Size and Price-to-Book Effects in Stock Returns: Evidence from Chinese Stock Markets

by

Haoran Zhang

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Approved by

Jitka Hilliard, Chair, Assistant Professor, Finance Department
Jimmy Hilliard, Professor, Finance Department
Marlin Jensen, Associate Professor, Finance Department

Abstract

In this thesis, the relationship between stock return, beta, size and P/B ratio in the Chinese stock market is reexamined. Jensen, Johnson, and Mercer's approach is applied to confirm whether the P/B effect and size effect work in Chinese stock market. Results provide strong evidence showing that the size effect is present. However, no definite evidence is provided for the P/B effect in Chinese markets. This conclusion is inconsistent with previous studies on the Chinese stock market. Furthermore, I find that contrary to the P/B ratio effect and size effect in the U.S. stock market these effects work better in restrictive monetary policy period. I also find that from Shanghai Stock Exchange can better explain the P/B ratio effect and size effect than Shenzhen Stock Exchange.

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CHAPTER I: INTRODUCTION

The ability of firm size and price-to-book ratio to explain stock returns in the U.S. markets has been well established in the financial literature. Historically, small firms earned higher risk-adjusted returns than large firms and similarly, firms with low price-to-book ratio earned higher risk-adjusted returns than firms with high price-to-book ratios. These findings became a basis for certain types of so-called “style” investing, such as investing in small-cap stocks or value stocks.

The findings that the size and price-to-book ratios have influence on stock returns are not consistent with the semi-strong form of market efficiency. According to the semi-strong form of market efficiency, investors should not be able to earn above-average risk-adjusted returns by using public information. The size of the firm and the firm’s price-to-book ratio are obviously public information.

The prevalent explanation of the size effect that is consistent with the semi-strong form of market efficiency is that small companies are riskier than is implied by their beta. Small firms are also usually less liquid and therefore have higher transaction costs than large, more liquid firms. As a result, investors require higher expected returns for small firms. The explanation for larger returns on firms with low price-to-book ratio is also based on the higher risk of these firms than is implied by their beta.

Studies that documented the size and price-to-book effects analyzed are based on the stock return in the U.S. markets. In my thesis, I investigate whether the size and price-to-book effects also exist in Chinese markets. Chinese markets are newer, less developed markets and their stock returns may or may not replicate anomalies found in the U.S. markets.

In my thesis, I closely follow the work of Jensen, Johnson and Mercer (1997). They documented the size and price-to-book effects on stock returns in the U.S. markets in time period from 1965 to 1994. They found that these effects largely depend on the monetary environment. They found that it is only in times of an expansive monetary policy environment when the size and price-to-book ratios have significant effects on the stock returns. They argue that investors assess med of risk change based on the economic and monetary environment. The change in an investor's risk perception influences the presence or absence of size and price-to-book effects on stock returns.

There are two major stock markets in China – Shanghai Stock Exchange and Shenzhen Stock Exchange. I examine the size and price-to-book effects in the overall Chinese markets and then separately for both exchanges. I also investigate whether the monetary policy of the People's Bank of China has influence on the size and price-to-book effects. The people's bank of China is the central bank in China that controls monetary policy and regulates financial institutions in mainland China.

The master's thesis proceeds as follows. Chapter II consists of a literature review on the size and price-to-book effects, as well as a description of Chinese markets. In chapter III, I explain the methodology and formation of the risk-adjusted portfolios and hypothesis testing. This chapter also contains a description of the data. The results are summarized and discussed in Chapter IV. Chapter V gives conclusions and suggestions for future research.

CHAPTER II: LITERATURE REVIEW

2.1 Size and Price-to-Book Effects in Stock Returns

The financial literature well has documented the importance of firm's size and price-to-book ratio as determinants of stock returns. Early evidence on the size effect came from the work of Banz (1981). The effect of price-to-book ratio (or equivalently book-to-market ratio) was first documented by Stattman (1980) and Rosenberg, Reid, and Lansein (1985). Probably the most cited study in this area is the study of Fama and French (1992). They found that the size and ratio of book-to-market equity can jointly explain the cross-sectional stock returns. Surprisingly, they also found that after controlling for the size and the book-to-market ratio, beta has no explanatory power in explaining cross-sectional stock returns. The study of Fama and French covered almost 30 years (1963 to 1990) of stock returns in the U.S. markets. Their study ignited interest in this area and the search for possible explanations.

One of the critiques of Fama and French study were doubts about the robustness of their findings. Fama and French excluded financial companies from their sample. Some researchers were not convinced about the robustness of their results. They argued that the size and book-to-market anomalies could be a result of data snooping (Black, 1993, MacKinlay, 1995). Consequently, Barber and Lyon (1997) conducted the study on

financial companies and confirmed that the results of Fama and French are robust to sample selection.

Another concern was raised by Chan and Lakonishok (1993). This concern was related to survivorship bias in large datasets that could generate the size and book-to-price effects. After controlling for survivorship biases, however, size and book-to-price factors were still found to have significant explanatory power on stock returns (Davis, 1994).

An important question surrounding the size and price-to-book ratio effects is related to the efficient market hypothesis. If markets are semi-strong form efficient, size and price-to-book effects (as public information) should not have influence on stock returns. Chan and Chen (1991) and Fama and French (1995) suggested that the size and price-to-book effects are proxies for the risk that is not captured by beta. Higher beta-adjusted returns of small firms and firms with low price-to-book ratios are then seen as compensation of investors for this additional risk.

2.2 Influence of Monetary Policy

Monetary policy reflects the opinion of the Federal Reserve Bank about the current and near future state of the economy. Therefore it is not surprising that monetary policy has been shown to be a strong predictor of stock returns (Jensen and Johnson, 1995, Jensen et al, 1996). Jensen et al. suggested that investor's risk concerns are different in times of restrictive and expansive monetary policies. This shift in the risk perception manifests

itself in terms of different sensitivity to the risk factors proxied by size and price-to-book ratios.

Jensen, Johnson, and Mercer (1997) examined returns on NYSE/AMEX stocks from 1965 through 1994. They found evidence that size and price-to-book ratios have effect on the risk-adjusted stock returns. However, this effect is significant and consistent only in times of expansive monetary policy. They also find that during the restrictive monetary policy, the size and price-to-book ratio is not consistently related to stock returns.

2.3 Evidence on the International Markets

The majority of research concerning the size and price-to-book effects has been done on the U.S. markets. However, several studies on international markets also confirmed the existence of these effects. Chan, Hamao, and Lakonishok (1991) examined the size and price-to-book effects in Japanese markets. They found that, similarly as in the U.S. markets, both size and price-to-book ratios have significant effect on stock returns. Lam (2002) studied the size and price-to-book effect in the Hong Kong stock market in the time period of 1984 to 1997. He confirmed the ability of the size and price-to-book ratios to explain the cross-sectional stock returns in Hong Kong markets. Chen, Kang, and Anderson (2007) examine the returns on Chinese A shares from 1998 to 2001. He found that returns are negatively related to market size and positively related to the book-to-market ratio.

2.4 Chinese Markets

The Chinese stock market is a new market compared to the markets of most western countries. Shanghai Stock Exchange started its trading in December 1990. Shenzhen Stock Exchange began trading in July 1991.

The Chinese stock market is regulated by China Securities Regulatory Commission (CSRC). The CSRC was established in December 1992, after the creation of Chinese stock market. The purpose of CSRC is to ensure that the Chinese security market functions orderly and legitimately.

In its early years, the Chinese market experienced a series of frauds and scandals. These events damaged investors' confidence in the stock market. Even though there are still some problems in the Chinese market, after series of new regulatory policies were introduced in early 2000s, the market became to work more orderly. At the end of 2012, 998 stocks were listed on Shanghai Stock Exchange and 1581 stocks are listed on Shenzhen Stock Exchange (Table 1). The total market value of Shanghai stock exchange is 15.8 trillion and total market value of Shenzhen stock exchange is 7.2 trillion. In the future, Shanghai Stock Exchange is expected to develop into a Main Board Market and Shenzhen stock exchange is expected to develop into a Growth Enterprises Market, much like the NYSE and NASDAQ exchanges in the U.S.

The Chinese markets are segmented markets. Chinese companies issue different classes

Table 1: Description of the Chinese Stock Exchanges

Data from Annual Reports of Shanghai Stock Exchange and Shenzhen Stock Exchange. Total capitalization of the market is in Reminbi (¥) millions. The average market value is also in ¥ millions. The number of stocks includes both A and B shares traded on the exchange.

Year	Number of Stocks	Total Capitalization	Average Market Value
Panel A: Shanghai Stock Exchange			
2002	759	2,536,372	3,342
2003	824	2,980,492	3,617
2004	881	2,601,434	2,953
2005	878	2,309,613	2,631
2006	886	7,161,238	8,083
2007	904	26,983,887	29,849
2008	908	9,725,197	10,711
2009	914	18,465,521	20,203
2010	938	17,900,724	19,084
2011	975	14,837,622	15,218
2012	998	15,869,809	15,901
Panel B: Shenzhen Stock Exchange			
2002	551	1,296,541	2,353
2003	548	1,265,279	2,309
2004	578	1,104,123	1,910
2005	586	933,415	1,593
2006	621	1,779,152	2,865
2007	712	5,730,202	8,048
2008	782	2,411,453	3,084
2009	872	5,928,389	6,799
2010	1211	8,641,535	7,136
2011	1453	6,638,187	4,569
2012	1581	7,165,918	4,533

of shares for Chinese residents and for foreigners. These are called A shares (for residents) and B shares (for foreigners). The A shares are further divided into three categories: state-owned shares, legal person shares and common tradable shares. The first two categories are known as non-tradable shares. According to Yeh, Shu, Lee and Su (2009), about two-thirds of total shares are non-tradable shares. Strict regulations separate these three categories. CRSC intends to break the barriers among the three categories in a stable and safe way. When barriers are broken and non-tradable shares are released, large amount of shares flood the market. This may have large impact on the stock prices and therefore may harm the interest of current shareholders. It is expected that this process will happen gradually and be completed by 2016.

The A shares are denominated in the domestic currency, Renminbi (CNY). The B shares traded on Shanghai exchange are traded in U.S. dollars and B shares traded on Shenzhen exchange are traded in Hong Kong dollars. The B shares give foreigner inventors direct access to Chinese market.

The complete segmentation of Chinese markets results in different prices of A and B shares. Although A shares and B shares have the same voting and distribution rights, they do not trade as the same price. The B shares consistently trade at significantly lower prices than A shares. Higher prices of tradable A shares are caused by large demand from the individual Chinese investors. Chinese residents apparently do not have enough investment opportunities. Therefore investing in the Chinese stock market is important

way to manage their assets. In 2012, individual investors held 25.33% of total market value while institutional investors held only 17.4%. Also 80.93% of the trading volume is done by individual investors compared to 15.19% by intuitional investors. As other investment opportunities for individual investors arise, their proportioned share in the Chinese stock markets may decrease. At the same time, preferential policies of CSRC toward the institutional investors are expected to lead to their dominant force in the Chinese markets.

Kang, Liu, Ni (2002) argue that the Chinese stock market has a 'super-speculative environment'. Investors, especially individual investors in the market do not behave rationally leading to irrational markets. A good example is the Bull and Bear market in 2007-2008. The Shanghai Composite Index rose more than 200% from October 2006 to October 2007 and then dropped more than 65% from October 2007 to October 2008. Because of the speculative environment, the Chinese stock market introduced price-limit system in 1996. The price-limit system imposes the restriction that the price of any stock cannot increase or decrease more than 10% on any given trading day. If the price of a stock reaches the 10% limit line, trading in the stock will be suspended on that day.

In short, the Chinese stock market is a very different market from the U.S. market with some unique characteristics and problems. These characters and problems are likely to lead to different results in this study.

CHAPTER III: METHODOLOGY

3.1 Data

The sample used in this study covers all companies listed on the Shanghai stock exchange and the Shenzhen stock exchange from 1999 to 2013. The sample excludes financial companies, ETFs and companies without ordinary common stock. Even though Barber and Lyon (1997) demonstrated that results are robust to sample selection, specifically to the inclusion of financial companies, we decided to follow the general practice and exclude the financial companies.

