

# Evaluating The International Diversification Benefits Of China's New Indexes


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## ABSTRACT

*This article examines the characteristics and performance of selected China's financial indexes. Although several indexes were recently made available, this study focuses on three in particular because they are compiled using distinct methodologies. Based on the differences in their composition, they were categorized as either "global" or "investable" indexes, herein indexes composed of shares that are readily available for trading in the market. From a portfolio diversification perspective, this study found that U.S. investors seeking exposure to China stand to gain the most from funds tracking the Standard & Poor's/CITIC 50 Index (a global index) than from those tracking the FTSE/Xinhua China 25 Index or the Halter USX China Index (investable indexes). Its risk-return characteristics, along with other performance evaluation measures used, show that it is most efficient in providing international diversification benefits.*

**Keywords:** China, global indexes, investable indexes, risk-adjusted returns.

## INTRODUCTION

 ver the last decade, China's importance to the world economy has increased exponentially. Deemed much too big to ignore, and given its outsized growth and considerable need for capital, China has been garnering sizeable attention from portfolio managers and individual investors alike, hence turning its markets into increasingly important destinations for their investments.

In response, a relatively new generation of indexes has been introduced to serve as benchmarks by which to evaluate the performance of money managers in China's markets. Several benchmarks exist, but, three in particular are considered especially capable of capturing the investment characteristics of these markets. Based on distinctly different investment strategies, the FTSE/Xinhua China 25 Index, the Halter USX China Index, and the Standard & Poor's/CITIC 50 Index represent means to answer important questions such as determination of the investment universe, sector weighting and ongoing performance comparison.

Not everyone, however, is convinced that investing in China's financial markets is an idea whose time has come. Critics believe that the benefits from international diversification are not large enough to outweigh the significant risks associated with its equity markets. The main purpose of this study is then to evaluate the legitimacy of these concerns and provide an overview of the investment environment in China. Issues investors should consider before allocating parts of their portfolios to China's index products include the presence of poor corporate governance, doubtful accounting standards, and other allegedly shady business practices.

In this study, the magnitude of the benefits from international diversification through exposure to China is looked at from the U.S. investor point of view. Its content is organized as follows: section 2 lays out the issues by providing background information about the Chinese markets while data and methodology are outlined in section 3. Section 4 describes some of China's new stock market indicators and the motivation which underlies the study's choice of these particular indices followed by section 5 which discusses the overall results. Summary and conclusion are presented in Section 6.

**REVIEW OF THE LITERATURE**

The benefits to the domestic investor from diversifying internationally have been widely documented by academic and practitioners. Grubel (1968), Levy and Sarnat (1970), and Lessard (1973)<sup>1</sup>, are among the most notable precursors of the research on international diversification, a practice that has become an essential tenet of modern portfolio theory.

Although they all noted the beneficial effects of diversifying investment across countries, they also determined that for international diversification to be successful it's important that individual stock market returns exhibit a certain degree of independence. For example, Grubel and Levy and Sarnat use cross-country correlation when assessing the performance of internationally diversified portfolios and recommend that such cross correlations should be continuously monitored by international money managers and positions altered accordingly.

The main reason given for international diversification clearly stems from the fact that returns in two individual stock markets may be sufficiently independent to provide a benefit to the international investor. International diversification can lead to a reduction in systematic risk because it reduces domestic market exposure that cannot be diversified otherwise. Overall, the early literature confirms the evidence of an international diversification benefit.

Some of the more recent studies also showcase the benefits of international diversification. Solnik (1996)<sup>2</sup> for one demonstrates that with approximately 40 securities equally spread among major U.S. and European stock markets, U.S. investors can reduce their risk exposure by at least 50 per cent when compared "with a portfolio consisting of only U.S. stocks." Other studies, however, indicate that emerging and developed stock markets have become more closely integrated, thus the benefit of international diversification may be diminishing. Serletis and King (1997)<sup>3</sup> document the process of convergence of the European Union stock markets using data from 1971 to 1992. Ng (2002)<sup>4</sup> raised the same issue for South East Asia by investigating potential linkages between the stock market returns of Indonesia, Malaysia, the Philippines, Singapore and Thailand over the period 1988-97. After splitting the period into two (1988-92 and 1993-97), he finds, based on correlation analysis, that their stocks have become more closely linked in the second period 1993-97.

