The Real Value of China's Stock Market*

Jennifer N. Carpenter
New York University

Fangzhou Lu
New York University

Robert F. Whitelaw
New York University

January 30, 2014

*We thank Franklin Allen, Jennifer Arlen, Kalok Chan, Hui Chen, Will Goetzmann, Joel Hasbrouck, Peter Henry, Kose John, Thomas Philippon, Alexi Savov, Antionette Schoar, Myron Scholes, Johannes Stroebel, Jiang Wang, and Hongjun Yan for helpful comments and suggestions.

The Real Value of China's Stock Market

Abstract

China is the world's largest investor and greatest contributor to global growth. The success of China's stock market in attracting domestic and international capital and allocating it efficiently to corporate investment will be an important determinant of global growth in the coming decades. Despite its reputation as a casino, China's stock market has functioned well since the reforms of the last decade. Stock price informativeness has increased and compares favorably with that in the US. The efficiency of corporate investment is highly correlated with stock price informativeness and has followed a strikingly similar trend. Despite its segmented nature, China's equity market delivers a cross-sectional pattern of returns surprisingly similar to that found in other countries, with high premia for size, value, illiquidity, and right-skewed payoffs. Moreover, China's stock market has performed well, especially its small and medium enterprises. It exhibits low correlation with other equity markets, reflecting restrictions on international capital flows. As a result, China's factor portfolios offer high alphas for US and global investors who can access them. This suggests that liberalizing capital flows would reduce corporate China's cost of capital. While China's stock market is already an important enterprise financing channel, additional regulatory reforms to improve the information environment and liberalize the flow of capital would further empower this market to attract capital, allocate it efficiently, and support economic growth worldwide.

China became the world's largest investor in 2010 and has held the leading position ever since. In 2013, China made $4.4 trillion of total fixed-asset investment, compared with $3.1 trillion in the US and $1.2 trillion in Japan. China has also been the greatest contributor to global growth since 2006, contributing $0.7 trillion to global GDP in 2013, compared with $0.5 trillion from the US and $0.1 trillion from Russia. The efficiency of China's financial system in allocating capital across investment opportunities will be an important determinant of global economic growth in the coming decades, and its stock market is likely to be the most critical channel.

China's financial system is dominated by a large state-owned banking sector and a growing shadow banking sector. Total bank credit was 128% of GDP in 2012, according to Elliott and Yan (2013), and total credit in the shadow banking sector was reckoned to be anywhere from 40 to 90% of GDP, while China's stock market capitalization is only 44% of GDP. By contrast, in the US, bank credit and stock market capitalization were 48% and 118% of GDP in 2012. Allen, Qian, and Qian (2005) argue that China is a counterexample to the findings of the law, insititutions, growth, and finance literature such as La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998, 2000), and that its alternative financing channels support its growth. Despite increasing concerns about the rapid growth of the unregulated shadow banking sector, bad loans, and systemic risk, China has tolerated this growing sector, perhaps as a channel for more market-driven lending and interest rate liberalization.

While China's shadow banking sector may be an effective financing channel for fueling economic growth, China's stock market has a unique, essential, and potentially more important role to play. A large literature in economics, finance, and accounting links good legal and market institutions, informativeness of stock prices about future profits and required returns, and efficiency of corporate investment and economic growth. Relative to other components of the financial system, such as banks, stock markets can improve the efficiency of capital allocation by creating stronger incentives for information generation and by aggregating that information across a broader set of market participants. In addition, listing standards and auditing and disclosure processes for publicly traded firms provide transparency. Stock markets also channel tradable equity capital to firms, lowering the cost of equity capital, and enriching the portfolio choice of investors. Relative to other financing channels, stock markets can also be the preferred access point for foreign portfolio investors because of the relative transparency and liquidity of traded equities. Finally, because of their role in generating information and transparency, stock markets can be important complements to the relationship-driven, custom-tailored, but often opaque banking and shadow banking sectors.

This paper examines the effectiveness of China's stock market at aggregating and impounding information about firm profits into prices, allocating capital efficiently across firms,

and enhancing the opportunity set of investors. We begin with an analysis of the informativeness of China's stock market over the period 1996 to 2012, using data from the China Stock Market and Accounting Research (CSMAR) database. Following Bai, Philippon, and Savov (2013), we define the informativeness of the market as the cross-sectional variation in future earnings predicted by firm market value. Our results suggest that the informativeness of prices has steadily improved since the establishment of market reforms around the time of China's entry into the WTO and compares favorably with that in the US. We relate the trends in the price informativeness of China's stock market to China's legal, market, and accounting regimes since 1996.

Next, we examine the efficiency of corporate investment in China during the same period. Modifying the approach of Durnev, Morck, and Yeung (2004) for the Chinese setting, we define the efficiency of investment as the unexpected change in equity value associated with a unit of unexpected investment, measured in a cross-sectional regression. We find that the trend of investment efficiency closely follows that of price informativeness over our sample period, with an economically and statisically high correlation between the series.

Finally, we analyze the pricing of equity in China by characterizing the cross-section of Chinese stock returns and their correlation with stock returns in other large economies. In contrast to the high correlations in returns across open markets, returns in China's stock market exhibit low correlation with other large economies. Yet, despite this evidence of market segmentation, and the market's early reputation as a casino, China's stocks exhibit cross-sectional return patterns surprising similar to those in the US. Moreover, although the Shanghai Stock Exchange index has recently earned China's stock market a reputation for poor performance, our analysis of the broader market, including stocks on the Shenzhen, SME, and ChiNext boards, suggests that China's stock market offers attractive returns and opportunities for diversification to international equity investors.

China's market is still young, but our results suggest that many of China's market reforms have already been effective, based on the trends of stock price informativeness and investment efficiency. To sustain China's contribution to global growth, further reforms that increase market informativeness, liberalize capital flows, and attract international capital will be important to reduce corporate China's cost of equity capital and increase its investment efficiency.

1 Overview of China's stock market

In contrast to the markets of developed countries, China's stock market has a history of only 23 years. However, since its opening in 1991 in Shanghai and Shenzhen, it has become one

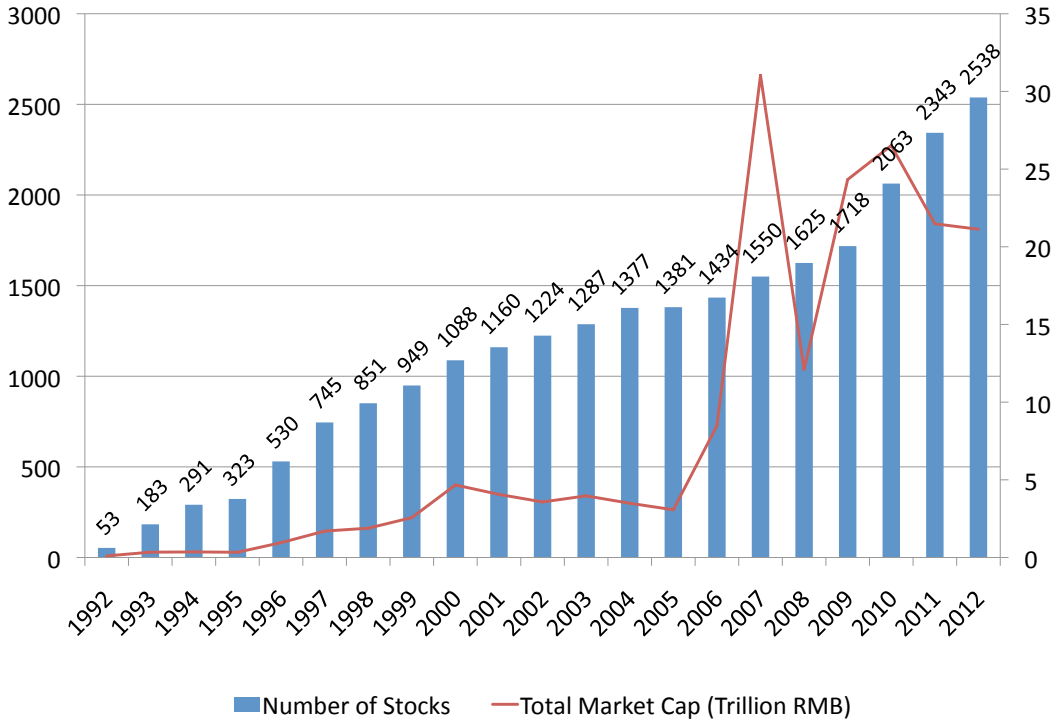
of the most important enterprise financing channels in China. As a country, China has the second largest stock market by trading volume and the third largest by market capitalization, $3.7 trillion in 2013, after the the US and Japan. Figure 1 shows that the number of stocks has risen from 53 in 1992 to 2538 in 2012. The main boards of the Shanghai and Shenzhen Stock Exchanges list larger more mature stocks, like the NYSE in the US. The Shenzhen Stock Exchange also includes two other boards, the Small and Medium Enterprise Board and the ChiNext Board, also known as the Growth Enterprise Board, more comparable to the NASDAQ in US, which provide capital for smaller and high-technology stocks.

