination is all the costs of each transaction. The third category is all direct costs incurred by the purchaser for the merger. The fourth type is that when both sides of the merged enterprise agree in the merger contract that there may be events that may affect the merger cost in the future, if the amount of impact on the merger cost can be measured, this part will be included in the merger cost.

According to the relevant requirements of the new accounting standards for Business Enterprises No. 8 - impairment of assets, goodwill generated by business combination may not be amortized during the holding period, but it must be tested for impairment at the end of each year. When an asset is considered to be impaired, the enterprise should estimate its recoverable amount based on a single asset. However, if it is difficult to estimate the recoverable amount by single asset such as goodwill, the recoverable amount of the asset group should be determined based on the asset group to which it belongs. And the new standard requires enterprises to reasonably allocate the goodwill generated in the merger activities to the asset group. If it is difficult to reasonably allocate the goodwill to the asset group, it should be allocated to the relevant asset group portfolio. Therefore, I use the last year's total sales and portfolio of asset groups to measure whether a company's goodwill is very large.

When doing the actual impairment test of goodwill, enterprises should first determine the value of impairment loss. If the recoverable amount of its asset group or combination of asset groups is lower than its book value, then its impairment loss is determined as the difference between them. Secondly, the amount of impairment loss shall be used to offset the book value of goodwill allocated to the asset group or portfolio. The book value of each asset after deduction shall not be lower than the highest value among the net fair value of the asset after deducting the disposal expenses, the present value of the expected future cash flow of the asset and zero. Through the above accounting treatment, compared with the US standards, it should be easier for investors in China to evaluate the goodwill of business combination and better estimate the potential economic value of the acquired and merged assets. However, whether the retail investors in China pay attention to goodwill or whether the investors are sophisticated enough to evaluate the fair value of goodwill is an empirical question, which is the main research question in this paper.

III. Data

My research data is from WIND and CSMAR database, it covers all the companies of Shanghai Stock Exchange and Shenzhen Stock Exchange. I set a restriction which is to ensure that goodwill is positive (data item: Net goodwill). In order to ensure that the accounting variables are known before the returns to explain earnings, I match the accounting data at the end of all financial years of calendar year t−1 with the earnings from July of t year to June of t+1 year. Since WIND and CSMAR started reporting goodwill in 2007, I start all portfolio testing and regression analysis at 2007. The samples will eventually cover the period from 2007 to 2018.

The main interest variable, goodwill-to-sales after industry adjustment (GTS_ adj) as shown below. I first calculate goodwill-to-sales (GTS) as Goodwill (GDWL) scaled by total sales (SALES). Investors generally believe that goodwill is assessed on the basis of cash flows. Consequently, I use total sales as denominator in accordance with accounting practice. Total sales as a direct measure of cash flow, but it cannot explain the cross-section of stock returns in the sample period. That means our results based on GTS is not only affected by the fluctuation of total sales.

Considering that different industries have different GTS, I have industry-adjusted GTS (GTS_adj), which is calculated as the difference between the GTS and the average GTS from the same industry. I guarantee the cross-industry transformation can obtain a good adjustment by using industry classification from WIND and CSMAR, and each industry category has enough inventories.

The table below presents descriptive statistics on the company characteristics of the sample. The sample includes all the common stock in the Shanghai stock exchange and Shenzhen stock exchange, which have positive goodwill at

the end of the financial year. I describe the company's statistical characteristics in terms of price, return, goodwill and size. Panel A report the summary statistics of the full sample. Panel B report the summary statistics of the SOE sample. Panel C report the summary statistics of the non-SOE sample. These values are obtained by taking the natural logarithm. The sample contains the period 2007 to 2018, as companies began reporting goodwill in 2007.

TABLE I: SUMMARY STATISTICS

Panel A: Full Sample							
	min	max	p1	median	p99	mean	std
Price	0.283	134.550	1.140	10.820	60.880	14.064	11.632
Return	-0.584	2.195	-0.357	-0.028	0.338	-0.038	0.143
Goodwill	0.000	10.664	4.670	7.493	9.749	8.552	9.156
Size	4.628	9.264	5.357	6.692	8.203	7.148	7.761
Panel B: SOE							
	min	max	p1	median	p99	mean	std
Price	1.053	134.550	2.300	9.555	54.300	12.479	10.543
Return	-0.584	1.122	-0.343	-0.032	0.309	-0.044	0.135
Goodwill	0.000	10.664	4.424	7.332	9.956	8.605	9.267
Size	5.046	9.264	5.821	6.804	8.507	7.379	7.950
Panel C: non-SOE							
	min	max	p1	median	p99	mean	std
Price	1.410	129.990	2.840	12.060	63.300	15.567	12.145
Return	-0.571	2.195	-0.369	-0.024	0.356	-0.034	0.150
Goodwill	0.000	10.461	4.811	7.587	9.566	8.521	9.032
Size	5.321	8.802	5.676	6.651	7.807	6.914	7.278

