E C O N O M I C S B U L L E T I N

Stock craze: an empirical analysis of PER in Chinese equity market

Mohamed El Hedi AROURI
LEO (Laboratoire d'Economie d'Orléans) and EDHEC (Ecole des Hautes Etudes Commerciales)

Chen Xiang LIU
EconomiX, Université de Paris X—Nanterre

Abstract

China's Shanghai and Shenzhen stock markets have been on a bullish run since the end of the split-share reform. The sharp gains are raising worries about stock overvaluations. We investigate the determinants of booming stock markets in modelling PER (price-earning ratio) over the available sample period 2000-2007 in Chinese A-share market with co-integration and error correction model specification. These results show that the market is driven primarily by the massive influx of fresh funds rather than corporate fundamentals. Regulators have been striving to cool down the surging stock markets for the good of long-term economic development and social stability.

Citation: AROURI, Mohamed El Hedi and Chen Xiang LIU, (2008) "Stock craze: an empirical analysis of PER in Chinese equity market." *Economics Bulletin*, Vol. 14, No. 1 pp. 1-17
Submitted: June 23, 2008. **Accepted:** July 31, 2008.
URL: http://economicsbulletin.vanderbilt.edu/2008/volume14/EB-08N20002A.pdf

1. Introduction

Split-share structure reform launched in April 2005 and strong economic development invigorate greatly Chinese lackluster equity market. China's stock market has been developing fast in recent years. The Shanghai Composite Index, China's main stock market index which tracks yuan-backed A shares and hard-currency B stocks, recorded gains of above 130 percent in 2006, to make it the world's best performing major bourse of the year, staging a remarkable turnaround from 18 months ago when prices floundered at eight-year lows and drawing hundreds of thousands of investors in each day. An investment mania is sweeping across China.

However, this creates stock overpricing concern and prompts regulators to repeatedly warn that share prices are far ahead of themselves and many investors risk losing their money if the bubble bursts. It reflects the fear that too much volatility will undermine equity division reform undertaken in 2005-2006, which essentially aims at making all non-tradable shares become tradable on the market and putting an end to the split-share structure derived from the planned economy. With it, the regulators tend to build up responsive financial channels in order to conduct an efficient monetary policy, a necessary step to create the capacity of reining investment and to promote a more balanced growth.

This paper is motivated by the sudden change of PER (price-earning ratio) since the reform. The next section evaluates the recent development of stock markets. Section 3 studies the determinants of PER. Section 4 presents the empirical methodology and interprets the results of the estimation. Section 5 analyses empirical evidence, and final section summarizes the findings and concludes the paper.

2. The recent development of stock markets

Since the establishment of Shanghai and Shenzhen Stock Exchanges in 1990's, China's equity market has been advancing step by step, with gradually improved market proficiency and growing market functions. The equity market plays an increasing role in the financing of enterprises in China. The number of enterprises quoted in Shanghai and Shenzhen Stock Exchange has increased rapidly, from only 10 in 1990 to 1530 at the end of 2007. So has market value (Figure 1). The total capitalization of Shanghai and Shenzhen markets rose from 104.81 billion yuans in 1992 to 32.71 trillion yuans in 2007, of which the tradable market capitalization reached 8.30 trillion yuans. A total of 843.19 billion yuans was raised on China's equity markets through initial and secondary public offerings in 2007, surpassing the combined investment from 2002 to 2006.

The big-cap blue chips showed momentum, and heavyweights took the lead in the upward trend. High-flying sentiment put the Shanghai Composite Index at 6124.04 on October 16, 2007, the highest point since the market had begun trading in 1990. The main-board A-shares in the Shanghai and Shenzhen markets were valued at over 60 times the earnings at the end of 2007 (Figure 2).

In contrast, the PER[1] of Hong Kong listed mainland enterprises shows stability over the

[1] The price-earning ratio is calculated as the current price of a stock divided by projected earnings. It is a measure of how much market participants are willing to pay above the present value of level stream of earnings for growth opportunities. Price-earning ratio is high when investors are willing to pay now for expected superior returns on investments that have not yet been made.

last years between 17 and 24. This level is consistent with other market compartments of the Hong Kong Stock Exchange as well as the level of emerging markets. Until 2004, the PER of Shanghai listed companies was 20 points higher than the PER of Hong Kong listed mainland enterprises due to higher selling prices on Mainland stock. This premium reflected higher cost due to capital controls, informational costs, governance and regulatory uncertainties. In 2005, the drop in stock prices in the mainland cancelled the gap.

Since the first semester 2006, it has dramatically broadened and it is obviously not related only to the so-called premium any more. The level reached in 2007 for the two markets is significantly higher than the one in 2001. Contrary to any expectation, this surge was not boosted by price rises of companies in the financial sector subject to IPO. On the contrary, the growth trend is relatively homogeneous in all economic sectors. This dramatic change of PER raises concerns: What does it tell about the state of the market? Is it an evidence of overpricing? Is it a stock bubble?

