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Comparison and Analysis of Chinese and United States Stock Market

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Abstract

To compare and analyze the difference between the United States and Chinese stock market, the relative variance, correlation, beta, and volatility of different stock markets are required. These parameters could help people to make better decisions and risk predictions while investing in China or the United States. The analysis also shows cases and the unique characteristics of both the Chinese and United States stock market, leading to the conclusion that the United States stock market is more mature and stable than the Chinese stock market. Through the comparison between the two stock markets, the Chinese and American economies could be better understood.

Keywords

Stock Market, Qualitative Evaluations, Quantitative Calculations

1. Introduction

Every developed country in the world constructs its distinct system of stock trading to support its economy, and Stock data inform us about trading returns and risks, providing clues about the differences between the economies. As a result, research on stock markets has a long tradition. In the past several decades, stock markets have played an important role in the economy. Through the issuance of stocks, a large amount of capital flows into the stock market and thence into the issuing enterprises, which promote the concentration of capital, improves the composition of enterprise capital, and greatly accelerates the development of commodity economy. Furthermore, since the trading price of the stock market can objectively reflect the supply and demand of the stock market, reference for the issuance of the stocks in terms of price and quantity can also be provided.

In 2015, the Chinese stock market suffered a great loss: the Shanghai Stock Exchange lost a great portion of its value. The exchange applied a trading halt to shares of 1400 companies, more than half of those traded. However, the stock market kept dropping with no trading in the shares. At the beginning of 2016, as the consequence of the crash of the Chinese stock market, the global financial melt down almost caused a new financial crisis. The stock market also affects the price of commodities. In 2018, as a result of the increase of the stock price of material companies, the market price of gold also increased. The higher market price caused the new gold rush globally, which causes the stock price of rare material companies to increase. This factor connects all stock markets to some degree.

Nowadays, stock trading has become an explosive topic among people. The foremost problem is the fact that some people get a great fortune from the stock market, while others lose everything; additionally, the stock market is increasingly globalized. However, as far as I know, the exploration of the relationship between different stock markets has rarely been done. There are many alternative methods which are available for solving these problems. In order to investigate the similarities and differences between the Chinese and the United States stock markets, this paper mainly presents a series of qualitative evaluations and quantitative calculations.

2. Literature Review

According to the analysis of Lin & Song (2001), the Chinese stock market has more limitations than the US stock market. The main problem is that the Chinese stock market founded only a few decades ago, which means that it is still immature. For example, the regulation of the Chinese stock market is neither efficient nor effective.

What's more, the financial environment in China is different from that in the United States. The Chinese stock market provides strong investment opportunities, but the lack of exchange management leads to the low efficiency of external environment governance, making it difficult to ensure the sustained and healthy development of the stock market. The Chinese stock market external environment problems are mainly arising from the following three causes:

First, the legal system development lags the market. Even if China continues to reform the legal system to protect the stock market, the rapid stock market development makes those reforms ineffective.

Second, the credit system favors larger firms. As China has not established effective regulatory measures for enterprise credit ratings, major shareholders exploit small and medium-sized shareholders. Many large shareholders often make use of their capital strength, the control of the enterprise's rights to important assets, and fast access to financial information advantages to seek profits, leaving medium-sized shareholders' interests unprotected.

Finally, excessive administrative intervention cripples progress. If the stock market is subjected to too much administrative control, it will be difficult to fully develop and form a self-improvement mechanism for itself, which will inevitably deviate from the normal track of economic development. Since the establishment of China's stock market, it has been modified by the administrative measures repeatedly, such as the policy rescue of the market in 2004-2005 and hundreds of regional and industrial planning exercises after the financial crisis. A modern market economy needs some administrative intervention, but excessive intervention or "habitual intervention" will destroy the market economic order and undermine the market's potential. In the securities industry, expansion policies or contraction policies will cause severe consequences: the negative effect of commercial speculation, high inventory, high pollution, and vicious competition, which would seriously hamper the self-regulation and self-development of the stock market.