Table I gives descriptive statistics on the characteristics of sample firms, it shows that the difference between SOE and non-SOE is not very great in terms of price, return, goodwill and size. For example, at the price level, the mean of the full sample is 14.064, the mean of the SOE sample is 12.479, and the mean of the non-SOE sample is 15.567. At the return level, the mean of the full sample is -0.038, the mean of the SOE sample is -0.044, and the mean of the non-SOE sample is -0.034. At the goodwill level, the mean of the full sample is 8.552, the mean of the SOE sample is 8.605, and the mean of the non-SOE sample is 8.521. At the size level, the mean of the full sample is 7.148, the mean of the SOE sample is 7.379, and the mean of the non-SOE sample is 6.914. And at the price level, the standard of the full sample is 11.632, the standard of the SOE sample is 10.543, and the standard of the non-SOE sample is 12.145. At the return level, the standard of the full sample is 0.143, the standard of the SOE sample is 0.135, and the standard of the non-SOE sample is 0.150. At the goodwill level, the standard of the full sample is 9.156, the standard of the SOE sample is 9.267, and the standard of the non-SOE sample is 9.032. At the size level, the standard of the full sample is 7.761, the standard of the SOE sample is 7.950, and the standard of the non-SOE sample is 7.278.

The data show that there is no significant difference between SOE and non-SOE at these levels, which shows that the distribution of enterprises is similar. It can be ruled out that the main research results are not caused by these factors.

IV. RESULTS

A. Main Results

In order to explore the relationship between goodwill-to-sales and the cross-section of stock returns, I do a single portfolio sorting based on industry adjusted goodwill. The following tables show the results of portfolios which sorted by industry-adjusted GTS with equal-weighted average excess returns and alphas. The sample of Table II includes all the common stock in the Shanghai stock exchange and Shenzhen stock exchange, which have positive goodwill at the end of the financial year. The sample of Table III includes all the SOE stock in the Shanghai stock exchange and Shenzhen stock exchange, which have positive goodwill at the end of the financial year. The sample of Table IV includes all the non-SOE stock in the Shanghai stock exchange and Shenzhen stock exchange, which have positive goodwill at the end of the financial year. According to Fama and French (1992), to ensure that the accounting variables are known before the returns to explain earnings, I match the accounting data at the end of all financial years of calendar year t−1 with the earnings from July of t year to June of t+1 year. At the end of June in each year, I first calculate goodwill to sales (GTS) as the ratio of goodwill to total sales of all common shares with positive goodwill at the end of the financial year traded on the Shanghai stock exchange and Shenzhen stock exchange. After that, I calculate the difference between the industry-adjusted GTS (GTS_adj) and the industry average GTS. I use the Chinese industry classification to adjust. The remaining stocks are based on GTS_ Adj is classified as a five portfolio. These portfolios are rebalanced at the end of June in each year. The last column reports the difference in average return between the lowest and the highest quintile of the portfolio. At the same time, I report excess returns, Fama-French three-factor alphas, Fama-French-Carhart four-factor alphas and Fama- French five-factor alphas in turn. These key data are from the China Asset Management Research Center of the Central University of Finance and Economics (website: http://sf.cufe.edu.cn/info/1198/8942.htm). Newey-west adjusted t-statistics are shown in brackets. The sample contains the period 2007 to 2018, as companies began reporting goodwill in 2007. *, * *, and * * denote significance of 10%, 5% and 1%, in turn. All returns are expressed in percentage.

TABLE II: QUINTILE PORTFOLIO SORTING RETURNS, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	1.49*	1.31	1.19	1.07	1.04	0.45**
	(1.77)	(1.53)	(1.46)	(1.28)	(1.25)	(2.10)
Three-factor alpha	0.31	0.14	0.03	-0.07	-0.17	0.49**
	(1.45)	(1.09)	(0.26)	(-0.74)	(-1.23)	(2.18)
Four-factor alpha	0.32	0.11	0.01	-0.10	-0.19	0.50**
	(1.37)	(1.04)	(0.05)	(-0.90)	(-1.32)	(2.12)
Five-factor alpha	0.32	0.22	0.08	0.01	-0.09	0.41
	(1.48)	(1.59)	(0.83)	(0.14)	(-0.56)	(1.59)

