The Real Value of China's Stock Market*

Jennifer N. Carpenter
New York University

Fangzhou Lu
MIT

Robert F. Whitelaw
New York University

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Abstract

China is the world's largest investor and greatest contributor to global economic growth by wide margins. The efficiency of its financial system in allocating capital to investment will be important to sustain this growth. This paper shows that China's stock market has a crucial role to play. Since the reforms of the last decade, China's stock market has become as informative about future corporate profits as in the US. Moreover, the trend of stock price informativeness over the last two decades is highly correlated with that of corporate investment efficiency. China's stock market appears to be aggregating diffuse information and generating useful signals for managers. Although it is a segmented market, Chinese investors price risk and other stock characteristics remarkably like investors in other large economies. They pay up for large stocks, growth stocks, and long shots, and they discount for illiquidity and market risk. In addition, because of its low correlation with other stock markets and high average returns, China's stock market offers high alpha to diversified global investors who can access it. However, this high alpha amounts to an inflated cost of equity capital, constraining the investment of China's smaller, more profitable enterprises. Further reforms that open this market to global investors and improve stock price informativeness will be important to increase China's investment efficiency and fuel its continued economic growth.

China became the world's largest investor in 2010 and will remain so for many years. In 2014, China made $4.9 trillion of total fixed-asset investment, compared with $3.4 trillion in the US and $1.1 trillion in Japan. China has also been the greatest contributor to global growth since 2007, contributing $0.9 trillion to the increase in global GDP in 2014, compared with $0.6 trillion from the US and $0.3 trillion from the UK. Adjusted for purchasing power, China's investment and contribution to growth are almost twice as large. 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. This paper presents evidence that China's stock market has a crucial role to play.

Though it has become the second largest in the world, with a market capitalization of $6 trillion at the end of 2014, China's stock market is still a sideshow in a financial system dominated by a massive state-controlled banking sector. After a rocky first decade from 1990 to 2000, China's stock market earned a reputation as a casino manipulated by speculators and insiders. In the years after the financial crisis, China's stock market recovery lagged those of other large economies, as its rapidly expanding shadow banking sector, issuing new high yielding but implicitly guaranteed wealth-management products to finance both market-driven and centrally planned investment, pulled in financial capital and raised required equity returns. Only recently has the market caught up, earning a 60% return in 2014, in anticipation of deposit insurance and other reforms that will reduce the implicit subsidy to the interconnected banking and shadow banking sector and stimulate economic growth.

This paper presents evidence that overturns two widely held perceptions about China's stock market and suggests that China would do well to open this market to international investors and let it pick winners, too. First, we show that China's stock market no longer deserves its reputation as a casino. On the contrary, over the last decade, the informativeness of stock prices about future corporate earnings has increased steadily, reaching levels that compare favorably with those in the US. Moreover, although China's financial market is largely inaccessible to foreign investors, the cross-sectional pattern of its stock returns is strikingly similar to that in global equity markets. Like global investors, Chinese investors pay up for large stocks, growth stocks, and long shots, and discount for illiquidity and market risk. In addition, the trend of stock price informativeness in China over the last two decades is significantly positively correlated with the efficiency of its corporate investment. Stock prices in China have become strongly linked with firm fundamentals and appear to play an important role in aggregating diffuse information and generating useful signals for managers.

Second, although the buy-and-hold return earned by undiversified domestic investors in China's stock market is depressed by the market's extremely high volatility, the market

offers very attractive returns to diversified international investors who can access them. Unlike stock returns in integrated financial markets, stock returns in China exhibit very low correlation with those in other large economies. At the same time, the average monthly excess return on China's stock market is twice that in the US. As a result, China offers high alpha with respect to global risk factors to international investors who can access it.

However, this high alpha to potential international investors amounts to an inflated cost of equity capital for China's firms, constraining the investment of its smaller and more profitable enterprises. In addition, the high volatility of China's stock market represents high systematic risk to Chinese investors who cannot diversify it. Both of these problems would be mitigated by opening financial capital flows between China and the global investment community. Regulatory reforms over the last decade, such as the unlock of state-owned shares, the introduction of the Qualified Foreign Institutional Investor (QFII) program, and rules that have strengthened minority shareholder protection, dividend policy, and disclosure, have done much to improve the functioning of China's stock market. But further reforms that liberalize capital flows and improve stock price informativeness will be important to increase China's investment efficiency and fuel its continued economic growth.

A large literature in economics, finance, and accounting going back to Hayek (1945) and Fama (1970) links good legal and market institutions, informativeness of stock prices about future profits, 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.

China's financial system is dominated by its state-controlled banking sector and expanding 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 is reckoned to be as much as 90% of GDP, while China's stock market capitalization is only 44% of GDP. By contrast, US bank credit and stock market capitalization were 48% and 118% of GDP in 2012. As in other socialist countries, the dominance of China's banking sector within its larger financial

system is rooted in its political economy. This sector is the key instrument of centrally planned investment policy.

The post-crisis expansion of China's shadow banking sector is also partly by design. This sector has been crucial to implementing China's massive post-crisis economic stimulus by quickly channeling large amounts of capital to new real estate and infrastructure projects in order to avert a recession, fuel real investment, and sustain economic growth. China's shadow banking sector represents an important extension of its traditional banking sector, which leverages the reputation and relationship-based enforcement mechanisms that underlie some of China's most effective financing channels. As Allen, Qian, and Qian (2005) show, China is a counterexample to the findings of the law, insititutions, growth, and finance literature such as La Porta, López-de Silanes, Shleifer, and Vishny (1997, 1998, 2000), and its alternative financing channels have been essential to its rapid growth. The shadow banking sector has also been a laboratory for China's interest rate liberalization. Despite increasing concerns about the rapid growth of this sector and the bad loans and systemic risk it has created, China's government has tolerated this growing sector as an incubator for more market-driven lending and expertise.

However, the implicit guarantee of China's shadow banking sector may be undermining the development of an equally important financing channel–China's stock market. This paper argues that because of its unique ability to aggregate diffuse information, create transparency, and channel capital accordingly, the stock market has a crucial and complementary role to play alongside the state-controlled, relationship-based banking sector. 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 equity 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. We also analyze the stock price synchronicity measure introduced by Morck, Yeung, and Yu (2000) and show that cross-country comparisons must account for differences in overall market volatility in order to yield correct implications about stock price informativeness.

Next, we examine the efficiency of corporate investment in China over the same period. Adapting the approach of Durnev, Morck, and Yeung (2004) to 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 follows that of price informativeness over our sample period, with an economically and statisically high correlation between the series. This strong positive association between China's stock price informativeness and corporate investment efficiency emphasizes the real economic value of China's stock market and merits the attention of financial market reformers.

Having established the link between stock prices and future corporate profits, the paper turns to the study of stock returns in China. This analysis begins 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 those in stock markets in other large economies. Yet, despite China's segmentation from other markets, the cross-sectional pattern of its stock returns is remarkably similar to that in the US and in other global equity markets. In this respect, China's stock market seems to be as efficient as those of other large economies, yet again challenging the casino theory.

Finally, we analyze the overall performance of China's stock market and uncover a number of striking new results. The much-publicized Shanghai Stock Exchange index earned China's stock market a reputation for poor performance during the post-crisis period, particularly in terms of its buy-and-hold return for undiversified domestic Chinese investors, and this culminated in a year-long closure of the market to IPOs during 2013. However, our analysis of the broader market, including stocks on the Shenzhen, SME, and ChiNext boards, suggests that China's stock market has in fact done very well over our full sample period 1995-2012, and offers attractive returns and opportunities for diversification to international equity investors who can access it, such as those approved as QFIIs. In particular, we show that China's stock market has had a high average monthly USD return, and a high alpha with respect to the US and global market, size, value, and momentum factors. However, this high alpha translates to a high cost of capital for China's firms, re-emphasizing the importance of opening China's stock market to the global investment community.

China's stock market is still young, but our results suggest that it is already serving an important role. To sustain China's continued contribution to global growth, further reforms that increase its stock market informativeness, liberalize its capital flows, and attract international capital will be important to reduce corporate China's cost of equity capital, increase its investment efficiency, and support economic growth worldwide.

The rest of the paper is organized as follows. Section 1 provides an overview of the history and unique features of China's stock market. Section 2 analyzes the informativeness of stock prices in China and shows that it compares favorably with that in the US, particularly since the reforms of the last decade. Section 3 examines the efficiency of corporate invest-

ment in China and documents its significant positive correlation with China's stock price informativeness. Section 4 studies the cross-sectional pricing of China's stocks and analyzes overall market performance, correlation with other markets, and opportunities for international investors. Section 5 discusses recent financial developments and reforms in China and interprets the corresponding stock market gyrations through the lens of this research.

1 Overview of China's stock market

In contrast to the markets of developed countries, China's stock market has a history of only 24 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 both trading volume and market capitalization, $6 trillion by the end of 2014. 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, which provide capital for smaller and high-technology stocks, like the NASDAQ in the US.