China's stock market has a number of distinctive features. First, it is a pure order-driven market, as opposed to a quote-driven market, whereas the US and several other countries have hybrid equity market systems. Second, it is a centralized market, whereas the US market is fragmented, with dark pools and other off-exchange trading. This may have important implications for market informativeness. There are no dark pools with hidden orders in China, all orders are visible. Moreover, there is no extended trading period for institutional investors. Institutional and retail investors have equal access to information from a market microstructure point of view. In addition, China's stock market has a price move limit of 10% to deter excess volatility and stock manipulation.

China's stock market has a dual-share system in which domestic investors can invest only in A shares, while foreign investors can invest only in B shares. In addition, many firms have H shares, traded on the Hong Kong Stock Exchange. A number of articles, such as Chan, Menkveld, and Yang (2008) and Mei, Scheinkman, and Xiong (2009), study the discount of B share and H share value relative to A shares, which they attribute to information asymmetry between foreign and domestic investors and speculative motives. With the introduction of programs such as the Qualified Foreign Institutional Investors (QFII) program of 2002, which relaxed the cross-trading restrictions, B share issuance and trading have mostly vanished. In addition, China's equity market used to have a large nontradable component, held by corporate founders, often central or local governments. With the share structure reform starting in 2002, this phenomenon has mostly disappeared among mid and small-cap stocks, though not entirely among large stocks.

In 2001, a famous Chinese economist, Wu Jinglian, characterized China's stock market as a "Casino" manipulated by speculators, misled by the central government's visible hand to unfairly support state-owned enterprises (SOEs), and without a strong link to fundamentals. Moreover, much of the academic literature in finance on China has emphasized the market's imperfections. However, our results suggest that, on the contrary, China's stock market is as informative as the US stock market in terms of aggregating and impounding information about future profits into prices, and exhibits a cross-sectional return pattern surprisingly

Figure 1. China's Stock Market 1992-2012



similar to those in developed markets, despite its segmented nature.

2 The informativeness of stock prices in China

A long literature in economics, finance, and accounting going back to Hayek (1945) and Fama (1970) links good legal and market institutions to stock price informativeness about future profits and required returns, and further to the efficiency of capital allocation and corporate investment. Elements of this nexus include the benefits of effective of listing, disclosure, and auditing policy, aggregation of diffuse information across individuals, incentives to generate information, and its inference from prices (Grossman and Stiglitz (1980), Glosten and Milgrom (1985), Kyle (1985)), and managerial use of price signals in resource allocation and investment decisions (Wurgler (2000), Baker, Stein, and Wurgler (2003), Durnev, Morck, and Yeung (2004), Chari and Henry (2004), and Chen, Goldstein, and Jiang (2007)). A branch of the literature introduced by Morck, Yeung, and Yu (2000) proposes stock price asynchronicity and idiosyncratic firm risk as measures of firm-specific information in prices. More recently, Bai, Philippon, and Savov (2013) define price informativeness as the predicted variation in a cross-sectional regression of future corporate earnings on firm market values and study its trend in the US stock market. Subsection 2.1 examines the price informativeness of China's stock market, shows that it is comparable to that in the US, and relates its trends to the regulatory regimes that prevailed during its history. Subsection 2.2 shows that the average idiosyncratic risk of China's stocks is greater than that in the US and highlights the difficulties of comparing R^2's across countries.

2.1 Price informativeness about future earnings

Bai, Philippon, and Savov (2013) develop a model in which stock price informativeness promotes efficient allocation of corporate investment and economic growth. They define price informativeness as the extent to which market valuations differentiate firms that will have high profits from those that will not. Empirically, they define price informativeness in a given year t as the predicted variation, $a_t \times \sigma_t(\log(M/A))$, in the following cross-sectional regression of future earnings on current market equity value and lagged earnings, normalized by book asset value,

$$\frac{E_{i,t+k}}{A_{i,t}} = c_t + a_t \log(\frac{M_{i,t}}{A_{i,t}}) + b_t(\frac{E_{i,t}}{A_{i,t}}) + \varepsilon_{i,t} \ , \tag{1}$$

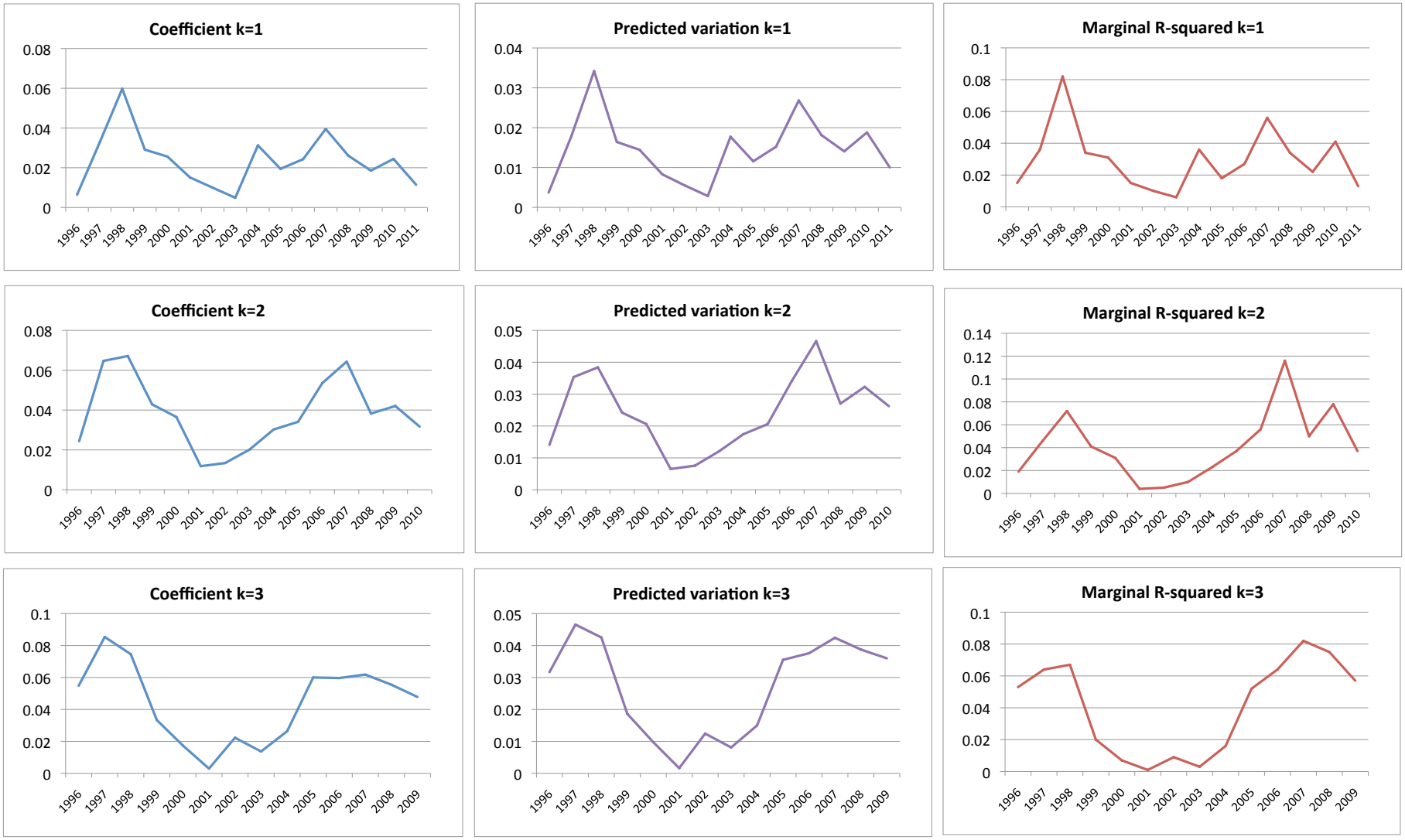
with industry fixed effects to control for differences in discount rates. Their focus is on the trend of stock price informativeness in the US, which they find has not increased since 1960. We take this model to the data on earnings, equity market value, and asset book value from the China Stock Market and Accounting Research (CSMAR) database from 1996 to 2012. To filter out bad data, we eliminate observations with earnings greater than three times book asset value.

Figure 2 plots the coefficients a_t, the predicted variation $a_t \times \sigma_t(\log(M/A))$, and the marginal R^2 of regression (1) for forecasting periods $k = 1, 2$, and 3, for each year $t = 1996$ to $2012-k$. Marginal R^2 is the change in the R^2 of regression (1) created by adding $\log(\frac{M_{i,t}}{A_{i,t}})$ as a regressor. Judging from a comparison with Figure 2 of Bai, Philippon, and Savov (2013), the average level of stock price informativeness in China over the period is similar to that in the US. However, four distinct periods are apparent, which we interpret in the context of the regulatory regimes that prevailed over the life of China's stock market in Figure 3.