The variables used in this work are from the Bloomberg database. The variables include monthly total returns, book value of equity, market price, and number of shares outstanding, and the Shanghai Composite Index and Shenzhen Composite Index are used as proxies for the Shanghai and Shenzhen stock markets. The market for the whole Chinese market is estimated by the weighted average of Shanghai Composite Index and Shenzhen Composite Index.

In the sample, only A shares are used since they have higher trading volume. All prices are denominated in the Chinese local currency, Renminbi (CNY). Only companies that have complete data are included in the study. My sample includes 514 to 1266 companies in each year (Table 2), a little more than half of the companies are trading on both exchanges.

As a risk free rate, I use the Shanghai interbank Repo rate (1 day, 2005-2012) and Shanghai interbank offer rate (overnight, 2002-2004) from the People's Bank of China. According to Dai and Liang (2006), the interbank repo rate is a better choice for estimating the risk free rate for Chinese market because it is better collateralized, and because repos are traded more frequently. However, the repo rate cannot be obtained before 2005, thus the Shanghai interbank offer rate is used to cover the remaining time.

3.2 Variables

The variables calculation closely follows that of Jensen, Johnson and Mercer (1997) (JJM). They are as following:

Size. The size of a company is calculated as the natural logarithm of the product of market price per share times the number of shares outstanding at the end of June of each year (*t*). The average size of companies trading on Shanghai Stock Exchange is larger than that of companies from the Shenzhen Stock Exchange.

P/B ratio. The price to book ratio is calculated as a market price per share divided by the book value per share at the end of year *t*-1. The mean P/B ratios in the Shanghai market range from 1.84 to 6.13, and from 1.94 to 6.28 in the Shenzhen market. The P/B ratios in both markets almost move in the same path over time. The Standard deviation of the P/B ratio is extremely high on Shanghai Stock Exchange in 2004, 2005, and 2006 while on the Shenzhen market only in 2003.

Table 2: Summary Statistics

Data are Chinese companies traded on Shanghai and Shenzhen Stock Exchanges. Datasets are based on pre-filtered samples and formed yearly (see Chapter III for detail).

	Size			P/B ratio		
	N	Mean	Std	N	Mean	Std
Panel A: Chinese Market						
2002	744	7.97	0.58	732	5.64	6.58
2003	825	7.72	0.66	815	4.63	11.34
2004	514	7.55	0.74	916	3.63	10.16
2005	850	7.11	0.85	833	2.88	10.94
2006	774	7.52	0.88	761	1.88	1.32
2007	785	8.30	1.01	777	2.76	3.08
2008	813	8.04	1.01	805	6.18	4.02
2009	924	8.29	0.94	916	2.32	1.65
2010	1090	8.33	0.93	1076	5.46	10.29
2011	1266	8.64	0.93	1254	5.63	7.01
Panel B: Shanghai Stock Exchange						
2002	376	8.04	0.62	371	5.56	7.12
2003	413	7.80	0.68	410	4.06	2.85
2004	514	7.55	0.74	503	3.69	12.01
2005	500	7.18	0.88	489	3.15	14.20
2006	487	7.56	0.89	478	1.84	1.12
2007	510	8.32	1.02	505	2.66	1.87
2008	522	8.08	1.02	517	6.13	4.22
2009	581	8.34	0.94	575	2.35	1.71
2010	642	8.40	0.97	632	5.78	13.22
2011	682	8.77	0.98	675	5.48	8.44
Panel C: Shenzhen Stock Exchange						
2002	368	7.90	0.54	361	5.73	5.98
2003	412	7.64	0.62	405	5.20	15.82
2004	419	7.44	0.71	413	3.56	7.29
2005	350	7.00	0.79	344	2.48	1.74
2006	287	7.45	0.85	283	1.94	1.59
2007	275	8.26	1.01	272	2.95	4.54
2008	291	7.96	0.99	288	6.28	3.63
2009	343	8.22	0.94	341	2.26	1.54
2010	448	8.23	0.87	444	5.01	2.73
2011	584	8.49	0.85	579	5.80	4.86

Beta. The Beta for each stock is estimated using 36 months of monthly returns ending in June of year *t*. I estimate beta using three different market indices for estimating beta. For stock trading on the Shanghai stock exchange, I use the Shanghai Composite Index, for stocks trading on the Shenzhen stock exchange, I use the Shenzhen Composite Index, and then for all the stocks, and I used the total Chinese index. The Chinese index is estimated as value-weighted average of Shanghai and Shenzhen composite indices.

3.3 Portfolios

I study two effects: the size effect and the price-to-book ratio effect. Therefore I create two types of portfolios that allow for variation in size or price-to-book ratio. In a following paragraph, I explain the creation of portfolios for studies the size effect. The same procedure is used for creating beta- and price-to-book-ranked portfolios.

To account for differences in returns that are explained by beta, I first sort all stocks according to their beta. Then I divide the stocks to deciles. Within each of these beta-ranked deciles I sort the stocks according to their size. Then I divide each of the beta-ranked decile into size-ranked deciles. The result is 100 portfolios ranked by beta and size.

Then, I test the hypothesis whether the return of the smallest firms (lowest P/B firms) in each decile is larger than that of the largest firm (highest P/B firms). T-statistics and P-

values are provided at the bottom of each table describing these 100 portfolios. Hypothesis is as follows:

H_0: The return of the smallest firms (lowest P/B firms) in each decile has no difference from that of the largest firm (highest P/B firms).

H_a: The return of the smallest firms (lowest P/B firms) in each decile is larger than that of the largest firm (highest P/B firms).

Portfolios are created at the end of June of year *t* based on information from the year *t-1*. I exactly follow the procedure JJM. I do this for two reasons. First, this methodology ensures that company specific data are available to investors (as discussed in JJM). Second, by following the same procedure I can better compare my results with results of JJM.

3.4 Monetary Environment

The monetary environment is classified using the discount rate set by the People's Bank of China. As used in JJM, months with increasing discount rate are classified as restrictive policy environment while months with decreasing discount rate are classified as expansive monetary policy environment. The months when the change in the direction of discount rate happened are excluded. Table 3 shows the expansive and restrictive monetary policy period as set by the People's Bank of China.

Table 3: Monetary Policy Period

Data represent 3-months discount rate from People's Bank of China. Policy is estimated by the sign of change in the rate (see chapter 3.4 for detail).

Policy Period	Policy Condition	Start Date	Start Rate	Total Change in Rates
1	Expansive	1996.05.01	10.08%	-
2	Expansive	1996.08.23	9.72%	-0.0036
3	Expansive	1997.10.23	8.82%	-0.009
4	Expansive	1998.03.21	6.84%	-0.0198
5	Expansive	1998.07.01	5.49%	-0.0135
6	Expansive	1998.12.07	4.86%	-0.0063
7	Expansive	1999.06.10	3.51%	-0.0135
8	Expansive	2002.02.21	2.97%	-0.0054
9	Restrictive	2004.10.29	3.60%	0.0063
10	Restrictive	2008.01.01	4.41%	0.0081
11	Expansive	2008.11.27	3.33%	-0.0108
12	Expansive	2008.12.23	3.06%	-0.0027
13	Restrictive	2010.12.26	3.55%	0.0049

CHAPTER IV: RESULT AND DISCUSSION

I examine the size and price-to-book effects in returns of 100 risk-adjusted portfolios in Chinese markets during the time period of 2002 to 2011. All variables used to create the portfolios are known to the investors before the portfolios are formed.

4.1 Size-effect

Table 4a shows monthly returns of portfolios ranked by beta and size in the overall Chinese market. Monthly returns of the smallest firms are consistently larger than monthly returns of the largest firms across all beta deciles. This is also illustrated in figure 1a. The differences in monthly returns for portfolios of the smallest and largest firms are significant at least at the 10% level for all beta deciles. For example, within the lowest beta decile, the average monthly return for the smallest firms is 1.36% compared to 0.55% return for the largest firms. This represents the annualized difference in average returns of 9.6%. For the highest beta decile this difference is even more pronounced with annualized difference of 20.8% for smallest versus largest firms. This finding is consistent with the findings of JJM who report consistently and significantly higher returns for portfolios of smallest firm versus largest firms across all beta deciles.

Table 6a presents results for the size effect on Shanghai Stock Exchange. The average monthly returns are consistently larger for the portfolios of smallest versus largest firms at all risk levels (figure 3a). The differences are significant at least at the 10% level in

seven deciles. The results for Shenzhen Stock Exchange are shown in table 8a. There is no consistent size effect across the beta-ranked deciles (figure 5a).

According to Arbel and Strebel (1983) and Amihud and Mendelson(1986), the neglected firm and liquidity effect on small companies are important reasons for the size effect. The lack of information and low liquidity of small firms lead to extra risk. Since investors require higher returns for bearing additional risk, the returns on small companies tend to be higher. The neglected firm effect and liquidity effect, however, cannot be used to explain the size effect in the Chinese stock market. According to Wang and Zhou (2002), small companies are always hot targets among Chinese investors and have rather high liquidity. A liquidity index such as the turnover rate on small-cap stocks is higher than the average of all firms in Chinese markets. Therefore it cannot be assumed that the liquidity effect contributes to higher returns on small companies in Chinese markets. Higher returns on small firms in Chinese markets may be a response to the risk raised by herding behavior of individual investors and the attempt of large investors to dominate the market. A famous strategy called following the big man is very popular in the Chinese market. Individual investors, especially those who have limited funds, tend to follow the lead of institutional investors or individual investors with large personal wealth. Small investors believe that those big men have advantages like better advisors and insider information. Small investors are willing to invest in the stocks dominated by “big men”. The “big men” dominate the price of one stock or several stocks, typically the stocks of small-cap companies. They put most of their money into one stock in a few

weeks, even more than one year and the price will continually increase. Individual investors come in for short-term return at this point. As the “big men” start to pull their money out, the price goes down and investors rush out. Risk hides in this process. Since small companies are easy to dominate, they are more vulnerable to herding behavior and therefore riskier. Consequently investors require higher return for this additional risk.

4.2 Price-to-Book Effect

The results on the price-to-book effect are not so convincing. Table 5a presents results for the overall Chinese market. The average monthly returns are higher for portfolio of lowest price-to-book firms in comparison with portfolios of firms with highest price-to-book ratio with exception of the highest beta decile (figure 2a). The differences in returns are, however, significant only in three out of ten cases. For example, within the lowest beta decile, the average monthly return for the firms with lowest P/B ratio is 1.26% compared to 0.31% return for the firms which have highest P/B ratio. This represents the annualized difference in average returns of 11.4%. However, for the highest beta decile average return of highest P/B firms is even higher than lowest P/B firms with annualized difference of 1.24%.

Average monthly returns for the portfolios with lowest price-to-book firms are consistently larger than returns for portfolios of highest price-to-book firms across all risk levels on Shanghai Stock Exchange (table 7a, figure 4a). But the differences in the

average returns are significant only in two deciles. For Shenzhen Stock Exchange the findings on the effect of price-to-book ratio are not consistent (table 9a, figure 6a).

4.3 Influence of Monetary Policy

In this section, I investigate whether the monetary policy environment has influence on the size and price-to-book effects in the Chinese markets. I classify each month as having expansive or restrictive monetary policy. I use the same methodology as described above but evaluate the results separately for months of expansive and restrictive monetary policy.

The results for the size effect during the months with expansive monetary policy are summarized in tables 4b, 6b and 8b and in figures 1b, 3b and 5b. In each of the three tables, average return of largest firms is even larger than that of smallest firms in three beta deciles or more. Most of beta deciles do not show significant difference between largest and smallest firms in statistics. Overall, the results do not provide evidence that size would have any consistent effect on the risk-adjusted stock returns.