Like the aforementioned articles, this study is also an examination of market convergence. It focuses on the nascent financial markets of China from the perspective of U.S. investors. After all, China has shown its commitment to reforming its domestic financial markets as demonstrated by Xiang (1998).<sup>5</sup> It views them as viable means to progressively sever the dependence of its state-owned enterprises on the state banking system as a source of capital. This in turn has caught the attention of global investors looking for effective means to diversify their portfolios.

Since China's markets are still evolving in relation to those of other emerging markets, this article posits that they have not been around long enough to start showing meaningful correlations with U.S. financial markets and could as such provide U.S. investors with significant diversification benefits.

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<sup>1</sup> Grubel, H., (1968). "Internationally Diversified Portfolios: Welfare Gains and Capital Flows," *American Economic Review*, December 1968, pp. 1299-1314

Levy, H. and M. Sarnat (1970). "International Diversification of Investment Portfolios," *American Economic Review*, 60, September 1970, pp. 668-675

Lessard, D. (1973). "International Portfolio Diversification: Multivariate Analysis for a Group of Latin American Countries," *Journal of Finance*, 28, June 1973, pp. 619-633

<sup>2</sup> Solnik, B. (1996), *International Investments*. 3rd edn, Addison-Wesley, Reading, MA

<sup>3</sup> Serletis, A. and King, M. (1997) 'Common Stochastic Trends and Convergence of European Union Stock Markets', *Manchester School of Economic Social Studies*, 65, 44-57.

<sup>4</sup> Ng, H. T. (2002) 'Stock Market Linkages in South-East Asia', *Asian Economic Journal*, 16, 353-77.

<sup>5</sup> Xiang B., 1998. "The reforms of China's Large State-Owned Enterprises: The Indispensable Role of Stock Markets," in *China in the Post-Deng Era* in Cheng, J. (ed), Hong Kong: The Chinese University Press, pp. 311-328.

## **BRIEF OVERVIEW OF CHINA'S MARKETS**

Few nations have changed as dramatically as China since the 1970s. After years of favoring state-owned enterprises, China has engaged in a series of economic reforms with the goal of development through economic liberalization. This shift toward the private sector is highlighted by an astounding GDP growth, underlined by a rising prominence in world trade, and the growing number of companies listed on mainland China's two primary stock exchanges in Shanghai and Shenzhen.

### **Important Characteristics**

China's securities markets have undergone rapid growth over the past decade. Between the Shenzhen stock market and the much larger Shanghai Stock Exchange, more than 1300 Chinese companies are now listed, with a market capitalization of nearly \$500 billion.

Although these markets are home to many unproven companies, the majority of the listed companies are cash-hungry state-owned enterprises in which the government has sold a minority share. The purchasers of these equity shares are typically Chinese private companies that doubt their ability to obtain a stock listing and opt instead for this form of back-door listing. With their equity capped at 30 percent, however, they often cannot control the companies in which they are investing, nor can they aspire to turn them around by putting a new and more effective management team in charge. Weak minority shareholder rights, poorly regarded management teams, questionable accounting practices, and weak corporate governance have led many foreign investors to consider most of these companies unworthy of investment.

Nearly all of China's offerings are Class A shares (a complete list of Chinese shares along with a brief description is shown in Exhibit 1) representing domestic companies, until recently reserved to local Chinese investors. These investors generally have scant education about relative value or equity fundamentals and more often than not are looking for short-term profit. When unseasoned investors speculate on shares with limited supply, it is also conceivable that the share prices are pushed beyond their actual values. Therefore the A-share market tends to roil significantly whenever investors are spooked by corporate scandals and market commotions.

The B-share market was introduced in February 1992. It represents about 10 percent of the total number of stocks outstanding. Both A-share and B-share stocks are listed on mainland China. Chinese investors have been allowed to invest in B shares since 2001.

B shares are freely tradable. They can be listed on either the Shanghai Stock Exchange where they are bought and sold in U.S. dollars or the Shenzhen Stock Exchange where they are traded in Hong Kong dollars but not in both. Considering that B shares are mostly issued to attract foreign capital, and considering that the more seasoned foreign investors have a more realistic view on the growth potential of the firms they are buying into, one can safely assume that the B share market is less volatile than the A share market.

H shares are listed in the more mature Hong Kong market. Beginning 1993, mainland companies able to meet the more stringent requirements of the Hong Kong Stock Exchange were allowed to list their shares in that market as H shares. Red-chip shares are issued by firms that are technically Hong Kong companies although they are largely based in mainland China. H share companies tend to specialize in a single activity or infrastructure projects where red-chip companies are more diversified conglomerates.