China's stock market has a number of distinctive features. First, it is dominated by retail investors, who account for more than 80% of trading. This reflects the still underdeveloped asset management industry in China and raises questions about the efficiency of the market. Second, 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. Third, it is a centralized market, whereas the US market is fragmented, with multiple exchanges, 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 daily price change limit of 10%, which is intended to reduce excess volatility and deter stock price 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 price discount of B shares and H shares relative to A shares, a phenomenon that they attribute to information asymmetry between foreign and domestic investors and speculative

motives. With the introduction of programs such as the 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 2005, 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 this view is no longer correct. On the contrary, China's stock market has become as effective as the US stock market at aggregating and impounding information about future profits into prices, and exhibits a cross-sectional return pattern surprisingly 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 listing, disclosure, and auditing policy (Amihud and Mendelson (1988), Diamond and Verrecchia (1991), Healy and Palepu (2001), and Hail and Leuz (2009)), 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), Chen, Goldstein, and Jiang (2007)). Bond, Edmans, and Goldstein (2012) provide a detailed review.

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 equity 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,

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

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. A number of papers in the accounting literature document the low quality of auditing and reported earnings in China (DeFond, Wong, and Li (1999), Chen and Yuan (2004), Wang, Wong, and Xia (2008)). Such errors should bias our results against finding price informativeness.

Figure 2 plots the coefficients a_t with their 95% confidence bands, 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 $2012 - k$. The confidence bands use White heteroskedasticity-consistent standard errors.[1] Marginal R^2 is the increment in the R^2 of regression (1) created by adding $\log(\frac{M_{i,t}}{A_{i,t}})$ as a regressor. A comparison with evidence on US stock price informativeness in Figure 2 of Bai, Philippon, and Savov (2013) shows that 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.

The first stage of the development of China's stock market, a period of market opening and construction from 1991 to 1997, is characterized by the establishment of the exchanges

[1] We also calculated standard errors clustered by industry, with qualitatively similar results.

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 to more than five hundred. 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.

By 1996, over five hundred companies had stocks listed on the Shanghai and Shenzhen exchanges and Dow Jones began to publish the China, Shanghai 30, and Shenzhen indices, which attracted a significant following by equity analysts. In addition, these 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 contributed to the rise of informativeness in China's stock market over this period. The adoption of a price change limit of 10% and a one-day minimum holding period in 1996 may also 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 businesses and enterprises.

The second stage, from 1998 to 2001, is a period of rampant speculation and accounting fraud, flagrant stock price manipulation, and the birth of the casino theory. In 1998, prices of firms in Special Treatment for financial distress began to soar and the CSRC reported widespread market manipulation. Pump-and-dump schemes were also common during this period. The average PE ratio of China's stocks surged to 70 by the end of 2000, suggesting that prices were deviating from fundamental value. This may be consistent with the theory in Goldstein, Ozdenoren, and Yuan (2013) showing that undesirable coordination across speculators makes the market less informative, decreases real investment, and increases stock market volatility.

Accounting fraud was a major problem during this period as well. In early 2000, the first stock traded above 100 RMB, which was an important cognitive benchmark. This sparked an investigation by the CSRC, which revealed serious accounting fraud. Later that year several other major accounting scandals came to light. DeFond et al. (1999) argue that the fraudulent accounting stemmed from an unregulated and 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 incentives 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, from 2001 to 2007, is a period of market reform. 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. At the end of year 2001, the CSRC enforced new and stricter delisting regulations to protect retail investor interests. In 2002, the CSRC ratified the QFII program, enabling qualified foreign institutional investors to 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 2005, the CSRC introduced the split share structure reform to unlock nontradeable shares gradually and privatize them in a way that compensated the holders of tradeable shares. Our results in Figure 3 suggest that this expansion and diversification of the base of market participants was a key turning point in the informativeness of stock prices. Liao, Liu, and Wang (2011) and Li, Wang, Cheung, and Jiang (2011) also study this share unlock and the improvements in information discovery and risk sharing it enabled.

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. More recently, Ljungqvist and Qian (2014) document a direct mechanism through which the possibility of short sales gives arbitrageurs an incentive to incorporate negative information into prices. The combination of regulatory reforms, capital market development, improving accounting and auditing quality, and foreign investors' direct participation in the market may all have helped to boost price informativeness in China's stock market during this period.

The fourth and last stage, from 2008, is the financial crisis period, during which price informativeness declined somewhat. The crisis could 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. Nevertheless, price informativeness has remained relatively high and comparable to price informativeness in the US stock market.

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.

Table 1 also shows that the annualized volatility of the excess return on the market portfolio in China is 32% over the period 1995-2012, double the US market volatility of 16% over the same period. To reconcile these results with commonly recognized stock return volatility figures and highlight China's high return variance, note that representative firms with these variance decompositions and market betas of one would have total return volatility of 66% and 31% in China and the US, respectively.

This 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 the last column of Table 1 summarizes, based on Panel B of Figure 2 of Morck, Yeung, and Yu (2013), the average firm R^2s is 36% in China versus 14% in the US. By this comparison, stock prices in the US would appear to contain greater firm-specific information than those in China. But by direct comparison of average idiosyncratic risk, stock prices in China contain greater firm-specific information. This illustrates the problem with 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, Peng, and Xiong (2013) elaborate on additional limitations of the R^2 measure.

Another measure of stock price synchronicity used to quantify the lack of firm-specific information in prices is co-movement, i.e., the fraction of stock prices in the market that move in the same direction. It is easy to show under reasonable assumptions that, like R^2, co-movement is another measure that increases with the variance of the return on the market, holding idiosyncratic firm variance constant. Thus, a high degree of co-movement in China's stock market may be attributable to the high variance of the market rather than to a shortage of firm-specific information in stock prices.

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 representative firms in China and the US, and average market model R^2s from Morck, Yeung, and Yu (2013), in percent.

Representative Firm	Idiosyncratic volatility	Market volatility	Total volatility	Average R^2
China	57.81	32.25	66.20	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 existing 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),

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

Here, $M_{i,t-1}$ is beginning of year equity market value for firm i, $\Delta M_{i,t}$ is the change in that equity value based on the realized stock return, and A_i is the book value of firm i's assets. The second regressor above controls for the expected return on equity and we include industry fixed effects to control for differences in expected growth and depreciation rates of capital stock. Thus, we interpret the coefficient β_t above as the cross-sectional average net present value of a unit of unexpected corporate investment in year t.

Working in the US setting, Durnev, Morck, and Yeung (2004) go a step further. They put the change in firm market value instead of the change in equity market value on the left-hand side, 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. While this may be a reasonable approach in the US, where firms might be expected to be profit maximizers investing according to a first-order condition, we believe our direct profitability measure β_t is more appropriate for the Chinese setting. Corporate finance in socialist countries is different than in capitalist countries. Firms are not only units of production, they are also instruments of social planning, and make investment decisions and internal capital allocations according to a number of criteria. State-controlled firms pursue a variety of social and political objectives, not just maximization of net present value. Therefore, the usual theoretical channel through which signals in prices affect managerial decisions is complicated by multiple objectives and constraints in China. Nevertheless, it is reasonable to assume that managers prefer more profitable investments, all else equal, and use stock market signals accordingly, so we still expect to see a positive time series correlation between stock price informativeness about future earnings and profitability of corporate investment.

It is also reasonable to treat innovations in net present value as accruing primarily to existing equity holders in China, rather than to both debt and equity holders, because corporate debt in China has been essentially riskless, and because new equity issued during a given year would likely be sold at approximately its present value. Thus, we take the change in existing equity value, instead of the change in firm value, as the dependent variable in the cross-sectional regression above, and the hurdle value of the coefficient β_t for positive net present value investment innovations is zero, instead of one, as in the specification of Durnev, Morck, and Yeung (2004).

Figure 4 presents the time series of estimates of the investment efficiency coefficient β_t from regression equation (4) above. The top panel plots the time series of these estimates for the full sample of non-financial firms with their White heteroskedasticity-consistent 95% confidence bands over the period 1996-2012. The bottom panel plots investment efficiency coefficients for both the full sample, and for the subsample of state-owned enterprises (SOEs), identified as those at least 35% state-owned, following the Hong Kong Stock Exchange definition. Although the average net present value of innovations in investment is consistently positive throughout the sample period, Figure 4 shows a clear downward time trend. This is consistent with broader macroeconomic evidence that as China has used centrally planned investment to drive its transition from a poor but fast-growing emerging market to a slower-growing middle income economy during this period, its investment has become less and less productive. The bottom panel also shows that the average profitability of investment at SOEs is consistently lower than the full sample average. We test formally for an SOE effect on investment efficiency using a panel regression version of equation (4) with an SOE interaction with unexpected investment. We find that the investment efficiency coefficient is on average lower than that of non-SOEs by 0.056, with a t-statistic of -4.11. This is consistent with the findings of Chen, Jiang, Ljungqvist, Lu, and Zhou (2015) that internal allocations of capital within state-controlled business groups are less efficient than capital allocations within privately owned business groups.