Table II shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.31 per month (t-statistic = 1.45). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.17(t-statistic = -1.23). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.49 three-factor-adjusted return per month (t-statistic = 2.18). The four-factor alpha of the lowest

quintile portfolio is 0.32 per month (t-statistic = 1.37). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to -0.19 (t-statistic = -1.32). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.50 four-factor-adjusted return per month (t-statistic = 2.12). The five-factor alpha of the lowest quintile portfolio is 0.32 per month (t-statistic = 1.48). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.09(t-statistic = -0.56). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.41 three-factor-adjusted return per month (t-statistic = 1.59).

TABLE III: QUINTILE PORTFOLIO SORTING RETURNS OF SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	1.15	1.09	0.97	0.90	0.84	0.31
	(1.41)	(1.30)	(1.25)	(1.12)	(1.07)	(1.15)
Three-factor alpha	0.12	-0.05	-0.10	-0. 10	-0.21*	0.33
	(0.44)	(-0.34)	(-0.56)	(-0.68)	(-1.75)	(1.34)
Four-factor alpha	0.10	-0.09	-0.14	-0.14	-0.23*	0.33
	(0.40)	(-0.51)	(-0.77)	(-0.70)	(-1.90)	(1.32)
Five-factor alpha	0.12	0.04	0.04	0.05	-0.12	0.24
	(0.49)	(0.23)	(0.30)	(0.32)	(-0.80)	(0.99)

Table III shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.12 per month (t-statistic = 0.44). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.21(t-statistic = -1.75). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.33 three-factor-adjusted return per month (t-statistic = 1.34). The four-factor alpha of the lowest quintile portfolio is 0.10 per month (t-statistic = 0.40). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to -0.23 (t-statistic = -1.90). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.33 four-factor-adjusted return per month (t-statistic = 1.32). The five-factor alpha of the lowest quintile portfolio is 0.12 per month (t-statistic = 0.49). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.12(t-statistic = -0.80). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.24 three-factor-adjusted return per month (t-statistic = 0.99).

Table IV shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.69 per month (t-statistic = 2.95). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.13(t-statistic = -0.83). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.82 three-factor-adjusted return per month (t-statistic = 3.20). The four-factor alpha of the lowest quintile portfolio is 0.71 per month (t-statistic = 2.72). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to -0.14 (t-statistic = -0.82). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.85 four-factor-adjusted return per month (t-statistic = 3.04). The five-factor alpha of the lowest quintile portfolio is 0.66 per month (t-statistic = 2.77). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the five-factor alpha changes to -0.06(t-statistic = -0.33). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.72 five-factor-adjusted return per month (t-statistic = 2.48). From the above data, it can clearly find that the results of SOE are not significant, but the results of non-SOE are significant.

TABLE IV: QUINTILE PORTFOLIO SORTING RETURNS OF NON-SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	2.01**	1.48*	1.45*	1.34	1.19	0.82***
	(2.18)	(1.65)	(1.65)	(1.49)	(1.36)	(3.79)
Three-factor alpha	0.69***	0.22	0.23**	0.02	-0.13	0.82***
	(2.95)	(1.60)	(1.98)	(0.18)	(-0.83)	(3.20)
Four-factor alpha	0.71***	0.20	0.22*	0.00	-0.14	0.85***
	(2.72)	(1.71)	(1.91)	(0.02)	(-0.82)	(3.04)
Five-factor alpha	0.66***	0.25	0.25**	0.08	-0.06	0.72**
	(2.77)	(1.51)	(2.06)	(0.58)	(-0.33)	(2.48)

B. Results for Small Firms

In order to explore whether the size of the company has an impact on the forecast result of goodwill, I divide SOE and non-SOE into large firms and small firms. This part mainly discusses the small firms of SOE and non-SOE. Then I do a single portfolio sorting based on industry adjusted goodwill of small firms of SOE and non-SOE. In each year (year t), I sort all stocks based on GTS_adj in the previous year (year t-1), and match the subsequent returns from July of that year (year t) to June of next year (year t+1). At the end of June in each year, GTS_adj, I divide stocks into five portfolios. I calculate the average equal-weighted monthly excess return of each quintile portfolio, and form a long-short strategy, that is, to long the stocks in the bottom quintile and short the stocks in the top quintile. The following two tables represent the data results of the small firms of SOE and non-SOE respectively. The average equal-weighted returns, Fama-French (1993) three-factor alphas, Fama-French-Carhart (1997) four-factor alphas, and Fama-French five-factor alphas are presented in each table.

