Estimating the Equity Risk Premium: the Case of Greater China*

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Abstract

We provide improved estimates of the equity risk premium in markets within Greater China. To be consistent, we perform the estimation for periods when markets are recovering from the bottom. To justify the findings, we also apply a relative estimation approach, which takes into account the lower required rate of return for Chinese investors due to lack of investment opportunities. After making these adjustments, we find that risk premia in Shanghai and Shenzhen are close to risk premia in Hong Kong and Taiwan. All of these risk premia are higher than the corresponding risk premium for the U.S. market.

JEL classifications: G12, G15

Keywords: Equity risk premium, Relative estimation, Required rate of return

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1 Introduction

The expected Equity Risk Premium (ERP) is probably one of the most important and frequently-used inputs in various financial models. It is a key factor in asset pricing, corporate finance, and other fields in finance. In practice, it is an important estimate used by investors (e.g., in estimating the required rate of return on stocks), corporate managers (e.g., in estimating the required rate of return on investment projects), market regulators (e.g., in designing the market mechanism and making policies), and others. One unavoidable problem faced by academic researchers and practitioners when applying the value of risk premium is that only the realized risk premium from historical data can be observed. There is no guarantee that the estimated *ex post* risk premium is the same as the *ex ante* risk premium required in various applications. In fact, empirical estimates on the *ex post* risk premium are quite uncertain.[1] The estimates on the *ex ante* risk premium may largely deviate from the estimated *ex post* risk premium.[2] Furthermore, most researches focus on the U.S. equity market, but little attention is paid to other markets. In fact, capital markets in East Asia, especially in China and its neighboring regions, have grown rapidly in recent years and have become important in global markets. Thus a thorough investigation on these markets is of fundamental importance from an investment perspective. This paper makes contribution to the existing literature by providing new empirical evidence on the equity risk premium in mainland China, Hong Kong and Taiwan, the so-called Greater China markets.[3] The new empirical evidence is obtained by shedding light on the inconsistency issue between the *ex ante* and *ex post* risk premium.

There exist several different approaches of measuring the equity risk premium. The estimated *ex post* risk premia from historical data are often higher than those imposed by financial theories. Mehra & Prescott (1985) first notice the issue and denote it as the equity premium puzzle. Such a concern has led to the development of *ex ante* estimation models, in which the estimate is obtained from inverting a pricing model, such as the Gordon's (1962) dividend growth model. A number of researches have shown that these *ex ante* estimates are usually lower than their *ex post* counterparts (e.g., Fama & French

[1] As pointed out by Donaldson, Kamstra & Kramer (2009), "...such estimates have very wide margins of error, as wide as 1000 basis points in typical studies and 320 basis points in some recent studies."

[2] For example, Ibbotson Associates Inc. reports a long-term risk premium estimate in U.S. over 1926-2004 of 8.4% per annum in the annual yearbook, *Stocks, Bonds Bills and Inflation Yearbook,* Chicago, IL: Ibbotson Associates. On the contrary, Donaldson et al. (2009) report an *ex ante* estimate of 3.5%.

[3] The definition of Greater China is not unique. Here we accept the usual definition which includes mainland China plus Hong Kong and Taiwan. The word China refers to mainland China hereafter.

(2002) and Vivian (2005)).[4]

Given that estimates from historical data have traditionally been and continue to be used, we adopt the *ex post* estimate in this paper. However, we do concern the issue that whether the historical estimates are valid for forward-looking applications. In addition, we also take several special factors related to these markets into consideration when estimating the risk premium, especially for China, i.e., the Shanghai and Shenzhen market. These factors include the relatively short period of data availability compared to the U.S. market, the dual-listed and different-priced stock classes, the lack of alternative investment opportunities for Chinese investors, the more speculative investors, the more volatile market dynamics, and the underdevelopment of bond markets, etc. We believe that these factors affect the risk premium at different levels, which will be discussed below.

As a starting point, we estimate the equity risk premium from realized historical stock returns and treasury bond yields, assuming that the *ex post* risk premium can reflect the expected risk premium looking forward promptly. In order to keep consistency of estimates among different markets, we estimate the equity risk premium for the period when the economy is recovering from the bottom. By selecting the specific sample period, we implicitly assume that the estimated risk premium can correctly reflect the market price of risk required by investors for all markets when the market is recovering from the bottom. Previous works show that business cycles can predict asset returns and have an impact on expected risk premium, see Avramov & Chordia (2006) for their recent contributions on this topic. By estimating the risk premium from the recovery, we control for the uncertainty from business cycles for all markets and thus guarantee that the estimate is obtained under similar market conditions.

Although we make these improvements and control for the business cycle risk, the estimates from historical data may still not be reliable because of the relatively short period for stock market data in China. As an alternative, we follow Damodaran (1999) and apply the relative estimation methodology to estimate the equity risk premium. The idea is to select a benchmark market and estimate the risk premium for that market at first, and then the risk premium for other markets can be estimated by comparing the relevant risk level of these markets to the benchmark market. This method assumes that the per unit price of risk is roughly the same for all markets. To make estimates more precise, we make two adjustments. First, we consider, when estimating risk premium

[4] Cochrane (2001) provides several possible explanations for the difference between the *ex ante* and *ex post* equity risk premium.

for the benchmark market, to exclude factors that may lead a biased estimation, thus obtaining the unbiased forward-looking risk premium, as suggested by Dimson, Marsh & Staunton (2003). Second, since investors in China face fewer investment opportunities than their foreign counterparts, they may require a lower rate of return. We also take this factor into consideration when making estimation. To the best of our knowledge, we are the first ones to include this factor when estimating the equity risk premium for the Chinese stock market. We also provide the risk premium estimation for different sectors, since investors interested in different business may require for different risk premium.

The rest of the paper is organized as follows. Section 2 reviews prior studies and presents a brief introduction of markets in Greater China. Section 3 discusses the data and estimation methodology. Empirical results are reported in Section 4. Section 5 summarizes the conclusions.

2 Prior Studies and Market Background

2.1 Prior Studies

Ibbotson & Sinquefield (1976) are perhaps the first ones to estimate the equity risk premium from a long-term historical return series. They decompose historical returns on an equity index into a part attributable to the riskfree rate and a part attributable to the equity premium. The key assumption in their approach is that the equity premium is stationary - the expected equity premium should be the same as the realized equity premium in the history. They conclude that the equity premium of stock index over returns from treasury bills is about 7%.[5] Since then, numerous articles have appeared in the literature, yet most of them are focused on the U.S. and other developed markets.[6]

There have been few studies of equity premia estimates on Greater China markets. Mishra & O'Brien (2005) estimate the *ex ante* cost of equity for a sample of 16 emerging markets including China, from 1990 to 2000. They conclude that the equity premium for China is 8.3%, yet the data for China is quite limited (only 5 firms). Hail & Leuz (2006) examine the cost of equity across 40 international markets, which contain Hong Kong and Taiwan, from 1992 to 2001. However, the focus of their study is on the cost of equity

[5] In the geometric average term. This is also the case for all other measures in this paper, since it is well known that the geometric average is better in reflecting the investment performance than the arithmetic average.

[6] Recently, Song (2007) provides an extensive review of the literature on estimating the equity risk premium.

instead of the equity premium, although they are closely related. There also exist some recent studies on excess returns. Shackman (2006) empirically estimates excess returns for a number of international markets, including Taiwan. He finds that emerging markets usually have higher excess returns than developed markets. For the case of Taiwan, the annual excess return (in US$) is 16.06% for the period from 1970 - 2000. Salomons & Grootveld (2003) also find that emerging markets excess returns have higher Sharpe Ratios than developed markets excess returns. They find that the monthly excess return for China and Taiwan is 0.67% and 1.09% respectively for the sample period. Brown, Hiraki, Arakawa & Ohno (2009) provide the new empirical evidence on excess return for Hong Kong. They estimate the equity premium for Hong Kong is 8.60%.