As indicated in Figure 3, we identify four stages of the development of China's stock market. The first, a period of market opening and construction from 1991 to 1997, is characterized by the establishment of the exchanges in Shanghai and Shenzhen and the transition from a decentralized and disorganized stock market to a centralized modern market. During the first five years, the number of stocks listed on the Shanghai and Shenzhen stock exchanges grew from eight stocks to more than five hundred stocks. Many stocks moved from an OTC platform to Shanghai and Shenzhen's electronic trading platform. In 1992, a direct electronic trading system was implemented, which increased liquidity in the equity market. In 1996, the number of listed companies first exceeded 500 and the Dow Jones first published the China, Shanghai 30, and Shenzhen indices, which attracted a significant following by equity analysts. In addition, the Exchanges unified limit-order books and greatly reduced trading commissions, which also increased liquidity. Chordia, Roll, and Subrahmanyam (2008) show theoretically that increasing liquidity improves market efficiency and informativeness, which suggests that these developments likely contributed to the rise of informativeness in China's stock market over this period. Moreover, the adoption of a price move limit of 10% and a one-day minimum holding period may have deterred stock price manipulation, as suggested by Kim and Park (2010). In 1997, the China Securities Regulatory Commission (CSRC) become the official regulator of China's stock market. These policies shaped the market opening and construction period of China's stock market and the prototype of an efficient capital allocation platform for China's business and enterprises.

The second stage, from 1998 to 2001, is a period of rampant speculation and accounting fraud, flagrant stock price manipulations, and the birth of the Casino theory. In 1998, prices of firms in Special Treatment, or distress, skyrocketed and the CSRC reported widespread

Figure 2. Stock price informativeness in China: Forecasting earnings with equity prices



I. 1991-1997 Market Opening & Construction

5/29/1996 Dow Jones China, Shanghai, and Shenzhen indices publicized

12/13/1996 Daily price change limit of 10% set for all stocks

II. 1998-2001 Speculation & Accounting Fraud

2/15/2000 First stock trades above 100 Yuan, investigation finds serious accounting fraud

III. 2001-2007 Market Reform

12/05/2001 New and stricter company delisting regulation enforced

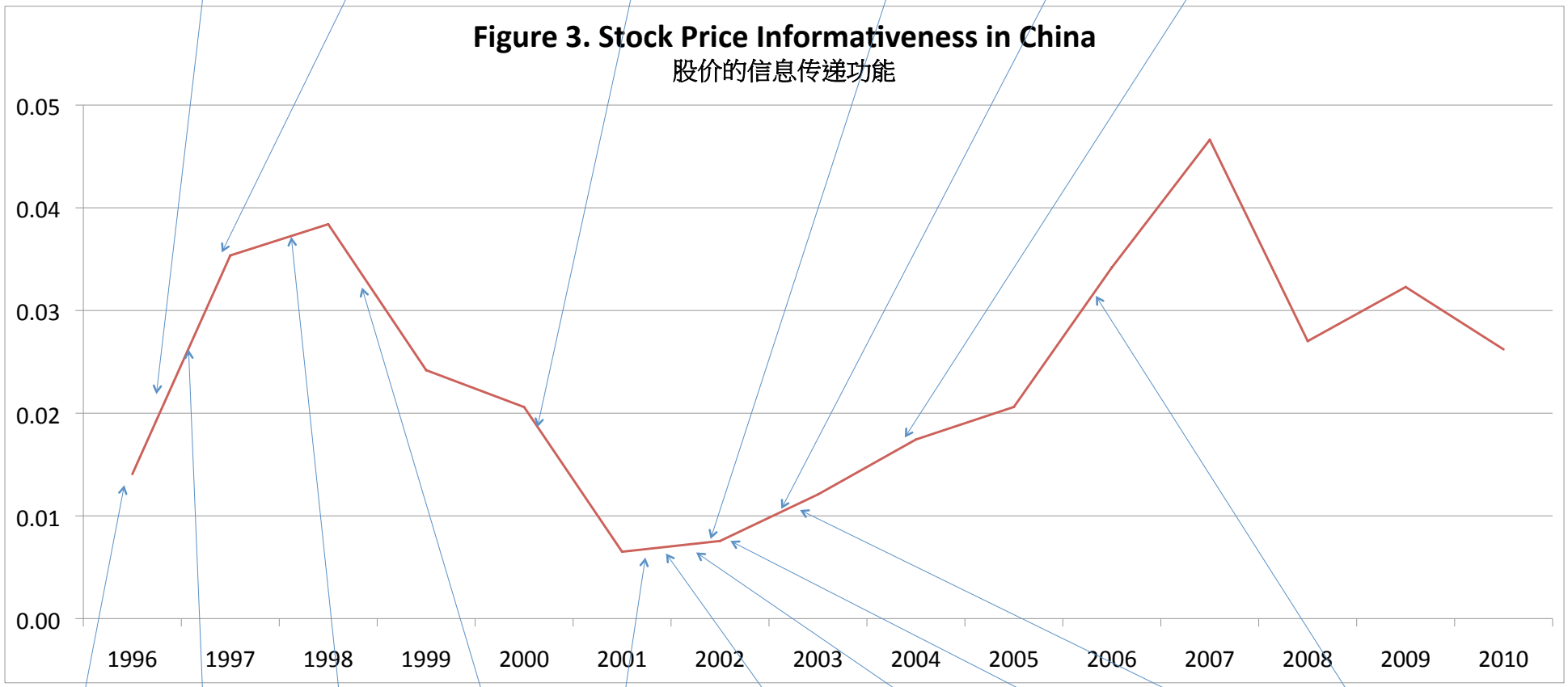
11/18/2002 The CSRC ratifies QFII program for direct foreign inst. A-share ownership

02/02/2004 National nine rules strengthen minority shareholder protection and dividend policy

IV. 2008-2010 Financial Crisis

Figure 3. Stock Price Informativeness in China

股价的信息传递功能



1996 Number of listed companies exceeds 500

9/24/1996 Limit-order books unified, trading fees reduced

8/15/1997 The CSRC becomes regulator of Shanghai and Shenzhen exchanges

1998 Prices of firms in ST skyrocket, market manipulation rampant

5/15/2001 Economist Wu Jinglian proposes "Casino" theory of China's stock market

08/20/2001 Several major accounting scandals revealed

11/11/2001 China joins the WTO

1/28/2002 Nontradable shares gradually go public, tradable shareholders compensated

01/07/2003 The CSRC tightens reporting rules to deter accounting fraud

01/13/2006 Margin trading and short selling pilot program introduced

market manipulation. The pump and dump scheme was also a common phenomenon in this period and the average PE ratio of China's stocks surged to 70 by the end of 2000, suggesting that prices were deviating from fundamental value. Goldstein, Ozdenoren, and Yuan (2013) show theoretically that undesirable coordination across speculators makes the market less informative, decreases real investment, and increases stock market volatility. Accounting fraud was a serious problem during this period as well. For example, in early 2000, the first stock to trade above 100 RMB, an important cognitive benchmark in China, was investigated by the CSRC and serious accounting fraud was revealed. Later that year several other major accounting scandals came to light. DeFond, Wong, and Li (1999) propose that the fraudulent accounting stemmed from a unregulated, poorly supervised audit market. They suggest that the audit market in China was dominated by government-affiliated auditors, who tended to audit in favor of government-affiliated companies. They also report that auditors lost market share after they behaved more independently, implying that they may have had incentive not to report frauds in order to retain clients. At the end of 2000, Chinese financial economist Wu Jinglian proposed the famous Casino theory, suggesting that China's equity market failed to fulfill its capital allocation function, and merely provided a platform for insiders and speculators to profit illegally at the expense of retail investors and minority shareholders whose interests were unprotected.

The third stage is a period of market reform from 2001 to 2007. This stage is milestoned by China's entry into the World Trade Organization (WTO) and marked by improvements in regulatory protection of minority shareholders, increases in accounting transparency and audit quality, privatization of state-owned enterprises, and the increase of foreign investors' direct investment in the A share market. Gul, Kim, and Qiu (2010) show that stock price synchronicity in China significantly declined with the increase in foreign shareholding, audit quality, and the decrease of ownership concentration. Wurgler (2000) also shows that the efficiency of capital allocation is negatively correlated with the degree of state ownership in the economy, positively correlated with the amount of firm-specific information in domestic stock returns, and positively correlated with the legal protection of minority investors. At the end of year 2001, new and stricter delisting regulations were enforced by the CSRC to protect retail investor interests. In 2002, the CSRC ratified the QFII program, signifying that foreign institutional investors could invest in A shares directly. The first two foreign institutional investors were the Nomura and UBS open-end mutual funds. In 2004, the CSRC established the National Nine Rules to protect minority shareholder interests, deter stock price manipulation, and deter accounting and audit fraud. In 2006, the Shanghai and Shenzhen Stock Exchanges introduced margin trading and short selling pilot programs, which expanded gradually in the subsequent years. In a study of 46 countries, Bris, Goetzmann,

and Zhu (2007) find evidence that allowing short sales permits prices to incorporate negative information more quickly. The combination of regulatory policies, capital market development, improving accounting and auditing quality, and foreign investors' holding of A shares directly may have helped boost informativeness in China's stock market during this period. The fourth and last stage, from 2008, is the financial crisis period. The crisis may have depressed realized price informativeness for at least two reasons, one, because it precipitated extreme realizations from the distribution of earnings, and two, because it lead to some dislocation and mistrust of capital markets, which did in fact undermine the informativeness of prices.