Figure 5 plots the time series of full-sample investment efficiency coefficients using the right-hand scale, in combination with the time series of Bai-Philippon-Savov price informativeness measures calculated in Section 2.1, using the left-hand scale, for three different earnings forecasting periods. The plots on the left side of the figure show the time series of the original investment efficiency coefficients from regression equation (4). The plots on the right show the residual efficiency coefficient after a linear time trend has been removed, to account for a macro-level decline in the overall productivity of investment in China over the sample period. The time series of price informativeness is positively correlated with the time series of corporate investment efficiency in all cases. The figure reports t-statistics for the sample correlations and shows that the estimated time series correlation between price informativeness and de-trended corporate investment efficiency is statistically significant, despite the short sample period.[2]

This strong positive correlation 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

[2]The t-statistics for the sample correlations are calculated as $t_{T-2} \equiv \hat{\rho}\sqrt{T-2}/\sqrt{1-\hat{\rho}^2}$ where T is the number of years in the time series.

for other reasons as well, for example, because disclosure and auditing standards in and of themselves lead to better managerial decision-making. The positive correlation may also flow from broader channels. For example, 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. In any case, this significant positive association between stock price informativeness and investment efficiency is an important empirical result and merits attention and careful consideration by financial market reformers in China.

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 financial investors and corporate cost of capital. We analyze the cross-sectional 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 and domestic investors. Our results challenge two widely held perceptions about China's stock market. First, 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 and other global stock markets. This is especially surprising given the low correlation between returns in China and those in other large economies. Second, despite the perception of overall poor performance, China's stock market offers attractive returns and opportunities for diversification, i.e., high alpha, to international equity investors who can access it. However, this high potential alpha for USD investors 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. Finally, we show how much domestic Chinese investors' lack of access to international diversification is costing them, both in terms of the volatility cost of having to buy and hold the whole Chinese market, and in terms of the potential US alpha they cannot currently access.

4.1 The cross-section of expected returns

This section presents new evidence on the cross-section of expected stock returns in China. In earlier work, 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 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 for size, book-to-market, cash-flow-to-price, and earnings-to-price, but not momentum. We update and extend this evidence using data from March 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 returns 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 total market value of firm equity at the end of the previous month. As in 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. We measure illiquidity, ILLIQ, 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, as in Amihud (2002). Following Bali, Cakici, and Whitelaw (2011), MAX is the maximum daily stock return over the previous month and, 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' political risk, governance structure, objectives, opportunity set, and access to capital, we also introduce the variable SOE, which is the percent of the firm's shares held by the central or local government in the previous month.

Table 2 contains summary statistics for these predictor variables. Specifically, we report the time series average across the months in the sample of the cross-sectional mean, standard deviation, skewness, and various percentiles for the 8 predictors. In general, there is little that is remarkable about these statistics, although they do reflect the specific nature of the Chinese market. For example, the average book-to-market ratio is lower than in the US, and the tails of the momentum (MOM) and reversal (REV) variables are more extreme than in US data due to the high volatility of individual stock returns in China. Given this

Table 2: Summary statistics for firm-level cross-sectional return predictor variables

Time-series averages of the cross-sectional summary statistics for each predictor variable used in the 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, divided by one million. 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 percent of shares held by the central or local government measured at the previous month.

	BETA	SIZE	BM	MOM	ILLIQ	MAX	REV	SOE
Mean	1.0414	21.5997	0.3819	0.2058	0.0011	0.0591	0.0168	0.2678
STD	0.5631	0.8422	0.2588	0.3809	0.0093	0.0448	0.1112	0.2265
SKEW	-0.4811	1.1465	6.9253	3.4452	14.6285	6.1251	2.8922	0.5476
5%	0.1863	20.5234	0.1191	-0.2614	0.0000	0.0292	-0.1156	0.0000
25%	0.7406	21.0141	0.2342	-0.0211	0.0002	0.0419	-0.0459	0.0439
50%	1.0586	21.4588	0.3427	0.1595	0.0005	0.0539	0.0026	0.2606
75%	1.3532	22.0121	0.4798	0.3811	0.0011	0.0708	0.0634	0.4265
95%	1.8592	23.1728	0.7593	0.7975	0.0027	0.1004	0.1911	0.6514

Table 3: Firm-level cross-sectional return regressions

Time-series averages of slope coefficients and associated Newey-West adjusted t-statistics from cross-sectional regressions of firm returns on the predictor variables for each month from July 1995 to December 2012. The top panel contains ordinary time-series averages of coefficient estimates. The bottom panel contains time-series average monthly coefficient estimates weighted by the square root of the number of firms in the monthly cross-section. 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 percent of shares held by the central or local government measured at the previous month.

BETA	SIZE	BM	MOM	ILLIQ	MAX	REV	SOE
0.0009							
0.36							
	-0.0060						
	-3.20						
		0.0186					
		2.87					
			0.0020				
			0.57				
				8.45			
				2.62			
					-0.0313		
					-1.99		
						-0.0248	
						-2.34	
							-0.0005
							-0.20
0.0023	-0.0061	0.0176	0.0064				
1.35	-3.32	2.67	2.12				
0.0038	-0.0030	0.0179	0.0063	37.03			
1.99	-1.59	2.84	2.29	2.10			
0.0032	-0.0064	0.0154	0.0064		-0.1902		
1.76	-3.41	2.38	2.21		-6.96		
0.0046	-0.0032	0.0158	0.0063	39.33	-0.1753		
2.31	-1.66	2.55	2.39	2.17	-6.40		
0.0039	-0.0034	0.0155	0.0050	43.07	-0.1333	-0.0293	0.0029
2.11	-1.81	2.50	1.81	2.08	-3.55	-1.74	1.93
0.0054	-0.0021	0.0113	0.0041	56.88	-0.0983	-0.0457	0.0045
4.11	-1.21	3.08	1.42	2.24	-2.49	-2.62	2.71

volatility, the 95th percentile of the maximum daily return over the past month (MAX), at just over 10%, seems surprisingly low. However, this statistic is a result of the fact that the magnitude of daily prices moves is capped at 10% for much of the sample. Once this limit is hit, trading on the stock is halted. Below, we address the issue of the effect of this restriction on the ability of MAX to predict returns in the cross-section. Of greater interest, SOE has a mean of 27%, a standard deviation of 23%, and 5th and 95th percentiles of 0% and 65%, respectively, indicating that there is substantial cross-sectional variation in state ownership, with significant fractions of firms that have no state ownership whatsoever and that are majority controlled by the state.

Table 3 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. The top panel contains ordinary time-series averages of coefficient estimates. The bottom panel contains time-series average monthly coefficient estimates weighted by the square root of the number of firms in the monthly cross-section, which Figure 1 shows is steadily increasing over time. Below each coefficient estimate is its associated Newey-West adjusted t-statistic.[3]

Overall, the cross-sectional return patterns are surprisingly similar to those for US stocks reported in, for example, Bali, Cakici, and Whitelaw (2011). 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.

[3]In unreported results, we also tried weighting with the reciprocal of fourth root of the number of firms in the cross-section, to incorporate the idea that cross-sectional correlation in returns means that the standard deviation of the cross-sectional coefficient estimates shrinks more slowly than with the square root of the number of firms. The results lie in between those with equal weights and those with square root weights.

The coefficient on MAX is highly significantly negative, as in the US data. This is particularly striking given that this variable is effectively truncated at 10% due to the price move limits discussed above, and that in the US this effect is heavily concentrated in firms with the most extreme returns. We interpret this result as strong evidence that, like US investors, Chinese investors pay up for lottery-like payoffs. Moreover, the fact that investors in China know that future returns will also be subject to this cap apparently does not diminish their appetite for high MAX stocks. 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.

In contrast to most results using US data, with equal weighting across time, the average coefficient on BETA is economically large and significantly positive in the multiple regressions, although not when used by itself. Weighting with the square root of the number of firms in the cross-section increases both the magnitude and significance of the BETA coefficient. This is intuitive for a couple of reasons. First, as more diverse firms are added to the sample, the increased cross-sectional dispersion in the BETA covariate increases the precision of the cross-sectional coefficient estimate. In addition, given likely measurement error in the BETAs and associated attenuation bias in its coefficient estimate, an increase in the ratio of the cross-sectional variance of the true betas to that of the measurement error would reduce the attenuation bias and increase the coefficient estimate. Moreover, given the high Morck R^2 of stocks in China, it is reasonable to expect that this ratio of the true cross-sectional variance of beta to that of the measurement error is higher than in the US. Finally, the high measured equity premium in China, 54 basis points in the bottom panel, compared with 25 basis points in the US as reported by Bali, Cakici, and Whitelaw (2011), is well justified theoretically. As we document in Section 4.2.2 and Table 7, China's equity market portfolio has very high volatility, twice that of the US, and this market volatility is almost undiversifiable across other financial risks for domestic Chinese investors, who lack access to the benefits of international diversification that other global investors enjoy. Thus it is natural that China's stock market portfolio would command a high equity premium. As we show in Table 8, this high risk premium also amounts to a high alpha for international investors who can access it. However, it also adds up to an inflated cost of equity capital for China's firms, which would likely fall if China integrated its capital markets with the global financial markets.