All of these studies are somehow related to the Greater China markets, but none of them is exclusively focused on these markets. To the best of our knowledge, there is no study on estimating the equity risk premium regarding Greater China markets as a whole up to now. The lack of such study is unparallel with the high integration of these markets, especially in recent years, due to a number of factors, like the similar culture background, release of political intense, and close economic relations, etc.[7] Since the markets in China, Hong Kong and Taiwan have attracted a growing number of investors, The booming interest requires an integrated study on these markets. The present paper is an attempt to fill the gap.

2.2 Market Background

The Chinese Stock Market is relatively young, yet it develops quickly and has its own characteristics. The two stock exchanges, the Shanghai Stock Exchange (SSE) and Shenzhen Stock Exchange (SZE) were established in 1990 and 1991, respectively. Since then the market has experienced a rapid development. The Shanghai Stock Exchange, for example, with only 8 listed stocks when it was established, has developed into a market with 912 listed stocks by September of 2009. The same story holds for the Shenzhen Stock Market, which has 809 listed stocks by the same time. The total market capitalization including both Exchanges reaches CNY18,710 billion (or US$2743 billion) by the end of August, 2009.[8]

One interesting and important feature in Chinese stock market is the twin-share issue. Domestic-only shares (known as A shares) are listed in either Shanghai or Shenzhen.

[7] See Brown et al. (2009) for discussions on market integration in international markets in general.
[8] Data source: China Securities Regulatory Commission (CSRC), www.csrc.gov.cn.

Foreign-only shares are listed (Known as B shares) in the same market where the corresponding A share is listed,[9] and cross-listing is not allowed. Although A and B shares are legally identical with same voting rights and dividends, they are priced differently usually with significant discounts in B shares. A number of researchers have worked on the A-B share pricing puzzle. For recent contributions, see Hong, Scheinkman & Xiong (2006) and Zhu (2009), and references therein.

The establishment of the Hong Kong Exchange (HKEx) can be back to the year 1891. It is one of most important securities exchanges in the world. By September of 2009, a total of 6341 securities issued by 1114 companies are listed on the main board of the HKEx with a market capitalization of HK$15,872 billion (or US$2009 billion).[10] The HKEx allows stocks satisfying certain requirements to be sold short in the market. The qualified stocks are listed on the D-list. Any stocks not listed on the D-list are prohibited from short sales. This restriction makes HKEx unique, whereas almost all stocks can be sold short in NYSE or NASDAQ.

The Taiwan Stock Exchange (TWSE) was launched in 1962. In the following decades, it has played an important role for the capital market in Taiwan. By the end of 2008, there are 718 listed companies with 721 listed stocks. The market capitalization is NT$11,707 billion (or US$361 billion).[11] The scale of TWSE is much smaller than that of China or Hong Kong, yet it is still an unnegligible part of the capital market in the region of Greater China.

Although these markets have different background, they are closely related to each other due to factors mentioned earlier. Actually, investors usually classify these markets in a single group - as sometimes is referred to Greater China. Thus an integrated study on all of them becomes necessary. In next section we provide the data description and estimation methodology.

3 Data and Methodology

A natural way to obtain the equity risk premium is to estimate it directly from historical data. Assume that the stock market will continue to perform as it has done in the past, then the *ex post* equity risk premium provides a consistent estimation for the expected

[9] Some foreign-only shares are also listed in Hong Kong stock exchange (H shares) or New York stock exchange (N shares). However, H shares and N shares are not allowed to be listed in Shanghai or Shenzhen.

[10] Data source: Hong Kong Exchanges and Clearing Limited, www.hkex.com.

[11] Data source: The Taiwan Stock Exchange, www.twse.com.tw.

risk premium in the future. This requires a relatively long historical data, as suggested by Dimson et al. (2003). The approach is summarized as follows:

Define the daily log return as $r_t = \ln(\frac{P_t}{P_{t-1}})$, where P_t indicates the closing price of the stock on day t. We allow r_t to include both dividend yield and capital gain.

$$r_t = \ln[(D_t + P_t)/P_{t-1}]. \tag{1}$$

After obtaining the stock return, we subtract the riskfree rate from it to get the risk premium, as the following equation shows:

$$\pi_t = r_t - r_{ft}. \tag{2}$$

This risk premium is the risk premium in real term, since the inflation rate embedded in both stock return and riskfree rate is netted out.[12]

The riskfree rate is defined as the treasury bond yield for a given maturity. We collected treasury bond yields for different maturities, ranging from 3 months to 10 years. In asset pricing models, valuation is usually based on long-term analysis, thus the long-term riskfree rate, like the 10-year treasury yield, is more relevant. Here we also present estimated results of short-term riskfree rates for comparison. Then the excess return or risk premium is defined as $r_t - r_{ft}$, based on daily frequency. It is converted into the annualized risk premium by multiplying the number of trading days in a year. Here we consider that a business year length equals to 252 days. The estimated risk premium is also adjusted to possible bias occurred by difference between arithmetic and geometric mean. See Blume (1974) and Cooper (1996) for more discussions.

The limitation of estimating the equity risk premium from the historical data approach is also obvious. The well-known equity risk premium puzzle discussed by Mehra & Prescott (1985) shows that the estimated equity risk premium from historical data is too high to be consistent with any reasonable risk aversion assumption. Furthermore, the whole idea of using the realized historical data to forecast the required risk premium depends on the stability of the data, yet we often empirically observe that the data violate the assumption. It is reasonable to expect that the required risk premium is time-varying. Finally, there are many factors which influenced stock prices in the history and some of them are not

[12] Assume that norminal return of stock and norminal treasury yield can be expressed as $\widehat{r}_t = r_t + \inf_t$ and $\widehat{r}_{ft} = r_{ft} + \inf_t$, where r_t and r_{ft} are real return and real treasury yield, and $\inf_t$ is the inflation rate. Then we see that $\widehat{r}_t - \widehat{r}_{ft} = r_t - r_{ft}$, i.e., the risk premium from norminal terms equals risk premium in real terms.

repeatable. We must take account of these facts when we use the historical data to estimate the required forward-looking risk premium.

One possible solution to alleviate the impact of these factors is to estimate the risk premium based on similar market conditions. In this way we make the estimated risk premium to be comparable for all markets. In this paper we let the risk premium to be estimated from the "Bottom Point". That is, we choose the estimation period starting from the beginning of recovery for all markets. The selection of the sample is to control for specific market conditions. It allows the risk premium to be estimated under similar scenarios. There is plenty of evidence that markets are highly co-varied in bearish situations. For example, Erb, Harvey & Viskanta (1994) document that monthly cross-equity correlations among the G7 countries are the highest when any two countries are in a common recession and also show that the correlations are much higher in bear markets. This may be due to some common factors which affect all markets in the bearish situation. See Campbell, Koedijk & Kofman (2002), Ang & Bakaert (2002), Patton (2004), and Poon, Rockinger & Tawn (2004) for recent studies on this topic. The business cycle may also have impact on asset returns, as indicated by Avramov & Chordia (2006) and others. By estimating the risk premium from the "Bottom Point", we can take the impact into consideration and make sure that risk premium is estimated under similar conditions for all markets.

Although the above-mentioned method alleviates the impact of certain factors on risk premium estimation by using the historical data, the results may still suffer from the short period available for estimation, especially for emerging markets like China.[13] We therefore adopt another method to estimate risk premium and make comparison between these two approaches. The alternative is called the relative estimation approach. The idea is first to choose a benchmark market and estimate risk premium for that market. Then for other markets, the risk premium is estimated by comparing their risk levels to that of the benchmark. The key issue for the method is to choose a benchmark with a long history of data and to correctly estimate the forward-looking risk premium from historical risk premium for the benchmark, excluding all factors which may bias the estimation from historical data.