2.2 Idiosyncratic firm risk

This section examines stock price informativeness in China measured by average idiosyncratic firm risk and market model R^2, as proposed by Morck, Yeung, and Yu (2000), Durnev, Morck, Yeung, and Zarowin (2003), and Morck, Yeung, and Yu (2013). Li, Rajgopal, and Venkatachalam (2013) catalog a large literature that links these measures to stock price informativeness, investment efficiency, disclosure and audit quality, and corporate governance. For each stock i with a return time series of at least 36 months during the period 1995-2012, we estimate the idiosyncratic variance $\sigma^2_{\varepsilon_i}$ from the monthly market model regression

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_i(r_{m,t} - r_{f,t}) + \varepsilon_{i,t} \ , \tag{2}$$

and then calculate the cross-sectional average idiosyncratic variance. Table 1 shows that the square root of the average annualized idiosyncratic variance in China is 58%, compared with 27% in the US during the period 1962-1997, as estimated in Campbell, Lettau, Malkiel, and Xu (2001). By this metric, the firm-specific information content of stocks in China is more than double that in the US.

We also estimate the annualized volatility of the excess return on the market portfolios in China and the US to be 32% and 16%, respectively, over the period 1995-2012. To reconcile these results with the more commonly recognized US stock return volatility figure and highlight China's high return variance, note that representative firms with these variance decompositions and market beta's of one would have total return volatility of 66% and 31% in China and the US, respectively.

The high market return variance in China drives up its synchronicity measure

$$R^2_i = \frac{\sigma^2_{\varepsilon_m}}{\sigma^2_{\varepsilon_m} + \sigma^2_{\varepsilon_i}} \ . \tag{3}$$

As Table 1 summarizes, Panel B of Figure 2 of Morck, Yeung, and Yu (2013) find average R^2s of 36% and 14% in China and the US, respectively, weighting by total firm variance. By this measure, stock prices in the US appear to contain greater firm-specific information. This highlights the difficulties of comparing R^2s across countries with very different market return variances, as Morck, Yeung, and Yu (2013) point out. Li, Rajgopal, and Venkatachalam (2013) and Hou, Lin, and Wei (2013) elaborate on additional limitations of the R^2 measure.

Table 1: Average idiosyncratic firm risk and R^2 in China and the US

Square root of cross-sectional average annualized idiosyncratic stock return variance, market return variance, total return variance for a representative firm, and average market model R^2s from Morck, Yeung, and Yu (2013), in percent.

	Idiosyncratic volatility	Market volatility	Total volatility	Average R^2
China	57.81	32.31	66.23	36.00
US	26.57	16.14	31.09	14.00

3 Efficiency of corporate investment in China

Summarizing economic arguments that go back to Hayek (1945) and Fama (1970), Durnev, Morck, and Yeung (2004) state that "corporate capital investment should be more efficient where stock prices are more informative." They find a positive cross-sectional correlation between their measure of corporate investment efficiency and firm-specific variation in stock returns in US firms. More broadly, in a study of 65 countries, Wurgler (2000) finds a positive correlation between the efficiency of capital allocation and the development of the financial sector and a positive correlation between efficiency and the amount of firm-specific information in domestic stock returns. This section examines the link between stock price informativeness and corporate investment efficiency in China and finds a strong positive correlation.

We define the efficiency of corporate investment as the unexpected change in equity value associated with a unit of unexpected investment, measured for each year t by the coefficient β_t in the following version of the cross-sectional regression proposed by Durnev, Morck, and Yeung (2004),

$$\frac{\Delta V_{i,t}}{A_{i,t-1}} = \alpha_t + \beta_t \frac{\Delta A_{i,t}}{A_{i,t-1}} + \gamma_t \frac{\Delta V_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t} \ , \tag{4}$$

where the second regressor above controls for the anticipated return on equity and in addition, we include industry fixed effects to control for differences in expected growth and depreciation rates of capital stock. Durnev, Morck, and Yeung (2004) use market asset value instead of equity value, they interpret the coefficient β_t as the marginal Tobin's q, and they measure efficiency of investment as the difference between this coefficient and one, based on the argument that the marginal q of firms that are investing optimally should be one. By contrast, we interpret the coefficient β above as a direct measure of investment efficiency for several reasons. First, unexpected investment may be "good news" about the productivity of both past and future investment, and may optimally translate to changes in value greater than one for one. Second, as it measures the relationship between investment and changes in value over a year, it is average rather than marginal q. Third, in a setting such as China, where most firms face potentially severe capital constraints, it may be difficult for firms to reach the optimal investment level. Thus, we interpret a larger coefficient in the cross-section as reflecting greater efficiency of investment.

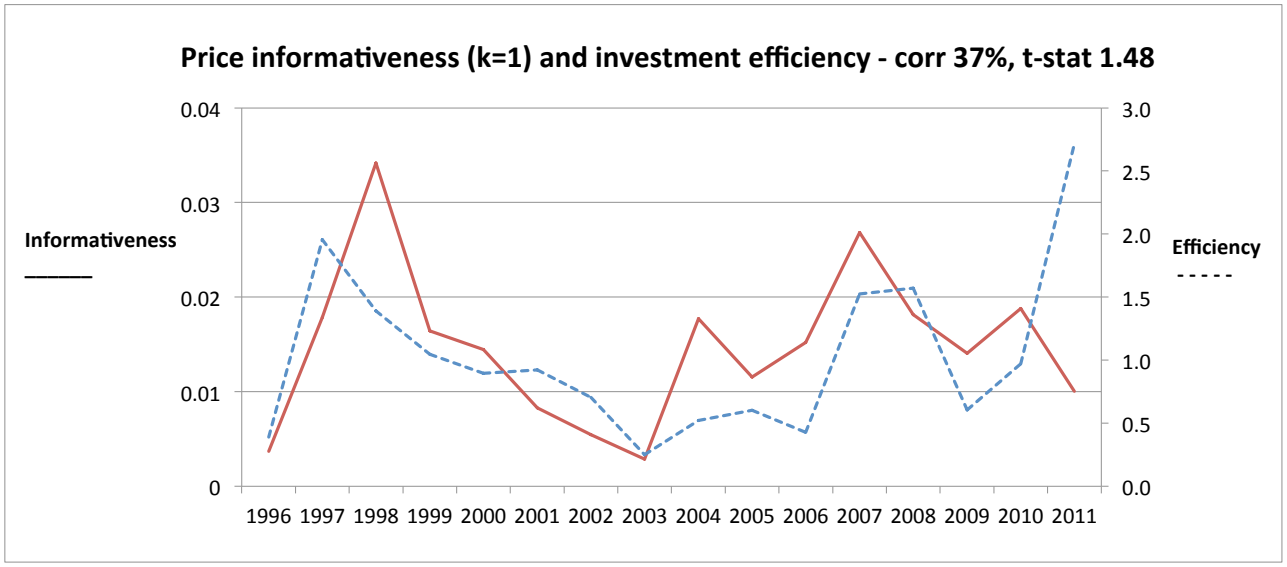
Figure 4 plots the time series of investment efficiency coefficients over the period 1996-2012, using the right-hand scale, in combination with the time series of Bai-Philippon-Savov price informativeness measures we calculated in Section 2.1, using the left-hand scale, for three different earnings forecasting periods. The patterns of the two time series are strikingly similar, and the correlation between them is high and statistically significant in the cases of earnings forecasting periods of 2 and 3 years, despite the short sample period.