**Exhibit 1: Chinese Share Description**

**A Shares**

Securities of Chinese incorporated companies that trade on either the Shanghai or Shenzhen stock exchanges. They are quoted in Chinese RMB. They can only be traded by residents of China and the selected investors noted above.

**B Shares**

Securities of Chinese incorporated companies that trade on either the Shanghai or Shenzhen stock exchanges. They are quoted in U.S. dollars on the Shanghai Stock Exchange and Hong Kong dollars on the Shenzhen Stock Exchange. They can be traded by nonresidents and residents of China with appropriate foreign currency dealing accounts.

**H Shares**

Securities of companies incorporated in China and nominated by the Chinese Government for listing and trading on the Hong Kong Stock Exchange. They are quoted and traded in Hong Kong dollars. As with other securities trading on the Hong Kong Stock Exchange, there are no restrictions on who can trade H shares.

**Red-Chip Shares**

Securities of Hong Kong incorporated companies that trade on the Hong Kong stock exchange. They are quoted in Hong Kong dollars. Red chips are companies that are substantially owned directly or indirectly by the Chinese government and have the majority of their business interests in mainland China.

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**The Welcome Mat**

Clearly, investors are not lacking in confidence regarding China's long-term economic growth. They are more concerned with the underlying fundamental structure of the stock market, which has seen several government-initiated reforms fail one after the other due to the systematic problems that entangle the stock market.

Hoping to infuse its markets with some stability, in October 2004 China decided on a transitional approach to opening up its securities market. Under its Qualified Foreign Institutional Investor program, it cautiously opened its once exclusive A-share market to a handful of foreign institutional investors under strict quotas. These same foreign investors once were restricted to B shares. By targeting foreign institutional investors with strong fundamentals, fiscal transparency, and good governance, China is hoping to help its domestic fund management companies improve their management and operational skills by learning from their foreign counterparts. In addition, by bringing in investors more versed in the concept of value and consequently more demanding of IPO issuers, China is in essence showing its resolve to significantly reduce the corporate scandals that have all too often tarnished the reputation of its markets.

Yet to avoid short-term profit schemes, these qualified investors are not allowed to repatriate their funds during the first year of investment. After that, only 20 percent can be repatriated in a quarter. Whether these qualified investors will have made enough money to compensate for the lock-up period remains to be seen. They have, nonetheless, been seeking bigger allotments in the program. Note that the gains or share dividends resulting from these investments can be remitted in foreign currency after being approved.

**EMPIRICAL METHODOLOGY AND DATA**

To test the diversification benefit of investing in China, this study uses a relatively new set of indexes built by competing index providers to facilitate investments in China. Indexes are chosen over individual securities for

two main reasons. They reduce investment risk; also known as selection risk; an important consideration considering that information on stocks is still not widely available in China. They also reduce costs which is another important consideration especially in the emerging markets where transaction costs can be significant. Indexes give investors access to a range of stocks for much less than it would cost to buy into individual stocks.

Since the manner in which an index is constructed can be construed as an investment strategy by itself, it is important to identify China's indexes and evaluate them in the first stage of the analysis. By overlooking them, this study could incorrectly assume that they exhibit the same return-risk characteristics. We examine a total of three different China's benchmarks although there are other indexes. These were carefully chosen because they were built on methodologies distinctly different from each other. The oldest of the three is the FTSE/Xinhua 25 Index. The Standard & Poor's/CITIC 50 Index and the Halter USX China Index are more recent additions.

Following Masters' methodology (1998) describing the difference between "global" and "investable" indexes<sup>6</sup>, the Standard & Poor's/CITIC 50 Index will be classified in the first category because it's comprised of A-shares, still largely off-limit to foreign investors and thereby "built up from the perspective of local investors." The other two will be categorized as investable indexes. These are free-float market capitalization indexes where 'free-float' refers to the fact that the shares of the companies comprising these indexes are readily available for trading in the market. As such, they exclude government and strategic holdings as well as other locked-in shares that are not readily available in the market. The analysis is performed using data provided by the indexes' respective compilers. The stock market returns include capital gains as well as dividend payments and are based on value-weighted indices.

The performance of an index fund is almost always judged against an index such the EAFE or S&P 500. In this case, since diversification is assessed from the perspective of a U.S. investor, the S&P 500 will be used as the performance benchmark. Hence, after summarizing both background and construction methodologies underlying these indexes, we will consider next their international correlation structure with the Standard & Poor's 500 Index as well as their risk/diversification benefits. Although the correlation among international markets may have increased in recent years as demonstrated by Solnik and Roulet (2000),<sup>7</sup> casting some doubt on the benefit of international diversification, securities are still much less correlated across several countries especially when their business cycles are asynchronous as is the case for China and the U.S.

