

Construction Methods for the Shanghai Stock Exchange Indexes: 1870-1940

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1 Brief history of Shanghai Stock Exchange

The market for securities trading in Shanghai begins in late 1860s. In June 1866 a list of thirteen companies, including the Hong Kong & Shanghai Banking Corporation, appeared in a local newspaper under the 'Shares and Stocks' section. According to *The North-China Herald* this is about the time when a 'regular system of dealing in Shares sprang up'. In 1891, during the boom in mining shares, foreign businessmen founded in Shanghai the Shanghai Share Broker's Association, China's first stock exchange. In 1904 the Association applied for registration in Hong Kong under the provision of the Companies Ordinance and was renamed as Shanghai Stock Exchange. Several brokers remained outside after the formation of the Exchange due to the different opinions on commissions. Outside brokers formed another Shanghai Sharebrokers' Association in 1909 in Shanghai International Settlement. An amalgamation eventually took place in 1929, and the combined markets operated thereafter as the Shanghai Stock Exchange. The operation of Shanghai stock exchange comes to an abrupt halt on December 8, 1941 when the Japanese grasped the International Settlement. After the war ended China assumed full control of over Shanghai, the legal privilege and means of enforcing financial contracts for foreign businessmen had gone. The Shanghai Stock Exchange, as a foreign share brokers' association, never reopened again.

2 Important market events:

- 1871 Speculative bubble burst triggered by a monetary panic
- 1883 Credit crisis resulted speculation in Chinese companies
- 1890 Bank crisis started from Hong Kong
- 1895 Treaty of Shimoneseki opened Chinese market to foreign investors
- 1909-1910 Rubber boom
- 1911 Revolution and the abdication of the Ch'ing Dynasty
- 1914 Market closed for a few months due to the Great War
- 1919 Speculation in cotton shares
- 1925 Second rubber boom
- 1931 Incursion of Japanese forces into northern China
- 1930s The market was dominated by the rubber share price movements
- 1941 The market closed on Friday 5 December

3 Data

In this project, we collect individual stock data over the period 1871 to 1940 from *the North China-Herald*. It was a local English newspaper published in Shanghai, which carried a comprehensive collection of the weekly share list. A broker company, J.P. Bisset & Co was given as the information source. We use the annual price and dividend information on all available individual securities to construct stock price indices and return series.

3.1 Share Price and Dividends

The North China-Herald quoted transaction prices as well as bid-ask prices with share quantity per week over most part of the sample period. We use end-of-month share price data in December to constructed annual indices for the market. When no traction data was available at the end-of-year, the latest bid-ask prices were averaged. The share prices were dominated in different currencies (pounds, dollars and local currencies). We converted all share prices into dollar values using historical exchange data. In addition, we adjusted share prices by a scale factor whenever stock splits and new-issuing information is presented.

We collected dividend data for each security by identifying the annual dividend payment reported in the North China-Herald. The product of last dividend payment and payout frequency were calculated if the total dividend information was not available.

3.2 Return Indices

We constructed both equally weighted and value-weighted indices for the Shanghai Stock Exchange. The return indices are

Capital Appreciation Return (CAR)

$$EWCAR_t = \frac{1}{n} \sum_{i=1}^n \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

$$VWCAR_t = \sum_{i=1}^n w_{i,t-1} \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

Where

$$w_{i,t-1} = \frac{P_{i,t-1} S_{i,t-1}}{\sum_{i=1}^n P_{i,t-1} S_{i,t-1}}$$

Total Return (TR)

$$EWTR_t = \frac{1}{n} \sum_{i=1}^n \frac{P_{i,t} + D_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

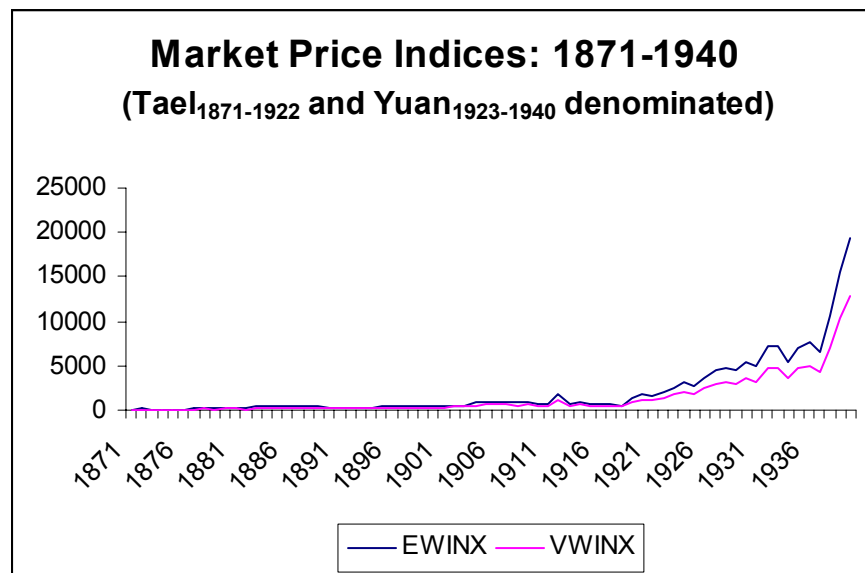
$$VWTR_t = \sum_{i=1}^n w_{i,t-1} \frac{P_{i,t} + D_{i,t} - P_{i,t-1}}{P_{i,t-1}}$$