Surprisingly, the size effect is consistent and significant during the times of restrictive monetary policy. Table 4c shows the results for the size effect for the restrictive monetary policy environment in the overall Chinese market. The average monthly returns for the smallest firms are consistently higher than for the largest firms across all beta deciles (figure 1c). The differences in their returns are significant for six out of ten deciles. This

effect is driven by the Shanghai Stock Exchange (table 6c, figure 3c). In table 6c, there are also six out of ten deciles have significant differences between returns of small firm and large firm. The size effect is not observed in the Shenzhen Stock Exchange (table 8c, figure 5c).

These results are not consistent with the results of JJM who found that the size effect is consistent and significant during the times of an expansive, but not restrictive monetary policy environment in the U.S. markets.

The results on the price-to-book effect during the periods of expansive monetary policy are summarized in tables 5b, 7b and 9b and figures (2b, 4b and 6b) and for periods of restrictive monetary policy in tables 5c, 7c and 9c and figures (2c, 4c and 6c). There is no evidence of a price-to-book effect during the expansive monetary policy times. During the periods of restrictive monetary policy, however, the portfolios of lowest price-to-book firms have consistently higher returns than the portfolios of highest price-to-book ratio firms across all beta deciles[1]. The differences in their average returns are not, with several exceptions, significant.

[1] The only exception is the highest beta decile for Shenzhen Stock Exchange.

Table 4a: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Overall Chinese Market

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	1.3550	1.9705	1.8726	2.2643	2.0075	1.9419	1.5995	2.0755	1.9722	2.2389	1.9298
2	1.3748	2.2091	1.3394	1.2798	1.9843	1.7446	1.5007	1.9782	1.2377	1.1408	1.5790
3	0.9454	0.7334	1.6975	1.9912	1.1107	1.5474	1.0801	0.8934	1.5061	0.8664	1.2372
4	0.8603	2.1189	1.7256	1.4451	1.3869	1.3760	1.3939	1.3113	1.1787	1.2203	1.4017
5	1.2388	0.9518	1.1334	1.5388	1.1144	1.2157	1.3511	1.2400	1.0715	0.0803	1.0936
6	0.9796	1.4188	1.2727	1.3886	0.7301	1.1187	1.0138	1.1616	1.0052	0.7865	1.0876
7	0.7801	1.0090	1.2286	1.3931	1.1107	0.6066	1.0516	0.8620	0.8622	0.5954	0.9499
8	1.2249	0.6019	0.6548	1.0442	0.9166	0.6946	0.7451	0.9120	0.7299	0.8201	0.8344
9	1.3871	0.9595	1.5911	1.0733	1.3399	0.6611	0.8697	1.2679	1.5346	0.9248	1.1609
Highest Size	0.5528	0.8940	0.9189	1.1277	1.3068	0.4040	0.9097	1.1244	0.7401	0.5081	0.8487
t-Statistics that the lowest size return exceeds the highest size return (Significant Level)											
	1.4481	2.0360	1.9722	1.8831	1.4590	2.5424	1.3330	1.6181	1.9974	2.6289	6.0093
	(0.0739)	(0.0209)	(0.0244)	(0.0299)	(0.0724)	(0.0055)	(0.0914)	(0.0529)	(0.0230)	(0.0043)	(0.0000)

Table 4b: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Overall Chinese Market during the Expansive Monetary Policy Environment

	Low beta	2	3	4	5	6	7	8	9	High beta	Total
Lowest Size	3.0329	2.4766	2.9676	2.6987	2.8684	2.2202	2.2568	2.3691	2.0222	2.6116	2.5524
2	1.9179	2.4434	1.8359	2.0818	2.4635	2.3755	1.9032	2.2665	2.3895	2.0759	2.1753
3	1.5113	2.131	2.1898	2.6324	2.6365	2.2561	1.7209	1.6712	2.1735	1.4256	2.0348
4	1.3351	2.7155	2.3557	2.2866	2.0916	1.3159	1.725	2.0105	1.7288	1.5791	1.9144
5	2.0174	1.7386	1.8698	2.3163	1.1825	1.7973	2.2119	1.8748	1.5529	1.3641	1.7926
6	2.0177	2.2594	2.0678	1.7216	1.6541	1.8731	1.2592	2.3308	1.2005	1.8135	1.8198
7	1.1258	1.6329	2.1932	1.7871	2.0624	1.1899	1.76	1.886	1.8399	1.3165	1.6794
8	2.4513	1.5017	0.9916	2.0149	2.2326	1.5662	1.5116	2.0914	1.4729	1.3416	1.7176
9	1.407	1.8495	2.2465	1.548	1.7312	1.4211	1.5033	1.7704	2.4567	2.1242	1.8058
Highest Size	0.9956	1.5278	1.2822	1.9081	2.0272	0.4346	1.7478	1.5247	2.0247	1.8759	1.5349
t-Statistics that the lowest size return exceeds the highest size return (Significant Level)											
	2.4381	1.1506	2.0415	0.9106	0.922	2.1331	0.606	0.8744	-0.0026	0.7143	3.6096
	(0.0075)	(0.1251)	(0.0208)	(0.1814)	(0.1784)	(0.0166)	(0.2723)	(0.1911)	(0.499)	(0.2376)	(0.0002)

Table 4c: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Overall Chinese Market during the Restrictive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	0.0185	1.6267	1.2379	1.9976	1.5971	1.7258	1.0695	1.9612	2.1323	1.7978	1.5164
2	1.1686	2.1006	1.0624	0.8028	1.7103	1.4630	1.3819	1.6817	0.5614	0.5812	1.2514
3	0.4014	-0.1928	1.5312	1.2981	0.1838	0.9200	0.6328	0.5563	1.1199	0.2579	0.6709
4	0.4366	1.5776	1.1224	0.8435	0.8455	1.3301	1.0326	0.5663	0.3641	0.6895	0.8808
5	0.4758	0.4158	0.5050	0.7524	1.0315	0.8124	0.7537	0.6673	0.4671	-0.8057	0.5075
6	0.3611	0.8494	0.5697	0.7791	-0.1691	0.4394	0.7014	0.3418	0.7835	0.0825	0.4739
7	0.6728	0.5781	0.6768	1.0628	0.5524	0.1226	0.4836	0.2133	0.2507	-0.1428	0.4470
8	0.2383	-0.1229	0.3731	0.4531	-0.2534	-0.0175	-0.2330	-0.0854	0.2726	0.3063	0.0931
9	1.3705	0.0630	0.7622	0.5214	0.8949	-0.1296	0.1209	0.6288	0.4663	-0.2468	0.4452
Highest Size	0.0179	0.0695	0.2897	0.4381	0.5448	0.1317	-0.1036	0.5404	-0.3331	-1.0688	0.0527
t-Statistics that the lowest size return exceeds the highest size return (Significant Level)											
	0.0008	1.6920	1.0358	1.6826	1.1619	1.6565	1.2115	1.3688	2.4744	2.7707	4.8697
	(0.4997)	(0.0455)	(0.1503)	(0.0464)	(0.1228)	(0.0489)	(0.1130)	(0.0857)	(0.0067)	(0.0028)	(0.0000)

Table 5a: Mean Returns of Portfolios Based on the Price-to-Book Ratios at Different Levels of Systematic Risk for Overall Chinese Market

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	1.2563	1.7262	1.6073	1.7133	1.3697	1.1270	1.7786	1.5123	1.3597	0.6600	1.4110
2	1.8113	1.4752	2.0886	1.7366	0.9038	1.2894	1.6774	1.9369	1.6362	0.6406	1.5196
3	1.1070	1.5551	1.2373	1.4195	1.2084	2.0908	1.1409	0.7575	0.9224	0.7405	1.2179
4	1.6342	1.3500	1.7058	1.3223	1.5589	1.2344	1.1810	1.8158	0.8420	1.5430	1.4187
5	1.4625	1.4208	1.5343	1.7105	1.7545	1.1435	1.4137	0.7268	1.3869	0.9085	1.3462
6	1.3345	1.8198	1.4066	1.5051	1.4379	0.7694	0.8392	1.1704	1.5263	1.1868	1.2996
7	1.5861	1.4141	1.0629	1.6071	1.1863	1.0123	1.2539	1.4046	0.6549	0.5124	1.1695
8	0.2307	0.7627	0.7208	1.0517	1.2448	0.6363	1.0555	1.0643	1.4465	0.8482	0.9062
9	-0.2190	0.3883	1.1929	1.2402	0.9434	0.6517	0.4112	0.5503	1.4526	0.6563	0.7268
Highest P/B	0.3068	1.1756	0.9367	0.9297	0.9568	0.8421	0.8079	1.0693	0.3519	0.7633	0.8140
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	1.4569	0.5532	0.8207	1.0747	0.6526	0.4042	1.3324	0.3317	1.4369	-0.3996	2.3956
	(0.0727)	(0.2901)	(0.2060)	(0.1413)	(0.2571)	(0.3431)	(0.0914)	(0.3701)	(0.0755)	(0.3448)	(0.0083)

Table 5b: Mean Returns of Portfolios Based on the Price-to Book Ratios at Different Levels of Systematic Risk for Overall Chinese Market during the Expansive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	1.8973	1.8220	2.0596	1.9303	2.1395	1.5313	2.2586	1.6328	1.2544	1.1412	1.7667
2	2.2582	1.8832	2.7883	2.0127	1.9485	1.5031	1.7265	2.3351	1.9357	0.8264	1.9218
3	2.9204	2.6512	1.8144	1.7592	1.7408	2.0228	1.4411	1.2162	1.9761	1.2318	1.8774
4	1.9159	2.2773	1.6423	1.8911	2.2155	1.7160	1.6567	1.9083	1.7591	2.2312	1.9213
5	1.5510	2.4482	2.3812	2.5108	2.6111	2.3148	2.1464	1.2046	1.6143	1.2370	2.0019
6	1.5608	1.9969	1.8491	2.3819	1.7041	2.0940	1.0589	1.5787	2.2429	1.9654	1.8433
7	2.4127	3.1751	1.7003	2.4783	1.7654	1.4368	1.7639	2.7130	1.1025	2.2680	2.0816
8	0.9375	1.5704	1.8575	1.3208	1.8313	0.5344	1.5131	2.3231	3.1158	1.6148	1.6619
9	0.4708	0.7008	2.0474	2.4002	1.6308	1.0204	2.1247	1.5185	2.2015	1.4928	1.5608
Highest P/B	0.9445	1.5491	1.8741	1.6210	2.4101	1.5735	1.3024	2.2215	1.2467	2.5140	1.7257
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	1.1181	0.3413	0.2429	0.3719	-0.3091	-0.0531	1.1589	-0.6716	0.0089	-1.4572	0.1588
	(0.1319)	(0.3665)	(0.4041)	(0.3550)	(0.3787)	(0.4788)	(0.1234)	(0.2510)	(0.4965)	(0.0727)	(0.4369)

Table 5c: Mean Returns of Portfolios Based on the Price-to Book Ratios at Different Levels of Systematic Risk for Overall Chinese Market during the Restrictive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	0.4229	1.1113	0.9129	1.0472	0.6202	0.4601	0.9343	0.9503	1.0870	-0.2480	0.7298
2	1.1958	1.1169	1.2075	1.1607	0.0821	0.9725	1.3681	1.2699	0.9940	0.0347	0.9402
3	-0.4189	0.4762	0.6111	0.9264	0.5527	1.8955	0.5667	0.3430	0.0432	-0.0119	0.4984
4	1.0176	0.2899	1.1351	0.6016	0.7369	0.4090	0.4265	1.4742	-0.2136	0.4253	0.6302
5	1.1583	0.2015	0.6949	0.7167	0.7801	-0.0163	0.3629	0.0792	0.9440	0.2304	0.5152
6	0.7624	1.2953	0.8817	0.5697	0.7631	-0.4336	0.3084	0.5034	0.8841	0.2764	0.5811
7	0.7721	-0.0926	0.3380	0.7445	0.7725	0.5552	0.5926	0.1620	-0.0627	-0.7943	0.2987
8	-0.3610	-0.0515	-0.2913	0.6272	0.5581	0.3470	0.1003	0.0676	-0.3084	-0.3121	0.0376
9	-0.8204	-0.1469	0.2875	0.0975	-0.0227	-0.0731	-0.9888	-0.4400	0.5106	-0.2907	-0.1887
Highest P/B	-0.4445	0.7203	0.1585	0.1237	-0.3081	-0.0207	0.1290	0.1164	-0.5507	-0.7784	-0.0855
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	0.9924	0.4447	0.8267	1.0631	1.0486	0.5233	0.8528	0.8366	1.7257	0.5430	2.8087
	(0.1606)	(0.3283)	(0.2043)	(0.1440)	(0.1473)	(0.3004)	(0.1970)	(0.2015)	(0.0423)	(0.2936)	(0.0025)