Even though trade between them has significantly increased, this study posits that persistent market imperfections in China will result in low correlations among the securities of these two countries. This assertion will be further established by calculating the betas of these indexes in relation to the S&P 500 index as a means to evaluate their sensitivity to domestic portfolios.

Next, the frequently used Sharpe Ratio (1966, 1994), which considers excess returns per unit of total risk as the appropriate measurement of risk-adjusted returns, is applied as a measure of performance that incorporates both risk and return.<sup>8</sup> Herein, it is used to demonstrate the economic benefits of index-specific diversification.

## **INDEX REVIEW**

The history of indexes related to China is relatively short compared to other benchmarks gauging Asia's financial markets. Both FTSE and Standard & Poor's have introduced indexes for asset management companies and other investors who see them as important performance benchmarks. A relative newcomer to the world of indexing, the Halter USX China Index, is also in direct competition with the other two index providers. The methodologies underlying the three indexes differ quite a bit from each other. A side-by-side comparison of the three indexes is shown in Exhibit 2.

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<sup>6</sup> Seth J. Masters, "The Problem with Emerging Market Indexes," *The Journal of Portfolio Management*, Winter 1998.

<sup>7</sup> Solnik, Bruno, and J. Roulet. "Dispersion as Cross-sectional Correlations." *Financial Analyst Journal* 56 (2000), pp 54-61.

<sup>8</sup> Sharpe, W. 1966. "Mutual Fund Performance." *Journal of Business*, vol. 39, no. 1 (January): 119-138

-----, 1994, "The Sharpe Ratio." *Journal of Portfolio Management*, vol. 21, no. 1 (Fall): 49-58.

**Exhibit 2: Index Characteristics**

	<b>FTSE/Xinhua China 25 Index *</b>	<b>Halter USX China Index *</b>	<b>Standard &amp; Poor's/ CITIC 50 Index *</b>
<b>Market Data</b>			
Components	25	58	50
<b>Top 10 Holdings</b>			
China Mobile [9.2%]		PetroChina Co [6.4%]	China Merchant Bk [9.2%]
PetroChina [8.5%]		Sinopec [6.1%]	Baoshan Iron & Steel [6.3%]
Cnooc [7.7%]		Yanzhou Coal [5.5%]	China United Telecom [5.7%]
China Petroleum [7.1%]		Aluminum Corp [5.4%]	China Yangtze Power [5.7%]
China Construction Bk [6.8%]		China Life Insr [5.2%]	China Petroleum [4.5%]
China Shenhua Energy [4.3%]		China Mobile [5.0%]	China Minsheng Bking [4.5%]
China Life Insurance [4.3%]		Cnooc [4.9%]	China Vanke [4.5%]
Ping An Insurance [4.2%]		China Petroleum [4.8%]	Shanghai Pudong Dev [3.5%]
China Merchant Hld [4.1%]		China Netcom [4.6%]	Shanghai Intl Airport [3.4%]
Bank of Communications [4.1%]		Huaneng Power [4.1%]	ZTE Corp [3.4%]
<b>Top 10 Total Weight</b>			
	60.1%	52.0%	50.7%
<b>Top Sectors</b>			
Financials [24.9%]		Info Tech [25.5%]	Financials [23.3%]
Oil & Gas [23.6%]		Energy [19.9%]	Materials [16.1%]
Telecom [19.7%]		Telecom [19.5%]	Industrials [14.9%]
Industrials [16.4%]		Materials [11.0%]	Utilities [11.6%]
Materials [11.1%]		Industrials [6.6%]	Cons Disc [10.0%]
<b>Top 5 Total Weight</b>			
	95.7%	82.5%	75.9%
<b>Review of Constituents</b>			
	Quarterly	Quarterly	Quarterly

\* As of March 7, 2006

**FTSE/Xinhua China 25 Index**

FTSE/Xinhua, a joint venture between the U.K. FTSE group and China's Xinhua Financial Network, embraces the idea that the best shares issued by Chinese state-owned enterprises are those listed in Hong Kong and New York, leaving the domestic market with lesser performing ones. Quite a few Chinese issuers have pursued international listings, such as with the NYSE, as a way to gain both cachet and to access a foreign investor base considered more affluent.