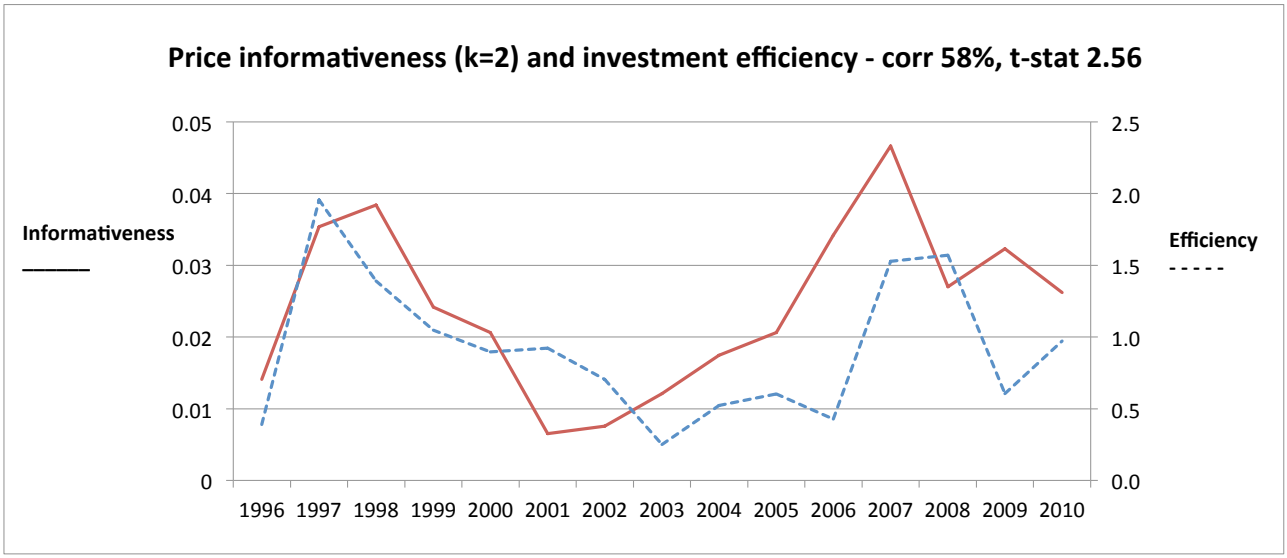
This result supports the idea that corporate investment is more efficient when stock prices are more informative. It may be that a listing on the stock exchange in salutory information environments improves the efficiency of corporate investment for other reasons as well, for example, because disclosure and auditing standards in and of themselves lead to better managerial decision-making. The result may flow from broader channels as well, for example, that legal, regulatory, and accounting environments in which the stock market is functioning well are also those in which managerial investment decisions are more informed and better aligned with equity value maximization. Finally, we note that the average level of investment efficiency over the sample period is 1.00, compared with an average coefficent of 0.91 in the US, reported by Durnev, Morck, and Yeung (2004).

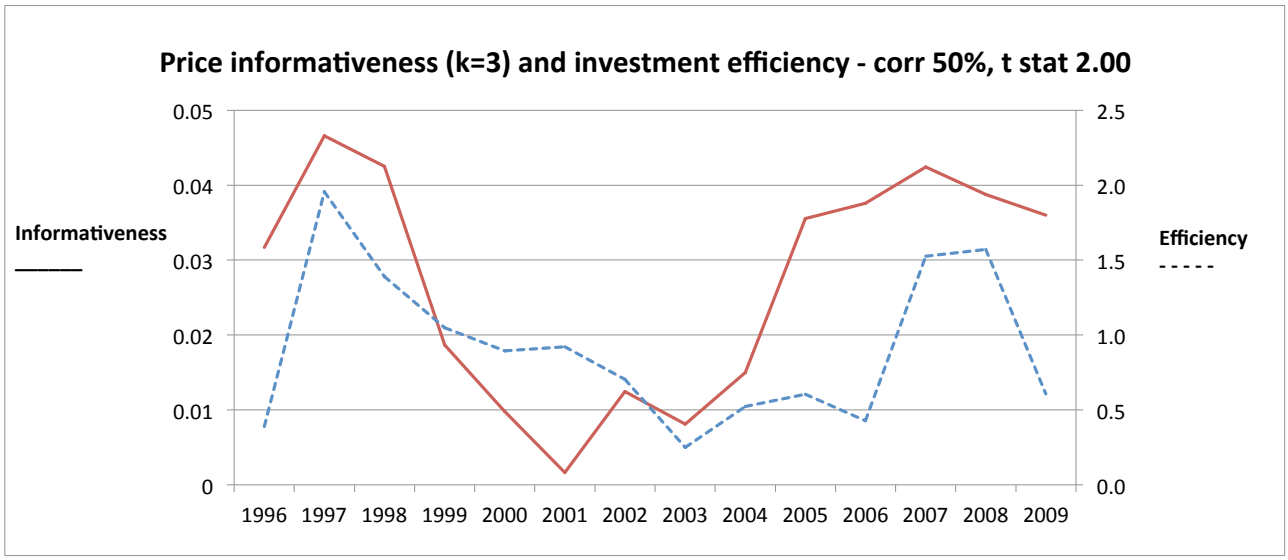
4 Equity pricing and investment opportunities in China

While the last section examines the informativeness of stock prices about future profits and its relation to corporate investment, this section studies the pricing of those profits and implications for portfolio investors and corporate cost of capital. We analyze the cross-sectional

Figure 4. Stock price informativeness and investment efficiency in China 1996-2012







structure of returns and equity premia paid to Chinese investors, the performance of China's stock market and correlation with stock markets in other countries, and investment opportunities for foreign investors. We find that despite the market's segmentation from other major markets and its early reputation as a casino, the cross-sectional pattern of returns is quite similar to that in the US. This is especially surprising given the low correlation between returns in China and those in other large economies. Moreover, China offers attractive returns and opportunities for diversification to international equity investors who can access them. However, this suggests that capital controls are raising the cost of equity capital for China's firms and that China has much to gain from opening its market to foreign investors.

4.1 The cross-section of expected returns

This section presents new evidence on the cross-section of expected returns. Chen, Kim, Yao, and Yu (2010) examine cross-sectional stock return predictability in China over the period July 1995 to June 2007 using data on A shares from the PACAP-CCER China database. They consider 18 firm-specific variables found to have predict returns in the US and find all 18 have signs consistent with US evidence, and five are significant in their sample, compared with eight variables that are significant in the US data over the same period. Cakici, Chan, and Topyan (2011) analyze stock return predictability in China from January 1994 to March 2011 using data on A shares traded on the Shanghai and Shenzhen Stock Exchanges from Datastream and find strong predictive power of size, book-to-market, cash-flow-to-price, and earnings-to-price, but not momentum. We update and extend this evidence using data from July 1995 to December 2012 on A shares of firms traded on the Shanghai and Shenzhen Exchanges from the CSMAR database.

4.1.1 Firm-level cross-sectional regressions

We begin with Fama and MacBeth (1973) firm-level cross-sectional regressions of returns on eight predictor variables: BETA, SIZE, BM, MOM, ILLIQ, MAX, REV, and SOE. Following Scholes and Williams (1977) and Dimson (1979) to account for nonsychronous trading, BETA is obtained from regressing daily firm return on daily current, lead, and lagged market returns over the previous month and summing the three coefficients. Following a long literature going back to Banz (1981), SIZE is the natural logarithm of the market value of firm equity at the end of the previous month. Following Fama and French (1992), BM is the ratio of book value of equity to market value of equity at the end of the previous calendar year. Following Jegadeesh and Titman (1993), momentum, MOM, is defined as the cumulative stock return over the previous eleven-month period, lagged one month. Following Amihud

(2002), illiquidity, ILLIQ, is measured as the average over the previous month of the daily ratio of the absolute value of the stock return to the total value of shares traded. Following Bali, Cakici, and Whitelaw (2011), MAX is the maximum daily stock return over the previous month. Following Jegadeesh (1990) and Lehmann (1990), short-term reversal, REV, is the return on the stock over the previous month. Given the importance of the level of state ownership in China in distinguishing firms' governance structure, objectives, opportunity set, and access to capital, we also introduce the variable SOE, which is the percentage of the firm's shares held by the central or local government in the previous month.

Table 2 presents the results of univariate regressions for each predictor, multiple regressions with BETA, SIZE, BM, and MOM, and multiple regressions with the additional predictor variables as well. Overall, the results are surprisingly similar to those for US stocks reported in Bali, Cakici, and Whitelaw (2011). The coefficient on BETA is significantly positive in the multiple regressions, but not by itself, with comparable magnitudes. The coefficient on SIZE is generally strongly significantly negative, though it loses magnitude and significance in the presence of ILLIQ. The coefficient on BM is consistently significantly positive, though smaller in magnitude than in the US data. The coefficient on MOM by itself is insignificant, in contrast to the US results, but it regains significance in the multiple regressions. Whether or not the premiums attributable to size, book-to-market, and momentum should be interpreted as evidence of market inefficiency, the predictive power of these variables for stock returns in China is in line with the cross-sectional return patterns documented for developed economies, such as in Fama and French (1998) and Fama and French (2012).

The coefficient on ILLIQ is consistently significantly positive. As in the US, Chinese investors charge a premium for bearing illiquidity, whether to compensate for direct trading costs or the probability of trading against more informed market participants. Information asymmetry between corporate insiders and outsiders, government insiders and outsiders, and domestic and foreign investors is regarded as a major concern in China. These results suggest that legal, accounting, and market reforms that increase transparency and level the playing field could not only attract more market participants, but also lower firms' cost of capital.

The coefficient on MAX is strikingly significantly negative, as in the US data. The evidence suggests that, like US investors, Chinese investors also pay up for lottery-like payoffs. This similarity in investor preferences is especially noteworthy considering potentially strong cultural differences between the two groups, and it raises the possibility that many of the behavioral biases documented for US investors may also hold more universally.

The coefficient on REV is also significantly negative, as in the US. Finally, the coefficient on SOE, the percentage of government-owned shares, is insignificant. It may be that the

degree of state-ownership is not in fact, a priced characteristic of equity, or it may be that this variable is measured with too much error to permit identification of the effect.