Table 6a: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shanghai Stock Exchange

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	1.0174	2.3848	1.6879	2.2448	1.8779	1.4551	1.7593	1.8616	1.7032	1.7846	1.7776
2	1.4318	1.7985	1.5668	1.1586	2.1598	1.6655	1.8012	1.6232	1.7619	1.0051	1.5972
3	0.9364	1.2824	1.9792	1.1736	1.8101	1.5470	1.2450	1.3997	1.7663	1.1715	1.4311
4	1.5445	1.1998	1.4164	1.6008	0.8163	0.6313	1.8430	1.3346	0.9223	0.4385	1.1747
5	1.0806	1.3943	1.1703	1.4604	1.7382	0.8630	0.7691	1.5015	0.6644	0.6433	1.1285
6	0.9808	1.2527	1.1604	1.8871	0.6767	1.4530	1.1700	1.4312	0.7003	0.4905	1.1203
7	1.3781	0.8887	0.8415	0.7850	1.3636	1.0135	0.9868	0.8832	1.1799	0.5822	0.9902
8	0.9972	0.5905	0.8986	1.0487	1.3793	0.5327	0.8586	1.1443	1.0035	0.6534	0.9107
9	0.9665	0.7971	0.8625	1.3557	1.4589	0.5468	0.4932	0.6325	1.2127	1.9469	1.0273
Highest Size	-0.1657	0.4714	1.4364	1.0644	0.9051	0.4902	0.6839	0.5964	0.7600	0.7701	0.7012
t-Statistics that the lowest size return exceeds the highest size return (Significant Level)											
	1.8356	2.4762	0.8002	1.7995	1.2363	1.2640	1.3678	2.0584	1.4576	1.5125	4.9986
	(0.0333)	(0.0067)	(0.2119)	(0.0361)	(0.1083)	(0.1032)	(0.0858)	(0.0199)	(0.0726)	(0.0653)	(0.0000)

Table 6b: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shanghai Stock Exchange during the Expansive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	2.5838	2.9421	2.7325	3.3164	2.2204	1.7386	2.7358	2.7856	1.5537	2.0950	2.4704
2	2.0052	2.2464	1.8616	1.7574	2.8350	2.2725	2.3772	1.5685	3.0975	1.9098	2.1931
3	1.6337	2.6039	2.9124	2.5431	3.1888	2.9792	2.2701	2.2321	2.6915	1.6881	2.4743
4	2.3429	2.4649	2.2057	2.3453	1.5205	1.7215	2.5353	2.9877	1.7807	2.0587	2.1963
5	2.0729	2.4750	2.9802	2.7059	2.7254	1.6947	2.1412	2.2476	2.5126	1.8905	2.3446
6	2.2728	1.7380	2.0943	3.0449	1.7490	2.8821	1.8958	2.3268	1.6679	1.0654	2.0737
7	2.2659	1.6351	1.4687	1.7377	2.6787	2.4425	1.7154	1.6770	2.2647	1.4575	1.9343
8	2.2846	0.6775	0.9688	0.4677	1.7568	0.9233	1.0757	2.0734	1.9548	1.6890	1.3872
9	1.9508	2.2478	1.7354	2.3596	1.8007	1.8059	1.2068	1.7141	2.0543	3.7468	2.0622
Highest Size	0.1132	1.1998	2.0574	1.0719	2.1360	2.2961	0.7638	1.3914	2.2016	2.1163	1.5348
t-Statistics that the low Size return exceeds the high Size return (Significant Level)											
	2.1300	1.6522	0.6054	1.9847	0.0777	-0.4965	1.7742	1.0210	-0.5206	-0.0173	2.5562
	(0.0169)	(0.0496)	(0.2726)	(0.0239)	(0.4691)	(0.3099)	(0.0383)	(0.1539)	(0.3014)	(0.4931)	(0.0053)

Table 6c: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shanghai Stock Exchange during the Restrictive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	0.0817	2.0343	1.2243	1.6916	1.5008	1.3672	1.1695	1.7870	2.1892	1.6290	1.4675
2	0.7655	1.5222	1.7168	0.6723	1.6647	1.3182	1.3670	1.8461	0.8367	0.1715	1.1881
3	0.3910	0.4386	1.4102	0.2315	1.1978	0.7703	0.5714	1.0929	0.9945	0.7009	0.7799
4	1.0174	0.5277	0.9359	1.0549	0.2374	-0.1090	1.4566	0.0896	0.1666	-0.6203	0.4757
5	-0.2035	0.3559	-0.1933	0.4742	1.2107	0.2634	-0.2463	0.8059	-0.5448	-0.3111	0.1611
6	0.2532	0.9796	0.6515	0.9774	-0.1813	0.6930	0.6918	0.6816	0.3353	-0.4330	0.4649
7	0.7981	0.2798	0.4179	0.2147	0.4467	-0.2832	0.3092	0.4367	0.1959	-0.3724	0.2443
8	0.1589	0.6365	0.8283	1.5191	1.1431	0.1396	0.5107	0.4715	0.0885	-0.3046	0.5191
9	0.1903	-0.1675	0.4950	0.7094	1.3216	-0.2512	0.0821	0.1203	0.2666	0.4170	0.3184
Highest Size	-0.6495	-0.1587	0.6174	0.8332	-0.1072	-0.7702	0.5187	-0.4627	-0.4077	-0.7498	-0.1337
t-Statistics that the low Size return exceeds the high Size return (Significant Level)											
	0.7060	1.8762	0.5406	0.7910	1.4042	1.8043	0.5194	1.8106	2.1087	1.7962	4.2874
	(0.2402)	(0.0305)	(0.2945)	(0.2146)	(0.0804)	(0.0358)	(0.3018)	(0.0353)	(0.0177)	(0.0365)	(0.0000)

Table 7a: Mean Returns of Portfolios Based on the Price-to-Book Ratios at Different Levels of Systematic Risk for Shanghai Stock Exchange

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	1.4240	1.9813	1.5331	2.1892	1.3251	1.1430	1.8202	1.6778	1.5645	0.9425	1.5601
2	1.3023	1.6334	1.1965	1.8234	0.8669	1.0947	1.6506	1.2687	1.0008	0.5160	1.2353
3	1.5935	1.5369	1.7623	1.3683	1.2136	1.3645	1.3600	1.2586	1.2948	0.5088	1.3261
4	1.2591	1.9040	1.4820	2.0192	1.9593	1.3622	1.2309	1.9039	0.6532	1.9464	1.5720
5	1.4037	1.3777	1.4397	1.2507	2.2024	1.1797	0.8321	1.0707	1.0016	1.5592	1.3317
6	1.2500	1.0167	1.1646	1.4747	1.6573	0.8426	0.5544	0.9179	1.2680	0.9188	1.1065
7	1.5014	0.7096	1.8071	0.8461	1.3364	1.0488	1.8602	0.7571	1.9369	0.7570	1.2561
8	0.5866	0.7699	0.3607	1.2295	1.8422	0.5600	1.0998	1.3880	1.1906	0.7739	0.9801
9	-0.2752	0.3433	0.9986	0.3550	0.5877	0.7090	0.5938	0.9023	1.0316	0.6043	0.5851
Highest P/B	-0.0732	1.1677	1.4004	0.8774	1.0770	0.4888	0.6569	1.4063	0.4864	-0.0883	0.7400
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	1.9550	0.9735	0.0153	1.4336	0.3245	0.6096	1.0675	0.2286	1.2551	1.0311	2.8057
	(0.0254)	(0.1653)	(0.4939)	(0.0760)	(0.3728)	(0.2711)	(0.1430)	(0.4096)	(0.1048)	(0.1514)	(0.0025)

Table 7b: Mean Returns of Portfolios Based on the Price-to-Book Ratios at Different Levels of Systematic Risk for Shanghai Stock Exchange during the Expansive Monetary Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	2.4091	2.2259	1.9822	2.5451	2.2971	2.3988	2.2663	1.4688	1.9396	1.5909	2.1124
2	2.6841	1.8050	2.3066	2.3147	1.3357	1.8794	1.8641	2.1738	1.7665	1.0892	1.9219
3	2.8366	1.8986	2.3174	1.1398	2.4201	2.0725	1.6930	1.0457	2.0257	1.0987	1.8548
4	2.5501	2.5081	2.8728	2.9650	2.6407	3.0924	2.0770	3.4144	2.0061	2.5854	2.6712
5	1.5176	2.5686	2.2376	2.5143	3.0271	2.3316	1.5928	1.5937	1.7791	2.4705	2.1633
6	1.9229	2.4365	2.3425	2.6424	2.0567	1.7925	1.9121	1.3402	1.9899	2.4579	2.0894
7	2.1105	2.4142	2.2391	1.5208	2.2071	2.2947	1.7548	1.1454	2.0249	1.3881	1.9100
8	1.4801	1.9637	0.6030	1.5878	2.3622	1.7261	2.2634	3.7623	3.3816	2.4749	2.1605
9	0.3088	0.9623	2.5829	1.7192	2.0422	1.4236	1.6016	2.1779	2.9380	1.2315	1.6988
Highest P/B	1.5847	1.6630	2.3043	1.6105	2.5943	1.7597	2.0811	2.7165	1.7185	2.7507	2.0783
t-Statistics that the low P/B ratio return exceeds the high P/B ratio return (Significant Level)											
	0.6388	0.4685	-0.3151	0.8406	-0.2616	0.5634	0.1640	-1.0223	0.1818	-0.8656	0.0886
	(0.2616)	(0.3198)	(0.3764)	(0.2005)	(0.3969)	(0.2867)	(0.4349)	(0.1536)	(0.4279)	(0.1936)	(0.4647)

Table 7c: Mean Returns of Portfolios Based on the Price-to-Book Ratios at Different Levels of Systematic Risk for Shanghai Stock Exchange during the Restrictive Monetary Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	0.8253	1.9282	1.3440	1.8049	0.6153	0.2753	1.4518	1.7882	1.4753	0.5369	1.2045
2	0.2635	1.4772	0.4954	1.2024	0.5563	0.5720	1.4334	0.6041	0.3168	-0.2291	0.6692
3	0.8021	1.3961	1.3582	1.5890	0.2638	0.9300	0.9909	1.2632	0.6459	-0.3064	0.8933
4	0.2901	1.4609	0.6288	1.3665	1.6209	0.2723	0.5778	0.9750	-0.3443	1.1514	0.7999
5	1.2187	0.3354	1.0091	0.2374	1.5131	0.2227	-0.1087	0.7231	0.2779	0.8251	0.6254
6	0.6952	-0.0804	0.2145	0.6546	1.4781	0.4322	-0.3637	0.5680	0.6806	-0.2612	0.4018
7	0.9870	-0.3362	1.5841	0.3934	0.7622	0.0339	1.8505	0.7417	1.7659	0.1297	0.7912
8	0.1858	-0.2390	0.1022	1.1474	1.4095	-0.3523	0.2330	-0.1143	-0.3492	-0.7780	0.1245
9	-0.9981	-0.0328	-0.1767	-0.2579	-0.4829	0.1693	0.2088	-0.1885	-0.3538	0.0195	-0.2093
Highest P/B	-1.5408	0.8537	1.0864	0.3989	-0.0519	-0.1872	-0.0962	0.5596	-0.3278	-2.2461	-0.1551
t-Statistics that the low P/B ratio return exceeds the high P/B ratio return (Significant Level)											
	2.0215	0.8705	0.2193	1.1827	0.5685	0.3974	1.1619	0.8792	1.3973	2.0516	3.3757
	(0.0218)	(0.1922)	(0.4132)	(0.1187)	(0.2850)	(0.3456)	(0.1228)	(0.1898)	(0.0814)	(0.0203)	(0.0004)