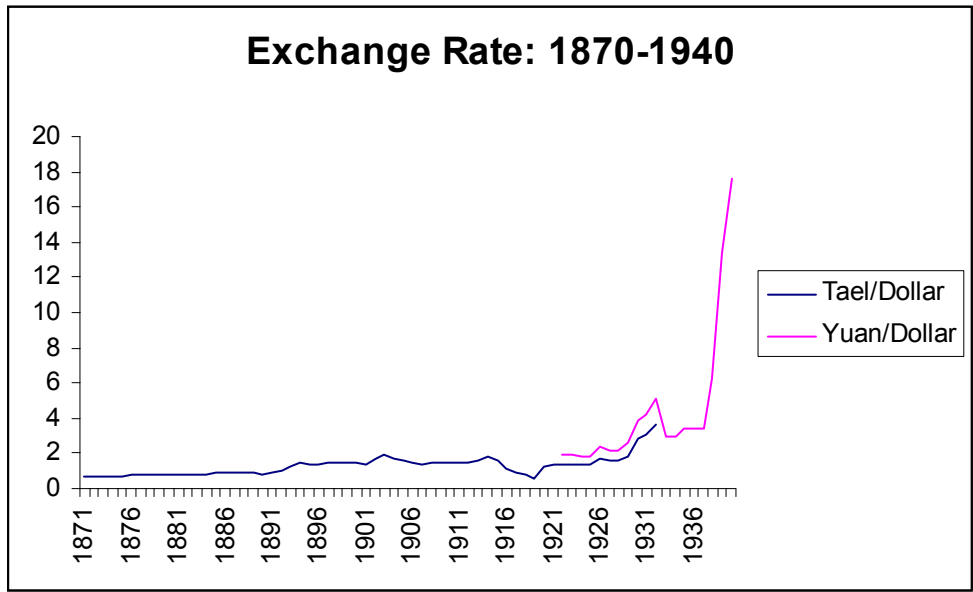
Table 1 Return Summary Statistics

	Equally-weighted CAR	Value-weighted CAR	Price-weighted CAR	Equally-weighted total return	Value-weighted total return
Mean	0.052967	0.047002	.0145792	0.128579	0.071037
Standard Deviation	0.313977	0.190016	0.212960669	0.327956	0.199946
Skewness	2.446331	1.030514	1.235512054	2.399103	0.999164
Kurtosis	9.125543	1.96585	3.236928	9.047473	1.486622
Serial correlation	-0.0347	-0.0509	-0.0529	-0.0376	-0.0200

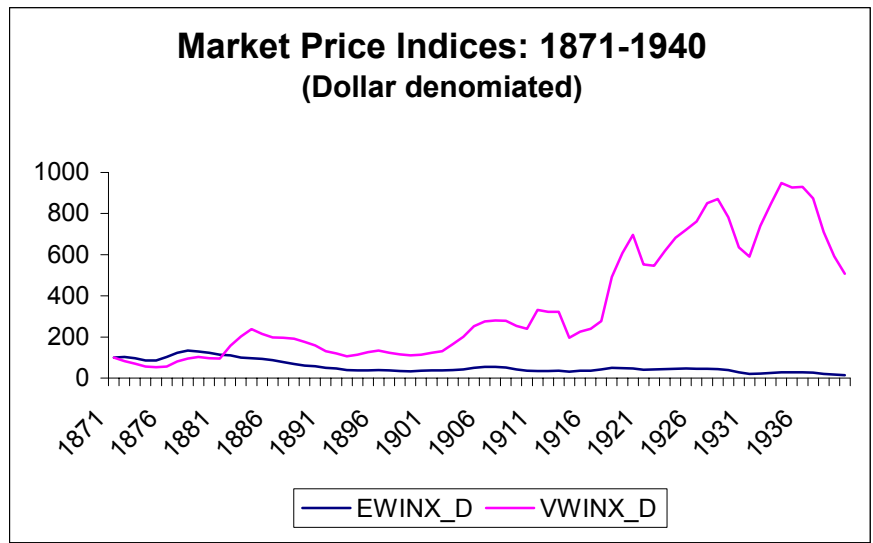
* All returns are denominated in dollars