Finally, the coefficient on SOE, the percentage of government-owned shares, is significantly positive in the multiple regression. This suggests that Chinese investors discount

state-controlled firms, perhaps for the political risk that government subsidies may be removed in the future, or more general uncertainties about state-owned firms' future objectives, governance structure, access to capital, and investment opportunity sets. The SOE coefficient estimate, though not its standard error, gets considerably larger in the bottom panel of Table 3, which weights more recent months more heavily. This likely reflects the changing composition of China's stock market, which was once dominated by large state-owned enterprises, but now includes more small and medium enterprises, and suggests that the relation between percent of state ownership and required return may be concave, flattening out once a critical level of state control is reached. The coefficient of 0.0045 implies that a firm with 50% state ownership requires an annualized return approximately 3% higher than a similar firm that has no state ownership.

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 form the six 2×3 value-weighted SIZE-BM portfolios and the six 2×3 value-weighted SIZE-MOM portfolios and construct 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 4 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 5 confirms the robustness of the illiquidity and maximum return effects by documenting the systematic pattern of CAPM and four-factor alphas of portfolios sorted on these characteristics.

Table 4 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 these China 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 5 shows the returns, CAPM alphas,

Table 4: Returns on portfolios sorted by size, book-to-market, and momentum

Average monthly returns and CAPM alphas (in %) on the six 2×3 value-weighted size/book-to-market portfolios in Panel A, the six 2×3 value-weighted size/momentum portfolios in Panel B, and the three corresponding size, book-to-market, and momentum factor portfolios, SMB, HML, and WML, in Panel C for China over the period March 1995 to December 2012, and associated Newey-West adjusted t-statistics for the factor portfolios. CAPM alphas are from time-series regressions of portfolio excess returns on the excess return of the market, RMRF.

	Return		Alpha	
Panel A. Size/book-to-market				
	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				
	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. Factor portfolios				
		t-stat		t-stat
SMB	0.59	1.82	0.54	1.67
HML	0.98	3.03	0.88	3.17
WML	-0.06	-0.24	-0.05	-0.19

Table 5: 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, and Newey-West adjusted t-statistics for differences. 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 market, size, book-to-market, and momentum 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	1.07	1.10	0.58
t-stat	2.10	2.26	2.62
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	0.38	0.59	0.52
t-stat	1.42	2.36	1.85

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. Note that the 10% cap on price moves does not affect the composition of the portfolios sorted on MAX, since all stocks that hit this limit fall into the top quintile.

4.2 Market segmentation and investment opportunities

This section provides evidence on China's stock market segmentation from other markets and opportunities available to international investors who can access them. Section 4.2.1 examines the correlations of the market, size, value, and momentum factor portfolio returns across four major markets, China, the US, Europe, and Japan. In contrast to the high correlations in returns across open 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 program and the Shanghai-Hong Kong Stock Connect program, but it is still a segmented market.

Section 4.2.2 examines the overall performance of the different markets and the excess returns that China offers to international investors who can access them. Counter to the perception that China's stock market has performed poorly, we show that China's stock market offers attractive returns and opportunities for diversification to international investors, i.e., high alpha. This high alpha for potential international investors amounts to an inflated cost of capital for China's firms and suggests that China has much to gain from liberalizing its capital account.

Section 4.2.3 distinguishes the perspective of a globally diversified USD investor, who would measure China's stock market performance by its average USD return, and ultimately alpha, from that of an undiversified Chinese investor, who might consider the stock market's CNY buy-and-hold return. We show how China's large stock market volatility drives a wedge between these performance measures over our sample period, because what would be idiosyncratic risk to a globally diversified investor is systematic risk to the undiversified Chinese investor. This re-emphasizes the importance of opening capital markets, so as to give Chinese investors access to international diversification as well as to reduce the cost of

capital for Chinese firms.

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 6 presents correlations across monthly returns from China, the US, Europe, and Japan for each of the four factor portfolios, RMRF, SMB, HML, and WML, from 1995 to 2012. Table 6 documents the high degree of correlation across the developed markets for RMRF, HML, and WML, ranging form 0.38 to 0.83. These results are consistent with Asness, Moskowitz, and Pedersen (2013), 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. China's correlations range from 0.07 to 0.21 for the market, value, and momentum factors, and China's size factor actually correlates negatively with the size factors of the other large markets. China looks like a segmented market, which is consistent with the lack of overlap between investors in China and investors in 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 large literature provides both theory and evidence on the positive effects of liberalization and integration on emerging markets' 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), 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,b, 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, 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 QFII program has awarded over $50 billion of investment quotas, and China and Hong Kong have just launched a new Shanghai-Hong Kong Stock Connect program last fall, which is slated to allow an additional $50 billion of financial capital to flow from Hong Kong to the Shanghai Stock Exchange and $40 billion from Shanghai to Hong

Kong. However, this is still only a beginning. Our evidence suggests that China still has much more to gain from opening its stock market to the international investment community.

Table 6: Correlations of FFC factors across large economies 1995-2012

Correlations of monthly USD returns on FFC factors across large economies over the period March 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 over our sample period and explores investment opportunities for international investors. Table 7 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. There is a momentum premium in the western markets. The size premium is only apparent in China over this period.

In terms of overall market performance, China's stock market is striking for both its high mean excess return and high volatility. Both its mean and volatility are double those of the US stock market over the sample period, thus delivering the same Sharpe ratio. The mean annualized return of 15.78% runs counter to the perception that China's stock market has performed poorly over its history. To illustrate the components of China's market return, Figure 6 shows the cumulative and average returns of the publicized Shanghai and Shenzhen price indexes in CNY, the return on the CNY, and the average USD return on the CSMAR market portfolio, which is weighted by tradeable market value and includes dividends. The Shanghai Stock Exchange index has an average annualized monthly appreciation of only 12.44% in CNY over the period. The Shenzhen price index, which includes the smaller stocks on the Shenzhen, SME, and ChiNext Boards, has 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

Table 7: Equity premiums and factor structures in large economies 1995-2012

Annualized means and volatilities in percent and Newey-West-adjusted t-statistics for monthly USD returns on the market, size, value, and momentum factors and the cross-factor correlations in decimal over the period March 1995 to December 2012 in China, the US, Europe and Japan.

	RMRF	SMB	HML	WML	RMRF	SMB	HML	WML
	China				US			
Mean (in %)	15.78	8.77	13.44	0.96	6.74	-1.36	5.65	5.64
Volatility (in %)	32.25	16.03	15.63	14.59	16.14	12.47	11.73	19.25
t-mean	1.53	2.23	3.43	0.30	1.53	-0.32	1.46	1.20
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	1.28	-0.20	1.62	2.69	-0.23	-0.11	1.76	0.55
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

return on the CNY of 1.71% over the period. Altogether, the average annualized monthly tradeable-market-value-weighted USD return on China's stock market is 18.68% over the period.

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 8 provides evidence on this question by examining alphas of the China portfolios with respect to the US and global factors. As the table shows, China's market portfolio earned an economically significant alpha with respect to the US and global factors of over 1% per month. Its size and book-to-market factor portfolios also earn large alphas, which are highly statistically 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 US 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 8: Alphas of China portfolios with respect to US and global factors

Monthly alphas (in %) of USD returns on the China market, size, value, and momentum factor portfolios with respect to the US and global Fama-French-Carhart factors, and their Newey-West adjusted t-statistics, over the period March 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	1.33	1.20	1.36	1.17
SMB	Alpha	0.75	0.77	0.74	0.81
	t-stat	2.32	2.36	2.28	2.38
HML	Alpha	1.14	1.12	1.14	1.16
	t-stat	3.36	2.36	2.28	2.38
WML	Alpha	0.09	0.05	0.08	-0.01
	t-stat	0.31	0.19	0.30	-0.04

4.2.3 Average monthly vs. buy-and-hold returns and US alphas for Chinese investors

The analysis of monthly USD returns above applies to a USD investor who could access China's A-share market and hold it in a well-diversified dynamically rebalanced portfolio, such as a QFII. Traditional portfolio theory shows that for a diversified investor, the relevant risk of an asset is its contribution to total portfolio risk, as measured by its covariance with the return on the rest of the investor's portfolio, and the relevant performance measure is the asset's mean per period return, or, ultimately, its alpha. By these metrics, China's stock market has high performance and low risk. However, for a domestic Chinese investor who could invest only in China's A-share market, China's total risk would have to be borne, so total stock market volatility would be the relevant risk measure, and the mean buy-and-hold return over the holding period would the relevant performance measure.