Table 8a: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shenzhen Stock

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	1.4719	1.7532	1.3031	2.5394	1.9839	1.6631	1.6236	1.2795	2.8003	2.1862	1.8604
2	2.4395	1.6019	1.4377	1.7601	1.4286	1.0133	1.8117	1.8196	1.2383	1.8514	1.6402
3	0.0552	1.2143	1.4293	1.6387	1.3420	1.3971	0.4635	1.1406	1.0053	0.9002	1.0586
4	0.5021	1.1489	1.8231	1.4653	1.2542	2.1708	0.5077	0.9611	0.8757	1.0406	1.1750
5	0.7358	0.7865	0.9277	1.6376	1.1567	0.7382	1.4790	0.8875	0.6904	1.3242	1.0364
6	1.8414	1.6800	1.2305	1.1726	1.6821	0.9228	0.7363	0.9783	0.9779	0.9561	1.2178
7	1.2355	0.9113	1.4151	0.4216	1.5295	1.0199	1.2970	0.7832	0.5513	0.3630	0.9527
8	0.7753	1.5705	1.9977	1.2095	1.2123	0.4810	0.9645	1.2757	0.4586	0.6894	1.0635
9	1.2856	1.4746	1.1904	0.8433	-0.1779	1.5310	0.6694	0.8750	1.3660	1.1662	1.0224
Highest Size	1.0652	2.0545	1.6816	1.4918	0.3663	1.5964	1.7193	0.0734	0.4085	0.0638	1.0521
t-Statistics that the lowest size return exceeds the highest size return (Significant Level)											
	0.9106	-0.2858	-0.5293	1.3140	1.5930	0.1825	0.4060	1.0984	2.3790	1.6844	2.8540
	(0.1814)	(0.3875)	(0.2984)	(0.0946)	(0.0558)	(0.4276)	(0.3424)	(0.1362)	(0.0088)	(0.0463)	(0.0022)

Table 8b: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shenzhen Stock Exchange during the Expansive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	2.6684	1.5117	2.1628	2.3054	1.5557	1.5803	2.1272	0.4149	3.4545	1.8029	1.9584
2	1.8913	1.1001	0.9773	1.3698	1.5309	0.9352	1.9721	1.9201	1.4562	1.3395	1.4492
3	1.0510	1.7602	2.2264	1.7136	1.5825	2.1695	0.7380	1.6456	1.0959	1.4397	1.5422
4	1.8502	1.7079	2.9599	1.2624	1.0488	1.5155	0.8065	1.5723	1.4728	1.1524	1.5349
5	1.4264	1.0197	1.2408	1.4298	1.5342	1.1091	1.7531	0.6042	1.0454	0.6446	1.1807
6	1.6295	1.8932	1.5519	2.3300	1.7880	1.3552	1.1500	1.8473	1.1753	1.4439	1.6164
7	1.2568	2.1542	2.4197	0.7931	0.9289	1.7301	1.3110	0.6804	1.4864	0.8747	1.3635
8	1.3711	2.3240	2.7075	0.8534	1.4096	0.0968	1.6483	1.6200	0.3119	1.4228	1.3766
9	2.2278	2.2668	1.7430	1.8982	0.9563	2.1833	2.0406	1.2737	1.8660	1.5291	1.7985
Highest Size	0.3160	2.0993	2.1888	2.6326	0.9975	1.5422	1.5311	0.2844	0.1739	1.8659	1.3632
t-Statistics that the low Size return exceeds the high Size return (Significant Level)											
	1.7997	-0.4684	-0.0202	-0.24	0.4066	0.0279	0.4417	0.105	2.0219	-0.0355	1.3693
	(0.0364)	(0.3199)	(0.4919)	(0.4053)	(0.3423)	(0.4889)	(0.3295)	(0.4582)	(0.022)	(0.4859)	(0.0855)

Table 8c: Mean Returns of Portfolios Based on Size at Different Levels of Systematic Risk for Shenzhen Stock Exchange during the Restrictive Monetary Policy Environment

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest Size	0.2736	1.0354	0.0240	1.9000	1.2563	0.8802	0.5264	1.4081	1.6641	1.6858	1.0654
2	1.8917	0.9964	0.8968	0.9241	0.3261	0.2984	0.4236	0.7605	0.2397	1.1622	0.7920
3	-1.2957	0.1250	0.1639	0.8143	0.9717	0.4733	-0.1318	0.0058	0.2741	0.2146	0.1615
4	-0.7892	0.2552	0.2946	0.5757	0.4073	2.0166	-0.3588	-0.2649	-0.0212	0.3130	0.2428
5	-0.0158	-0.2451	0.0707	0.6801	0.1369	-0.4437	0.3766	0.4207	-0.2999	0.3183	0.0999
6	1.3994	0.9071	0.3544	-0.0601	0.6666	-0.0842	-0.2118	-0.2464	0.1789	-0.3721	0.2532
7	0.5119	-0.4363	0.2283	-0.3973	1.4459	0.1213	0.6273	0.1467	-0.5828	-0.3523	0.1313
8	-0.3812	0.3326	0.7291	0.5531	-0.3291	0.0438	-0.3684	-0.2406	-0.1495	-0.7820	-0.0592
9	-0.1671	0.3694	0.2960	-0.3336	-1.3043	0.3422	-0.6496	-0.1369	0.1466	-0.8618	-0.2299
Highest Size	0.4756	1.0355	0.7351	-0.7887	-1.1852	0.5278	0.1217	-0.3995	-0.3714	-1.7897	-0.1639
t-Statistics that the low Size return exceeds the high Size return (Significant Level)											
	-0.1642	-0.0001	-0.5716	1.9039	1.7297	0.2354	0.2552	1.24	1.4278	2.1163	2.6546
	(0.4348)	(0.5)	(0.2839)	(0.0288)	(0.0422)	(0.407)	(0.3993)	(0.1078)	(0.077)	(0.0175)	(0.004)

Table 9a: Mean Returns of Portfolios Based on the Price-to-Book Ratio at Different Levels of Systematic Risk for Shenzhen Stock Exchange

	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B	0.7332	1.6200	1.8807	0.9407	2.1428	1.0836	1.3381	2.1341	0.8791	0.7458	1.3498
2	1.7979	1.3688	1.7959	0.9052	2.1674	1.2462	0.4698	2.3070	1.6134	1.1805	1.4852
3	1.6022	1.0176	1.9457	1.3416	0.9047	1.6898	2.2286	1.2636	0.8406	0.6680	1.3502
4	1.8597	1.4213	1.4160	1.7675	0.9292	1.1479	0.7971	0.4457	1.4151	1.8817	1.3081
5	1.7292	1.6224	1.1655	1.7261	1.4095	1.3998	1.2598	0.9981	1.2810	1.0590	1.3650
6	1.8595	1.5121	1.9116	1.6934	1.8502	1.1204	1.0760	0.6031	1.1729	0.6544	1.3454
7	0.6771	2.0875	0.9353	1.7671	0.4336	1.3059	1.2015	0.8357	0.6872	0.8405	1.0771
8	0.0097	0.7487	1.5569	1.7070	1.3505	0.8950	0.6696	0.2310	0.9874	0.9089	0.9065
9	1.0063	1.6220	1.0103	1.2331	1.1929	0.8777	0.9823	1.1925	0.4486	1.3704	1.0936
Highest P/B	0.0073	0.9660	0.7611	1.0922	0.0237	1.2684	0.5691	1.2511	0.6120	0.7386	0.7289
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	0.7919	0.7286	1.0053	-0.0199	1.8306	0.0986	1.3360	0.9009	0.4402	0.0759	2.2803
	(0.2143)	(0.2332)	(0.1575)	(0.4921)	(0.0338)	(0.4607)	(0.0910)	(0.1840)	(0.3299)	(0.4698)	(0.0113)

Table 9b: Mean Returns of Portfolios Based on the Price-to-Book Ratio at Different Levels of Systematic Risk for Shenzhen Stock Exchange during the Expansive Monetary Policy Environment

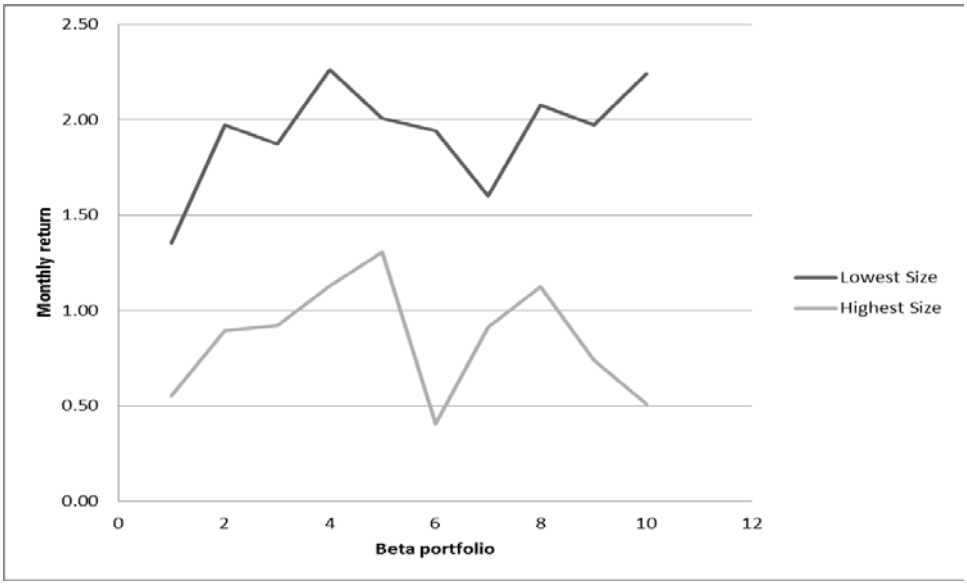
	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B ratio	1.1044	2.2015	2.9800	1.8687	1.9570	1.8287	1.7664	1.8664	0.5136	0.9185	1.7005
2	2.2119	0.9571	2.0491	1.4206	1.1526	1.4247	0.4435	2.3945	0.7364	0.3562	1.3147
3	2.2724	1.5609	2.1664	0.8140	1.6944	1.2324	1.3468	0.7430	1.4339	0.9301	1.4194
4	2.1638	3.2727	2.2509	1.8216	1.1499	1.3454	2.1010	0.8133	1.6329	2.0449	1.8596
5	2.1198	1.8786	1.3813	2.7332	1.4045	1.1581	1.8208	1.3469	2.1545	1.6137	1.7611
6	2.9247	0.9789	3.4120	2.3399	1.8765	1.5024	2.2504	1.5601	0.8552	1.7056	1.9406
7	0.2495	3.0408	0.4068	0.5448	1.5493	1.3420	1.4650	1.0899	1.3894	1.8071	1.2885
8	1.4954	1.3674	2.0702	2.4127	0.4867	1.3953	1.8778	1.8816	2.1750	0.2354	1.5397
9	0.8725	1.1458	1.8185	1.4722	1.9369	0.5460	1.4475	1.1771	0.8036	2.3470	1.3567
Highest P/B ratio	0.0666	1.4038	1.2665	1.6485	0.4248	2.4300	0.8409	0.3365	1.0971	0.6038	1.0119
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	0.8642	0.6409	1.3398	0.1740	1.0587	-0.4321	0.7209	1.1719	-0.4632	0.2325	1.6706
	(0.1940)	(0.2610)	(0.0906)	(0.4310)	(0.1453)	(0.3330)	(0.2357)	(0.1210)	(0.3218)	(0.4081)	(0.0474)

Table 9b: Mean Returns of Portfolios Based on the Price-to-Book Ratio at Different Levels of Systematic Risk for Shenzhen Stock Exchange during the Restrictive Monetary Policy Environment