Table V shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.30 per month (t-statistic = 0.17). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three- factor alpha changes to -0.21(t-statistic = -1.58). Long-short

strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.24 three-factor-adjusted return per month (t-statistic = 1.24). The four-factor alpha of the lowest quintile portfolio is 0.01 per month (t-statistic = 0.05). Four-factor alpha decreases with the increase of GTS_adj.) For the top GTS_adj quintile, the four-factor alpha changes to -0.22 (t-statistic = -1.53). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.23 four-factor-adjusted return per month (t-statistic = 1.23). The five-factor alpha of the lowest quintile portfolio is 0.19 per month (t-statistic = 0.99). Five-factor alpha decreases with the increase of GTS_adj.） For the top GTS_adj quintiles, the five-factor alpha changes to -0.16(t-statistic = -0.92). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.34 five-factor-adjusted return per month (t-statistic = 1.64).

TABLE V: QUINTILE PORTFOLIO SORTING RETURNS OF SMALL SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	1.55*	1.43	1.50*	1.27	1.27	0.28
	(1.77)	(1.59)	(1.71)	(1.44)	(1.47)	(1.05)
Three-factor alpha	0.30	-0.16	0.01	-0.37**	-0.21	0.24
	(0.17)	(-0.77)	(0.04)	(-2.15)	(-1.58)	(1.24)
Four-factor alpha	0.01	-0.21	-0.04	-0.41*	-0.22	0.23
	(0.05)	(-0.85)	(-0.18)	(-1.71)	(-1.53)	(1.23)
Five-factor alpha	0.19	-0.01	0.20	-0.15	-0.16	0.34*
	(0.99)	(-0.06)	(0.91)	(-0.81)	(-0.92)	(1.64)

TABLE VI: QUINTILE PORTFOLIO SORTING RETURNS OF SMALL NON-SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	2.28**	1.71*	1.93**	2.17**	1.64*	0.64**
	(2.36)	(1.83)	(2.05)	(2.25)	(1.77)	(2.55)
Three-factor alpha	0.69***	0.23*	0.39***	0.62***	0.09	0.60**
	(3.05)	(1.84)	(3.16)	(4.01)	(0.59)	(2.41)
Four-factor alpha	0.71***	0.21**	0.39***	0.61***	0.08	0.62**
	(2.82)	(2.11)	(3.11)	(4.14)	(0.56)	(2.37)
Five-factor alpha	0.61***	0.27	0.37**	0.66***	0.13	0.48
	(2.67)	(1.57)	(2.56)	(3.67)	(0.62)	(1.55)

Table VI shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.69 per month (t-statistic = 3.05). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to 0.09(t-statistic = 0.59). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.60 three- factor-adjusted return per month (t-statistic = 2.41). The four-factor alpha of the lowest quintile portfolio is 0.71 per month (t-statistic = 2.82). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to 0.08 (t-statistic = 0.56). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.62 four-factor-adjusted return per month (t-statistic = 2.37). The five-factor alpha of the lowest quintile portfolio is 0.61 per month (t-statistic = 2.67). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the five-factor alpha changes to 0.13(t-statistic = 0.62). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.48 five-factor-adjusted return per month (t-statistic = 1.55). From the above data, it can clearly find that the results of SOE are not significant, but the results of non-SOE are significant.

C. Results for Large Firms

This part mainly discusses the large companies of SOE and non-SOE. Then I do a single portfolio sorting based on industry adjusted goodwill of large firms of SOE and non-SOE. In each year (year t), I sort all stocks based on GTS_adj in the previous year (year t-1), and match the subsequent returns from July of that year (year t) to June of next year (year t+1). At the end of June in each year, GTS_adj, I divide stocks into five portfolios. I calculate the average equal-weighted monthly excess return of each quintile portfolio, and form a long-short strategy, that is, to long the stocks in the bottom quintile and short the stocks in the top quintile. The following two tables represent the data results of the large firms of SOE and non-SOE respectively. The average equal-weighted returns, Fama-French (1993) three-factor alphas, Fama-French-Carhart (1997) four-factor alphas, and Fama-French five-factor alphas are presented in each table.