To see the effect of an asset's volatility on its buy-and-hold return over multiple periods, note that while the annualized average per period return is an arithmetic mean, the annualized buy-and-hold return over the holding period involves a geometric mean. The mean buy-and-hold return converges to the mean of the log of one plus the simple return. Thus, the buy-and-hold return is less than the average simple return by approximately one-half the variance of the simple return. If the return volatility were zero, the average per period

return would equal the buy-and-hold return. The larger the return volatility, the larger the difference between these two performance measures. Put simply, all else equal, higher volatility assets look less attractive for undiversified investors. China's stock market variance is extremely high, so the difference is large. This highlights the difference in perspective on China's stock market between an investor who can hold China in a globally diversified portfolio, and an investor who can invest only in China's stock market. It also emphasizes the importance of opening capital markets in countries with high asset volatility so as to allow domestic investors to diversify risk globally.

An additional difference in perspective on performance arises when investors measure returns in different currencies. The CNY appreciated against the USD over our sample period, making the USD return on China's stock market more attractive than its CNY return, but this effect is small relative to the volatility effect over the full sample period. Finally, inflation drives a wedge between nominal returns and real returns. Our analysis above uses nominal returns, but the results for excess returns and alphas would be essentially unchanged if we used real returns.

Table 9 illustrates these volatility, currency, and inflation effects, and the differences they create between average monthly nominal USD returns and real CNY buy-and hold returns on China's stock market, over our full sample period 1995-2012 and over two subperiods, 2001-2012 and 2010-2012. For comparison, the table also shows the corresponding performance measures for the US stock market, where the volatility effect is much smaller. The exchange rate data are from Datastream and the CNY inflation data are from the World Bank. As the table shows, the real CNY buy-and-hold return is approximately equal to the average monthly USD return minus half the variance of this return, minus the average CNY appreciation against the USD, minus the average CNY inflation rate. All quantities in the table are annualized, i.e., all calculations are done at the monthly level and then multiplied by twelve.

Table 9 shows that over the periods 1995-2012 and 2001-2012, the difference between the average monthly and buy-and-hold returns is primarily due to the high volatility of China's stock market return, although this volatility diminishes over time. Nevertheless, despite its high volatility, China's stock market still outperforms the US stock market over these subperiods, even in terms of buy-and-hold return. Using data from Datastream, Allen, Qian, Shan, and Zhu (2014) find that over the period 2001-2012, the cumulative real CNY buy-and-hold return is 0.62, for an annualized buy-and-hold return of -3.91%. The difference between this result and our 1.32% shown in Table 9 is partly attributable to the difference in weighting method. Allen, Qian, Shan, and Zhu (2014) weight stock returns by total market capitalization, which relates to the market valuation of China's macroeconomy, while we

Table 9: Average monthly vs. buy-and-hold returns

Average monthly nominal USD returns in the top row, real CNY buy-and-hold returns in the bottom row, and the volatility, currency, and inflation effects that explain the difference, in the middle rows, for the China and US stock markets over three sample periods. All quantities are annualized and in percent.

	1995-2012		2001-2012		2010-2012	
	China	US	China	US	China	US
Avg monthly nom USD return	18.68	9.40	10.89	4.66	-3.76	11.85
0.5*Var of monthly nom USD return	5.24	1.31	4.76	1.32	2.27	1.26
Avg monthly USD return on CNY	1.71	1.71	2.39	2.39	3.10	3.10
Avg CNY inflation	2.62	2.62	2.51	2.51	3.73	3.73
Approx real CNY BHR return	9.12	3.76	1.23	-1.56	-12.86	3.76
Actual real CNY BHR return	9.45	3.91	1.32	-1.52	-12.61	3.86

weight by tradable market value, reflecting our focus on investment opportunities. Weighting by total market capitalization gives more weight to the large state-owned enterprises, which did less well than the smaller private firms over the period. Another difference is in the sample of firms. The sample of Allen, Qian, Shan, and Zhu (2014) consists of stocks traded on the main boards of Shanghai and Shenzhen. Our sample also includes the stocks on the SME and Chinext Boards, which did better over the period, in addition to the stocks traded on the Shanghai and Shenzhen main boards.

Finally, to further highlight the benefits to granting domestic Chinese investors access to international financial markets, Table 10 illustrates alphas potentially available to Chinese investors who can invest in US equities or mutual funds, such as through the Qualified Domestic Institutional Investor program. The table lists monthly alphas of CNY returns on the Fama-French US market, size, value, and momentum factor portfolios with respect to the China market, size, value, and momentum factor portfolio CNY returns. Although the significance levels are not high, due in part to the short sample period, the alphas are economically large. For example, the US market has a China four-factor alpha of 43 basis points per month. Again, the presence of alpha to be earned in either direction reflects the low correlation between US and China stock returns, which means that virtually all of the return in excess of the risk-free rate is alpha. As a simple example of international finance, investors in both countries stand to gain by integrating their financial markets because of improved risk sharing. From the perspective of a US pension fund manager, the fall of the Chinese financial wall and the chance to serve Chinese investors starved for long-term savings vehicles could represent the opportunity of a lifetime.

Table 10: Alphas of US portfolios with respect to China factors

Monthly alphas (in %) of CNY returns on the US market, size, value, and momentum factor portfolios with respect to the China market, size, value, and momentum factor portfolio CNY returns, and their Newey-West adjusted t-statistics, over the period March 1995 to December 2012.

US portfolio		China factors	
		1-factor	4-factor
RMRF	Alpha	0.31	0.43
	t-stat	0.83	1.26
SMB	Alpha	-0.22	-0.11
	t-stat	-0.75	-0.41
HML	Alpha	0.31	0.21
	t-stat	0.97	0.66
WML	Alpha	0.36	0.43
	t-stat	0.93	1.11

5 Recent financial developments and reforms in China

This section discusses the post-crisis reconstruction of China's financial system and more recent financial reforms, and interprets their impact on the stock market through the lens of our foregoing analysis.

5.1 The post-crisis shadow banking boom and stock market bust

The years after the financial crisis of 2007-2008 and the ensuing economic recession have been a period of major economic stimulus and reconstruction of financial markets by central banks and regulators across the globe. In China, this has taken the form of a massive economic stimulus that started in 2009 and the development of a shadow banking sector large enough and flexible enough to channel large amounts of capital quickly to real estate, infrastructure, and other projects across the country and thus fuel real investment and economic growth. The development of this shadow banking sector has also been the first step in China's liberalization of interest rates. While the asset side of China's shadow banking balance sheet represents real investments in spaces previously unspanned by the traditional banking sector, the liability side offers a rich new menu of wealth management products that give domestic Chinese investors access to interest rates higher than the 3% cap on traditional bank deposit rates. In particular, this period has seen an explosion in short-term money-market products offering rates of 4-7% and higher. These products can be offered by traditional banks, marketed through the banks by trusts, or offered directly by trusts and other shadow banks.

Other shadow banks include internet companies such as Alibaba, which offers 7-day money market products to its e-commerce customers online.

Although these wealth management products carry warnings about risk, most of them enjoy a halo effect created by their association with the traditional banking sector and an implicit backing by the government through its deep network of guarantees to the state-owned banks, state-owned enterprises, and local governments. In fact, because of its deep pocket and its political, economic, and regulatory structure, China may have the biggest implicit guarantee problem in the world. Until China establishes deposit insurance and other reforms that draw more explicit boundaries around its guaranteed bank sector, it is highly implausible that it will allow large-scale defaults on wealth-management products and risk a run on the interconnected banking and shadow banking sector that is supporting its economic growth. To the extent that investors therefore perceive these products to be virtually risk free, the proliferation of these higher yielding wealth management products amounts to an increase in China's risk-free rate over what has been available on administered deposits. Consistent with this idea, the 2014 China Financial Stability Report of the People's Bank of China asserts that "the rigid payment (implicit guarantee) in wealth management market eroded market discipline, fueled moral hazard risks, elevated price of risk-free capital, and caused misallocation of funding among different markets."

Indeed, at the same time that wealth management products issued by the shadow banking sector proliferated, China's post-crisis stock market recovery lagged well behind those of other large economies. The last two columns of Table 9 show that China's stock market had negative returns over this period by both performance measures, in contrast to the high returns earned by the US stock market. This period of poor performance precipitated a loss of confidence in China's stock market and reinforced the perception that it has not been functioning properly. This period culminated in a year-long closure of the stock market to IPOs during 2013.