Following Dimson et al. (2003), we consider two factors that are included in the historical risk premium. In order to correctly estimate the required risk premium from historical data, we have to separate their effects from the historical risk premium. These two factors

[13] See Damodaran (2008) for more discussions.

are the unexpected dividend growth and the fall in the required risk premium, the later is due to diminished business and investment risk. These two factors distort the estimation for the true risk premium from historical data since they are based on investors' expectation and don't reflect the real change in risk premium. So we have to extract both from the actual historical data.

To estimate the unexpected dividend growth, we assume that investors use the long-term real dividend growth rate to make a naive projection of future real growth. More specifically, at the beginning of year t, investors use the long-term real dividend growth rate up to year $t-1$ to project the dividend growth rate for year t. At the end of year t, investors observe the realized dividend growth rate in that year. The unexpected dividend growth rate for year t is calculated as the difference between the projected dividend growth rate and realized dividend growth, as in the following expression:

$$g_{ut} = \frac{1}{t-1}\sum_{i=1}^{t-1} g_i - g_t, \tag{3}$$

where g_{ut} is the unexpected dividend growth rate for year t, g_i is the realized dividend growth up to year $t-1$ and g_t is the realized dividend growth rate for year t.

This procedure is repeated for each year and the averaged unexpected dividend growth is the one that we need to subtract from the historical equity risk premium:

$$\text{Unexpected dividend growth} = \frac{1}{T}\sum_{i=1}^{T} g_{ui}. \tag{4}$$

Another factor we need to exclude from the historical data is the change in valuation basis for equity markets due to the diminished business and investment risk. The diminished business risk is attributed to technological innovation, productivity and efficiency growth and improvement of management and corporate governance, etc. The diminished investment risk may attribute to diversified benefits, decrease in transaction costs and so on. All these factors may cause a fall in the required rate of return in the long term. For example, the price/dividend ratio at the start of 1900 was 23 for U.S. and it increased to 81 in 2002.[14] This change must in part reflect the fall in the required rate of return for investors. We need to exclude that factor as well when estimating the expected equity risk premium. To keep things simple, we assume that the increase in the price/dividend ratio

[14] See discussions in Dimson et al. (2003).

is attributed solely to the long-term fall in the required rate of return, as the assumption made by Dimson et al. (2003). Then the fall in the required rate of return is estimated as follows:

$$\text{Fall in required rate of return} = \sqrt[T]{\frac{(P/E)_T}{(P/E)_0}} - 1, \tag{5}$$

where $(P/E)_T$ and $(P/E)_0$ are the P/E ratio at the end and at the beginning of the sample period respectively, and T is the number of years for the sample period. The adjusted risk premium is estimated by subtracting the unexpected dividend growth and the fall in the required rate of return in Eq. (4) and Eq. (5) from the risk premium in Eq. (2).

After obtaining the adjusted forward-looking projection of equity risk premium for the U.S. market, we can derive the risk premium for markets in Greater China from the U.S. estimates. Following Damodaran (1999), one simple approach is to assume that the market price of risk is relatively constant for all markets. Thus if we know the equity risk premium for the benchmark market and risks (reflected by volatility) for the benchmark and other markets, we can estimate equity risk premia for other markets using the following equation:

$$ERP_i = \frac{\sigma_i}{\sigma_{US}} ERP_{US}, \tag{6}$$

where σ_i and σ_{US} are the volatility for market i and the U.S. market respectively.

The relative estimation approach sounds attractive. It avoids the problem of unreliable estimation of historical data due to lack of data for markets like China. Also for certain market like Taiwan, since the market performed quite poor for the estimation period. The estimated risk premium is close to zero or even negative, which doesn't make any sense for valuation purpose. In that case, the relative estimation approach becomes a promising alternative instead of the pure historical estimation.

We can even go further, especially for the case of China. Prior studies show that the Chinese stock market is relatively a segmented market compared to the rest of the world. For example, Fernald & Rogers (2002) argue that domestic investors in China face fewer investment opportunities than their foreign counterparts due to strict capital control and other regulations. Yang (2003) also concludes that Chinese stock market has low correlation with other markets. See Bailey (1994), Sun & Tong (2000), Chen, Lee &

Rui (2001), and Zhu (2009) for more discussions.

If domestic investors in China face fewer investment opportunities, they may require a lower rate of return since they have few alternative options. However, the risk premium we estimate from Eq. (6) is based on the assumption that investors assign the same value per unit of risk in all markets. Thus it may not correctly reflect the risk premium in a segmented market like China. We need to make the adjustment for the value obtained from Eq. (6). The question left is how to quantify the adjustment or the difference in the required rate of return due to market segmentation. A ready-proxy for such spread is the average B share price discount. As discussed in Section 2, the corresponding B shares enjoy the same dividend policy and voting rights. They are virtually equivalent to A shares for valuation purpose. According to the Gordon's (1962) model, the current stock price can be expressed as follows:

$$P_0 = \frac{D_1}{r-g}, \tag{7}$$

where P_o is the current stock price, D_1 is the expected dividend for the next year, r is investor's required rate of return, and g is the dividend growth rate.

For A share and the corresponding B share, Eq. (7) implies that:

$$P_A = \frac{D_1}{(ERP_A + r_{f,A}) - g}, \tag{8}$$

and

$$P_B = \frac{D_1}{(ERP_B + r_{f,B}) - g}, \tag{9}$$

where P_A and P_B are prices for A share and corresponding B share respectively. ERP_A and ERP_B are equity risk premia for A share and B share, and $r_{f,A}$ and $r_{f,B}$ are correspondingly riskfree rates applying to A share and B or H share.[15] Since A share and B share are issued by the same company, they have equivalent D_1 and g.

Rearranging Eq. (8) and Eq. (9), we get the following equation for ERP_A:

$$ERP_A = \frac{p_B}{P_A}[(ERP_B + r_{f,B}) - g] + g - r_{f,A}. \tag{10}$$

Assume the risk premium for proxy ERP_B equals risk premium we obtain from Eq. (6).

[15] Since B shares are quoted in US dollar in Shanghai and HK dollar in Shenzhen, we use the yield for treasury bonds issued in U.S. and in Hong Kong as proxies for riskfree rates for B shares, respectively.

As long as we know the proxy discount, $\frac{p_B}{P_A}$, the riskfree rates, $r_{f,A}$ and $r_{f,B}$, and dividend growth rate, g, we can estimate ERP_A from Eq. (10). For example, if $\frac{p_B}{P_A} = 0.6$ (the average B-share discount obtained from the market), $r_{f,B} = 5\%$, $r_{f,A} = 3\%$, $ERP_B = 11\%$, and $g = 2\%$, given these values, according to Eq. (10), $ERP_A = 7.4\%$. Thus there is a 3.6% spread for the adjustment. We will apply this method for adjustments in empirical studies presented in the next section.

4 Empirical Results

The data on stock market indices of markets in Greater China is collected from stock exchanges in Shanghai, Shenzhen, Hong Kong, and Taiwan. Due to historical reasons, the stock markets in Hong Kong and Taiwan were opened much earlier than the stock markets in Shanghai and Shenzhen, which were launched in early 1990s. The Shanghai Composite Index (SHCI), Shenzhen Composite Index (SZCI), Hong Kong Hang Seng Index (HSI) and Taiwan Weighted Industry Index (TWII) are adopted as representative indices for these four markets. A brief introduction of these indices is given as below.