3. The determinants of PER and Gordon Shapiro Formula

The relationships between stock price and fundamentals (especially earnings, book value and dividends) have been of considerable interest to practitioners and academics alike. Of these relationships, the price earning ratio (PER) has received the most attention from both practitioners and academics. Practitioners' interest in the PER stems primarily from its widespread use as a valuation tool. And academics have studied the PER to examine the rationality and efficiency of the stock market. Much attention has focused on the frequently observed and often substantial departures from notionally "normal PER" (Campbell and Shiller 2001; Shiller 2005; Fama and French 2002). Two approaches have been used to study this issue. The first takes a macro view, supposing that PER varies through time with variation of the conditional (point-in-time) expected stock return and the conditional expected growth rates of dividends and earnings (Campbell and Shiller 1989). The second adopts a micro approach, attempting to explain cross-sectional variation in PER with cross-sectional differences in firm characteristics (Beaver and Morse 1978, Zarowin 1990, Penman 1996, Fama and French 2002, Thomas and Zhang 2006). Their primary focus is to identify the determinants of PER. Our research takes the first approach and studies the determinants of PER in Chinese stock markets.

PER is determined by Gordon and Shapiro formula. In investors' position, they are assumed to be rational. So they require higher return from the market portfolio than from a risk free investment. This is what is called the risk premium, i.e. the difference between the investment's expected return and the risk-free rate.

When they take their decision, the investors operate the following arbitrage: the rate of return of a stock is required to equal the risk-free rate r, the real interest rate on government bonds plus the risk premium, ρ . So:

$$\text{rate of return of stocks} = r + \rho \qquad (1)$$

At the same time, the rate of return of stocks is defined as the expected earning per share divided by its present price (the inverse of the PER) plus the anticipated earnings growth rate, g. So:

$$\text{rate of return of stocks} = 1/PER + g \qquad (2)$$

Now gathering equalities (1) and (2) yields:

$$PER = 1/(r + \rho - g) \qquad (3)$$

This relationship holds that : 1) the higher anticipated growth g, the higher the PER; 2) the safer the stocks are perceived ρ , the lower the required return and the higher the PER; 3) the rate of return of government bonds r is taken for granted by investors.

In an already developed market with long data span, it is possible to estimate long-term PER. It provides a convenient indicator of the long-run fundamental value. Comparing the current PER with its long-term value gives then a measure of how expensive a stock is. This is why the PER is often examined when there is a concern of overpricing. But in emerging markets with short existence, like the case of Chinese market we study, it is impossible to estimate a so-called long-term equilibrium value. High absolute PER only provides suspicion of overpricing.

4. Empirical Methodology and Econometric Verification

4.1 Creation of model

According to the theory mentioned above, we use the factors concerning profit, liquidity, supply, demand and transaction and create a model to seek the determinants of PER in Chinese stock markets.

PER=C1*EPS+C2*LFund+C3*LCapRe+C4*LDeposit+C5*Part+C6*LTO+C7*LNaccount+C8 (4)

In equation (4), PER is specified as a function of a factor of profit—earning per share (EPS), three factors of liquidity—mutual funds (Fund), capitals raised (CapRe), household deposit (Deposit), a factor of supply—the number of negotiable shares divided by the total number of shares (Part), a factor of transaction—turnover in volume (TO), a factor of demand—new accounts[2] open in the market. We don't use the interest rate in bank deposit, because its variation has little influence to the stock markets (WANG Guogang, 2007). Besides PER, EPS and Part, the rest of the variables are expressed in logarithm.

We recall that PER rises when profit, liquidity and demand increase; its value falls when supply rises. As a result, with earning per share increasing with PER, C1 is expected to be positive. C2 and C3 are expected to be positive, C4 negative, implying that more liquidity is put into the market. C5 is expected to be negative and C7 positive when supply and demand of shares rise. C6 is expected to be positive when there are more transactions.

Due to lack of certain statistics in Shanghai stock market, the model is reduced to the following form:

PER=C1*EPS +C3*LCapRe+C4*LDeposit +C6*LTO +C8 (5)

Data sources and definitions as well as the descriptive statistics of the series are specified in the appendices.

4.2 Integration of the series

Five variables (Fund, CapRe, Deposit, TO, Naccount) are expressed in log form and their stationarity are checked with the Augmented Dickey-Fuller (ADF) test. The results are reported in tables 1 and 2. Over the period january 2000-september 2007, EPS in Shanghai

[2] The new accounts are considered a rough indicator for the number of new individual investors entering the market although there have been cases in the past where individual traders have opened accounts using fake identification. There is also the issue of double counting, as most investors open accounts in both the Shanghai and Shenzhen stock exchanges and they can buy stocks in the companies listed in either city. So in fact, the actual number of investors will be less than the number of accounts.

market and LCapRe in Shenzhen Market are found to be stationary and thus are eliminated. The rest of the variables are all found to be integrated of first order, with which we carry out the estimation.