3. Data and Methods

3.1. Data

The data of specific stocks of the Chinese and the United States stock markets are obtained from https://finance.yahoo.com/ and then analyzed in Python. Additionally, the source of partial data such as inflation rate, GDP growth, exchange rate and unemployment rate are listed in References.

3.2. Methods

Comparing the returns of the Chinese and the United States stocks index could present the difference in the value of the stock market. Through the comparison between the daily returns of the Shanghai Composite and the S&P 500, the disparity between the Chinese stock market and the US stock market is clear, with which people could estimate whether its worth buying.

$$\text{Returns} = \frac{\text{Current Price} - \text{Previous Price}}{\text{Previous Price}}$$

Volatility is the measure that presents the percentage change of returns of the stocks market. To figure out volatility, the variance is essential in the calculation.

$$\text{Variance} = \sum\left(Pav - Pi\right) * 2/n$$

Then find out the square root of variance. The result would be the daily volatility, which is also the standard deviation of the stocks. Daily volatility tells the changing of returning for each day. Therefore, in order to find the annual volatility, it needs to multiply the daily volatility by the square root of trading dates.

$$\text{Daily Volitility} = \sqrt{\left(\sum\left(Pav - Pi\right) * 2/n\right)}$$

By calculating the annual volatility, people can determine whether a stock is fluctuating or not. Therefore, people could make better choices while deciding which stock to invest.

$$\text{Annual Volatility} = \sqrt{252\left(\sum\left(Pav - Pi\right) * 2/n\right)}$$

To recognize the relationship between the market index and stocks index, evaluating the beta parameter is necessary. Beta stands for correlation between stocks and the market. People can use beta to determine whether the stock is relative to the market. The function uses the covariance between the market and stocks divides by the variance of the market to get the beta. Therefore, people can reduce risk while investing.

$$\beta = \operatorname{cov}(x, y)/\operatorname{var}(x).$$

4. Results and Discussion

4.1. Rules

As Ge (2019) pointed out, the rules of Chinese and the US stock markets are not the same. The differences in rules are listed in Table 1.

4.2. Chinese Economy

The main difference between the China model and the Western model is that China uses its strong government power to regulate the economy, building numerous capital construction projects and powerful state-owned enterprises.

Table 1. The differences in rules.

Differences \ Stock Markets	The Chinese Stock Market	The US Stock Market
Trading Period	9:30 AM to 11:30 AM and 1:00 PM to 3:00 PM	9:30 AM to 4:00 PM or 10:30 AM to 5:00 PM
Currency	USD, HKD and CNY	USD
Trading Unit	*Shou* (100 shares)	Any
Limit of Rising or Fall	10%	No limit
Transaction Fee	1/3000 of the purchased stock price	$15
Tax Burden	1/2000 of the value of the purchased stock	Foreigners are exempted
Delivery Rule	A-shares (domestic ownership) needed to wait until the second trading date, and B-shares (foreign ownership) needed to wait three more days after purchasing the stock	Stocks can be purchased and sold immediately, and the stock trades clear and settle within one day
Stock Split Exit Right	After receiving the stocks	When the stocks split
Transaction Code	A series of numbers	Ticker symbols
Business	Only Chinese companies can go public	Companies from almost 100 countries can go public
Prediction and Market Condition	Short bull periods and long bear periods	Much longer bull periods and shorter bear periods

"Marketization" is one of the central concepts most commonly used to describe China's transformation over the past 30 years. That is a transformation process, whose core is the transformation from a highly centralized, planned economy to a market economy. The significance of market-oriented transformation and social structure is mainly reflected in the formation of new social resources and structures: the introduction of new economic integration mechanisms not only provides the social basis for the emergence of new class but also leads to the emergence of a new mechanism of social stratification, such as the rise of the private entrepreneur class and the formation of the middle class. In China, the rise of the private entrepreneur is reflected in its business in a typical industry, such as Huawei in the telecommunication industry and Alibaba in the service industry.