The Shanghai Composite Index is complied and published by the Shanghai Stock Exchange. It is a weighted index which includes all listed stocks in Shanghai and total market capitalization is used as the weight for each stock. The publishing date for SHCI is on July 15, 1991, using the date on December 19, 1990 as the basis date and 100 as the starting value. The construction of Shenzhen Composite Index is similar to that of SHCI. It also includes all listed shares in Shenzhen stock market and uses total market capitalization as the weight for each stock. The Hang Seng Index is one of the best known indices in Asia and widely used by fund managers as their performance benchmark. It is a market capitalization-weighted index of the representative listed stocks in Hong Kong stock market. The Taiwan weighted index is also a market capitalization-weighted index, which is similar to HSI. Finally, for the U.S. market, we choose the S&P 500 index. It is the most representative index for overall market performance and widely used for academic and practical purposes.

Since we would like to estimate the equity risk premium from the "Bottom point", i.e., the date when markets recover from the bottom, the starting date for estimation varies for different markets. For the U.S. market, we choose the start date as from October 20, 1987, the date following "the Black Monday" in 1987, and from when the stock market recovered. For the Hong Kong market, we choose June 6, 1989, the date on which the market rebounded from the previous crash and grew rapidly afterwards. For Taiwan, the start date is on October 2, 1990, the date on which the market recovered from the bust of internet bubble. For the two markets in China, i.e., the Shanghai and Shenzhen stock market, since there is no significant crisis caused by fundamental changes after the establishment of the markets, we choose the estimation period from July 1, 1996. Note we discard the data for the earlier years of the markets due to the abnormal instability of the data. The ending date is fixed on June 30, 2008 for all markets.

The data is obtained from Yahoo!Finance and the Center for Research on Security Prices (CRSP) data set. For the riskfree rate, we choose the yield to maturity of U.S. treasury bills with different maturities, ranging from 3-month to 10-year. The 3-month HIBOR (Hong Kong Interbank Offer Rate) is used as the riskfree rate for Hong Kong. Since the limitation of data, we choose the three-month deposit rate and averaged deposit rate as a proxy for risk-free rates for China and Taiwan, respectively.

Table 1 reports the summary statistics for those indices. We can observe that the S&P 500 index has the most daily observations and SHCI and SZCI have the least observations. The annualized mean is more than 14.0% for SHCI, SZCI and HSI. It is 12.0% for S&P 500 index and is only 7.11% for TWII. However, the volatility (as expressed as the annualized standard deviation in the table) is also much higher for SHCI and SZCI than for S&P 500 index. This is consistent with previous researches: emerging markets provide higher return, yet companied with higher risk, compared to developed markets. The volatility for HSI and TWII is close and they range between that of SHCI, SZCI and S&P 500. The values of skewness and kurtosis indicate that the distribution of these return series is not far away from the normal ones.

<Insert Table 1 about here>

Table 2 reports the Pearson correlation coefficient estimations for period from July 1, 1996 to June 30, 2008. Considering the time difference and the leading effect of the U.S. market, we use the one-day lagged S&P 500 index to calculate its correlation with other indices. It is obvious to see from the table that the two stock markets in China has much lower correlation with S&P 500 index compared to HSI and TWII. Yet there is strong evidence of highly positive correlation between SHCI and SZCI. This indicates that the two stock markets in China are still relatively segmented from other markets. HSI and TWII have higher correlation with S&P 500 index, although the correlation between HSI and S&P 500 is almost doubled than the correlation between TWII and S&P 500. To reflect the acceleration of openness for China's capital markets in recent years, we also present the estimation results for the correlation coefficient from July 1, 2002 to June 30, 2008. The results are shown in the second panel of Table 2. It is interesting to see from the table that the correlation between SHCI, SZCI and S&P 500, respectively, is increased to 0.103 and 0.0769 from 0.0609 and 0.0491 for the full period, although the absolute amount increased is not much. Also it is true that there is not much increase for the correlation between HSI, TWII and S&P 500 index. However, the correlation between HSI and two stock markets in China is almost doubled. It indicates that, in recent years, the Hong Kong stock market become more integrated with the stock market in China. We believe the trend should continue in the future, taking closer economic relations between these markets into consideration.

<Insert Table 2 about here>

Next we estimate the risk premium for S&P 500 index against treasury yields with different maturities for a long period of nearly 50 years. The results are presented in Table 3. We see that for different riskfree rates, the risk premium ranges from 3.20% to 6.10%. This result is similar to prior studies, i.e., Fama & French (2002) and Goetzmann & Ibbotson (2005).

<Insert Table 3 about here>

Table 4 reports the first major result for this paper: the equity risk premium estimated from historical data considering the recovery period. It is not surprising that SHCI and SZCI offer the highest risk premium among all indices. In the contrast, TWII offers the lowest risk premium, which is even much lower than that of S&P 500 index. It indicates that the stock market in Taiwan from 1990 performed poorly compared to other markets. However, on the other side, SHCI and SZCI also show the highest volatility. Calculating the usual Sharpe Ratio, we find that S&P 500 index has the highest Sharpe Ratio, and the Sharpe Ratio for SHCI, SZCI and HSI is on similar level and TWII has the lowest Sharpe Ratio, due to the poor performance of the market.

<Insert Table 4 about here>

The figures following Table 4 describe dynamic of risk premium for these indices over the estimating periods. It is obvious to see that SHCI and SZCI are more volatile than other indices, especially for the period starting from 2005. This reflects the bull market for China starting from the end of 2005 and the following crash after the bull market. For other indices, we see from the figures that although the risk premium is volatile year over year, it becomes more stable for later period, especially for Hong Kong and Taiwan.

<Insert Figures about here>

Table 5 to Table 9 report the estimated risk premium for representative sectors in different markets. We select manufacturing, properties and finance sectors for the Shanghai and Shenzhen stock market and Table 5 and Table 6 report results for those two markets. Due to data availability, the estimation period is shorter compared to Table 4 and varies for different sectors. As a comparison, we also provide estimation results for the market index in the sixth column, in addition to sectors. In Table 5, we see that the manufacturing sector offers a little higher risk premium than the market, although the properties sector offers a risk premium less than 3.0%. Finance sector performs much better than the market and other sectors, which can be verified from its highest Sharpe Ratio. However, the result for Shenzhen market is quite different. In Table 6 we see that the manufacturing sector has the worst performance, and the properties sector becomes the best. Note that the estimation period is starting from 2001 instead of 1997 as for Shanghai. We can make a reasonable conclusion that the properties sector develops quite positively in recent years, yet the manufacturing sector does well in earlier years but becomes worse since 2001. Table 7 reports sector risk premium for Hong Kong. Again the finance sector leads the market, and other sectors, the commerce & industry sector and the properties sector, provide the risk premium less than the market does. The result for Taiwan is presented in Table 8. Although the risk premia are quite low or even negative, we can still see that finance sector beats the market and the risk premium for the electronic sector is much lower than the market risk premium. The results for the U.S. market (Table 9) are not much different. The industry sector runs behind the market and the finance sector is in the leading position compared to the market. From these tables, we may conclude that the finance sector is performing positively against the market in almost all markets, and the performance of the manufacturing sector seems to be behind the market.

<Insert Table 5 to Table 9 about here>

As we mentioned earlier, the estimates from historical data suffers from several weaknesses. One of them is that the estimated risk premium may vary significantly from year to year. In order to obtain reliable estimates, we need a sufficiently long historical data series to iron out good and bad lucks. However, it is difficult for emerging markets to fulfill the requirement since these markets usually have short history and the market often suffers from abnormal fluctuations. To check that, we estimate the realized risk premium for each year over the estimation period for all markets in Great China and present the result in Table 10. We see that these estimated risk premia range widely from year to year, especially for SHCI and SZCI. For example, the risk premium reaches as high as 81.7% for SHCI and then drops more than −100.0% (in log return). It is the similar story for SZCI. Although HSI and TWII are not as volatile as SHCI and SZCI, they also face the similar problem of large deviation from their mean. Thus estimating risk premium by only using historical data is not enough for justification.