4.3 Cointegration

Trace statistics proposed by Johansen and Juselius (1990) are used to identify the number of cointegration relations. This is a test of maximum likelihood to calculate the statistical value: $\lambda_{trace} = -T\sum_{q+1}^{N} \ln(1-\lambda_i)$ The null hypothesis is that there are at most r cointegrating vectors. In the equation T represents the number of observations, and λ_i show the estimated values of the characteristic roots, in assuming that the series are integrated of first order. Tables 3 and 4 report the results of Johansen-Juselius cointegration tests for the series in these two markets. Special critical values for the test statistics are obtained from Johansen and Juselius (1990). The optimal number of lags is identified by using Akaike and Schwartz information criteria on a VAR specification. A specification with a linear trend in the data and no trend in the cointegration equation appears the most appropriate for the model in these two markets because most of the series have a trend but there is no relation between their trends. Consequently, the regression for Shanghai market is estimated with one lag and one cointegration relationship, and two lags and two cointegration relationships for Shenzhen market. The estimation sample runs from January 2000 to September 2007.

4.4 The Vector Error Correction Model

A reduced-form representation of the vector error correction model (VECM), omitting the deterministic terms, can be written as:

$$\triangle x_t = \Pi x_{t-1} + \Gamma_1 \triangle x_{t-1} + \cdots + \Gamma_{p-1} \triangle x_{t-p+1} + u_t \quad (6)$$

where p is the order of the VAR-model, K is the number of variables, $x_t = (x_{1t},\ldots, x_{Kt})$ is a (Kx1) random vector, and Γ_1 are fixed (KxK) coeffcient matrices. The $u_t = (u_1 \ldots u_{Kt})'$ is a K-dimensional white noise process with $E(u_t) = 0$. When the variables are cointegrated, Π has reduced rank and $r = rk(\Pi) < K$ and can be written $\Pi = \alpha \beta'$, where α and β are (Kxr) matrices that contain the weight coefficients α_r and the cointegration vectors, β (r, k = 1 to K) of the r_{th} cointegrating relation.

The Johansen maximum likelihood (ML) procedure including the restrictions yielded the following estimate for the long-run relationships. The normalization of the coefficient on PER to one in (7) and (8), respectively, leads to an interpretation in line with the specification of PER (5) and (4):

Shanghai

$$PER_t = 0.30LCapRe_t - 166.22LDeposit_t + 71.89LTO_t + 3280.51 \quad (7)$$
$$(-0.50) \qquad (1.97) \qquad (-1.66)$$

In Shanghai market, PER rises when more capitals are raised and more transactions are carried out (but not significantly), more household deposits are put into the market.

Shenzhen

$$PER_t = 188.06EPS_t + 51.00LFund_t - 27.72LDeposit_t - 267.92Part_t + 7.84LTO_t - 4.54LNaccount_t - 417.56 \quad (8)$$
$$(-4.93) \quad (-7.36) \quad (2.89) \quad (3.34) \quad (-2.21) \quad (2.16)$$

In Shenzhen market, PER rises when earning per share increases, more funds are put into the market, more transactions are carried out and more demands appear. PER falls when more shares are accessible to public.

In addition to the estimation of long run dynamics, the co-integrated error-correction model allows to examine short run dynamics as reported below.

Shanghai

$$\triangle PER_t=-0.02u_{t-1}+0.17\triangle PER_{t-1}-0.02\triangle LCapRe_{t-1}-40.06\triangle LDeposit_{t-1}-0.97\triangle LTO_{t-1}-0.28 \quad (9)$$

There are no significant coefficients at 5% risk level.

Shenzhen

$$\triangle PER_t=-0.13\ u_{t-1}+0.21\triangle PER_{t-1}+0.05\triangle PER_{t-2}+14.40\triangle EPS_{t-1}-5.70\triangle EPS_{t-2}-6.09\triangle LFund_{t-1}+8.04\triangle LFund_{t-2}-35.35\triangle LDeposit_{t-1}+57.15\triangle LDeposit_{t-2}+349.19\triangle Part_{t-1}+43.46\triangle Part_{t-2}-0.27\triangle LTO_{t-1}-0.48\triangle LTO_{t-2}-0.10\triangle LNaccount_{t-1}-1.42\triangle LNaccount_{t-2}-0.84 \quad (10)$$

Only the coefficients of $\triangle Part_{t-1,}$ $\triangle LNaccount_{t-2}$ and u_{t-1} are significant at 5% risk level.