Whether China's economy will still grow powerfully as it did before is one of the biggest questions puzzling world economists. After all, there are signs of a slowdown in China's economic growth. China's economic growth rate in 2018 is the lowest one (6.2%) over 30 years. According to the New York Times, price increases have been tame, according to official statistics. But many in China complain that the actual cost of living is rising fast, particularly for food but also for rent and other daily expenses.

4.3. United States Economy

The United States is the world's largest economy. By overcoming the most serious economic crisis, such as the Great Depression in the 1930s and the 2008 world economic crisis, the U.S. has proven its powerful economic system. Compared with its recent largest rival, China, whose economy is controlled more by the government, the microeconomic decisions are made more often by private enterprises in the U.S.

The United States has developed its economic system for a long period. However, government control has always been the long-debated issue in the United States. According to the policies of US economy, since Ronald Reagan's presidency in the 1980s, the United States has increased the use of neoliberal economic policies, relatively reducing the government's intervention in the economy, reducing the size of the welfare system, and abandoning the interventionist Keynesian economic policies long implemented since the great economic panic.

As a result, the U.S. government provides fewer social welfare services than other industrialized countries, lower domestic taxes, and relies more on free markets and private charities.

4.4. Inflation Rate

From two websites (https://tradingeconomics.com/united-states/inflation-cpi, https://tradingeconomics.com/china/inflation-cpi), the inflation rate of China and the US can be obtained. As shown in **Figure 1**, the Chinese inflation rate is so unstable that it once rose above 6%, almost double the United States inflation

Figure 1. Inflation rate from 2010-2019.

rate. The inflation rate in the United States is much more stable than the Chinese inflation rate. It is always maintained below 4%. Under the stable inflation rate in the United States, the returns of the US stock market grow steadily which attracts more investors to put funds into the stock market. In contrast, the Chinese stock markets are vulnerable while facing drastic changes in the inflation rate.

4.5. GDP Growth

In Table 2, the growth rate of the United States GDP stays at a stable rate which falls from 1.5% - 3.0%. The steady growth rate of the United States GDP stands out the maturity and size of the US economy. With a mature economy, the US stock market would be expected to be less regulated with less governmental involvement. Although in China, the growth rate of GDP is double or even triple of United States GDP, the growth rate gradually decelerates. Because of the drop in the growth rate, the Chinese stock market attracts less funding. That is the reason why the Chinese stock market falls behind the US stock market.

4.6. Exchange Rate

China and the United States compete on the international stage. Therefore, there are many trading wars between them which generate the unstable exchange rate. In Figure 2, though the USD depreciates drastically in 2015, it recovered from the trough in a short period. With the higher exchange rate, the United States stock market could always have higher value and returns than the Chinese stock market.

4.7. Unemployment Rate

The unemployment rate of China and the US can be obtained from websites (https://tradingeconomics.com/china/unemployment-rate;https://tradingeconomics.com/united-states/unemployment-rate). As shown in Figure 3, although China has a much lower average unemployment rate, it implies that it is difficult or costly to find additional labor resources. The United States unemployment

Table 2. GDP growth rate of US and China.

Year	United States	China
2010	2.60%	10.60%
2011	1.60%	9.50%
2012	2.20%	7.90%
2013	1.80%	7.80%
2014	2.50%	7.30%
2015	2.90%	6.90%
2016	1.60%	6.70%
2017	2.20%	6.80%
2018	2.90%	6.60%

Figure 2. Exchange rate of USD to CNY.