<Insert Table 10 about here>

In order to make sure that our estimated risk premium from historical data is reliable, here we use the alternative approach to get another estimates. We call it the relative estimation approach. As illustrated before, we first choose a benchmark market and estimate a reliable risk premium for that market, then risk premium for other markets can be derived by comparing the relevant risk between the benchmark and target markets. The key is to estimate the forward-looking risk premium for the benchmark correctly. We exclude two factors from the estimation of pure historical risk premium. The first is the unexpected dividend growth and the second is the fall in the required rate of return. After calculating values for these two factors, we subtract both from the real risk premium and thus obtain the forward-looking risk premium for the benchmark. The risk premium for other markets is estimated by comparing the benchmark and these markets.

As we want to obtain a reliable risk premium for the benchmark, we need the history data to be as long as possible. Thus we estimate the risk premium for the CRSP S&P 500 value-weighted index from January 1, 1925 (the start date of CRSP data set) to December 31, 2007. Using yield on 10-year treasury bond as a proxy for riskfree rate, we see that the real annualized risk premium from the estimation is 6.70%. The unexpected dividend growth rate is estimated by applying Eq. (7) and Eq. (4). Using historical data of S&P 500 index with dividends, we can estimate the average unexpected dividend growth rate is 0.66%. The fall in required rate of return is estimated by simply assuming that the raise in P/E ratio from 1925 to 2007 is solely due to the fall in required rate of return, thus we obtain the value to be 1.60% per year.

After subtracting the unexpected dividend growth rate of 0.66% and the fall in required rate of return of 1.60% from the historical risk premium, we obtain the forward-looking risk premium with a value 4.44%. Then we use Eq. (6) to calculate risk premium for Chinese stock markets. The result shows that the risk premium for SHCI and SZCI is 11.23% and 14.04% respectively, and risk premium for HSI and TWII is 8.19% and 8.75% respectively.

<Insert Table 11 about here>

The numbers seem to be close to the risk premia reported in Table 4 except for the case of Taiwan. However, we believe that this number is more reliable for Taiwan, since the risk premium obtained from the historical data may be biased due to the extremely bad performance of the market during the estimation period. A risk premium lower than 3%, as reported in Table 4, seems to be too low for any given reasonable assumptions.[16]

The case for China is also interesting. As we argued before, the investors in China face few investment opportunities, thus they may require a lower rate of return, as compared to the investors who have more investment opportunities, i.e. the investors in B share markets. Using Eq. (10) we can estimate the adjusted risk premium for Shanghai and Shenzhen stock markets. The current averaged B and H shares discount is 0.62,[17] the risk-free rate for Hong Kong is 4.52% and risk-free rate for Shanghai and Shenzhen is 2.25%. We assume that dividend growth rate equals to the actual dividend growth rate of 1.2%. Using the estimated risk premium of 11.23% for Shanghai and 14.04% for Shenzhen and plugging these numbers into Eq. (10), we obtain the after-adjustment risk premium for Shanghai is 7.98% and 9.71% for Shenzhen, as shown in row 8 of Table 11. So the adjusted risk premium, taking the lower required rate of return due to lack of investment opportunities into consideration, is roughly 3.0% lower than the estimates from the relative estimation approach. After the adjustment, the risk premium for the Shanghai market is close to the risk premium obtained from the Hong Kong and Taiwan market. We also note that the Shenzhen market has a higher risk premium than that of Shanghai, but it

[16] Fama & French (2002) report estimates of equity risk premium of 2.55% and 4.32% for the U.S. market for the period of 1951-2000, by using dividend and earnings growth retes respectively to measure the expected rate of capital gain. However, the risk premium for the Taiwan market should be higher than those since Taiwan is, to some extent, considered to be an emerging market and should have higher required rate of expected return.

[17] This number is estimated by averaging the B share price dsicount for all B shares listed in Shanghai and Shenzhen.

also faces higher risk. Both Shanghai and Shenzhen market have higher risk than those of the Hong Kong and Taiwan market, as reflected in the annualized standard deviation.

Although it is difficult to empirically test our findings since we never know the true *ex ante* or forward-looking risk premium,[18] we believe that the relative estimation approach is a promising alternative way to estimate the risk premium. It may provide more relevant results, especially in the case when the market performs badly (in the case of Taiwan) or the market fluctuates widely (in the case of China) during the estimation period. Furthermore, the choice of the estimation period is more or less arbitrary in the historical data approach, and the difference choice will lead to quite different results, as shown in Table 10. The relative estimation approach avoids these problems. On the other hand, the relative estimation approach requires to choose a reliable benchmark market and makes some additional assumptions. The suitability of the benchmark and assumptions will have significant impact on the results. Nevertheless, it provides an alternative option to estimate the risk premium. For the case of China, prior studies show the similarly empirical results. For example, Liao & Wang (2003) conclude that the risk premium in China should be 6.38%. Also see Cheng & Zhang (2004) for the equity risk premium estimation in Chinese stock market. We complement to the existing literature by presenting more empirical results.

5 Conclusion

This paper provides the empirical estimation for the risk premium in Great China's stock markets. We use two approaches to estimate those values: historical data approach and relative estimation approach. We use the historical data from the recovery point for the economy and the result shows that the equity risk premium for Shanghai and Shenzhen market is higher than that for others. The real risk premium is about 11.0% for these two markets. As a comparison, the risk premium for Hong Kong and U.S. is about 10.3% and 7.6%, respectively. However, the risk premium obtained from historical data may not be reliable. It highly depends on the market performance for the estimation period. The case of Taiwan verifies the weakness. The historical risk premium for Taiwan is less than 3% from the historical data due to the unusually bad market performance.

In order to justify the results obtained from the historical data, we apply the relative estimation approach as an alternative. The results show that the risk premium for the

[18] See Fama & French (2002) for more discussions.

U.S. market, adjusted for unexpected dividend growth and a fall in required rate of return, is about 4.4%. From that number we calculate the market risk premium for stock markets in Great China. We also take into consideration the lower required rate of return due to lack of investment opportunities for investors in China. Using B share discount as a proxy for difference in risk premium, we show that the after-adjustment risk premium for the Shanghai and Shenzhen market is about 8.0% and 9.7% respectively, which is close to the risk premium obtained from the same approach for the Hong Kong and Taiwan market. Estimates of the risk premium for different industry sectors are also provided. It is interesting to see that in recent years, the finance sector provides higher return than the overall market and other sectors for all markets except for Shenzhen, yet the manufacturing sector seems to run behind the market for all markets except for Shanghai.

The relative estimation method seems to provide more reliable estimates compared to the historical data. However, the choice of the benchmark market is critical. The present paper chooses the U.S. market as the benchmark, since it has the longest historical data. The choice of other markets may change the empirical results. The improvement on measuring the relative risk between the benchmark and the target market is also a key issue for obtaining better results. Both are left for further research.

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Table 1: Summary statistics for market indices

Markets	SHCI	SZCI	HSI	TWII	S&P 500
Sample period	1996/07/01–2008/06/30	1996/07/01–2008/06/30	1989/06/06–2008/06/30	1990/10/02–2008/06/30	1987/10/20–2008/06/30
Daily Observations	2873	2873	4723	4734	5182
Annualized Mean	14.8%	14.6%	14.9%	7.11%	12.0%
Annualized Std. Dev.	35.0%	42.9%	25.1%	26.5%	13.9%
Skewness	1.05	1.20	−0.808	−0.451	−0.702
Kurtosis	0.755	1.21	0.896	0.102	0.429

Note: SHCI, SZCI, HSI, TWII and S&P 500 refer to Shanghai Composite Index, Shenzhen Component Index, Hang Seng Index, Taiwan Weighted Index and S&P 500 Index respectively. The data is collected from Yahoo!Finance and CRSP data service. It is adjusted for dividends and splits. We assume that there are 252 trading days per year. In the following tables, without specified indication, all reported returns are in norminal terms.