All 25 companies represent China's largest and most liquid such as China Mobile and PetroChina or Cnooc Ltd.; the latter being an energy company whose relatively recent \$18.5 billion failed bid for Unocal (a fairly small energy player in U.S. markets but a significant provider of natural gas to Southeast Asia) brought it out of relative obscurity. The index caps at 10 percent, the maximum weight for any individual company in the index to order to reduce exposure risk to larger stocks.

Of the four types of Chinese shares traded, the index has focused on two in particular: the H shares and the Red-Chip shares, both of which trade in Hong Kong. The former are issued by Chinese-incorporated companies and the latter by Hong Kong-incorporated ones. For investors willing to take on the risk of investing in Chinese companies, these shares logically tend to be more stable and provide greater corporate governance and financial reporting since they fall under the jurisdiction of Hong Kong's securities regulators. In comparison, B shares (not included in the index) represent the Shanghai- and Shenzhen-listed companies foreigners are allowed to buy. Although priced in Hong Kong in U.S. dollars, they are not subject to the same degree of regulatory scrutiny as the H and Red Chip shares.

Critics of the index often point out that it does not provide enough diversity among Chinese companies as it tracks only 25 stocks. Its large concentration risk is reflected in the weight of its top 10 companies, which, together, represent 60.1 percent of the index total market capitalization, per Exhibit 2. A large concentration risk is also seen in the index sector allocation with five industries representing no less than 95.7 percent of the index total allocation, also per Exhibit 2.

For example, note the large industry weight of financials that represents 24.9 percent of the index. The increasing presence of banks and insurance companies in the index could mean that this industry is finally coming together as the banking sector continues to undergo massive recapitalization and thorough restructuring. These changes are explained by the recent buying of small stakes in China's biggest lenders by highly visible finance companies such as Royal Bank of Scotland and Merrill Lynch. As a result, shares of Chinese banks have soared, thereby increasing their market capitalization in the index.

On the other hand, this excessively large presence threatens the diversification of the index; especially considering that the sector is represented by only a few large state-owned banks and life insurance companies with lax risk controls. Indeed, it remains an open question whether taking a minority stake with little control will help foreign bankers turn China's financial system into a sector with strict oversight.

### **Halter USX China Index**

In contrast to the fixed number of the components of the FTSE/Xinhua China 25 Index, the Halter USX China Index expands and contracts at the discretion of the index selection committee. The index includes 58 stocks as of March 31, 2007, up from 38 at inception. That number could rise substantially as more and more maturing companies meet the index committee's selection criteria.

The index tracks a mixture of American Depositary Receipts (ADRs) for Chinese companies and securities of companies that trade in the U.S. but mostly derive their revenues from China. The methodology clearly underscores the index provider's opinion that a search for local stocks will be marred with difficulties, especially for foreigners who are largely excluded from the A-share market to begin with. Loading the index with ADRs and U.S.-listed Chinese stocks issued by SEC-compliant companies such as China Life or China Netcom ostensibly constitutes a system with built-in protection. After all, U.S. financial markets are much more heavily regulated. For the funds that track the index, its dollar-denominated constituents are also easy to buy and sell since they trade in U.S. markets.

### **Standard & Poor's/CITIC 50 Index**

Standard & Poor's partnered with CITIC Securities Co. Ltd, a local Chinese financial and investment company, to develop the Standard & Poor's/CITIC 50 Index on China's domestic A-shares. The index is created by

a completely different methodology than the two other indexes. Only the A shares listed on the Shanghai and Shenzhen stock exchanges are eligible for possible inclusion in the index.

Its structure reflects the view that the index will be better served by the small and nimble companies with better management that constitute the A-share market. Seemingly, this type of market is where investors may have a better chance to find many of the active companies that could benefit from China’s expansive growth. According to the index selection committee, the 50 stocks that comprise the index are not only issued by the soundest China-based companies but are also, on a float-adjusted basis, traded actively. All figures are in China’s RMB, since it only incorporates shares locally traded.

Its top 10 holdings are also shown in Exhibit 2. The index shares only two companies with the other two benchmarks: China Merchant is also included in the FTSE/Xinhua China 25 Index while China Petroleum figures prominently in all three benchmarks. On the other hand, although the standard & Poor’s/CITIC 50 Index is also noticeably concentrated with 50.7 percent of its free-float market capitalization held by its top 10 holdings, this concentration risk, along with that of the Halter USX China Index, is undeniably lower than that of the FTSE/Xinhua Index, with 60.1 percent exposure to its top 10 holdings. The latter’s heavier concentration clearly is due to its smaller size.