We argue that this period of poor stock market returns in China was not dysfunctional, but rather a rational downward price adjustment in response to negative shocks to GDP growth forecasts and positive shocks to discount rates associated with the liberalization of interest rates and implicit subsidies to the shadow banking sector. The prices of stocks of so-called dual-listed firms, those with A-share listings on the mainland exchanges and H-share listings in Hong Kong, provide some evidence for this conjecture. In principle, A and H shares on the same firm reflect the pricing of the same future cash flows, but using different discount rates, with Chinese investors discounting the A shares, and global investors discounting the H shares, which are traded in Hong Kong in HKD. An upward shock to discount rates in mainland China would affect the A shares but not the H shares.

In particular, if the risk-free rate in mainland China effectively rose from 3% to more like 5% over the period 2010-2012, then China's A-share prices would have to adjust downward so that they could offer competitive returns going forward. H-share prices, which reflect discounting by global investors, would not have experienced this shock. Consistent with this hypothesis, the Hang Seng China A-H Premium Index at the HKEX (2014) website, which tracks the average price difference of A shares over H shares for the largest and most liquid dual-listed Chinese companies, declined over this period. After this adjustment to mainland China's high liberalized interest rates is complete, we might expect to see higher returns on A shares going forward.

Higher required returns for China's stocks translate to higher costs of capital for China's smaller private companies, which have relatively more difficulty getting bank loans. On one hand, this could be an efficient market adjustment to high liberalized interest rates in a fast-growing economy. On the other hand, if China's implicit guarantee of the banking sector is creating an excessive supply of high-yielding low-risk financial assets, and thereby pulling capital away from the equity market to the banking sector where more politically-driven lending takes place, then this implicit guarantee could be channeling capital to less efficient investment and slowing economic growth. A recent article in The Economist (2014) cites research from the People's Bank of China that finds "a strongly negative correlation between growth in lending and in total factor productivity" and interprets this as "an indication that state-owned banks, which still dominate China's financial sector, are still not disbursing enough credit to the country's most deserving companies."

As a component of its larger financial system, China's state-controlled banking sector is the key instrument of its centrally planned investment policy. Its shadow banking sector has also played an essential role in averting a post-crisis recession and fostering more market-driven capital allocation. But our results suggest that China would do well to let its stock market pick winners, too. As Figure 3 shows, A-share prices have remained highly informative about future corporate earnings even during the post-crisis period. As important steps in this direction, the CSRC re-opened the IPO window in early 2014 and the Shanghai-Hong Kong Stock Connect program also opened a small new channel for capital flow between global and domestic Chinese stock markets in fall 2014. Additional reforms that further open capital channels and allow prices to reflect available information, such as reforms to listing procedures as suggested by Allen, Qian, Shan, and Zhu (2014), could help China harness the potential of this market.

5.2 Last year's big run-up: Rational momentum

The Shanghai Composite Index is up more than 100% over the last year. In our view, this run-up in prices is not a bubble. Instead, it is a rational response to the roll-out of a number of key financial reforms, such as deposit insurance, optimism among investors at indications that the consolidation of power under the current political regime will finally bring about the political will to drive forward major economic reforms, and a rational momentum effect as the market's performance has attracted the attention of the international investment community and precipitated upweightings of China in global equity indexes that could mobilize potentially enormous global capital flows into China's stock market in the long run.

The first big jump in the stock market came at the end of November 2014, when the market rose 30% in two weeks. A number of announcements came out around that time, including the opening of the Shanghai-Hong Kong Stock Connect program and the lowering of policy interest rates. Less obvious, but just as important to the stock market, was announcement of the launch of deposit insurance for Chinese banks and the prospect of the removal of the implicit subsidy of many of the banking and shadow banking liabilities that have proliferated in the post-crisis period. As we explain in Carpenter and Whitelaw (2015), though it may be counterintuitive to those who study other markets, the prospect of deposit insurance in China is actually news that China is finally preparing to allow smaller and less politically connected financial institutions and liabilities to sink or swim on their own. This amounts to a tighter boundary around the guaranteed sector and a reduction in the supply of risk-free assets. This potentially reduces required returns on stocks and allows capital to flow back to the stock market, and helps explain the subsequent surge in A-share account registration. In addition to this reduction in discount rates, the shrinkage of the banking sector safety net brings the prospect of more market-disciplined bank lending and monitoring, and more efficient real investment, which should boost corporate profits more broadly. As China's banking sector is the centerpiece of its financial system, deposit insurance represents an essential first step in the path of financial reform.

More generally, last year brought with it new hope that the extensive and significant reforms proposed in the Third Plenum of November 2013 may be successfully implemented under the new regime and that China may succeed in its transition to a slower but more sustainable growth model. A number of authors have documented the asymmetry between China's GDP growth pattern and its stock market returns, but this asymmetry does not contradict traditional asset pricing theory if we view GDP growth rates as akin to cash flow growth rates at the aggregate. In theory, the stock market would rationally impound expectations about future growth rates into current prices, and large stock market movements would be driven only by changes in expectations about those growth rates, or changes in

discount rates. The fact that announcements of slower GDP growth rates in recent years have not appreciably moved the stock market suggests that the growth slowdown was anticipated by the stock market years ago. Instead, the current stock market run-up likely reflects a new optimism that the slowdown in growth will not be as acute in the coming years as was previously feared. Announcements of slower GDP growth are now increasingly accepted as evidence that China is entering a "new normal" economic growth phase as it transitions from a fast-growing emerging market to a developed economy.

More recently, the second stage of the run-up seen this spring likely reflects a kind of rational momentum, a correction of underpricing associated with the Merton (1987) Investor Recognition Hypothesis, as the first stage of the run-up last fall alerted the global investment community to the equity investment opportunity offered by China's stock market. China's stock market has historically been significantly underweighted in the global indexes and portfolios. Although in principle this is because of the strict limits on the amount of foreign capital allowed into China's markets, in fact, the quotas in China's QFII and Shanghai-Hong Kong Connect programs are still only partially filled. This slow uptake by foreign investors may reflect rational fears of repatriation risk, taxation risk, political and legal risk, currency risk, and administrative frictions, but it may also reflect a behavioral home bias, as documented by French and Poterba (1991). However, last fall's run-up drew the attention of global equity investors to China's stock market and has accelerated the timetable for China's inclusion in major equity indices of MSCI, FTSE, and Vanguard. These inclusions are predicted to mobilize tens of billions of dollars worth of foreign capital into China. More broadly, as China continues to signal its commitment to internationalize the Chinese Yuan and open its market, these inclusions represent the beginning of what could be a much larger flow of foreign capital into China and much larger upweighting of China in the long run. If Chinese supply of equity does not keep up with global demand, this dynamic would put upward pressure on prices, which is already being anticipated and capitalized in.

At the same time, these optimistic scenarios are surrounded by tremendous uncertainty about the success of China's economic reforms and the path of capital market liberalization. This rationalizes the market's tremendous volatility. Although pundits rush to call the bursting of the bubble whenever the market makes one of its large daily drops, the drops are counterbalanced by large daily jumps and are in the natural course of the gyrations of a market rationally reacting to daily news about reform prospects and the potential response of the international investment community.

Finally, the even more striking run-up in the prices of the small, growth enterprises on the ChiNext Board of the Shenzhen Stock Exchange, where price-earnings ratios have soared to extremes, may also in fact be rational and consistent with asset pricing theory.

As Pástor and Veronesi (2006) show, when investors expect a firm to enjoy a period of abnormally high profitability, the firm's stock price actually increases with the uncertainty about this high profitability. Interestingly, their model may apply even more strongly to the Shenzhen stocks than it does to the NASDAQ stocks that are the focus of their paper. The smaller, privately-owned enterprises on the Shenzhen Stock Exchange, which are typically underserved by China's banking sector, are likely to be the greatest beneficiaries of both the prospective economic reforms and increased financial capital flows. The larger state-owned enterprises traded primarily on the Shanghai Stock Exchange likely have fewer growth opportunities and are already well-capitalized by China's state-controlled banks. In addition, at the same time that investors are anticipating a period of abnormal profitability for these stocks, there is tremendous political and economic uncertainty surrounding this expectation, together with China's already naturally high baseline stock market volatility. This further boosts the price-earnings ratios, through the mechanism modeled by Pástor and Veronesi (2006). Although many of these stocks may crash, some will skyrocket in value, so that a well-diversified portfolio of these stocks could still be priced to offer a fair return for its risk.

6 Conclusions and future research

China is the world's largest investor and greatest contributor to global growth by wide margins, and will remain so for many years. 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 in China is significantly positively correlated with stock price informativeness, suggesting that the stock market is playing an important role in capital allocation. Despite its segmented nature, China's equity market exhibits 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 on average, especially its small and medium enterprises. Furthermore, the market 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 navigate capital controls through programs such as QFII and Shanghai-Hong Kong Connect. At the same time, this high alpha amounts to an inflated cost of capital for China's firms and suggests further capital market liberalization will reduce equity cost of capital in China. In addition, the

pronounced difference between average monthly and buy-and-hold returns reflects the toll that the stock market's high volatility takes on domestic Chinese investors who are unable to diversify internationally. Taken together, our results suggest that China's stock market is already playing a vital role in supporting economic growth, especially through its small and medium enterprises. However, 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.