3.3 Price Indices in local currency





3.4 Price indices in dollars

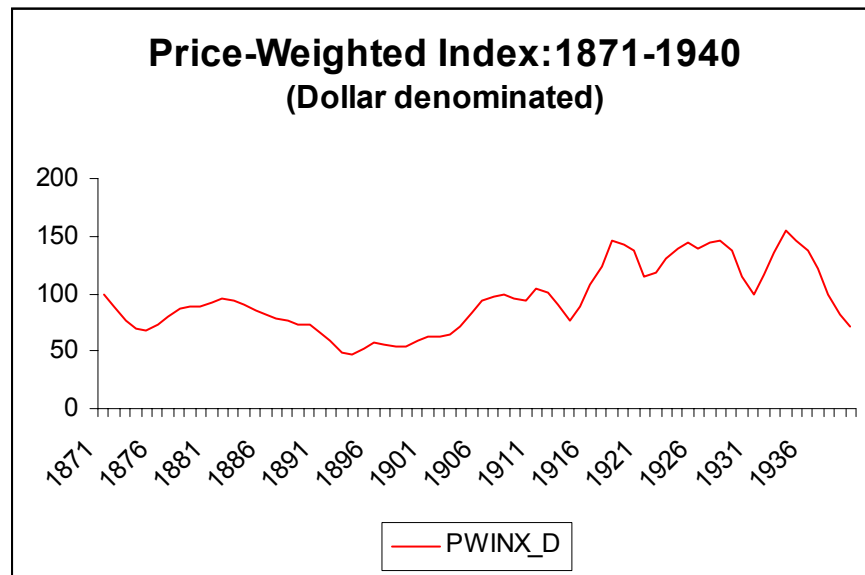


The composition of the share list changed dramatically over years. Usually, a typical company is listed no longer than 12 years. The share list consisted of mainly large companies with higher price and high par value in the early sample period, but in the late sample period the market was dominated by a large amount of small shares with lower

price and face value.¹ For each year in our sample, we calculated annual returns for all stocks that trade in two consecutive periods. We weighted these returns by the price at the beginning of the two periods. The price-weighted capital index over period t, is given by

$$PWCAR_t \equiv r_t^i \cdot w_t^j \equiv \sum_{i=1}^N \left(\frac{P_t^i}{P_{t-1}^i} \cdot \frac{P_{t-1}^i}{\sum_{j=1}^N P_{t-1}^j} \right) \equiv \frac{\sum_{i=1}^N P_t^i}{\sum_{i=1}^N P_{t-1}^i}.$$

A capital appreciation index was constructed from the price-weighted market return.



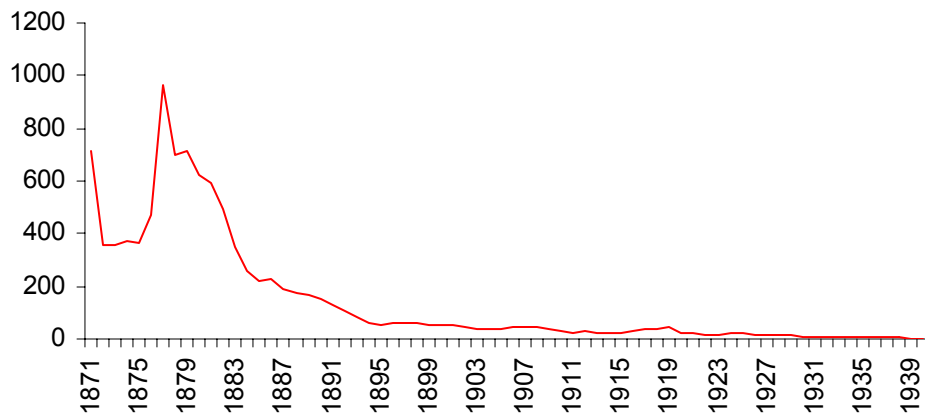
In addition, we calculated the market-average return on equity to measure the market average profitability².

$$\left(\frac{M}{B}\right)_t = \frac{1}{n} \sum_{i=1}^n \frac{P_{i,t}}{Par_{i,t}}$$

¹ Indeed, the equal-weighted price index exhibited a persistent downward trend over the entire sample period, which implies a share list composition change.

² We noted that the market average par value dropped from 714.4 dollar in 1871 to 2.74 in 1940,

**Market-average Par Value
(Dollar denominated)**



M/B Ratio