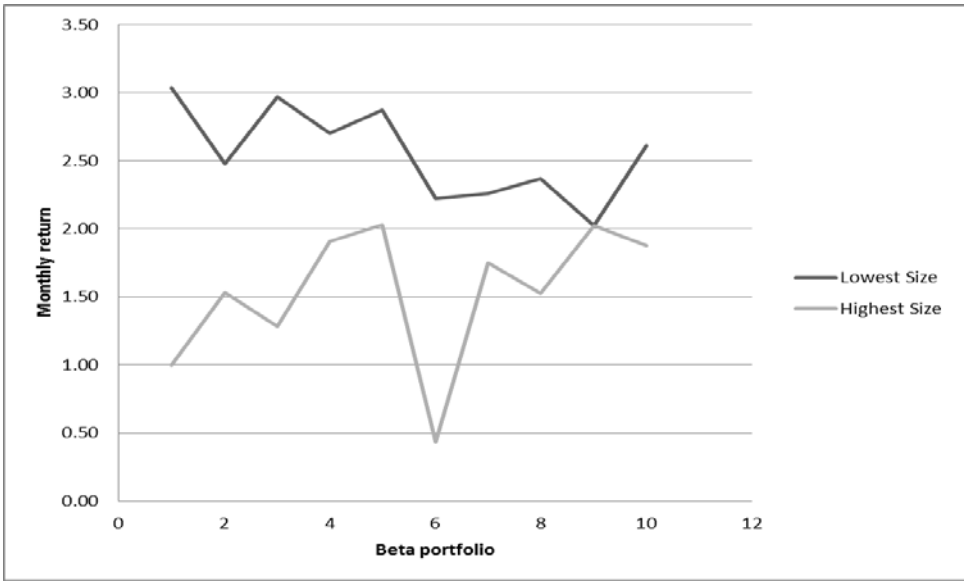
	Lowest beta	2	3	4	5	6	7	8	9	Highest beta	Total
Lowest P/B ratio	0.1256	0.4202	0.4487	-0.3123	1.2652	0.1334	0.7179	1.0953	0.4834	-0.1513	0.4226
2	0.3971	0.9247	0.5394	-0.1561	1.7641	0.3904	-0.6095	1.1286	1.3717	0.5329	0.6283
3	0.1604	0.1769	0.9419	0.9967	-0.2875	1.2401	1.7905	0.8436	-0.1343	0.0590	0.5787
4	0.9793	-0.8824	0.3846	0.7511	0.0855	0.3939	-0.6565	0.0524	0.7572	0.3727	0.2238
5	0.5858	0.6622	0.2998	-0.2309	0.2554	0.6354	0.0314	0.0154	0.0011	0.0325	0.2288
6	0.7069	1.4505	0.1366	0.3429	1.3706	0.0896	-0.2304	-0.5376	0.8226	-0.6371	0.3514
7	0.2312	0.4976	0.7946	1.5228	-0.8697	0.6001	0.1697	-0.2174	-0.7461	-1.0341	0.0949
8	-0.9536	-0.1876	0.4989	0.5500	0.9540	0.3258	-0.6014	-1.5723	-0.2945	0.7058	-0.0575
9	0.2097	0.6461	-0.3668	0.4177	-0.1840	0.3487	-0.4149	0.1009	-0.4627	-0.1641	0.0131
Highest P/B ratio	-0.4551	-0.2112	-0.0221	-0.2303	-1.0758	-0.5901	-0.9767	0.4606	-0.7819	-0.1082	-0.3991
t-Statistics that the lowest P/B ratio return exceeds the highest P/B ratio return (Significant Level)											
	0.4040	0.4836	0.3381	-0.0568	1.5313	0.5023	1.1605	0.3679	0.8430	-0.0263	1.7506
	(0.3432)	(0.3144)	(0.3677)	(0.4774)	(0.0632)	(0.3079)	(0.1232)	(0.3566)	(0.1998)	(0.4895)	(0.0400)

Figure 1: Mean Monthly Return of lowest and highest Size portfolios at different level of beta, Chinese Market.

a. Overall



b. Expansive Monetary Policy Period



c. Restrictive Monetary Policy Period

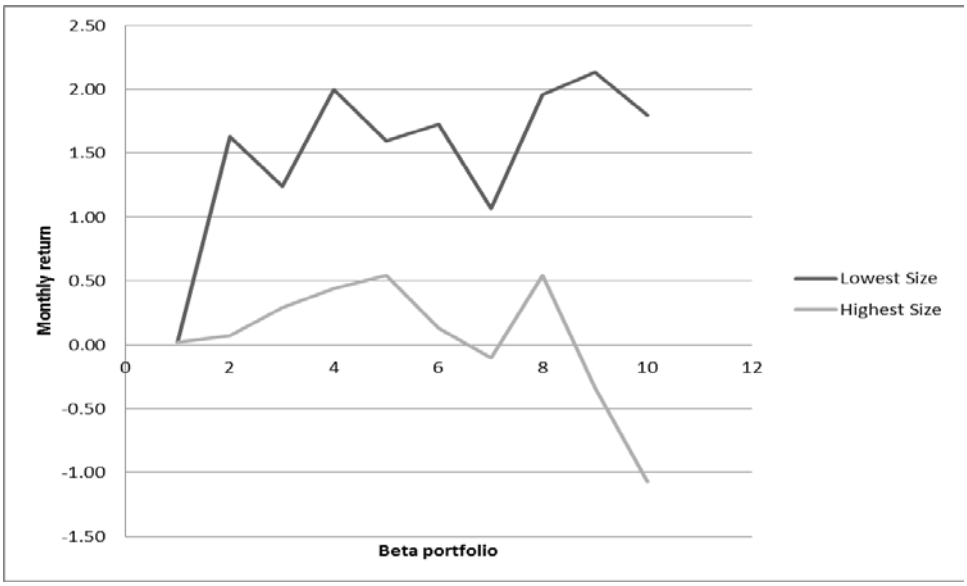
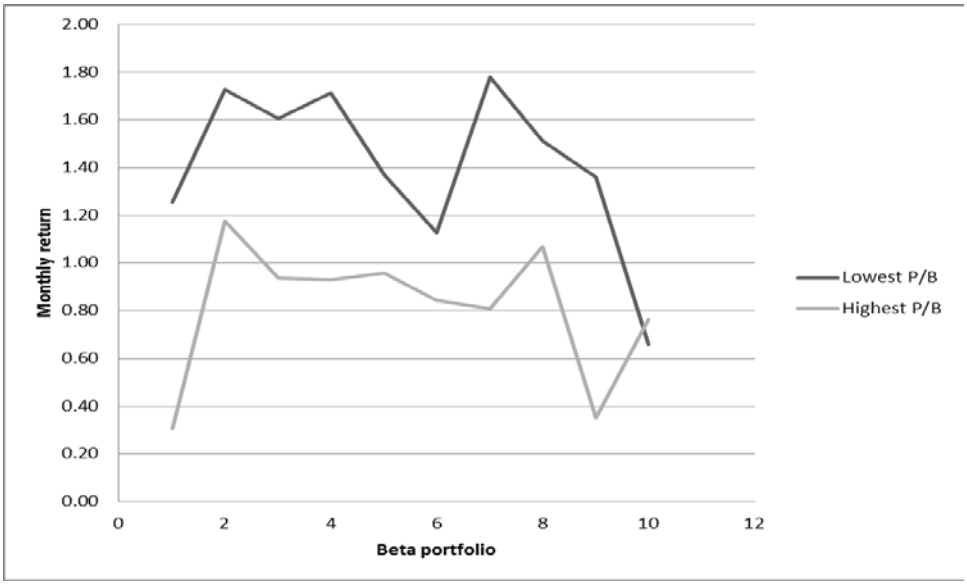
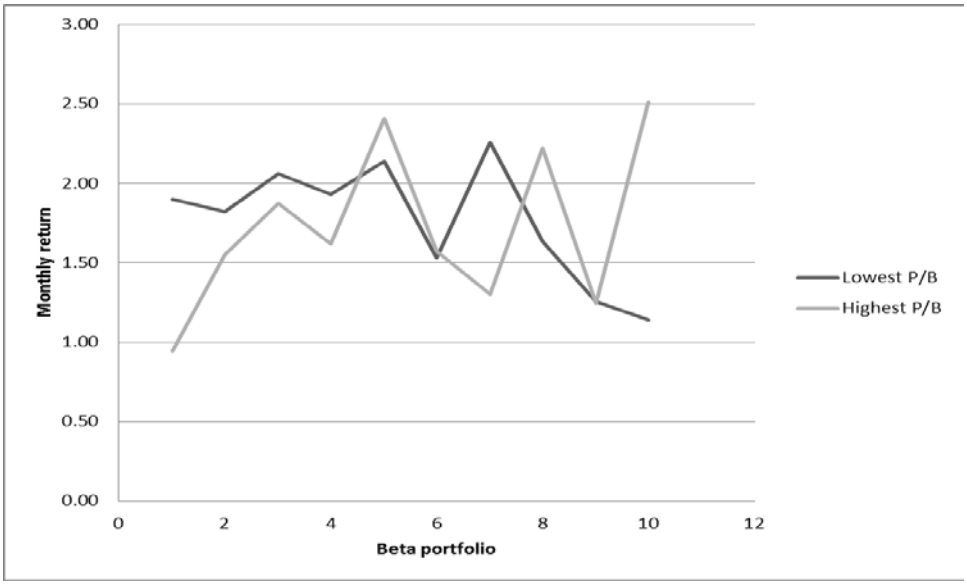


Figure 2: Mean Monthly Return of lowest and highest P/B ratio portfolios at different level of beta, Chinese Market.