We calculate PER according to the equations (7) and (9) for Shanghai market, and (8) and (10) for Shenzhen market. We compare estimated PER with observed PER. The observed PER are far away from the estimated PER in long term in most cases, but have almost the same value with the estimated PER in short term. So there is no long-term equilibrium value for PER (figures 3 and 4).

5. Empirical Evidence Discussion

In this section, we combine the results of estimation and macro-economic environment to discuss the fact of high PER and to study the measures for reducing it.

5.1 Split-share Structure Reform

The split-share structure reform undertaken in mi-2005 in the stock markets put an end of a five-year slump. Before the reform, frequent insider trading due to collusion, share-price manipulation, low accounting standards, regulatory uncertainties were the features of Chinese equity market. Two thirds of domestically listed companies' shares were held by government entities and not negotiable. The securities authorities had suspended all re-financing of listed companies and IPOs that could create new non-tradable shares[3] in this reform. As a result, investors kept away, the stock markets did not reflect the growth of the profits and Hong Kong Stock Exchange grabbed the lion's share of the listing of the landmark banks.

In 2006, the non-tradable shares started to be released under a program of gradual sale of the shares held by government entities. The new IPOs and re-financing markets were reopened in mi-2006. The authorities announced that financially weak securities companies were being merged with stronger ones. Foreign participation was increased through higher quotas for QFII (qualified foreign institutional investor) in the equity market. New accounting standards were adopted in 2007. With amended Corporate Law and Securities Law applied from January 2006, mutual funds have developed rapidly, and 53 million new trading accounts were open in 2006-2007.

This overhaul aimed at cleaning up the markets, freeing them from the constraints which prevented the financial growth to reflect the real growth. It results in a high anticipated growth, g, consistent with the bright prospects for corporate profits boosted by robust

[3] This step was taken to ensure the transformation of state-owned shares into tradable stocks proceeded smoothly.

economy and the corporate profits growth registered between 2001 and 2005 and not absorbed by the stock prices.

5.2 Excessive liquidity

Another reason more important is that China abounds in liquidity, mainly due to the economic growth and the lack of investment products to allocate the subsequent profits and savings. The People's Bank of China has taken a lot of measures to sterilize foreign capital inflows and to address the credit and investment boom. Alternative investment securities and vehicles are underdeveloped. At the end of 2007, 17 trillion yuans deposited in the banking sector earns on average a 4.14% nominal return with 4.8% inflation rate for 2007, implying a negative real return. So the natural response for investors is to turn toward the only place where its capital does not lie idle and to keep reducing their estimated discount rate. (CAO 2007 and WU 2008) In total, the lack of investment alternatives for Chinese savers makes the equity market attractive and drives down the return they required. This reduces the risk premium ρ in spite of regulatory uncertainties, unclear corporate governance framework and informational problems.

Another factor of excessive liquidity is the yuan's recent increase in value, which causes great amounts of overseas investment funds to flow into mainland China. The investors are waiting for the value of the yuan to increase and to earn a profit on their investment.

5.3 A speculative market

High expected growth and low risk premium driven by the overhaul and high liquidity explain the jump of PER in 2006-2007. This makes the market short-term oriented, looking for quick and high profits, in a word, "speculative".

Good news kept rolling in from China's equity market and the soaring stock index boosted investor confidence. Hundreds of thousands of new investors swarm into the market every day. In addition to more funds, they bring volatility to the market, given their lack of investment sense. Unlike developed markets overseas, individual investors make up a majority of China's stock market, including a lot of retirees who risk losing their hard-earned savings. Many people put up their apartments and vehicles as collateral to get loans to invest in stock market. The university students are also joining the bull run.

5.4 Chinese liberalism

5.4.1 Supply increase

Two-thirds of non tradable shares result in real low supply and "false" high PER (WU 2003, LU 2004 and WU 2008). At present, more and more shares initially non-tradable have received sale approval after lock-up periods ranging from one to three years[4]. Moreover, the authorities, in the hope to achieve a stronger and more stable market, are eyeing to bolster the stock market by adding more quality companies to soak up excessive liquidity. The authorities have inspired mainland companies to list on domestic bourses rather than Hong Kong's. They have further encouraged overseas quality companies, such as the venerable

[4] The non-tradable shares shall not be traded or transferred within 12 months from the date of implementation of the reform plan. A former non-tradable shareholder who holds more than 5% of the total shares of a listed company, upon expiry of the lock-up period of 12 months, may sell their shares, with a maximum of 5% of the total shares of the listed company within 12 months via the trading system of the stock exchanges, and not more than 10% within 24 months.

HSBC Holdings to list A-shares in the mainland.

5.4.2 Overseas investment

Chinese citizens have been allowed to invest directly in the overseas securities market on a trial basis. In the early stages of the pilot project, individuals will only be allowed to invest in securities traded on the Hong Kong securities market with self-owned or purchased foreign currency[5]. The rapid and steady development of the Chinese economy, people's rising income, their growing demand for investment and China's ample foreign reserve have created a sound environment for the pilot project. With the indefinite postponement of the so-called "through train" scheme to permit individuals to move money into Hong Kong stocks, only the QDII (qualified domestic institutional investors) scheme is now available for individual savers to move their funds abroad.