China's evolving financial system is a treasure trove of natural experiments, counterfactuals, new financial institutions and markets, and new governance and enforcement mechanisms. In addition, the success of China's financial reforms will be of significant global importance. It is not just China's own contribution to global GDP growth that counts so much. China's economic growth and growing middle class are driving economic growth around the world. Important questions for future research include the role of China's economic reform risk in global financial markets; asset pricing and corporate listing choice across international exchanges; intermediary asset pricing and capital allocation in China; and interest rate liberalization, government bond pricing, and macroeconomic risks in China.

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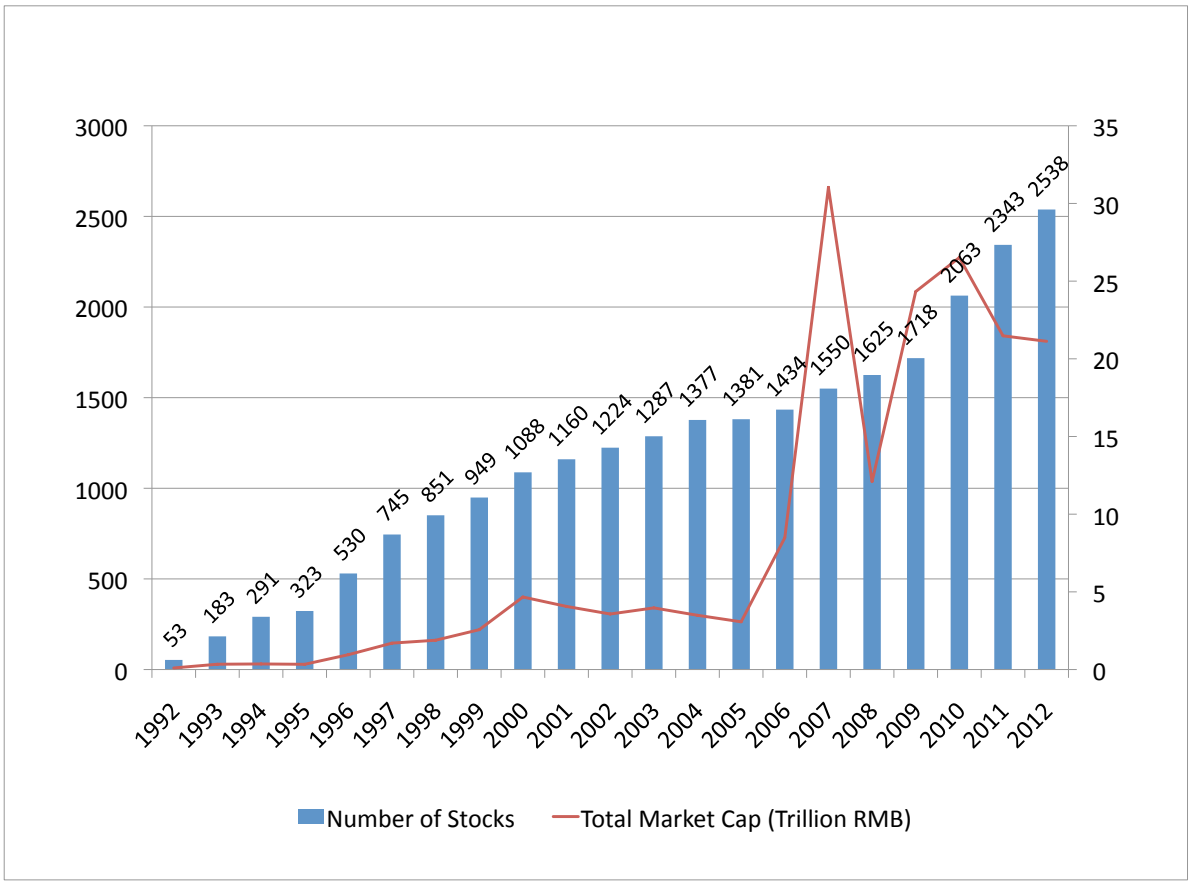

Figure 1
China's stock market 1992-2012
The total number of stocks listed on the Shanghai and Shenzhen Stock Exchanges (left scale) and the total stock market capitalization in trillions of RMB (right scale).

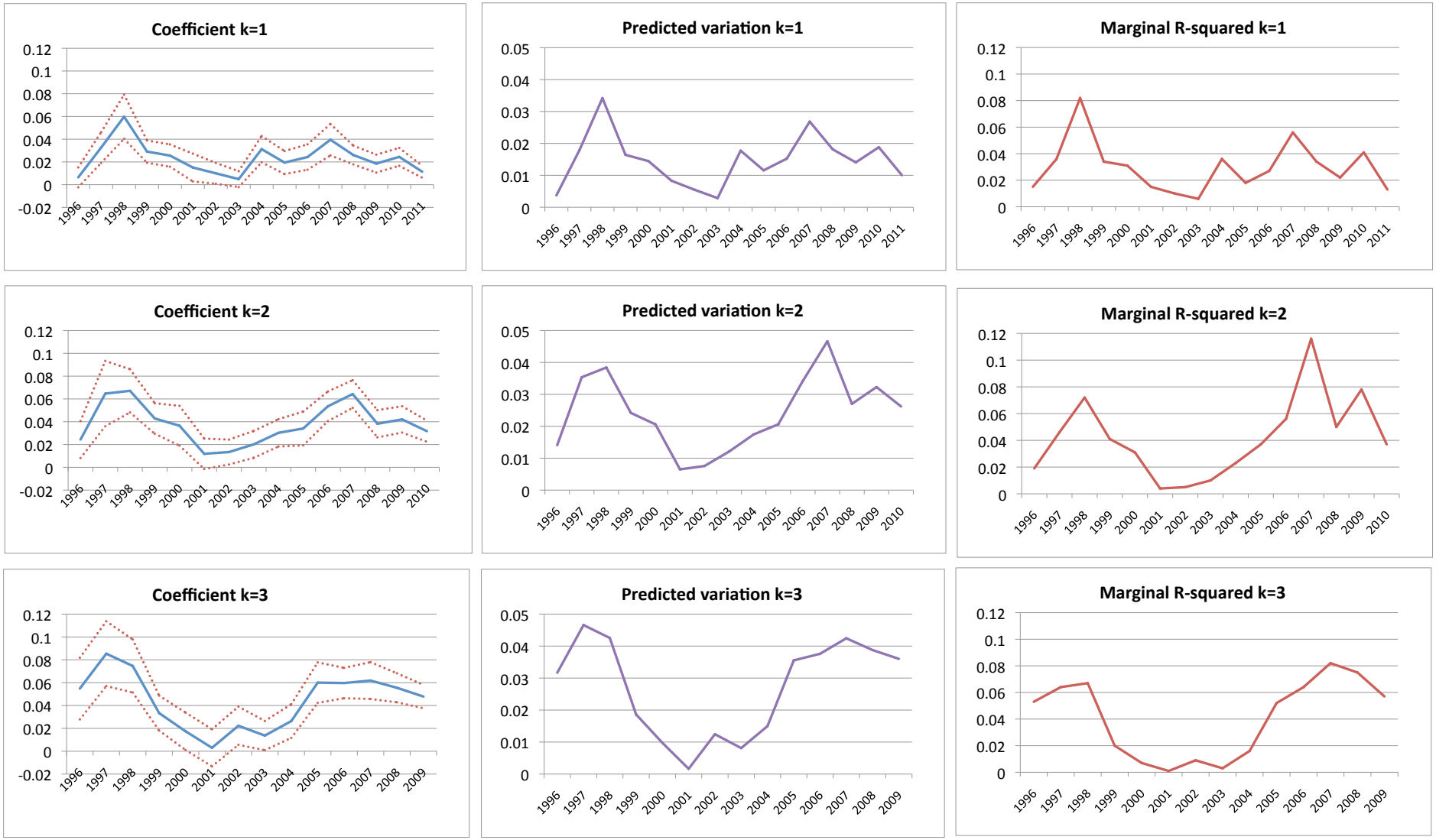

Figure 2

Stock price informativeness in China: Forecasting earnings with equity prices

Results from cross-sectional regressions of the form $E_{i,t+k}/A_{i,t} = c_t + a_t \log (M_{i,t}/A_{i,t}) + b_t E_{i,t}/A_{i,t} + \varepsilon_{i,t+k}$, for each calendar year t = 1996 to 2012-k, and forecasting horizon k = 1, 2,or 3 years. E is firm earnings, A is firm asset book value, and M is firm equity market value. The left plots show the coefficients a_t and their 95% confidence bands, the center plots show the predicted variation, which is the coefficient a_t times the standard deviation of the regressor $\log (M_{i,t}/A_{i,t})$, and the right plots show the marginal R^2 of this regressor.