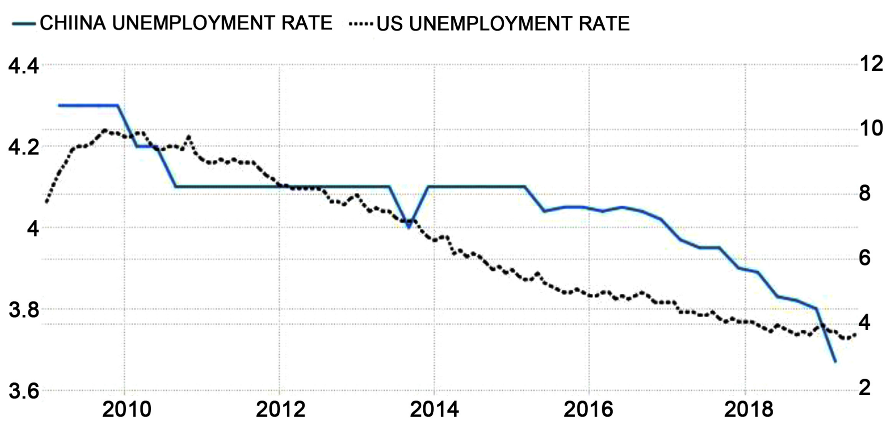

Figure 3. Unemployment rate 2010-2019.

rate appears to be falling continuously. The steady decrease of US unemployment rate gives the US businesses possibilities to advance. Therefore, the stock market of the United States would be more valuable.

4.8. Qualitative Analysis

Based on the different regulatory system, the investor structure and stock market fluctuation differ between the American and Chinese stock market. This part of the report shows the difference between the two stock markets, mainly focusing on five parts.

4.8.1. Market Operation

Trading possibilities and hedging are more complete under a more mature American stock market. In this case, the price increases stably with reasonable fluctuation. For the Chinese stock market, once it experiences a bull market, the index could double or triple within one year, which causes the stock price to drop dramatically back to the original price.

4.8.2. Share Price

The Chinese stock market is highly regulated by the government-the stock exchange needs to follow the strict rules and regulations, While the Chinese stock market is highly impacted by the policies, the price of American stock is associated with the growth potential of the companies, more influenced by private enterprise decisions and less influenced by government. Also, the earning per share influences the share price.

4.8.3. Investor Structure

For Chinese stock exchange, 90% of participants are middle or small investors who only have limited knowledge, trading frequently and sometimes irrationally.

On the other hand, for the U.S. since 1950, the American stock market tends to discourage small investors, as institutional investors are more likely to earn large benefits. So nowadays, with more mature investors making wiser decisions, the American stock market tends to be more stable compared with the Chinese stock market, occupied by middle and small investors.

4.8.4. Government Control

According to Cui (2015), the Chinese government often associated national credit with the securities market, which causes the potential crisis. Since most investors avoid risks by following the government's guiding decisions, they tend to spend more time on analyzing them, rather than focusing on securities value. Under special cases, the intervention of government on securities market will lead to stable psychological expectation in most investors deeply affected by government behavior. While for ordinary investors, because of the difficulty to predict the exact time of government intervention in the market or the degree of policy support for the securities market, they tend to make unwise decisions under government intervention.

4.8.5. Regulations for Go Public

The Chinese government regulates that there is four processes for a company to go public: Listing application and approval; Documents to be submitted when applying for stock listing; Enter into a listing contract; Release the listing announcement. However, American company needs twelve steps to go public: Board approval; Assemble team; Review and restate financials, Letter of intent with investment bank; Draft prospectus; Due diligence; Preliminary prospectus presentation to SEC; Syndication; Road show; Prospectus finalization; Determine offering size and price; Print the final prospectus. American go public requirements and procedures are far more stringent and cumbersome than those in China, but as a result, companies going public in the U.S. have more credibility and can attract more investors.