The QDII scheme, launched in July 2006, allows mainland institutions and residents to entrust mainland commercial banks to invest in overseas financial products, and allows insurance institutions to invest some of their assets in overseas fixed-income products and monetary market products. The QDII program offers more channels of investment for mainland residents, who are not allowed to directly invest in overseas markets, and has become an effective channel for them to decentralize risks. The investment quota allowed to China's QDIIs has reached US$42.17 billion by the end of September 2007. A total investment of US$10.86 billion had already been made in overseas markets before this date. Some $80-90 billion in quotas in total is projected by the end of 2008.

6. Summary and Conclusion

Shareholder reform initiated in 2005 to float non-tradable state owned shares, sufficient liquidity, rapid economic growth and the return of heavyweight state-owned enterprises from overseas bourses to domestic A-share markets are considered as factors leading to the bull run on the stock market. China's stock market soared 97 percent in 2007 after rallying 130 percent in 2006.

A lack of multiple investment channels has swelled China's mainland stock market. The heady rise in the stock markets is driven by speculative demand from retail investors seeking to buy into China's bull market. The recent boom of stock market is caused by a huge amount of money flow rather than further improvement in the performance of the listed company. Speculation has been too strong in the bourses, which have become casinos and people have lost rationality. The debate about the bubbles rings a warning bell for market participants. Investors, especially individual investors who make up a majority of China's stock markets, should be cautious about the risks of stock market investment, especially those who use all their savings or mortgage their apartments to invest in stocks. Investors should beware of hidden bubbles behind the profit surge and invest in a prudent and rational manner against "blind optimism".

Under the current speculative atmosphere in the equity market, the authorities have taken a lot of measures to monitor closely asset prices and to cool off the heated-up market. More quality companies are allowed to be quoted in domestic equity market, and overseas investments are opened through different programs.

[5] A popular trade is to buy so-called H-shares of major Chinese companies that are under-priced relative to their comparable A-shares listed in mainland.

Appendices - Description of the series

Table A1 – Description of the variables used in the model of Shanghai

January 2000-September 2007	Monthly data	Source	Comments
PER	Price-earning ratio	CEIC	
EPS	Earning per share	TEJ	Linear interpolation of quarterly series
LCapRe	Ln(Capital Raised)	CEIC	
LDeposit	Ln(household deposit in banks)	The People's Bank of China	
LTO	Ln(Turnover in volume)	CEIC	

Table A2 – Description of the variables used in the model of Shenzhen

January 2000-September 2007	Monthly data	Source	Comments
PER	Price-earning ratio	CEIC	
EPS	Earning per share	TEJ	Linear interpolation of quarterly series
LFund	Ln(mutual funds)	CEIC	
LCapRe	Ln(Capital Raised)	CEIC	
LDeposit	Ln(household deposit in banks)	The People's Bank of China	
Part	The proportion of the number of tradable shares in the total issued shares	Shenzhen Stock Exchange	
LTO	Ln(Turnover in volume)	Shenzhen Stock Exchange	
LNaccount	Ln(New accounts)	Shenzhen Stock Exchange	

Table A3 – Descriptive statistics of the variables used in the model of Shanghai

	PER	EPS	LCapRe	LDeposit	LTO
Mean	36.90	0.13	18.36	29.96	24.09
Median	38.20	0.13	22.03	29.96	23.86
Max	63.74	0.26	25.64	30.48	26.39
Min	15.63	0.03	0	29.43	22.74
St Dev	13.64	0.05	8.80	0.34	0.95
Skewness	0.13	0.08	-1.58	-0.02	0.88
Kurtosis	2.04	2.56	3.60	1.64	2.97

Table A4 – Descriptive statistics of the variables used in the model of Shenzhen

	PER	EPS	LFund	LCapRe	LDeposit	Part	LTO	LNaccount
Mean	38.75	0.11	24.31	15.59	29.96	0.39	23.68	11.90
Median	40.25	0.11	24.21	20.78	29.96	0.38	23.60	11.51
Max	75.54	0.22	25.62	23.54	30.48	0.51	25.72	15.25
Min	16.19	0.02	23.91	0	29.43	0.32	22.29	9.38
St Dev	13.76	0.04	0.37	9.56	0.34	0.05	0.84	1.32
Skewness	0.10	0.39	2.07	-1.01	-0.02	1.07	0.71	0.80
Kurtosis	2.42	2.60	6.60	2.07	1.64	3.15	2.79	2.92

REFERENCES

Anderson, K. and Brooks, C. (2006) "The Long-Term Price-Earnings Ratio" *Journal of Business Finance and Accounting* **33 (7) & (8)**, 1063-1086.