4.1.2 Portfolio-level analysis

This section provides further evidence on the pricing of size, book-to-market, momentum, illiquidity, and asymmetric returns through analysis of return differences across portfolios sorted by the predictor variables. Following Fama and French (1993), Carhart (1997), and the Ken French Data Library, we begin by forming the six 2×3 value-weighted SIZE-BM portfolios and the six 2×3 value-weighted SIZE-MOM portfolios that go into the construction of the size, book-to-market, and momentum zero-cost factor portfolios SMB, HML, and WML, for China. Throughout our analysis, we use tradeable rather than total market value in the weighting. Table 3 presents the returns and alphas for the twelve double-sorted portfolios as well as for the factor portfolios. The CAPM alphas are from time-series regressions of portfolio excess returns on the excess return of the market, RMRF.

Table 3 shows that small stocks consistently outperform large stocks and value stocks consistently outperform growth stocks in China, in terms of both excess return and CAPM alpha. Moreover, the SMB and HML factors returns are significantly positive. On the other hand, consistent with Cakici, Chan, and Topyan (2011), the WML factor returns are insignificant. Xu and Zhang (2013) provide a comprehensive analysis of the Fama-French factor portfolios and their ability to explain size and book-to-market effects in stock returns in China. We use the factor portfolios to check the robustness of our previous results and then examine correlations and investment opportunities across countries in the next section.

We form value-weighted portfolios of stocks sorted into quintiles by Amihud illiquidity and by Bali-Cakici-Whitelaw maximum return. Table 4 shows the returns, CAPM alphas, and four-factor alphas for the quintile portfolios and the difference in these quantities between quintiles one and five. The four-factor alphas are from time-series regressions of the portfolio excess returns on RMRF, SMB, HML, and WML. Panel A shows an almost monotonic illiquidity effect across the quintiles, and the differences between top and bottom quintiles are significant for all performance measures. Panel B shows performance across MAX quintiles. Similar to the findings of Bali, Cakici, and Whitelaw (2011) for US stocks, the pattern is slightly hump-shaped, rather than strictly monotonic, but the difference in alphas between low and high max quintiles is significant. The magnitudes of the differences are also similar to those for US stocks.

Table 2: Firm-level cross-sectional return regressions

The table reports time-series averages of slope coefficients and associated t-statistics from cross-sectional regressions of firm returns on the predictor variables for each month from July 1995 to December 2012. BETA is the Scholes-Williams-Dimson beta obtained from regressing daily firm return on daily current, lead, and lagged market returns over the previous month. SIZE is the log of total market value of equity at the end of the previous month. BM is the Fama-French book-to-market ratio of book value of equity to market value of equity at the end of the previous calendar year. MOM is Jegadeesh-Titman momentum defined as the cumulative stock return over months $t-12$ to $t-1$. ILLIQ is Amihud illiquidity measured as the average over the previous month of the daily ratio of the absolute value of the stock return to the total value of shares traded. MAX is the Bali-Cakici-Whitelaw maximum daily stock return over the previous month. REV is Jegadeesh-Lehmann short-term reversal defined as the return on the stock over the previous month. SOE is the percentage of shares held by the central or local government measured at the previous month.

BETA	SIZE	BM	MOM	ILLIQ	MAX	REV	SOE
0.0009							
0.44							
	-0.0060						
	-3.45						
		0.0186					
		2.96					
			0.0020				
			0.50				
				8.45E+06			
				3.86			
					-0.0313		
					-2.22		
						-0.0248	
						-2.12	
							-5.12E-06
							-0.20
0.0023	-0.0061	0.0176	0.0064				
1.43	-3.58	2.96	1.98				
0.0038	-0.0030	0.0179	0.0063	3.70E+07			
2.32	-1.66	3.16	2.00	2.29			
0.0032	-0.0064	0.0154	0.0064		-0.1902		
1.99	-3.79	2.65	2.02		-6.55		
0.0046	-0.0032	0.0158	0.0063	3.93E+07	-0.1753		
2.86	-1.78	2.83	2.06	2.41	-5.78		
0.0039	-0.0034	0.0155	0.0050	4.31E+07	-0.1333	-0.0293	2.87E-05
2.60	-1.89	2.81	1.71	2.40	-3.58	-1.92	1.57

Table 3: Returns on portfolios sorted by size, book-to-market, and momentum

Average returns and alphas on the six 2×3 value-weighted size/book-to-market portfolios and the six 2×3 value-weighted size/momentum portfolios that go into the construction of the Fama-French-Carhart factor portfolios, SMB, HML, and WML, for China over the period March 1995 to December 2012. CAPM alphas are from time-series regressions of portfolio excess returns on the excess return of the market, RMRF.

	Returns		CAPM alphas	
Panel A. Size/book-to-mkt portfolios				
	S	B	S	B
H	2.64	1.68	1.10	0.26
M	2.03	1.32	0.56	-0.17
L	1.22	1.14	-0.18	-0.23
Panel B. Size/momentum portfolios				
	S	B	S	B
W	1.64	1.39	0.16	-0.01
M	2.28	1.43	0.77	-0.02
L	2.06	1.10	0.60	-0.34
Panel C. Differences and t-statistics				
SMB	0.59	1.87	0.54	1.69
HML	0.98	3.17	0.88	2.88
WML	-0.06	-0.22	-0.05	-0.17

Table 4: Returns on portfolios sorted by illiquidity and maximum return

Average returns and alphas on value-weighted quintile portfolios over the period March 1995 to December 2012. The CAPM alphas are from time-series regressions of portfolio excess returns on the excess return of the China market portfolio, RMRF. The four-factor alphas are from time-series regressions of the portfolio excess returns on the Fama-French-Carhart factor portfolios RMRF, SMB, HML, and WML, constructed from stocks in China. In panel A, stocks are sorted into portfolios based on Amihud illiquidity, measured as the average over the previous month of the daily ratio of the absolute value of the stock return to the total value of shares traded. In panel B, stocks are sorted into portfolios based on Bali-Cakici-Whitelaw maximum daily stock return over the previous month.

Quintile	Returns	CAPM alphas	Four-factor alphas
Panel A. Portfolios sorted by illiquidity			
Illiquid	2.37	0.98	0.64
2	2.12	0.68	0.32
3	1.75	0.32	0.02
4	1.54	0.09	-0.13
Liquid	1.30	-0.12	0.07
Difference 1-5	1.07	1.10	0.58
t-stat	2.36	2.40	2.72
Panel B. Portfolios sorted by maximum return			
Low MAX	1.50	0.20	0.05
2	1.67	0.24	0.20
3	1.75	0.28	0.25
4	1.30	-0.14	-0.08
High MAX	1.12	-0.39	-0.48
Difference 1-5	0.38	0.59	0.52
t-stat	1.23	2.02	1.76

4.2 Market integration and investment opportunities

This section provides preliminary evidence on China's stock market integration with other markets and opportunities available to international investors. Section 4.2.1 examines the correlations of Fama-French-Carhart factors across four major markets, China, the US, Europe, and Japan. Section 4.2.2 examines the performance of the different markets and discusses implications for investment opportunities. We find that in contrast to the high correlations in returns across developed markets, returns in China's stock market have low correlations with those in other large economies. China has begun to open its doors to foreign investors through its QFII prgram, but it is still a segmented market and may have much to gain from liberalizing its capital account. At the same time, our evidence suggests that despite a reputation for poor performance, China's stock market offers attractive returns and opportunities for diversification to international investors.

4.2.1 Stock market correlations across large economies

This section gives preliminary evidence on the degree of integration between China's stock market and those of other large economies and discusses the implications and related literature. Table 5 presents correlations across monthly returns from China, the US, Europe, and Japan for each of the four Fama-French-Carhart factors, RMRF, SMB, HML, and WML, from 1995 to 2012. Table 5 shows a high degree of correlation across the developed markets for RMRF, HML, and WML, ranging form 0.38 to 0.83. This is consistent with Asness, Moskowitz, and Pedersen (2013) for who find average correlations of 0.68 and 0.65 for value and momentum strategies, respectively, across the US, the UK, Europe, and Japan.

However, in contrast to the developed markets, returns in China have low correlations with returns elsewhere, ranging from 0.07 to 0.21, for the market, value, and momentum factors, and correlations are even negative for the size factor. China looks like a segmented market, which is consistent with the lack of overlap in investors between the China and other markets. However, one might expect there to be a common global cash flow factor in all markets. As exporters, Chinese firms should be exposed to this factor. In other words, capital markets are segregated, but the economy is not. That would explain the small but generally positive correlations.