4.9. Quantitative Analysis

4.9.1. Stock Exchange

Figure 4 and Figure 5 demonstrate the two comparable stock indices in the United States and China. In Figure 4 and Figure 5, we can see the value of

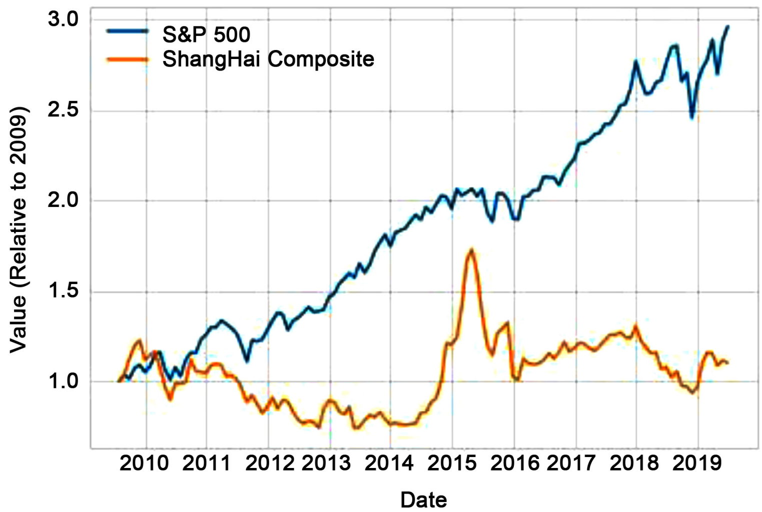

Figure 4. Chinese and US stock index.

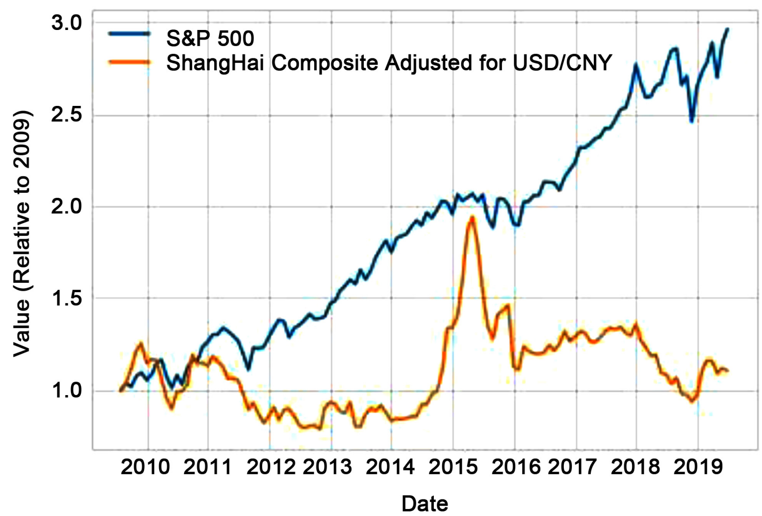

Figure 5. Chinese and US stock index with the adjusted exchange rate.

American stocks (blue line) is constantly rising with a small range of fluctuation, in terms of this trend, it can be explained that American stocks show a long bull market and a short bear market. For American stocks, market behavior is relatively mature, which is also confirmed by Ren (2019). Compared with the American stock market, the Chinese stock market appears to be more unpredictable. The Chinese stock market shows its characteristics in the graph (orange line)-short bull market and a long bear market. The value of stocks in the Chinese company is relatively unsteady, which is showed by the intense fluctuation (**Figure 4** and **Figure 5**). From 2010 to 2019, the value of S&P 500 increases steadily which means that US stock market keeps advancing. Although the Shanghai Composites once sustained an explosive increase, it subsided rapidly and maintained a low value. To be specific, the bull market generally brings a considerable price increase for Chinese stocks, however, it cannot last for a long time. Furthermore, as the price of the Chinese stocks reverts to prices preceding the bull market, it can never return to its initial higher price.

4.9.2. Volatility

Figure 6 exhibits the weakness of the Chinese stock market. The volatility of the Shanghai Composite fluctuates much more intensely than the S&P 500. The fluctuation means that the Chinese stock market is more unpredictable. What's more, the volatility in the Chinese stock market in each year is much higher than the United States stock market. The investors in the Chinese stock market are suffering higher risk because of the high volatility. In contrast, the volatility of the S&P 500 is stable and less variable. Stock traders in the market are more protected by the stable investing environment.