Beaver, W. and Morse, D. (1978) "What determines price-earnings ratios?" *Financial Analysts Journal* **34(4)**, 65-76.

Beltratti, A. and Caccavaio, M. (2007) "Asset Float and Stock Prices: Evidence from the Chinese Stock Market" SSRN Working Paper Id.971721.

Brooks, R.D. and Ragunathan, V. (2003) "Returns and volatility on the Chinese stock markets" *Appliqued Financial Economics* **13,** 747-752.

Campbell, J.Y. and Shiller, R.J. (2001) "Valuation ratios and the long-run stock market outlook: an update" NBER Working Paper W8221.

Campbell, J.Y. and Shiller, R.J. (1989) "Stock prices, earnings and expected dividends" NBER Working Paper W2511.

Cao, H.H. (2007) "the coordination between the government and the equity market" Chinese Academy of Social Sciences, August 1.

Chen, Z.Y., Lobo, G.J. and Wang, W. (2007) "The Effect of Dilution from Convertible Securities on the Price-Earnings Ratio: Theory and Empirical Evidence" the 44th Finance and Accounting Forum, Jiageng.

Dai, X.F. and Zhou, W. (2005) "An Empirical Analysis of Bubbles in China's Stock Market" Journal of Hunan University (Social Science) **2**.

Easton, P.D. (2004) "PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital" The Accounting Review **79(1)**, 73-95.

Fama, E. F. and French, K. R. (2002) "The equity premium" Journal of Finance **57**, 637-659.

Fairfield P.M. (1994) "P/E, P/B, and present value of future dividends" Financial Analysts Journal **50 (4)**, 23-31.

Girardin, E. and Liu, Z.Y. (2003) "The Chinese Stock Market: A Casino with "Buffer Zones"?" Journal of Chinese Economic and Business Studies **1(1)**, 57-70.

Gordon, M.J. and Shapiro, E. (1956) "Capital equipment analysis: The required rate of profit" Management Science **3**, 102-110.

Gordon, M.J. (1962) “The investment, financing and valuation of the corporation” Richard D. Irwin, Homewood, IL.

Johanson, S. (1988) “Statistical Analysis of Cointegration Vectors” Journal of Economic Dynamics and Control **12**, 231-254.

Johanson, S. (1991) “Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models” Econometrica **59**, 1551-1580.

Johanson, S. and Juselius, K. (1990), “Maximum Likelihood Estimation and Inference on Cointegration—With Applications to the Demand for Money” Oxford Bulletin of Economics and Statitics **52**, 169-210.

Lu, Y.S. (2004) “Comparative analysis of price evaluation in A-share market and other markets” Shanghai Securities, november 2.

Mei, J.P., Scheinkman, J.A. and Xiong, W. (2005) “Speculative Trading and Stock Prices: Evidence from Chinese A-B Share Premium” NBER Working Paper 11362.

Molodovsky, N. (1953) “A theory of price-earnings ratios” Financial Analysts Journal. (November), 65-80.

Pettis, M. (2008) “The government condemns Chinese financial markets to speculation” http://piaohaoreport.sampasite.com/blog/The-government-condemns-Chinese.htm

Preinreich, G.A.D.(1938) “Annual survey of economic theory; the theory of depreciation” Econometrica **6(3)**, 219-241.

Ramcharran, H. (2002) “An empirical analysis of the determinants of the P/E ratio in emerging markets” Emerging Markets Review **3**, 165-178.

Thomas, J.K. and Zhang, H. (2006) “Another look at P/E ratios” Working paper Yale University.

Wang, F.H. and Xu, Y.X. (2003) “What determines Chinese Stock Returns?” SSRN Working Paper September.

Wang, G.G. (2007), “Bubble” should not become the point at issue in Chinese A-share market” JINGJI YAOCAN **46**.

Wei, X.Y. (2000) “empirical analysis of PER in Chinese stock market” Shanghai Securities Sept 29.

Wu, M.X. (2003) “the Price-earning Ratio of Stock Market and Nonnegotiable shares”

Business Studies **12**.

Wu, X.Q. (2008) *Research report of Chinese Securities Markets*, Renmin University of China:Beijing.

Zarowin, P. (1990) "What determines earnings-price ratios: revisited" Journal of Accounting, Auditing and Finance **5(3)**, 439-457.

Zou, X.P. and Chen, X.J. (2002) "Earnings Management of Chinese Listed Companies: A Survey of Empirical Studies" China and World Economy **4**, 38-43.

Zheng, X.W. and Zhang, Z.C. (2006) "Commonality in liquidity in emerging markets: evidence from the Chinese Stock Market" Working Paper in Economics and Finance 06/04, University of Durham.