Considering that the index providers use different industry classification, additional work needs to be done to compare the three indexes in terms of sector allocation. This comparison also needs to be performed over a longer time horizon before drawing any meaningful conclusion, especially considering that their content is in constant flux. An unsurprisingly strong IPO calendar due to its buoyant economy implies that China’s historical pattern of large changes to industry weights is unlikely to abate in the near future.

**HISTORICAL PERFORMANCE REVIEW AND INTERINDEX CORRELATIONS**

The cross-index correlations of returns appear below the diagonal in Exhibit 3. While no measure of statistical significance is reported in the table, almost all correlations greater in absolute value than 0.04 are significant at the 5 percent level. In relation to the S&P 500, the study’s proxy of the U.S. stock market, the coefficient is fairly large at 0.59 for the Halter USX China Index. In contrast, U.S. equities have weak correlation (0.10) with the FTSE/Xinhua Index and especially the Standard & Poor’s/CITIC 50 Index (0.007). In turn, the FTSE/Xinhua Index has a relatively high positive correlation (0.64) with the Halter USX China Index. On the other hand, both are weakly correlated with the Standard & Poor’s/CITIC 50 Index with 0.20 and 0.12, respectively. Such information can be used to build a diversified portfolio by combining those assets with low positive correlations.

Although correlations change over time, these results suggest that U.S. investors are more likely to achieve gains on their international investments at a reduced risk if they purchase index-linked products based on the Standard & Poor’s/CITIC 50 Index (especially) and to those tracking the FTSE/Xinhua Index. Results do not show funds tracking the Halter USX China Index as especially beneficial for U.S. investors. The segmentation of the Standard & Poor’s/CITIC 50 Index from the U.S. markets could be explained by the source of its constituents. They are all selected within the A-share market known for its persisting restrictions on foreign ownership of domestic assets.

**Exhibit 3: Performance Evaluation and Correlation Coefficients of the Daily Returns**

	S&P 500	FTSE	HALTER	CITIC
S&P 500	1.0000			
FTSE	0.1042	1.0000		
HALTER	0.5887	0.6389	1.0000	
CITIC	0.0067	0.1975	0.1185	1.0000



The high inter-index correlation between the Standard & Poor’s 500 on the one hand and the Halter USX China Index on the other is at first quite intriguing. Normally, business cycles are not supposed to be synchronous between China and the U.S., especially considering that the former is still in the process of deregulating its capital markets. This result could be, however, traced to the source of the sample. In all likelihood, their risk-return characteristics have been altered by the fact that their components can be easily obtained in Hong Kong and the U.S. This hypothesis will be tested in the next section of this study.

**Exhibit 4: Regression Results on Daily Returns**

	$\beta$	Std error	t-Stat	F-Stat	R <sup>2</sup>	Number of obs
FTSE	0.11	0.04	2.85	8.11	0.50	1631
HALTER	1.37	0.06	21.24	451.10	38.42	725
CITIC	-0.03	0.03	-0.88	0.77	0.04	2072

Exhibit 4 shows summary results of a regression run on daily rates of returns. Daily rates are calculated by the standard method  $(P_t - P_{t-1})/P_{t-1}$  where  $P_t$  is the current day's price and  $P_{t-1}$  is yesterday's price. Assuming that all securities are fairly priced and using as a guideline an index model that employs the market index to proxy for the systematic risk, the rate of return on the  $i$ th benchmark is given by  $R_i = \alpha_i + \beta_i R_m + e_i$  where  $e_i$  is the zero mean index-specific disturbance and  $R_m$  is the daily return on the market. Beta ( $\beta$ ) denotes the responsiveness of the index to the U.S. stock market measured by the S&P 500 whereas alpha ( $\alpha$ ) denotes the index excess returns (herein the ability of the index publisher to select individual securities that earns above average returns) that equals  $R_i - \beta_i R_m$ .

Exhibit 4 provides the U.S. beta measures of China’s indexes and the associated coefficient of determination values ( $R^2$ ). Herein, the betas measure the sensitivity of these indexes to the U.S. stock market returns whereas  $R^2$  measures the fraction of the variance of index returns that can be explained by the U.S. market returns. Note that both the FTSE/Xinhua Index and especially the Halter USX China Index have a beta value that is much less than unity. In the case of the former, this means that U.S. stock market movements account for about 11 percent of the fluctuations in the index. Although this average shows that these indexes provide U.S. investors with a valuable opportunity to diversify internationally, it’s the Standard & Poor’s/CITIC 50 that has the lowest beta value with -0.03 and an  $R^2$  value of 0.04 percent. This means that of all three indexes, the monthly returns of this index behave the least like that of the S&P 500, thereby providing the most effective international diversification. This result is consistent with that indicated by their correlation coefficient which also suggests from a portfolio risk diversification perspective the desirability to invest in funds linked to this index.