Figure 3
Stock price informativeness across market regimes in China
Predicted variation from cross-sectional regressions $E_{i,t+2}/A_{i,t} = c_t + a_t \log (M_{i,t}/A_{i,t}) + b_t E_{i,t}/A_{i,t} + \varepsilon_{i,t+2}$, for each calendar year t = 1996 to 2010, where E is firm earnings, A is firm asset book value, and M is firm equity market value. The predicted variation is the coefficient a_t times the standard deviation of the regressor $\log (M_{i,t}/A_{i,t})$.

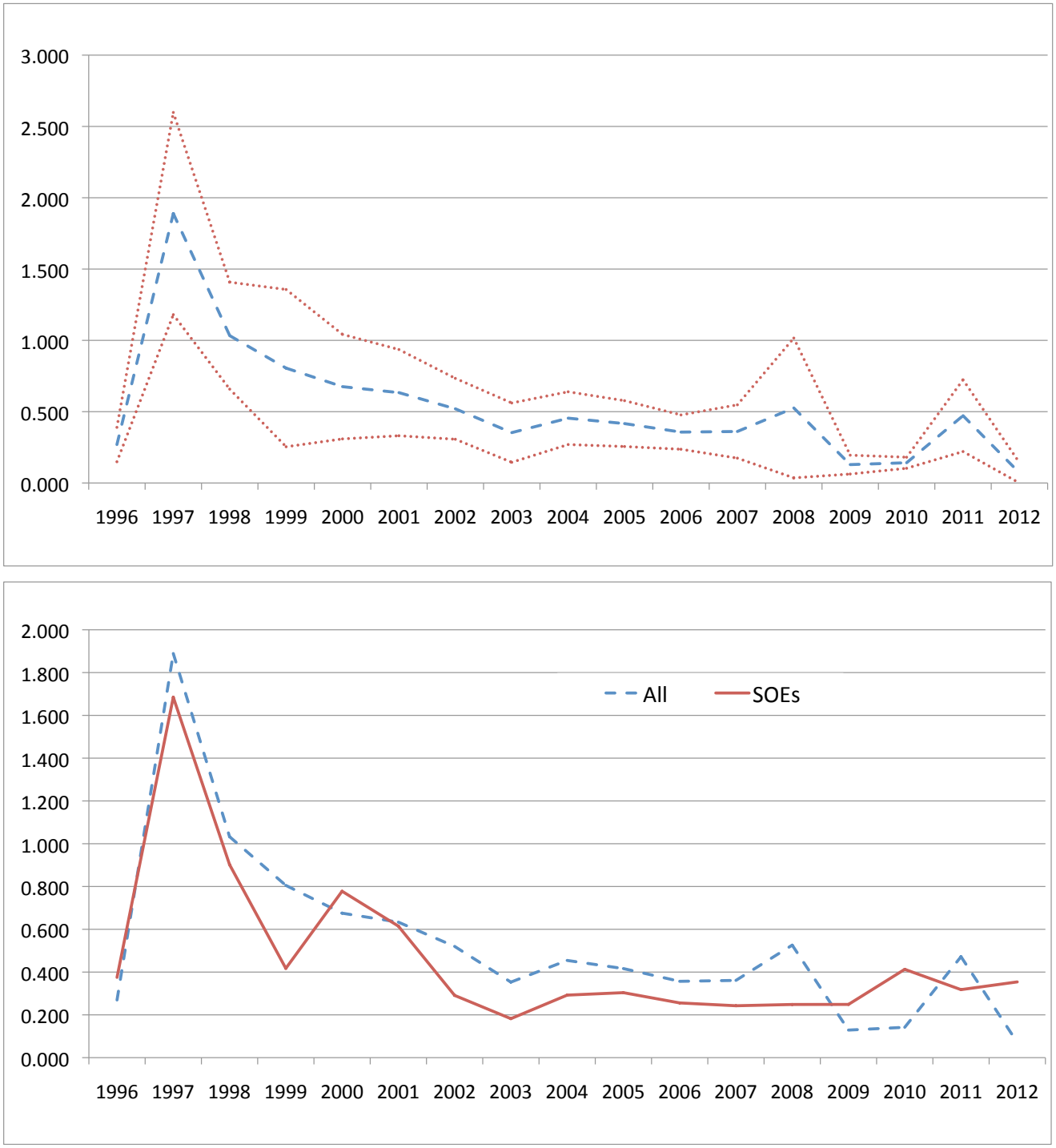

Figure 4

Efficiency of corporate investment in China

The top panel shows the investment efficiency coefficients β_t and their 95% confidence bands in the cross-sectional regressions of unexpected change in equity market value on unexpected investment,

$\Delta M_{i,t}/A_{i,t-1} = \alpha_t + \beta_t \Delta A_{i,t}/A_{i,t-1} + Y_t M_{i,t-1}/A_{i,t-1} + \varepsilon_{i,t}$

for the full sample of nonfinancial firms in each year t = 1996 to 2012. Here, M is equity market value and A is firm book value. The bottom panel shows the time series of cross-sectional investment efficiency coefficients for both the full sample and for the subsample of SOEs only.

Figure 5

Stock price informativeness and investment efficiency in China 1996-2012

Predicted variation by log $(M_{i,t}/A_{i,t})$ in the cross-sectional regressions $E_{i,t+k}/A_{i,t} = c_t + a_t \log (M_{i,t}/A_{i,t}) + b_t E_{i,t}/A_{i,t} + \varepsilon_{i,t+k}$ (left scale) and investment efficiency coefficients β_t in the cross-sectional regressions $\Delta M_{i,t}/A_{i,t-1} = \alpha_t + \beta_t \Delta A_{i,t}/A_{i,t-1} + Y_t M_{i,t-1}/A_{i,t-1} + \varepsilon_{i,t}$ (right scale), where E is firm earnings, A is firm book value, and M is equity market value. In the right-hand panels the time series of investment efficiency coefficients is linearly detrended.

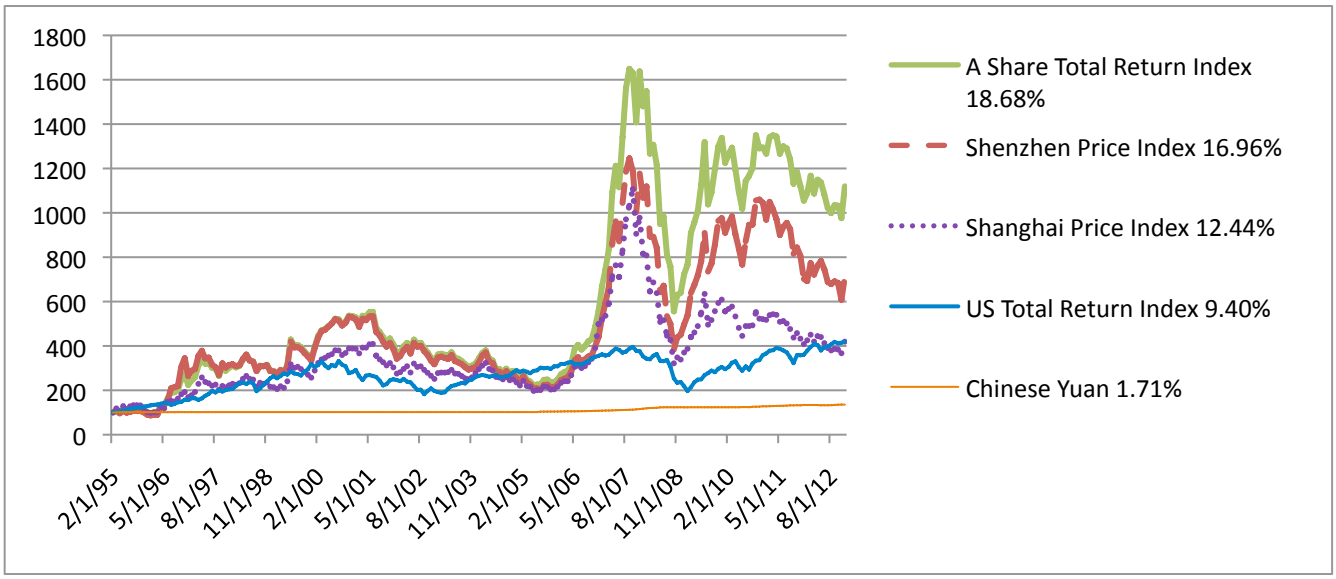

Figure 6
Cumulative and average returns 1995-2012
Cumulative returns on China's entire A-share market in USD, the Shenzhen price index in CNY, the Shanghai price index in CNY, the US stock market in USD, and the Chinese Yuan, in USD. Annualized average monthy returns are listed in the legend. The China returns are weighted by tradable market value and include dividends.