4.9.3. Comparison of Monthly Returns

As shown in **Figure 7**, the frequency distribution of the monthly return of the Chinese stock market is approximately symmetric which indicates that half of the companies generate a positive return and half of them generate a loss. For

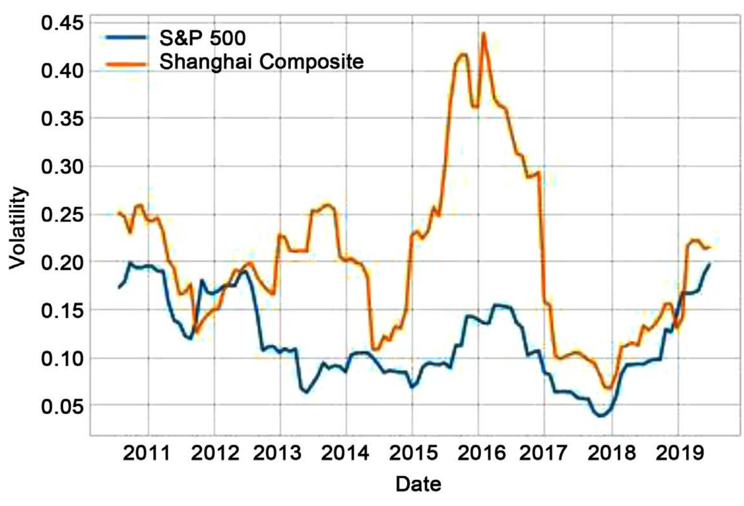

Figure 6. Volatility of last 12 months.

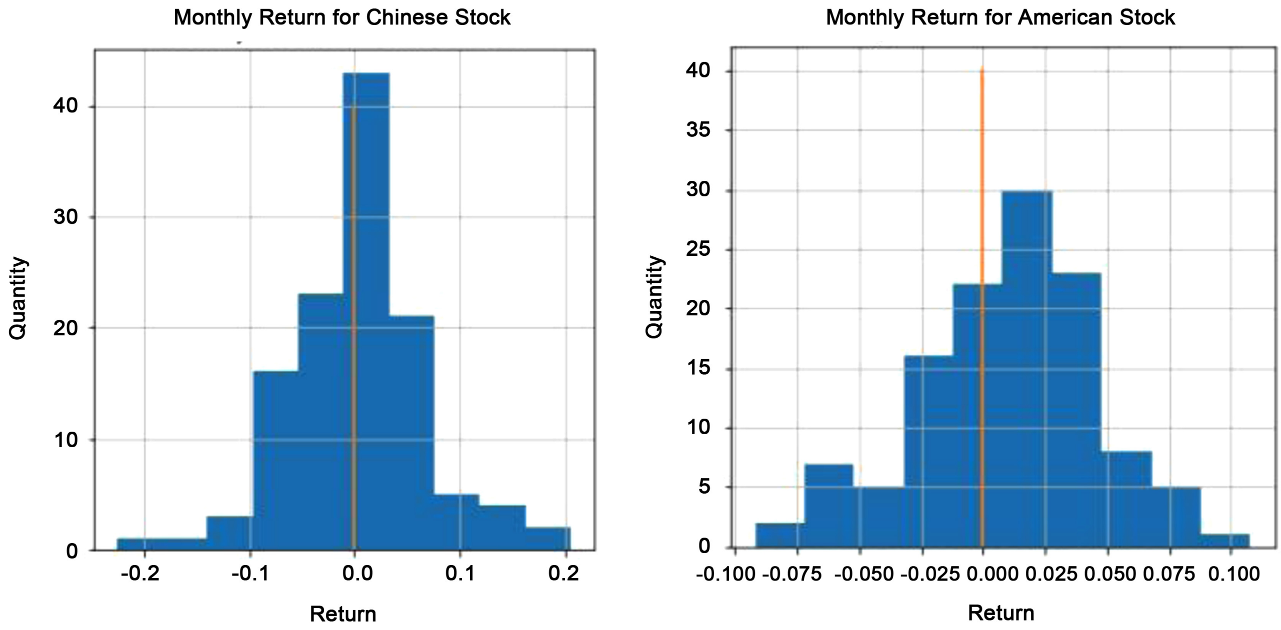

Figure 7. Monthly return for Chinese and American stock.

the American stock index, the distribution is negatively skewed, which means that the less frequent low returns are greater in magnitude. Moreover, the number of companies with zero return for Chinese stocks is more than companies in the US stock market.