Note that in the early stages of its development, the capital asset pricing model (CAPM) offered a straightforward explanation of the relationship between risk and expected return by depicting the Security Market Line (SML) over the range  $\beta \geq 0$ . It’s only after Ross and Westerfield (1988)<sup>9</sup> explicitly showed the SML over both positive and negative beta values that the misspecification of beta was corrected. The opposite movement of a negative beta makes negative beta assets particularly valuable additions to any portfolios because even if the expected return of the new portfolio falls in response to the decline in the portfolio’s beta, its risk also declines due to the offsetting movements in the negative beta security. In practice, negative beta stocks such as gold stocks and liquidation companies are hard to find since they are rarely listed. In the case of the Standard & Poor’s/CITIC 50, the index components seemingly have enough negative beta values to introduce a downward bias in the slope of the regression. This is most likely due to the fact that most of the A shares included in the index are not moving in tandem with the components of the S&P 500 as our prior correlation results indicated.

<sup>9</sup> Ross, S. and Westerfield R. (1988) *Corporate Finance*, Times Mirror/Mosby, St. Louis

**PERFORMANCE REVIEW IN TERMS OF INDEX RISK-RETURN CHARACTERISTICS**

Portfolio theory suggests that investors should select funds by considering both returns and risk. Rational investors may be willing to assume additional risk if they are sufficiently compensated by a higher expected return. So we now expand this analysis to cover both return and risk associated with China’s indexes.

Exhibit 5 shows summary statistics of the daily returns for the Standard & Poor’s 500 in relation to the three stock market indexes under review. The annualized means and standard deviations of daily returns are provided for each year over the 2001-2005 period for the Standard & Poor’s 500, FTSE/Xinhua 25 and the Standard & Poor’s/CITIC 50, but only for the 2004-2005 time frame for the Halter USX China Index due to its more limited historical performance. Returns, standard deviations, and Sharpe Ratios were also calculated for the two-, three-, and five-year holding horizons except for the Halter USX China Index due to its shorter performance history.

Note that, because the study’s horizon includes years when the benchmarks underperformed U.S. Treasury bills, a few of these ratios are negative. For example, both FTSE/Xinhua 25 and Standard & Poor’s/CITIC China along with the S&P 500 underperformed U.S. Treasuries in 2001 and 2002. The Standard & Poor’s/CITIC China Index in particular underperformed U.S. Treasury bills in four out of the five years that constitute its data history. The Halter USX China Index, on the other hand, underperformed in both 2004 and 2005.

**Exhibit 5: Risk-Return Characteristics\***

	S&P 500	U.S. T-Bills	FTSE Xinhua 25	S&P/CITIC 50 (TR)	Halter USX China Price Index
1998 (%)	28.58	4.82	na	na	na
2001 (%)	-11.89	3.45	-5.51	-24.45	na
2002 (%)	-22.10	1.60	-2.76	-17.83	na
2003 (%)	28.68	1.02	101.09	32.42	na
2004 (%)	10.87	1.40	2.37	-11.21	-0.75
2005 (%)	4.91	3.19	15.05	-3.09	-4.49
2-Yr Ann. Return (%)	7.85	2.29	8.52	-7.24	-2.64
3-Yr Ann. Return (%)	14.39	1.87	33.29	4.45	na
5-Yr Ann. Return (%)	0.54	2.13	16.82	-6.69	na
2 -Yr. Ann. Std. Dev. (%)	7.50	0.29	20.42	17.81	22.13
3 -Yr. Ann. Std. Dev. (%)	9.17	0.29	22.55	18.77	na
5 -Yr. Ann. Std. Dev. (%)	14.94	0.33	23.07	20.00	na
2-Yr. Sharpe Ratio	0.74	-----	0.31	-0.54	-0.22
3 -Yr. Sharpe Ratio	1.37	-----	1.39	0.14	na
5 -Yr. Sharpe Ratio	-0.11	-----	0.64	-0.44	na

\* As of December 31, 2005

Exhibit 5 shows summary statistics of the annualized means and standard deviations of monthly returns for the Standard & Poor’s 500 in relation to the three stock market indexes over the 2001-2005 period.