Table 2: Correlations between Different Markets for period 1996/07/01 – 2008/06/30

Markets	SHCI	SZCI	HSI	TWII	Lagged S&P 500
SHCI	1	0.912^{**}	0.147^{**}	0.0300	0.0609^{**}
SZCI	–	1	0.127^{**}	0.0292^{*}	0.0491^{**}
HSI	–	–	1	0.205^{**}	0.389^{**}
TWII	–	–	–	1	0.179^{**}
S&P 500	–	–	–	–	1

Note: SHCI, SZCI, HSI, TWII and S&P 500 refer to Shanghai Composite Index, Shenzhen Component Index, Hang Seng Index, Taiwan Weighted Index and S&P 500 Index respectively. The data is collected from Yahoo!Finance and CRSP data service. It is adjusted for dividends and splits. Total Observations $T = 2879$. ** and * indicate significance level at 1% and 5% respectively.

Table 2 (Cont.): Correlations between Different Markets for period 2002/07/01 – 2008/06/30

Markets	SHCI	SZCI	HSI	TWII	Lagged S&P 500
SHCI	1	0.930^{**}	0.297^{**}	0.0717^{**}	0.103^{**}
SZCI	–	1	0.252^{**}	0.0781^{**}	0.0769^{**}
HSI	–	–	1	0.215^{**}	0.408^{**}
TWII	–	–	–	1	0.205^{**}
S&P 500	–	–	–	–	1

Note: SHCI, SZCI, HSI, TWII and S&P 500 refer to Shanghai Composite Index, Shenzhen Component Index, Hang Seng Index, Taiwan Weighted Index and S&P 500 Index respectively. The data is collected from Yahoo!Finance and CRSP data service. It is adjusted for dividends and splits. Total Observations $T = 1434$. ** and * indicate significance level at 1% and 5% respectively.

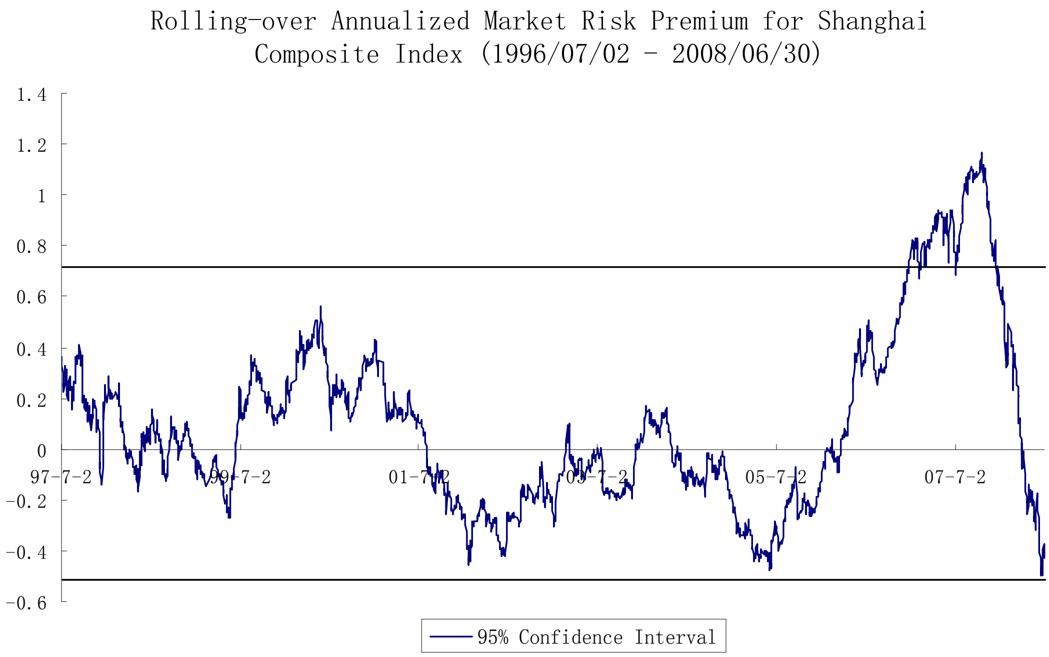
Table 3: Estimation results of ex post market risk premium for S&P 500 index using historical data

Maturity for treasury bonds	3-month	1-year	5-year	10-year
Estimation Period	1954/01/04–2007/12/31	1959/07/15–2001/08/24	1962/01/02–2007/12/31	1962/01/02–2007/12/31
Total Observations	13,439	10,480	11,448	11,448
Averaged Daily ERP	0.0242%	0.0186%	0.0136%	0.0127%
Averaged Yearly ERP	6.10%	4.67%	3.42%	3.20%
Annualized Std. Dev.	14.3%	14.3%	14.8%	14.8%

Table 4: Equity Risk Premium for Great China's indices from Recovery Period

Markets	SHCI	SZCI	HSI	TWII	S&P 500
Period	1996/07/01–2008/06/30	1996/07/01–2008/06/30	1989/06/06–2008/06/30	1990/10/02–2008/06/30	1987/10/20–2008/06/30
r_f	2.25%	2.25%	4.52%	4.33%	4.29%
Real ERP	11.4%	12.4%	10.33%	2.69%	7.63%
σ	34.4%	43.0%	25.1%	26.8%	13.6%
Sharpe Ratio	0.331	0.288	0.412	0.100	0.561

Note: This table reports the real equity risk premium for Shanghai, Shenzhen, Hong Kong, Taiwan market indices as well as S&P 500, which stands as a benchmark. The risk-free rate is denoted as r_f. It refers to the 3-month deposit rate for Shanghai and Shenzhen, the 3-month HIBOR for Hong Kong, the 3-month average deposit rate for Taiwan and yield on 3-month treasury note for S&P 500. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms, r and r_f, and thus cancelled out. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ. The average dividend yield for Shanghai and Shenzhen is about 1.2%, 2.8% for Hong Kong and 3.4% for Taiwan.