TABLE VII: QUINTILE PORTFOLIO SORTING RETURNS OF LARGE SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	0.93	0.85	0.74	0.66	0.53	0.39
	(1.13)	(1.05)	(0.97)	(0.87)	(0.69)	(1.05)
Three-factor alpha	0.16	-0.02	-0.12	0.05	-0.27	0.42
	(0.42)	(-0.09)	(-0.07)	(0.29)	(-1.38)	(1.17)
Four-factor alpha	0.14	-0.03	-0.16	0.02	-0.29	0.43
	(0.39)	(-0.18)	(-0.76)	(0.08)	(-1.57)	(1.16)
Five-factor alpha	0.12	0.00	0.03	0.14	-0.13	0.25
	(0.38)	(0.00)	(0.20)	(0.85)	(-0.59)	(0.70)

Table VII shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.16 per month (t-statistic = 0.42). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.27(t-statistic = -1.38). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.42 three-factor-adjusted return per month (t-statistic = 1.17). The four-factor alpha of the lowest quintile portfolio is 0.14 per month (t-statistic = 0.39). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to -0.29 (t-statistic = -1.57). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks

in the highest quintile portfolio can obtain 0.43 four-factor-adjusted return per month (t-statistic = 1.16). The five-factor alpha of the lowest quintile portfolio is 0.12 per month (t-statistic = 0.38). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the five-factor alpha changes to -0.13(t-statistic = -0.59). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.25 five-factor-adjusted return per month (t-statistic = 0.70).

TABLE VIII: QUINTILE PORTFOLIO SORTING RETURNS OF LARGE NON-SOE, 2007-2018

	Goodwill-to-Sales Quintiles					
	Low	2	3	4	High	Low-High
Excess returns	1.55*	1.11	0.61	0.51	0.55	1.00***
	(1.74)	(1.29)	(0.75)	(0.61)	(0.67)	(3.42)
Three-factor alpha	0.60**	0.20	-0.23	-0.54***	-0.40*	1.00***
	(2.03)	(1.16)	(-1.14)	(-2.62)	(-1.66)	(3.24)
Four-factor alpha	0.63**	0.19	-0.25	-0.56**	-0.42*	1.04***
	(1.97)	(1.10)	(-1.17)	(-2.58)	(-1.71)	(3.08)
Five-factor alpha	0.59**	0.31*	-0.20	-0.47**	-0.28	0.87***
	(2.07)	(1.74)	(-0.99)	(-2.27)	(-1.13)	(2.80)

Table VIII shows a negative pattern of goodwill-to-sales and future stock returns. For example, the three-factor alpha of the lowest quintile portfolio is 0.60 per month (t-statistic = 2.03). Three-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the three-factor alpha changes to -0.40(t-statistic = -1.66). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 1.00 three-factor-adjusted return per month (t-statistic = 3.24). The four-factor alpha of the lowest quintile portfolio is 0.63 per month (t-statistic = 1.97). Four-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintile, the four-factor alpha changes to -0.42 (t-statistic = -1.71). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 1.04 four-factor-adjusted return per month (t-statistic = 3.08). The five-factor alpha of the lowest quintile portfolio is 0.59 per month (t-statistic = 2.07). Five-factor alpha decreases with the increase of GTS_adj. For the top GTS_adj quintiles, the five-factor alpha changes to -0.28(t-statistic = -1.13). Long-short strategy refers to long the stocks in the lowest quintile portfolio, and short the stocks in the highest quintile portfolio can obtain 0.87 five-factor-adjusted return per month (t-statistic = 2.80). From the above data, it can clearly find that the results of SOE are not significant, but the results of non-SOE are significant.

V. CONCLUSION

In this article, I examine goodwill, the largest intangible assets. Since the fair value of goodwill is difficult to assess, investors have not responded to this information enough, underestimating goodwill and ignoring its value. I made the hypothesis that goodwill can predict the future returns of China stocks market. Consistent with the hypothesis, the regression result of portfolio returns is relatively significant, and I obtained the negative correlation between goodwill and sales volume and future stock returns. In summary, the research results show that goodwill can predict the future return of stock in China market.

Compared with the prediction ability of goodwill in Liu, Yin, Zheng (2020) [1], China's results are weaker than US, which is probably due to the different mechanism of acquisition and merger between China and US. According to the new accounting standards for business enterprises issued by China, the accounting treatment of business combination should first be divided into business combination under the same control or business combination not under the same control. Then these two have different accounting measurement methods respectively.

I also study and analyze the SOE and non-SOE respectively. The results show that only non-SOE have the results whether it is the whole sample or the classification comparison of large companies and small companies. Therefore, the organizational structure of the company will not only affect the company's acquisition and merger, but also have a certain degree of influence on the ability of goodwill to predict the future stock returns, as well as the market information and the profits of investors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Yongqing Li is the only author of this paper. She is responsible for the writing, literature review, data analysis and summary of the whole paper.

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