Monthly rates of return are calculated by the standard method:  $(P_t - P_{t-1})/P_{t-1}$  where  $P_t$  = current month price and  $P_{t-1}$  = last month's price.

The Sharpe measure is computed using  $S_i = [R_i - RFR]/\sigma_i$  where  $S_i$  is the measurement of the index excess annualized return ( $R_i$ ) over the annualized 90-day risk-free Treasury Bills (RFR) return obtained for each month from the Federal Reserve Bank adjusted for the index volatility as measured by annualized standard deviation ( $\sigma_i$ ) of the monthly index returns.

The results of this peculiar time period translate into a total of four negative Sharpe Ratios out of the 10 shown in Exhibit 5: the five-year ratio for the Standard & Poor’s 500, the two- and five-year ratios for the Standard & Poor’s/CITIC 50, and the two-year ratio for the Halter USX China index, the only ratio that could be calculated for this more recent benchmark. The notable exception is the FTSE/Xinhua 25 as it displays positive Sharpe Ratios

throughout the three horizons. This outstanding risk-adjusted performance is most likely owed to its outstanding 101 percent annualized return in 2003.

In view of the Halter USX China Index's negative Sharpe Ratio and its clearly limiting shorter history, for now this index cannot make a meaningful contribution to our risk-adjusted return analysis. Furthermore, from the point of view of the U.S. investor, its high correlation with the Standard & Poor's 500 as noted in Exhibit 2 (0.59) doesn't mitigate its inclusion in a diversified global portfolio. Albeit based on a short performance history, this strong positive correlation in returns for the two indexes prevents any meaningful reduction in risk when they are combined.

In contrast, the FTSE/Xinhua 25 seems at first the ideal index with positive Sharpe Ratios over the three holding horizons. Its three-year ratio, in particular, compares favorably with that of the Standard & Poor's 500 at 1.39 versus 1.37 for the latter. This, of course, could appeal to U.S. investors interested in translating China's rapid growth into investment gains. With one of the major tenets of investment theory stating that investors should diversify their portfolio by spreading the risk, its low positive correlation of 0.11 with the S&P 500 constitutes risk reduction via diversification without sacrificing risk-adjusted returns as indicated by its high Sharpe ratio. From these two important perspectives, the FTSE/Xinhua certainly provides diversification benefits to the U.S. investor interested in adding China to his or her investment portfolio.

In comparison, over the last three years, the only investment horizon over which its Sharpe Ratio could be meaningfully interpreted, the Standard & Poor's/CITIC 50 conceivably shows at best a modest risk-adjusted gain with 0.14 compared to 1.39 for the FTSE/Xinhua. Nonetheless, its potential diversification benefits are huge if its independence vis-à-vis the Standard & Poor's 500 as indicated (correlation equal to 0.0067) is any indication. Hence products tracking this index could also provide effective diversification tools for the globally minded investors.

In a CAPM world, this also means that the risk-adjusted return difference between the FTSE/Xinhua and the Standard & Poor's/CITIC 50 comes from the difference in the beta risk. As Exhibit 3 shows, with a beta of -0.03 the Standard & Poor's/CITIC 50 exhibits the lowest sensitivity to the S&P 500, thereby demonstrating that by investing in the A share market, U.S. investors can gain additional diversification benefits.

## **CONCLUDING REMARKS**

The emergence of China as an economic force has created tempting investment opportunities for globally-minded investors. A thorough review of three indexes shows that they are by no means redundant. While there is some minor overlap in holdings they are of very different construction methodologies.

As investable indexes, the Halter USX China Index incorporates a basket of China-based companies that have either ADRs or New York-registered shares that trade on the New York Stock Exchange while the FTSE/Xinhua 25 Index is mainly constituted of H- and Red-Chip shares trading in Hong Kong. The "global" Standard & Poor's/CITIC 50 Index solely concentrates on China's A-share market. But, overall, this study has demonstrated that investors with higher tolerance for risk may consider that benefits from international portfolio diversification are likely to be achieved by purchasing products tracking the Standard & Poor's/CITIC 50 Index. In view of their low correlation with the S&P 500 and high Sharpe ratio, this study also indicates that products tracking the FTSE/Xinhua 25 Index are also capable of providing global investors with significant diversification benefits. The same cannot be said of the Halter USX China Index.

Nonetheless, before these results are implemented in a meaningful global portfolio strategy, they need to be reassessed in future research as these relatively recent indexes continue to mature and further observations are available. Considering the dynamic characteristics of international correlations and the other statistical tools used in this analysis, a more substantial historical database can only enhance the robustness of the study's results.

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