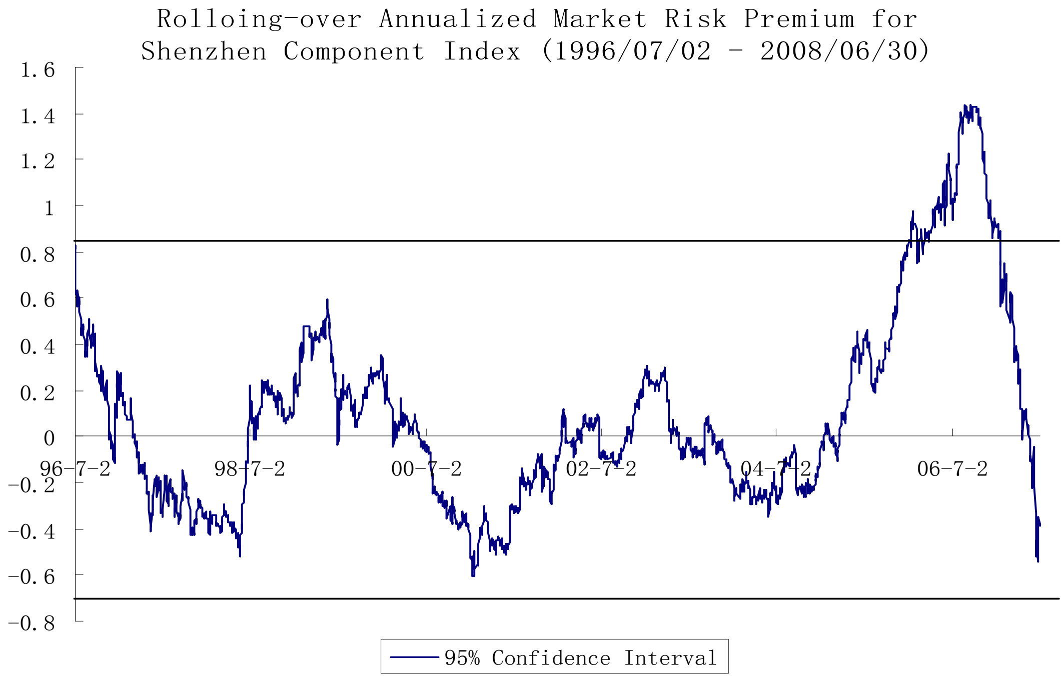


Table 5: Equity Risk Premium for Different Sectors in the Shanghai stock market

Sectors	Manufacturing	Properties	Market	Finance	Market
Period	1997/01/01–2008/06/30	1997/01/01–2008/06/30	1997/01/01–2008/06/30	2004/01/01–2008/06/30	2004/01/01–2008/06/30
r_f	2.15%	2.15%	2.15%	2.03%	2.03%
Real ERP	9.06%	2.62%	7.71%	25.3%	11.9%
σ	27.1%	35.1%	26.6%	35.0%	28.9%
Sharpe Ratio	0.334	0.0746	0.290	0.723	0.412

Note: This table reports the real equity risk premium for industry sectors of Manufacturing, Real Estate and Finance in Shanghai stock market. The risk-free rate is denoted as r_f. It refers to the 3-month deposit rate. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms, r and r_f, and thus cancelled out. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ.

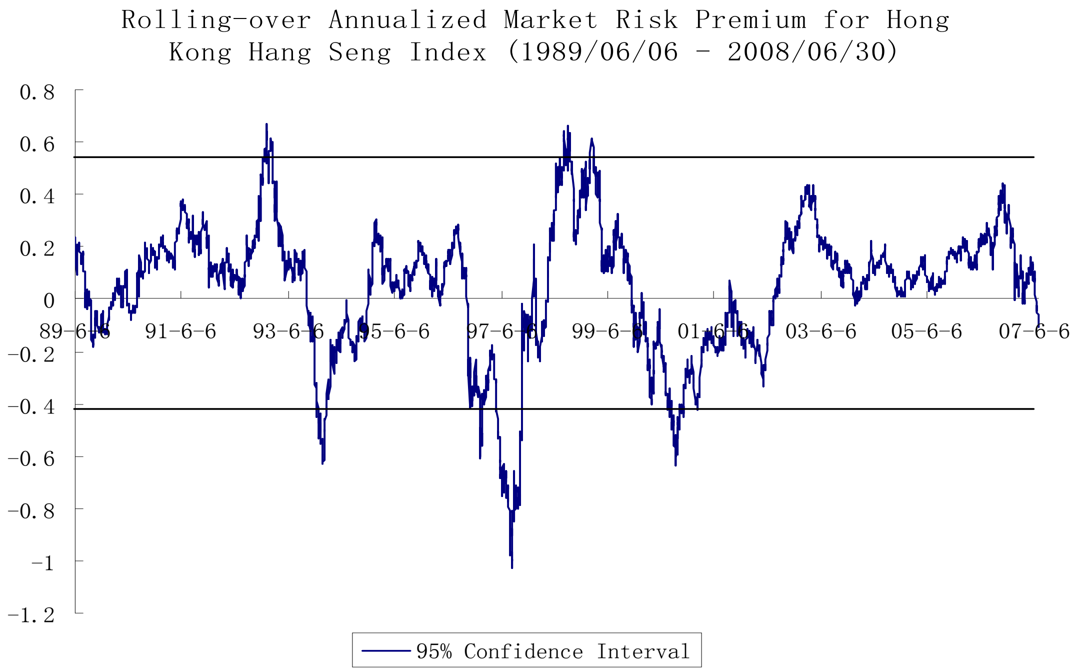


Table 6: Equity Risk Premium for Different Sectors in the Shenzhen stock market

Sectors	Manufacturing	Market	Properties	Finance	Market
Period	2001/03/14–2008/06/30	2001/03/14–2008/06/30	2002/02/26–2008/06/30	2002/02/26–2008/06/30	2002/02/26–2008/06/30
r_f	1.95%	1.95%	1.94%	1.94%	1.94%
Real ERP	−6.73%	7.79%	15.8%	8.50%	16.5%
σ	42.9%	29.0%	36.4%	39.9%	29.7%
Sharpe Ratio	–	0.269	0.434	0.213	0.556

Note: This table reports the real equity risk premium for industry sectors of Manufacturing, Real Estate and Finance in Shenzhen stock market. The risk-free rate is denoted as r_f. It refers to the 3-month deposit rate. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms, r and r_f, and thus cancelled out. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ.

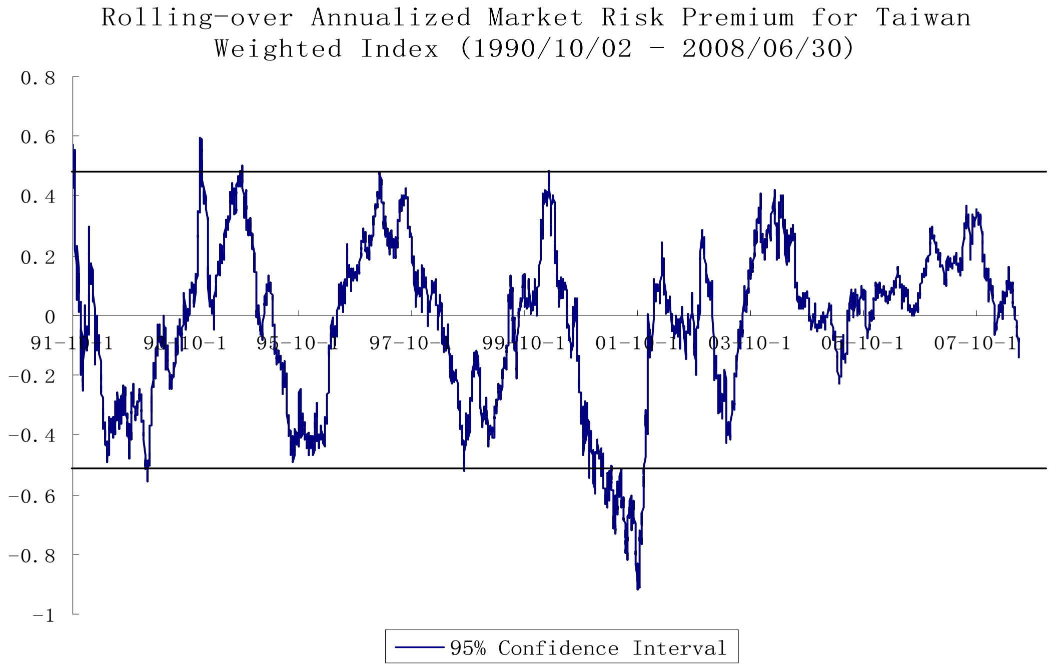


Table 7: Equity Risk Premium for Different Sectors in the Hong Kong stock market

Sectors	Commerce & Industry	Properties	Finance	Market
Period	1993/0/1/01–2008/06/30	1993/0/1/01–2008/06/30	1993/0/1/01–2008/06/30	1993/0/1/01–2008/06/30
r_f	4.36%	4.36%	4.36%	4.36%
Real ERP	6.00%	5.31%	12.12%	7.61%
σ	31.5%	32.7%	25.6%	26.4%
Sharpe Ratio	0.190	0.162	0.473	0.288

Note: This table reports the real equity risk premium for industry sectors of Commerce & Industry, Properties and Finance in Hong Kong stock market. The risk-free rate is denoted as r_f. It refers to the 3-month HIBOR rate. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms, r and r_f, and thus cancelled out. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ.