a. Overall



b. Expansive Monetary Policy Period



c. Restrictive Monetary Policy Period

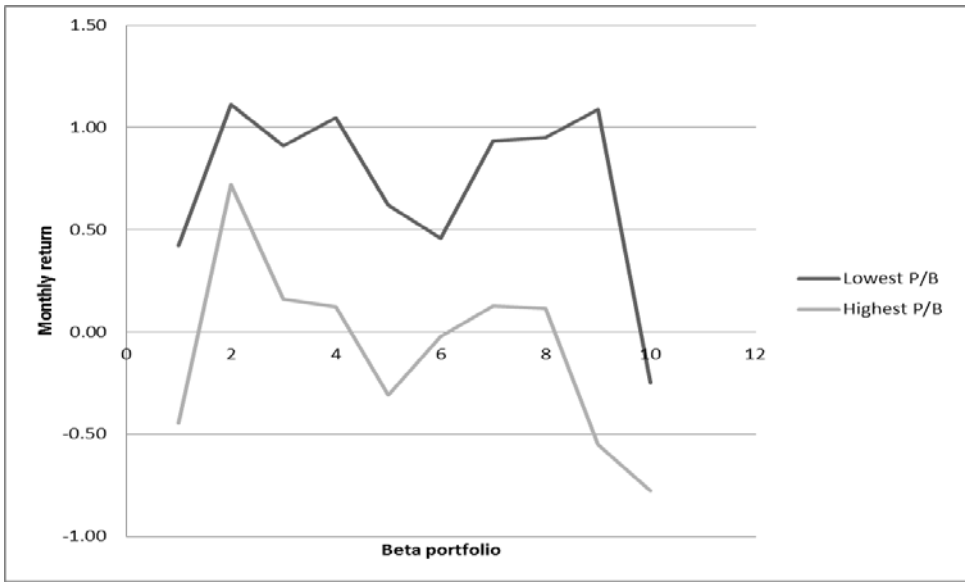
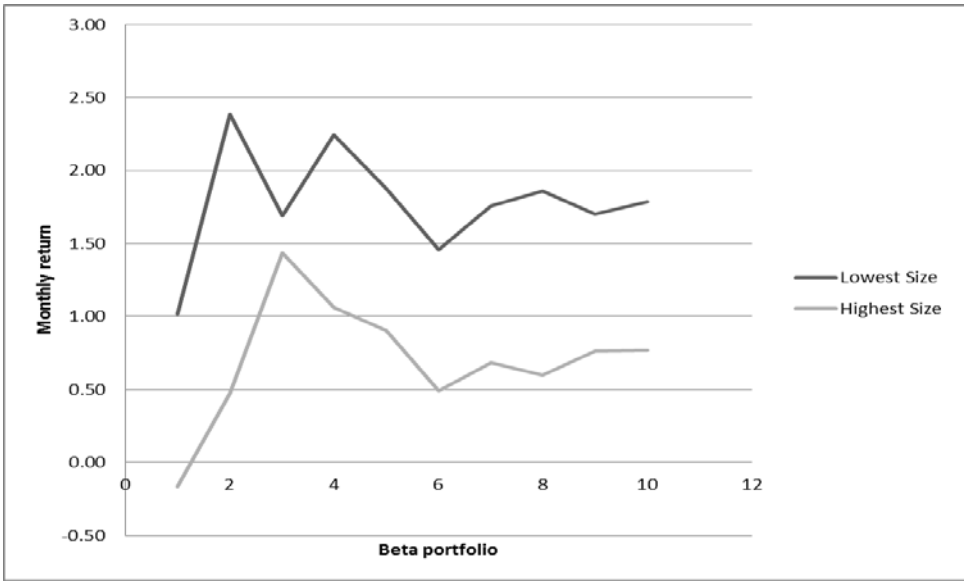
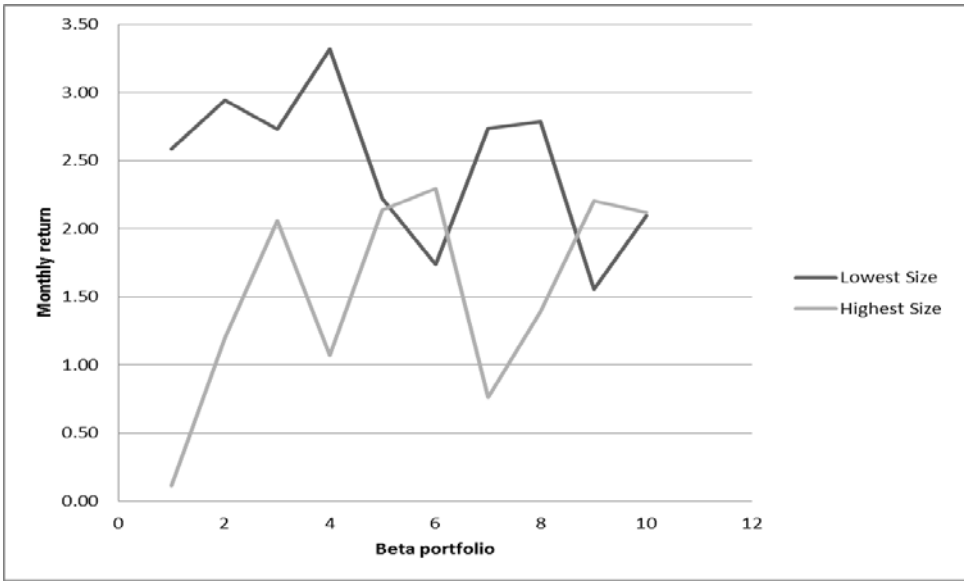


Figure 3: Mean Monthly Return of lowest and highest Size portfolios at different level of Beta, for Shanghai Stock Exchange.

a. Overall



b. Expansive Monetary Policy



c. Restrictive Monetary Policy

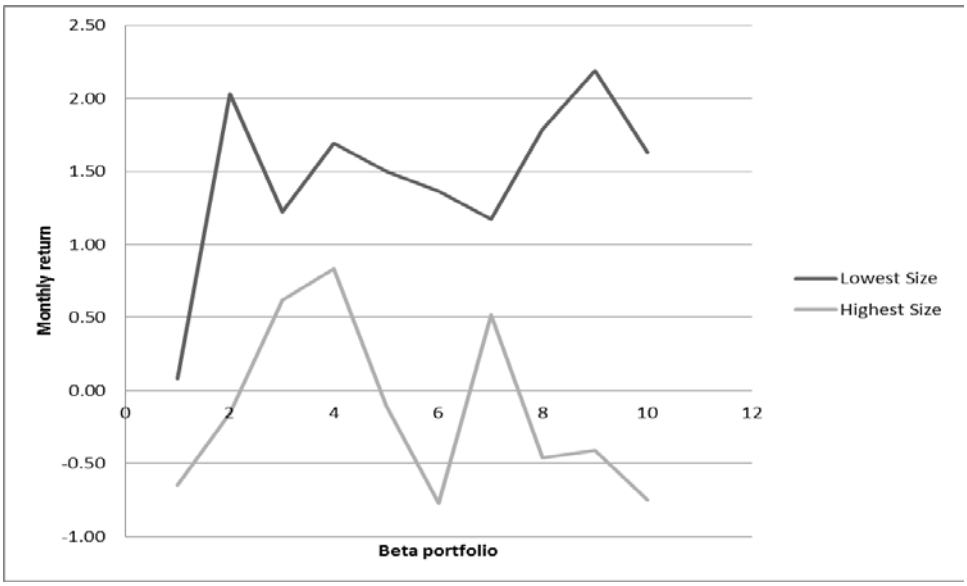
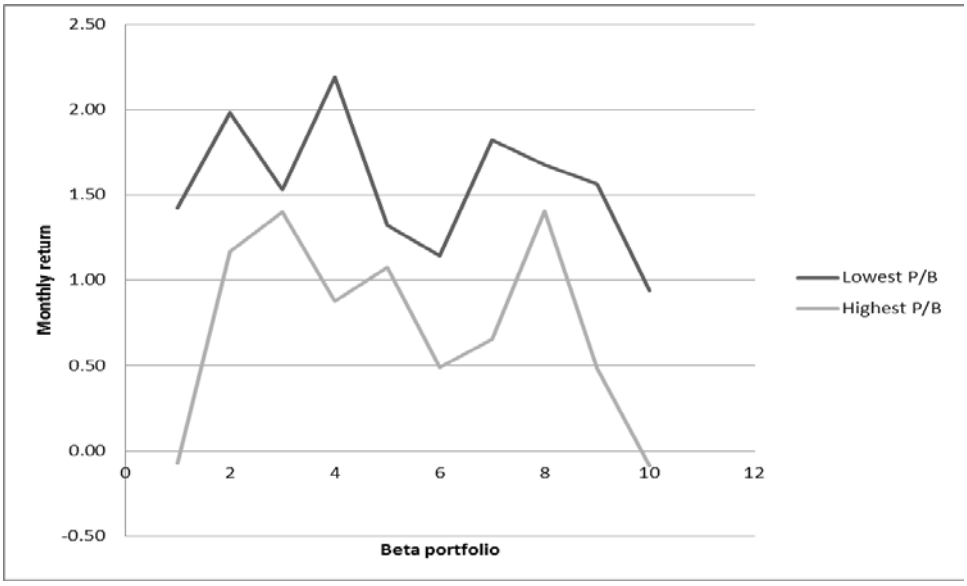
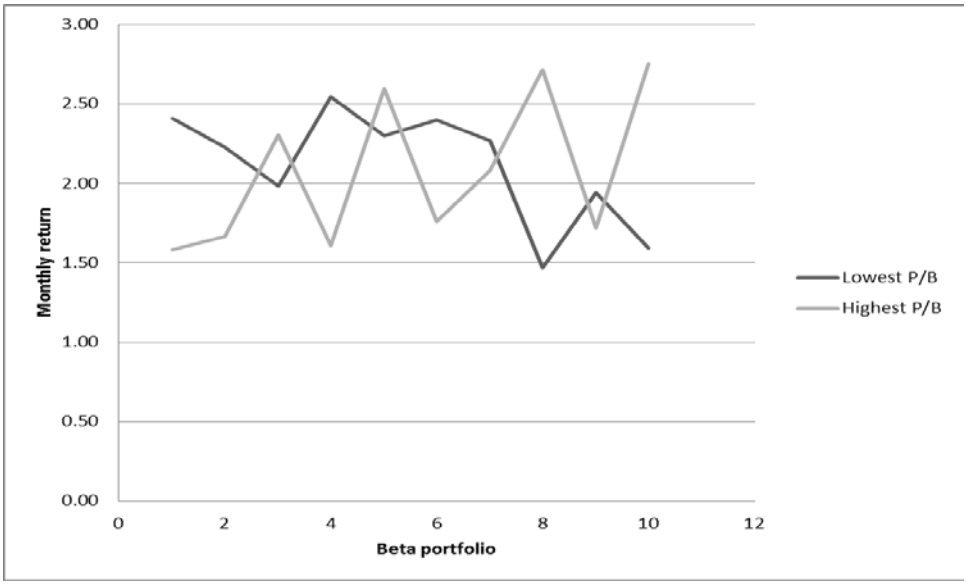


Figure 4: Mean Monthly Return of lowest and highest P/B ratio portfolios at different level of Beta, for Shanghai Stock Exchange.

a. Overall



b. Expansive Monetary Policy



c. Restrictive Monetary Policy

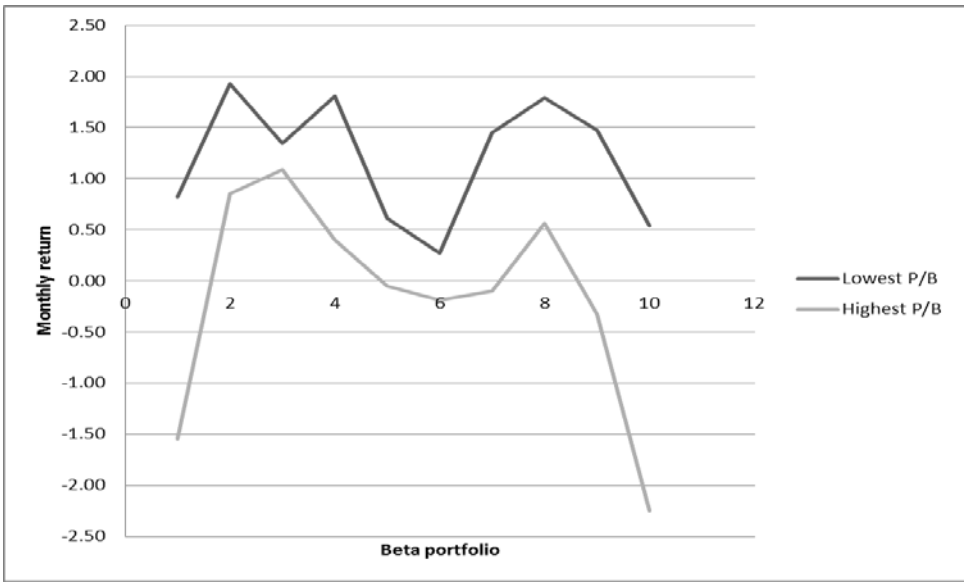
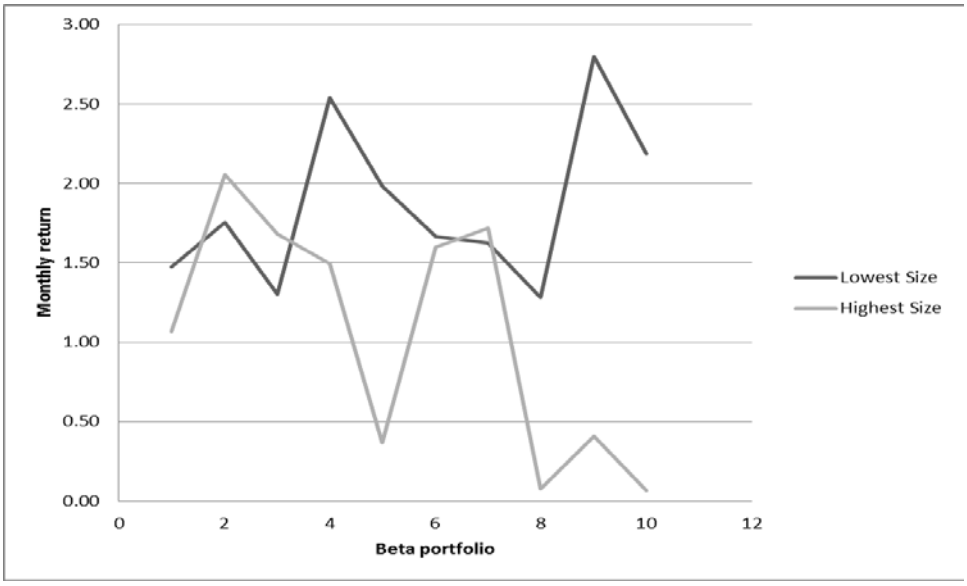
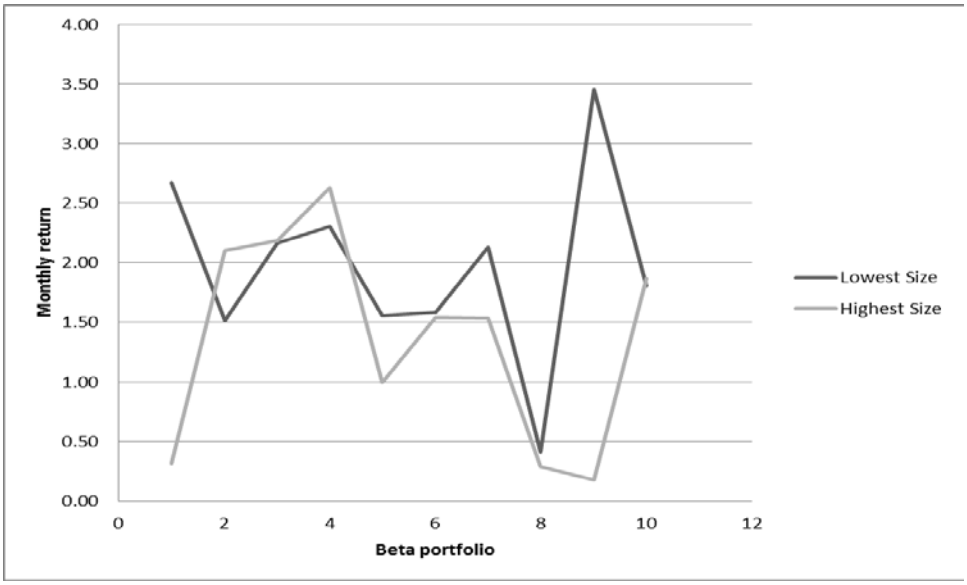