Table 1 – Integration test in the model of Shanghai

Variable	Form	Constant Trend	Constant No Trend	No Constant No Trend
PER	Level	1.60 (1)	1.00 (1)	0.04 (1)
	First difference	1.90 (2)	0.33 (2)	-3.98 (2)
EPS	Level	-0.73 (3)	-3.67 (3)	
	First difference			
LCapRe	Level	-0.15 (2)	-2.73 (2)	
	First difference	0.49 (3)	0.08 (3)	-5.91 (3)
LDeposit	Level	2.76 (1)	0.37 (1)	5.00 (1)
	First difference	-0.28 (1)	-5.76(1)	
LTO	Level	-2.86 (2)		
	First difference	1.56 (4)	1.04 (4)	-4.77 (4)

The null hypothesis for ADF test is that the variable has a unit root. The optimal lag length is chosen by significant partial correlation.

Table 2 – Integration test in the model of Shenzhen

Variable	Form	Constant Trend	Constant No Trend	No Constant No Trend
PER	Level	2.05 (1)		
	First difference	2.29 (3)	0.55 (3)	-2.36 (3)
EPS	Level	1.09 (3)	-2.59 (3)	
	First difference	0.83 (0)	0.27 (0)	-4.76 (0)
LFund	Level	2.05 (2)	-1.79 (2)	1.52 (2)
	First difference	2.19 (2)	1.51 (2)	-3.60 (2)
LCapRe	Level	-0.12 (2)	-3.40 (2)	
	First difference			
LDeposit	Level	2.76 (1)	0.37 (1)	5.00 (1)
	First difference	-0.28 (1)	-5.76(1)	
Part	Level	1.34 (2)	-0.75 (2)	2.14 (2)
	First difference	1.54 (1)	2.01 (1)	-2.60 (1)
LTO	Level	2.77 (1)	1.24 (1)	0.67 (1)
	First difference	1.49 (4)	0.53 (4)	-4.64 (4)
LNaccount	Level	1.09 (0)	1.32 (0)	0.45 (0)
	First difference	2.21 (2)	0.38 (2)	-5.87 (2)

The null hypothesis for ADF test is that the variable has a unit root. The optimal lag length is chosen by significant partial correlation.

Table 3 – Cointegration test in the model of Shanghai

Eigenvalue	Likelihood Ratio	5 Percent Critical value	1 Percent Critical value	Hypothesized No. of CE(s)
0.303242	53.58164	47.21	54.46	None *
0.155216	20.70179	29.68	35.65	At most 1
0.035775	5.352419	15.41	20.04	At most 2
0.022139	2.037271	3.76	6.65	At most 3

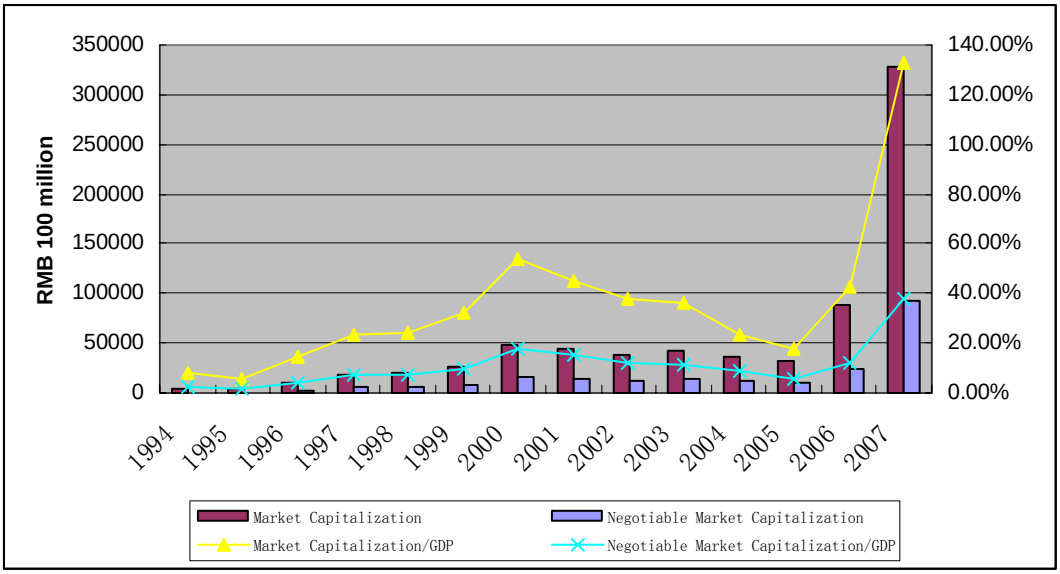
*(**) denotes rejection of the hypothesis at 5% (1%) significance level