This evidence of market segmentation has a number of implications. A long literature provides both theory and evidence on the positive effects of liberalization and integration on emerging markets' the cost of capital, investment, growth, and investment opportunities for foreign investors through improvements in risk sharing across countries. For example, in samples of up to 16 emerging markets, Stulz (1999) and Bekaert and Harvey (2000) and

Bekaert, Harvey, and Lundblad (2003) find that opening a country to portfolio flows decreases its cost of capital without increasing its volatility or creating excessive contagion effects, although liberalizations do not generally lead to full market integration. In samples of up to 25 countries, Henry (2000a), Henry (2000b), Henry (2003), and Chari, Henry, and Sasson (2012) find that stock market liberalizations reduce cost of capital and boost investment, growth, and wages. Chari and Henry (2004) and Chari and Henry (2008) study the effect of market liberalization at the firm level and show how stock prices and corporate investment respond to reductions in cost of capital that occur after liberalization. China's Qualified Foreign Institutional Investor program awarded $42 billion of investment quotas to almost 200 foreign investors by March 2013, but this is only a beginning. The evidence suggests that China still has much to gain from opening its stock market up to the international investment community.

Table 5: Correlations of FFC factors across large economies 1995-2012

Correlations of monthly USD returns on FFC factors across large economies over the period January 1995 to December 2012.

	US	Europe	Japan	US	Europe	Japan
	RMRF			SMB		
China	0.16	0.21	0.10	-0.15	-0.05	-0.13
US		0.83	0.49		0.27	0.00
Europe			0.51			0.35
	HML			WML		
China	0.07	0.12	0.13	0.10	0.10	0.09
US		0.77	0.46		0.51	0.38
Europe			0.42			0.45

4.2.2 Investment performance and opportunities

This section examines the stock market performance in China, the US, Europe, and Japan over from 1995 to 2012 and explores investment opportunities for international investors. Table 6 presents mean returns, volatilities, and cross-factor correlations for the market, size, value, and momentum factors in the four different markets. Consistent with Fama and French (2012), we find a significant value premium in all four markets, and there is a significant momentum premium in the western markets, but it is much smaller in Japan, and insignificant in China. On the other hand the size premium is only apparent in China over this period.

In terms of overall market performance, China is striking for both its high mean and high

volatility, both double those in the US over the same period, and thus delivering the same Sharpe ratio. The mean annualized return of 15.01% runs counter to the perception that China's stock market has performed poorly over its history. To explain the components of China's market return, Figure 5 shows the cumulative and average returns of the publicized price indices, in Yuan, the return on the Yuan, and the average USD return on the CSMAR market portfolio, which is weighted by traded market value and includes dividends. The much publicized Shanghai Stock Exchange index has only averaged an annual appreciation of 12.44% over the period. The Shenzhen price index, which includes the smaller stocks on the Shenzhen, SME, and ChiNext Boards have done better, averaging 16.96%. The smaller enterprises, outside the state-controlled sector have the been the growth drivers in China's corporate sector. China's USD return is further augmented by an annualized average USD return in the Chinese Yuan of 1.73% over the period. Altogether, the average raw USD return on China's stock market is 16.97% over the period.

Table 6: Returns and factor structures in large economies 1995-2012

Annualized means and volatilities (in %) of monthly USD returns on the Fama-French-Carhart factors, t-statistics for mean return, and cross-factor correlations (in decimal) over the period January 1995 to December 2012 in China, the US, Europe and Japan.

	RMRF	SMB	HML	WML	RMRF	SMB	HML	WML
	China				US			
Mean (in %)	15.01	8.77	13.44	0.96	6.74	-1.36	5.65	5.64
Volatility (in %)	32.31	16.03	15.63	14.59	16.14	12.47	11.73	19.25
t-mean	1.96	2.31	3.63	0.28	1.76	-0.46	2.03	1.24
RMRF		0.09	0.18	-0.03		0.20	-0.21	-0.29
SMB			0.16	-0.33			-0.35	-0.21
HML				-0.38				0.04
	Europe				Japan			
Mean (in %)	6.69	-0.33	5.29	11.78	-1.91	-0.24	5.43	2.35
Volatility (in %)	18.34	8.19	8.97	15.84	18.82	11.13	10.55	16.78
t-mean	1.54	-0.17	2.49	3.14	-0.43	-0.09	2.17	0.59
RMRF		-0.16	0.16	-0.35		0.06	-0.20	-0.15
SMB			-0.12	0.11			0.06	-0.16
HML				-0.28				-0.27

The evidence of high mean portfolio returns in China and low correlations with developed markets suggests that China offers attractive investment opportunities for international investors. Following Fama and French (2012), Table 7 provides evidence on this question by examining alphas of the China portfolios with respect to the US and Global factors. As the

Figure 5. Cumulative and Average Returns 1995-2012

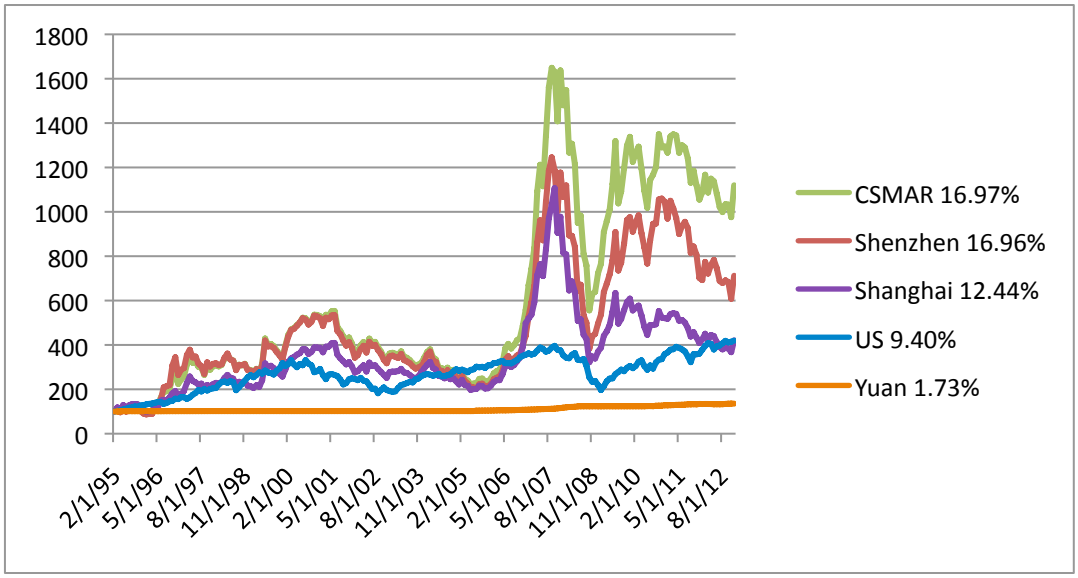


table shows, China's market portfolio earned a significant alpha with respect to the US and Global four factors of over 1% per month. Its size and book-to-market factor portfolios also earn large alphas, which are even more significant.

We rule out the possibility that these results are driven by a missing China factor in US returns by examining the effect of adding the China market portfolio as a fifth factor, along with the US RMRF, SMB, HML, and WML factors, in time series regressions of test portfolio returns on these factors. We use as test portfolios the 25 Fama-French size/book-to-market portfolios and the 30 Fama-French industry portfolios from the Ken French Data Library. We find that their alphas, factor loadings, and R^2s scarcely change and they do not load significantly on the China factor, consistent with our earlier results on the low correlation between US and China factors. This robustness check reconfirms our evidence of the availability of high alphas in China for international investors who can access them.

Table 7: Alphas of China portfolios with respect to US and global factors

Monthly alphas (in %) of USD returns on the four Fama-French-Carhart China portfolios with respect to the US and global Fama-French-Carhart factors, and their t-statistics, over the period January 1995 to December 2012.

China portfolio		US factors		Global factors	
		1-factor	4-factor	1-factor	4-factor
RMRF	Alpha	1.08	1.00	1.07	0.97
	t-stat	1.70	1.54	1.70	1.47
SMB	Alpha	0.75	0.77	0.74	0.81
	t-stat	2.35	2.39	2.33	2.44
HML	Alpha	1.14	1.12	1.14	1.16
	t-stat	3.67	3.54	3.68	3.60
WML	Alpha	0.09	0.05	0.08	-0.01
	t-stat	0.30	0.18	0.29	-0.04

5 Conclusions

China is the world's largest investor and greatest contributor to global growth by wide margins. The success of China's stock market in attracting domestic and international capital and allocating it efficiently to corporate investment will be an important determinant of global growth in the coming decades. China's stock market is young but, despite its early reputation as a casino, has functioned well since the reforms of the last decade. Stock price informativeness has increased and compares favorably with that in the US. The efficiency of

corporate investment is highly correlated with stock price informativeness and has followed a strikingly similar trend. Despite its segmented nature, China's equity market delivers a cross-sectional pattern of returns that is surprisingly similar to that found in other countries, with high premia for size, value, illiquidity, and right-skewed payoffs. Moreover, counter to perception, China's stock market has performed very well, especially its small and medium enterprises. Furthermore, the market exhibits low correlation with other equity markets, reflecting its restrictions on international capital flows. As a result, China's factor portfolios offer high alphas for US and global investors who can navigate capital controls through programs such as QFII. At the same time, this suggests further capital market liberalization would reduce the cost of capital. Taken together, our results suggest that while China's stock market is already playing a vital role in supporting economic growth, especially through its small and medium enterprises, additional regulatory reforms to improve the information environment and liberalize the flow of capital would further empower the market to attract capital, allocate it efficiently, and support economic growth worldwide.