Figure 5: Mean Monthly Return of lowest and highest Size portfolios at different level of beta, for Shenzhen Exchange Market.

a. Overall



b. Expansive Monetary Policy Period



c. Restrictive Monetary Policy Period

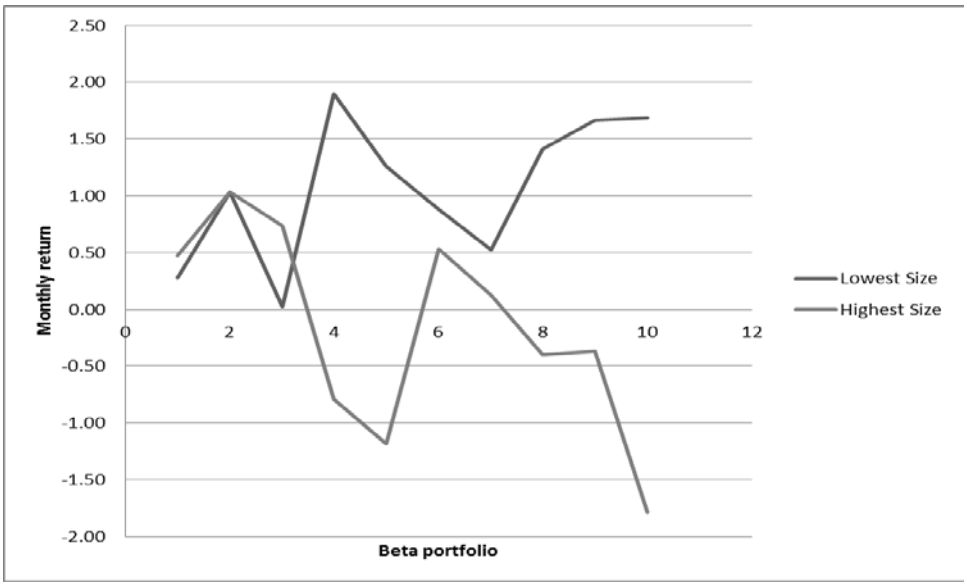
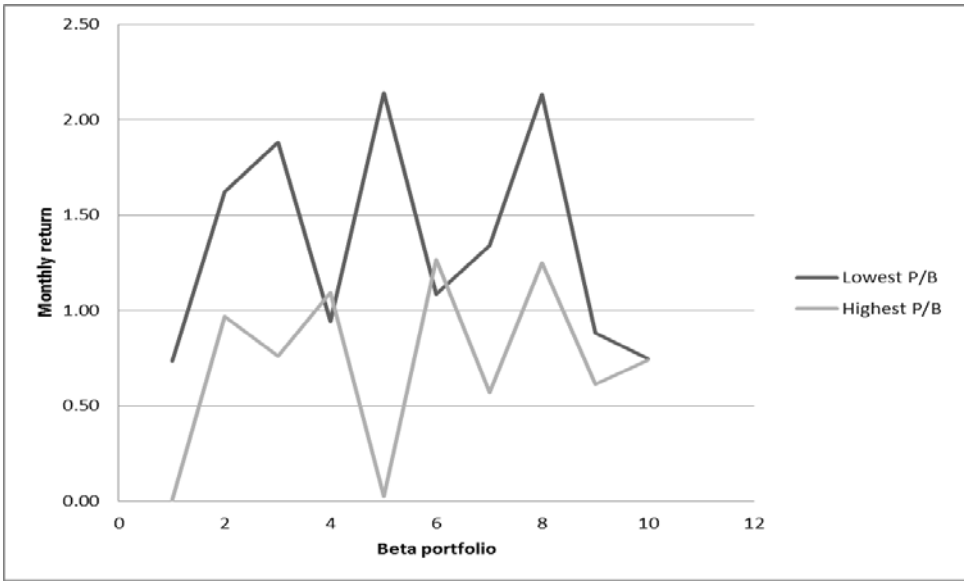
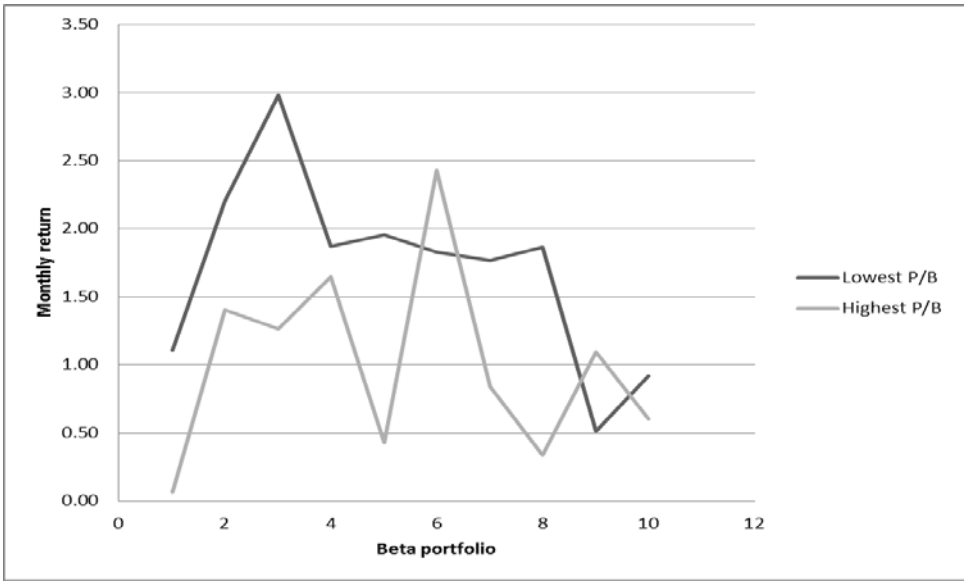


Figure 6: Mean Monthly Return of lowest and highest P/B ratio portfolios at different level of beta, for Shenzhen Exchange Market.

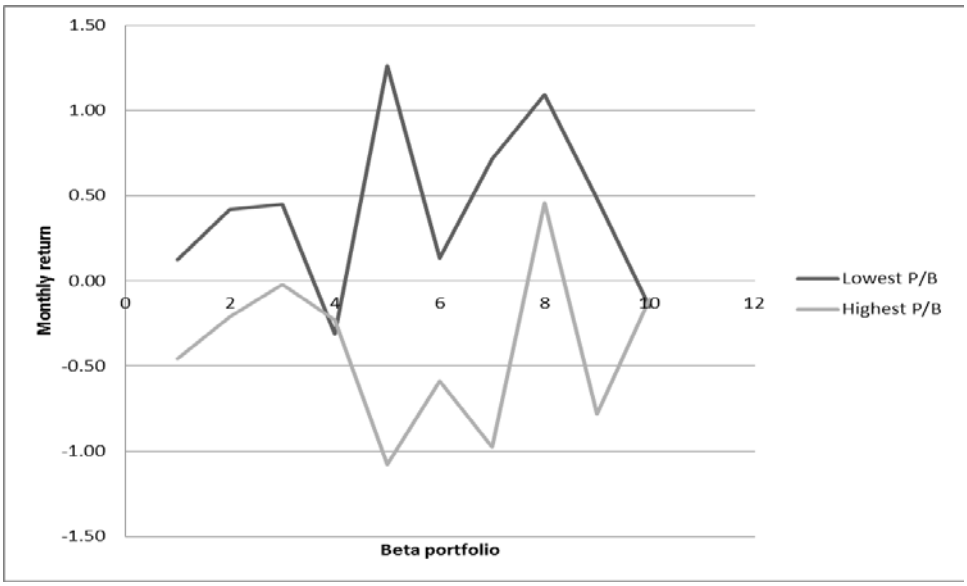
a. Overall



b. Expansive Monetary Policy Period



c. Restrictive Monetary Policy Period



CHAPTER V: CONCLUSION

This study provides strong evidence in support of the size effect across all levels of systematic risk in Chinese markets. This finding is consistent with previous studies in the U.S. as well as in the international markets. In contrast to previous studies (JJM), I find that the size effect is consistent and significant only during the times of a restrictive, but not expansive monetary policy environment. This finding is puzzling. JJM document that the size effect is significant and consistent only during the times of expansive monetary policy in the U.S. markets. They argue that during the restrictive monetary policy periods, small companies are likely to perform well with a generally expanding economy. Therefore their small size does not increase their risk. In times of an expansive monetary policy environment, the small companies tend to be more sensitive to the shrinking economy and therefore investors require additional compensation in form of higher returns.

There could be two explanations why my results on the influence of the stringency of monetary policy differ from the results of JJM. First, the size effect is well known and investors are aware of higher risk-adjusted returns of small-cap companies. Therefore, the abnormal returns may have been competed away in recent years. The second explanation could be that Chinese markets react differently to the monetary policy environment than the U.S. markets. In a restrictive monetary environment, the economy expands and investors have resources to invest in the markets. Therefore the herd behavior described

in Chinese markets may be more prevalent and powerful investors may engage in dominating small stocks more relatively more frequently.

My results do not provide definite evidence for the price-to-book effect in Chinese markets. This effect is virtually non-existent during the expansive monetary policy periods and weak during the restrictive monetary policy periods. This finding is not consistent with previous research. My sample, compared to the previous research, contains only recent years (2002 to 2011) which may explain the lack of the price-to-book effect.

My results also document that the Shanghai Stock Exchange and Shenzhen Stock Exchange behave differently. Generally, evidence from Shanghai Stock Exchange is stronger than from the Shenzhen Stock Exchange. Shanghai Stock Exchange seems to be more similar to the U.S. markets.

Chinese stock markets are relatively young and less developed than the U.S. markets. I find differences in the size and price-to-book effects in Chinese markets as compared to the U.S. markets. Future research could investigate the risk characteristics of small stocks in Chinese markets that may be the reasons for these differences. In addition, more research could be done on other less developed and emerging markets to find if they exhibit similar behavior to that found in Chinese markets.

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