4.9.4. Comparison of Stock Beta

Beta in the stock market is defined as the measurement of an asset's risk about the market or an alternative benchmark. For estimation of the beta, we use 10 years daily return for both US and Chinese stocks. We set the X variable as the index return and the Y variable as the individual stock return. Then we plot the beta in the histogram and draw a line represent the mean of beta. From Figure 8, we can interpret that the average beta for 50 largest Chinese companies is around 0.85 while for 50 largest America stock is approximately 0.95. Two possible reasons make the beta close to the market beta of 1. Firstly, the 50 largest market cap companies in both countries are included in the index which decreasing the viability of the range for the beta. Secondly, the 50 largest market Cap companies represent the market, so the risk is closer to the market risk which is approximate to one. The Beta for Chinese stock is more spread out than that of the US. This may because the Chinese stock market is relatively young, and some companies just go public in recent years.

5. Conclusion

The Chinese and United States stock markets have their own special identities and they advance through different methods. The United States stock market is a mature and regulated system which provides people a stable and predictable environment to invest their money. Although there are many weaknesses in the

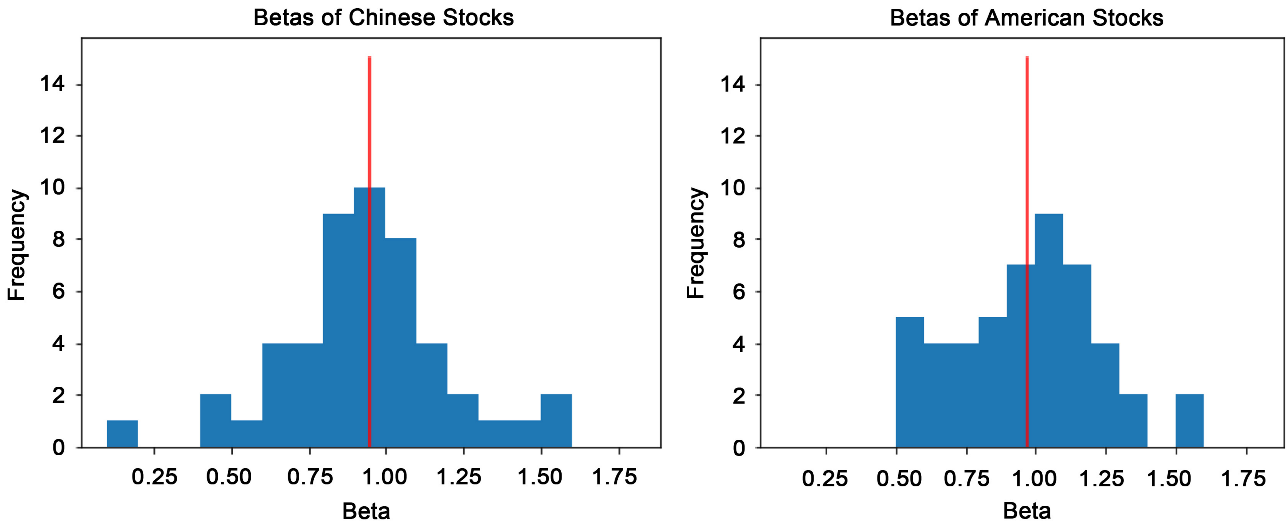

Figure 8. Betas for Chinese and American stock.

Chinese stock market and financial system, it has only existed for a few decades. By developing regulation, trading speculation, and an improving economy, the Chinese stock market will soon be as mature as that of the United States.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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