Table 4 – Cointegration test in the model of Shenzhen

Eigenvalue	Likelihood Ratio	5 Percent Critical value	1 Percent Critical value	Hypothesized No. of CE(s)
0.528139	181.3040	124.24	133.57	None **
0.445322	116.7119	94.15	103.18	At most 1 **
0.286536	66.02636	68.52	76.07	At most 2
0.222739	36.99071	47.21	54.46	At most 3
0.133877	15.32050	29.68	35.65	At most 4
0.033828	2.959896	15.41	20.04	At most 5
4.04E-06	0.000347	3.76	6.65	At most 6

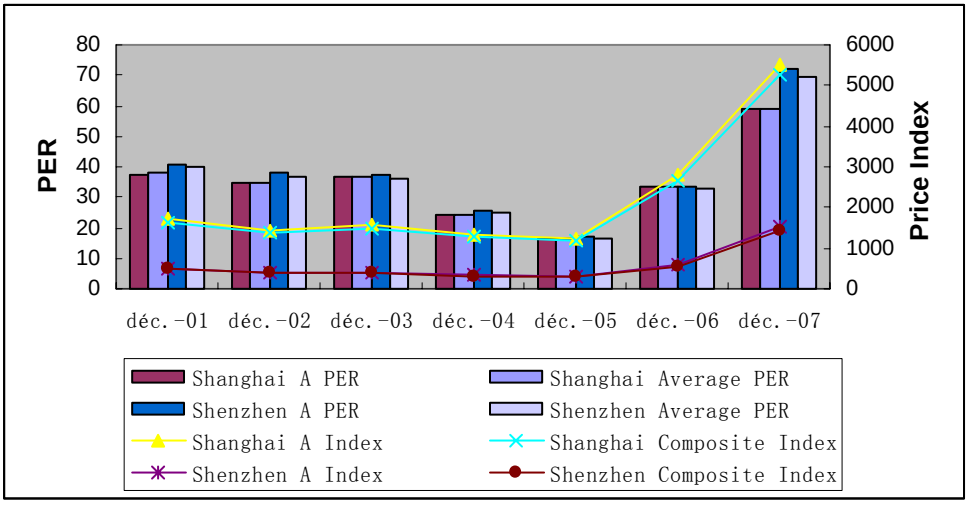
*(**) denotes rejection of the hypothesis at 5% (1%) significance level

Figure 1 – Market Capitalization and Ratio of Market Capitalization to GDP



Source : China Securities and Futures Statistical Yearbook (2007), CSRC, NBS

Figure 2 – PER and Price Index



Source: CEIC

Figure 3 – Observed PER and estimated PER in Shanghai market

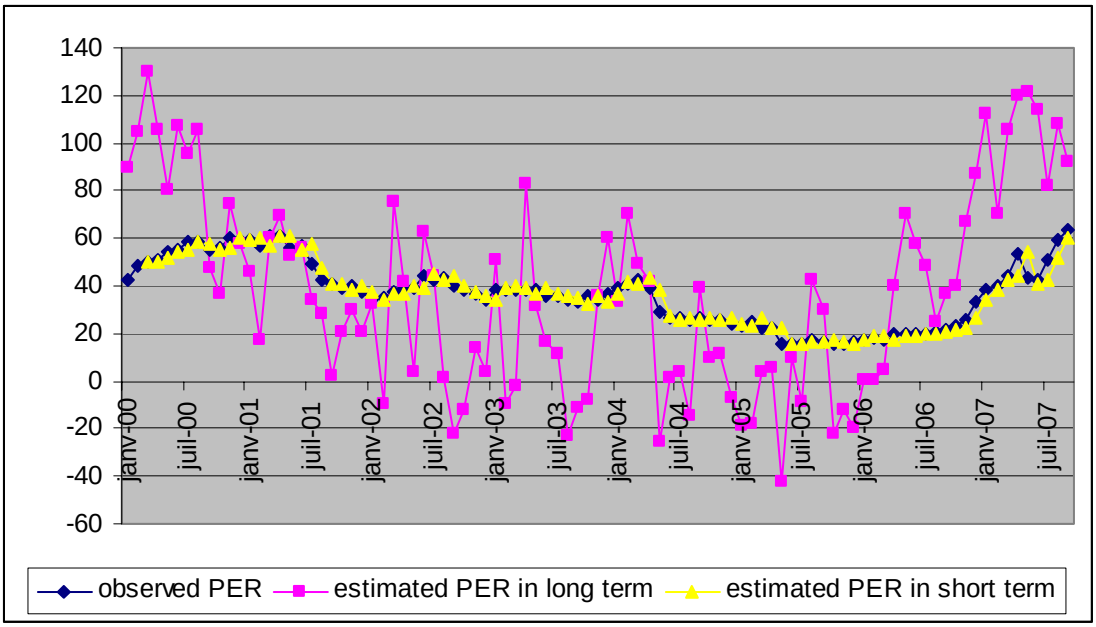


Figure 4 – Observed PER and estimated PER in Shenzhen market