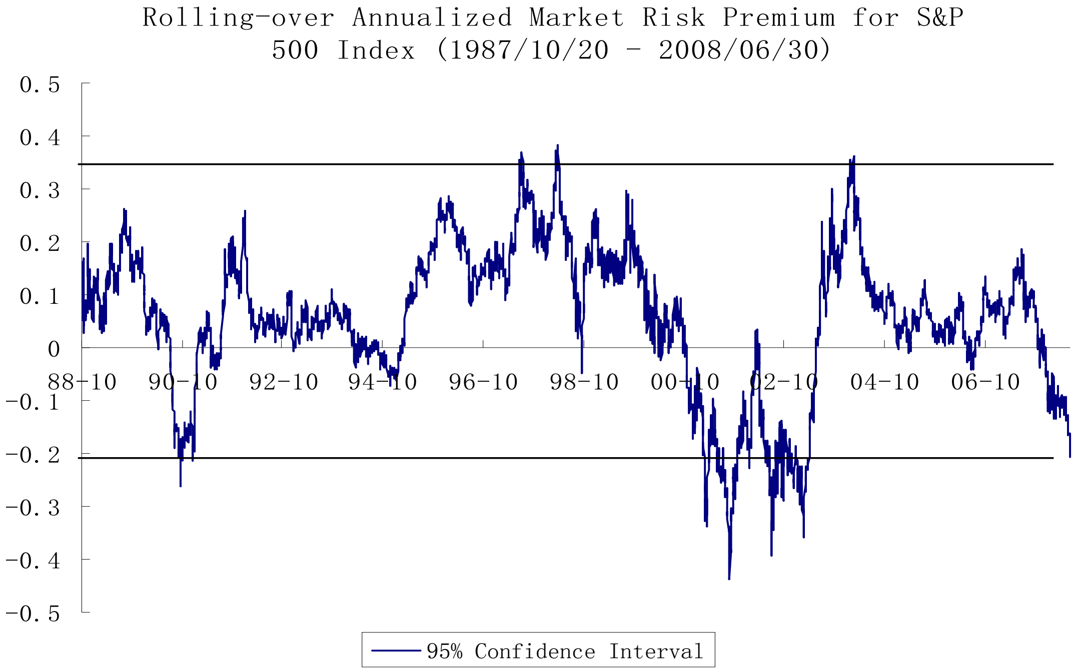


Table 8: Equity Risk Premium for Different Sectors in the Taiwan stock market

Sectors	Electronic	Finance	Market
Period	2000/01/05–2008/06/30	2000/01/05–2008/06/30	2000/01/05–2008/06/30
r_f	2.25%	2.25%	2.25%
Real ERP	−5.22%	0.35%	−0.07%
σ	29.0%	27.8%	24.7%
Sharpe Ratio	–	0.0126	–

Note: This table reports the real equity risk premium for industry sectors of Electronic and Finance in Hong Kong stock market. The risk-free rate is denoted as r_f. It refers to the 3-month deposit rate. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms, r and r_f, and thus cancelled out. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ. The dividend yield is included in the total return. The average dividend for electronic and finance industry is 2.59% and 2.26% respectively.

Table 9: Equity Risk Premium for Different Sectors in the U.S. stock market

Sectors	Industry	Bank	Nasdaq Composite	S&P 500
Period	1991/01/03– 2008/06/30	1991/01/03– 2008/06/30	1991/01/03– 2008/06/30	1991/01/03– 2008/06/30
r_f	3.83%	3.83%	3.83%	3.83%
Real ERP	5.12%	7.97%	6.63%	7.15%
σ	22.1%	14.6%	23.8%	15.9%
Sharpe Ratio	0.232	0.546	0.279	0.450

Note: This table reports the norminal and real equity risk premium for industry sectors of Manufacturing, Real Estate and Finance in Shenzhen stock market. The risk-free rate is denoted as r_f. It refers to the yield on 3-month treasury note for S&P 500. The index return r is the total return which includes dividend yield and capital gain. The Real $ERP = r - r_f$ since inflation is embedded in both norminal terms r and r_f. σ is the standard deviation and all variables are annualized. The Sharpe Ratio is defined in the usual way as Real ERP/σ.

Table 10: Estimation results of ex post market risk premium for China's indices in different years

Markets	SHCI	SZCI	HSI	TWII
1996	21.5% (33.8%)	79.1% (49.6%)	29.4% (14.5%)	–
1997	23.2% (34.5%)	23.0% (38.4%)	−29.9% (39.7%)	–
1998	−6.93% (20.8%)	−37.7% (22.0%)	−14.9% (43.7%)	−28.1% (24.0%)
1999	15.3% (27.4%)	11.0% (32.1%)	46.2 (26.7%)	22.6% (26.9%)
2000	39.7% (21.2%)	32.4% (23.5%)	−17.8% (31.0%)	−62.0% (36.7%)
2001	−25.1% (21.4%)	−37.5% (22.4%)	−31.6% (27.3%)	11.6% (30.9%)
2002	−20.1% (23.7%)	−19.9% (24.7%)	−21.9% (19.1%)	−24.3% (27.7%)
2003	7.47% (17.4%)	21.0% (18.7%)	28.8% (16.8%)	26.4% (21.3%)
2004	−17.8% (20.6%)	−14.2% (21.7%)	11.8% (16.2%)	2.94% (23.5%)
2005	−11.0% (21.2%)	−8.02% (22.2%)	1.36% (11.3%)	5.13% (12.8%)
2006	81.7% (21.0%)	82.1% (23.8%)	25.0% (14.3%)	16.2% (16.2%)
2007	65.3% (34.7%)	95.6% (38.7%)	28.5% (25.9%)	6.75% (20.8%)
2008.06.30	−134% (45.1%)	−129% (49.7%)	−47.4% (38.5%)	−26.1% (26.2%)

Note: This table reports the estimation results of ex post Market Risk Premium of Greater China's stock markets for different subperiods. For Taiwan market, the first period is from 1998/01/01 – 1999/01/01. The values in the parenthesis are standard errors in percentage.

Table 11: Equity Risk Premium for Great China's indices, using U.S. market as benchmark

Markets	SHCI	SZCI	HSI	TWII	S&P 500
Period	1996/07/01–2008/06/30	1996/07/01–2008/06/30	1989/06/06–2008/06/30	1990/10/02–2008/06/30	1926/01/01–2007/12/31
r_f	2.25%	2.25%	4.52%	4.33%	5.22%
Real ERP	11.4%	12.4%	10.33%	2.69%	6.70%
Unexpected div_g	–	–	–	–	0.66%
Fall in r_g	–	–	–	–	1.60%
Relative ERP	11.23%	14.04%	8.19%	8.75%	4.44%
Adjusted ERP	7.98%	9.71%	–	–	–
σ	34.4%	43.0%	25.1%	26.8%	13.6%

Note: This table reports the estimated risk premium from relative estimation approach. The risk-free rate for U.S. is the average 10-year treasury bond yield for the sample period. The unexpected dividend growth rate is estimated according to Eq. (3) and Eq. (4). The fall in required rate of return is estimated according to Eq. (5). The relative ERP is estimated according to Eq. (6). The adjusted-ERP for Shanghai and Shenzhen is calculated according to Eq. (10).