References

Allen, Franklin, Jun Qian, and Meijun Qian, 2005, Law, finance, and economic growth in China, *Journal of Financial Economics* 77, 57–116.

Amihud, Yakov, 2002, Illiquidity and stock returns: cross-section and time-series effects, *Journal of Financial Markets* 5, 31–56.

Asness, Clifford S, Tobias J Moskowitz, and Lasse Heje Pedersen, 2013, Value and momentum everywhere, *The Journal of Finance* 68, 929–985.

Bai, Jennie, Thomas Philippon, and Alexi Savov, 2013, Have financial markets become more informative?, *New York University Working paper* .

Baker, Malcolm, Jeremy C Stein, and Jeffrey Wurgler, 2003, When does the market matter? Stock prices and the investment of equity-dependent firms, *The Quarterly Journal of Economics* 118, 969–1005.

Bali, Turan G, Nusret Cakici, and Robert F Whitelaw, 2011, Maxing out: Stocks as lotteries and the cross-section of expected returns, *Journal of Financial Economics* 99, 427–446.

Banz, Rolf W, 1981, The relationship between return and market value of common stocks, *Journal of Financial Economics* 9, 3–18.

Bekaert, Geert, and Campbell R Harvey, 2000, Foreign speculators and emerging equity markets, *The Journal of Finance* 55, 565–613.

Bekaert, Geert, Campbell R Harvey, and Christian T Lundblad, 2003, Equity market liberalization in emerging markets, *Journal of Financial Research* 26, 275–299.

Bris, Arturo, William N Goetzmann, and Ning Zhu, 2007, Efficiency and the bear: Short sales and markets around the world, *The Journal of Finance* 62, 1029–1079.

Cakici, Nusret, Kalok Chan, and Kudret Topyan, 2011, Cross-sectional stock return predictability in China, *Available at SSRN 2038497* .

Campbell, John Y, Martin Lettau, Burton G Malkiel, and Yexiao Xu, 2001, Have individual stocks become more volatile? An empirical exploration of idiosyncratic risk, *The Journal of Finance* 56, 1–43.

Carhart, Mark M, 1997, On persistence in mutual fund performance, *The Journal of Finance* 52, 57–82.

Chan, Kalok, Albert J Menkveld, and Zhishu Yang, 2008, Information asymmetry and asset prices: Evidence from the China foreign share discount, *The Journal of Finance* 63, 159–196.

Chari, Anusha, Peter Henry, and Diego Sasson, 2012, Capital market integration and wages, *American Economic Journal: Macroeconomics* 4, 102–132.

Chari, Anusha, and Peter Blair Henry, 2004, Risk-sharing and asset prices: Evidence from a natural experiment, *The Journal of Finance* 59, 1295–1324.

Chari, Anusha, and Peter Blair Henry, 2008, Firm-specific information and the efficiency of investment, *Journal of Financial Economics* 87, 636–655.

Chen, Qi, Itay Goldstein, and Wei Jiang, 2007, Price informativeness and investment sensitivity to stock price, *Review of Financial Studies* 20, 619–650.

Chen, Xuanjuan, Kenneth A Kim, Tong Yao, and Tong Yu, 2010, On the predictability of Chinese stock returns, *Pacific-Basin Finance Journal* 18, 403–425.

Chordia, Tarun, Richard Roll, and Avanidhar Subrahmanyam, 2008, Liquidity and market efficiency, *Journal of Financial Economics* 87, 249–268.

DeFond, Mark L, Tak Jun Wong, and Shuhua Li, 1999, The impact of improved auditor independence on audit market concentration in China, *Journal of Accounting and Economics* 28, 269–305.

Dimson, Elroy, 1979, Risk measurement when shares are subject to infrequent trading, *Journal of Financial Economics* 7, 197–226.

Durnev, Art, Randall Morck, and Bernard Yeung, 2004, Value-enhancing capital budgeting and firm-specific stock return variation, *The Journal of Finance* 59, 65–105.

Durnev, Artyom, Randall Morck, Bernard Yeung, and Paul Zarowin, 2003, Does greater firm-specific return variation mean more or less informed stock pricing?, *Journal of Accounting Research* 41, 797–836.

Elliott, Douglas, and Kai Yan, 2013, The Chinese financial system: An introduction and overview, *John L. Thornton China Center Monograph Series* .

Fama, Eugene F, 1970, Efficient capital markets: A review of theory and empirical work, *The Journal of Finance* 25, 383–417.

Fama, Eugene F, and Kenneth R French, 1992, The cross-section of expected stock returns, *The Journal of Finance* 47, 427–465.

Fama, Eugene F, and Kenneth R French, 1993, Common risk factors in the returns on stocks and bonds, *Journal of Financial Economics* 33, 3–56.

Fama, Eugene F, and Kenneth R French, 1998, Value versus growth: The international evidence, *The Journal of Finance* 53, 1975–1999.

Fama, Eugene F, and Kenneth R French, 2012, Size, value, and momentum in international stock returns, *Journal of Financial Economics* 105, 457–472.

Fama, Eugene F, and James D MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *The Journal of Political Economy* 607–636.

Glosten, Lawrence R, and Paul R Milgrom, 1985, Bid, ask and transaction prices in a specialist market with heterogeneously informed traders, *Journal of Financial Economics* 14, 71–100.

Goldstein, Itay, Emre Ozdenoren, and Kathy Yuan, 2013, Trading frenzies and their impact on real investment, *Journal of Financial Economics* .

Grossman, Sanford J, and Joseph E Stiglitz, 1980, On the impossibility of informationally efficient markets, *The American Economic Review* 70, 393–408.

Gul, Ferdinand A, Jeong-Bon Kim, and Annie A Qiu, 2010, Ownership concentration, foreign shareholding, audit quality, and stock price synchronicity: Evidence from China, *Journal of Financial Economics* 95, 425–442.

Hayek, Friedrich August, 1945, The use of knowledge in society, *American Economic Review* 35, 519–530.

Henry, Peter Blair, 2000a, Do stock market liberalizations cause investment booms?, *Journal of Financial Economics* 58, 301–334.

Henry, Peter Blair, 2000b, Stock market liberalization, economic reform, and emerging market equity prices, *The Journal of Finance* 55, 529–564.

Henry, Peter Blair, 2003, Capital account liberalization, the cost of capital, and economic growth, *American Economic Review* 93, 91–96.

Hou, Kewei, Peng Lin, and Xiong Wei, 2013, Is R-squared a measure of market inefficiency?, *Princeton University Working Paper* .

Jegadeesh, Narasimhan, 1990, Evidence of predictable behavior of security returns, *The Journal of Finance* 45, 881–898.

Jegadeesh, Narasimhan, and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency, *The Journal of Finance* 48, 65–91.

Kim, Kenneth A, and Jungsoo Park, 2010, Why do price limits exist in stock markets? A manipulation-based explanation, *European Financial Management* 16, 296–318.

Kyle, Albert S, 1985, Continuous auctions and insider trading, *Econometrica: Journal of the Econometric Society* 1315–1335.

La Porta, Rafael, Florencio López-de Silanes, Andrei Shleifer, and Robert W Vishny, 1997, Legal determinants of external finance, *The Journal of Finance* 52, 1131–1150.

La Porta, Rafael, Florencio López-de Silanes, Andrei Shleifer, and Robert W Vishny, 1998, Law and finance, *Journal of Political Economy* 106, 1113–1155.

La Porta, Rafael, Florencio López-de Silanes, Andrei Shleifer, and Robert W Vishny, 2000, Investor protection and corporate governance, *Journal of Financial Economics* 58, 3–27.

Lehmann, Bruce N, 1990, Fads, martingales, and market efficiency, *The Quarterly Journal of Economics* 105, 1–28.

Li, Bin, Shivaram Rajgopal, and Mohan Venkatachalam, 2013, R-squared and idiosyncratic risk are not interchangeable, *Duke University Working paper* .

Mei, Jianping, Jose A Scheinkman, and Wei Xiong, 2009, Speculative trading and stock prices: Evidence from Chinese AB share premia, *Annals of Economics and Finance* 10, 225–255.

Morck, Randall, Bernard Yeung, and Wayne Yu, 2000, The information content of stock markets: why do emerging markets have synchronous stock price movements?, *Journal of Financial Economics* 58, 215–260.

Morck, Randall, Bernard Yeung, and Wayne Yu, 2013, R-squared and the economy, *Working Paper* .

Scholes, Myron, and Joseph Williams, 1977, Estimating betas from nonsynchronous data, *Journal of Financial Economics* 5, 309–327.

Stulz, René M, 1999, Globalization, corporate finance, and the cost of capital, *Journal of Applied Corporate Finance* 12, 8–25.

Wurgler, Jeffrey, 2000, Financial markets and the allocation of capital, *Journal of Financial Economics* 58, 187–214.

Xu, Jin, and Shaojun Zhang, 2013, The Fama-French three factors in the Chinese stock market, *Hong Kong Polytechnic University Working paper* .