



Investing in China

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As every investor is aware, there are a number of emerging markets that have been generating phenomenal returns over recent years. Of these, a great deal of attention is focused on BRIC (Brazil, Russia, India, and China). Clearly, these countries all have enormous potential for growth—but they are also highly volatile. The one-day 9% drop in China’s market early in 2007 prompted quite a number of investors to re-evaluate their strategies in China. In this article, I want to examine some of the issues with investing in China from a quantitative perspective. The issue at hand is not whether China’s economy will grow---most authorities believe that China’s economy will continue to expand impressively. The question that must be asked is as to the risk/return proposition here.

Last year, I wrote an article on investing in country-specific funds that discussed some of the broader issues associated with these funds:

<http://www.quantext.com/GlobalRisk.pdf>

I find it odd that so many investors either don’t know or are content to ignore the historical risks associated with emerging markets—especially when you are looking at specific countries. There is an implicit belief, I think, that “it’s different this time” and that the old rules of risk and return no longer apply. Perhaps—but perhaps not. When you consider the very high volatility in China even in recent years, when global capital markets have been exhibiting extremely low volatility, there appears to be solid potential for a substantial volatility shock in China. The potential for substantial increases in volatility in China in the fairly near future is mirrored in the options prices. This does not mean that investors should avoid China.

Investors may decide to invest in China via ETF’s (PGJ, FXI), mutual funds (GCHAX), or via individual Chinese stocks that trade on U.S. exchanges. For most investors, the prospects of choosing individual stocks in an emerging economy appear fairly daunting. A recent article by James Altucher provides an interesting thesis on the relative merits of buying a broad-based fund or individual stocks:

“If a Chinese public company is paying a comfortable dividend, then a flight to quality will help buffer any volatility that the Chinese markets might experience, even as they hit higher highs over the long-term (and perhaps the short-term).”

http://biz.yahoo.com/special/invest060407_article1.html

In this article, Mr. Altucher suggests that buying individual high-dividend stocks in China provides a way to lower the risk associated with investing in this high-volatility market. This is an interesting idea. It is true that high-yield stocks in the U.S. markets are typically in ‘defensive’ industries, have low Beta, and generally help to mitigate broad volatility in the U.S. markets. Is this true in China?

To really get down to looking at this issue, we need to establish some baselines for China. The two China-focused ETF’s listed above (PGJ, FXI) have only been around for a about 2.5 years---but let’s start out by looking at them—along with a much longer-lived China-focused mutual fund (GCHAX).

Ticker	Beta	Standard Deviation	Average Annual Return
PGJ	146%	19%	31%
FXI	137%	23%	40%
GCHAX	117%	15%	33%

Trailing 2.5 years through 6/30/2007

Note that Beta in this table is calculated vs. the S&P500. Beta is greater than 100% for all three of these funds, which means that they tend to respond quite strongly to the S&P500. Obviously, the average annual returns from these funds are very high—nobody will sneeze at funds that have generated 30+% per year. On the other hand, the volatility in these funds is also high. Let’s put these standard deviations in perspective. Over this same period, the S&P500 has exhibited Standard Deviation in annual return of 6.97%, so FXI is three times as volatile as the S&P500, for example. It is worthwhile to note that FXI has exhibited 50% higher volatility than GCHAX. PGJ and FXI are highly correlated (90%) but there is still a bit of diversification value in putting money in both of

them. For the 2.5 year period, a portfolio invested 50% in PGJ and 50% in FXI has generated an average return of 35% with a standard deviation of 20.2%.

The article mentioned earlier that advocated using high-yield stocks to cushion the impacts of high volatility in China specifically mentions three stocks as examples:

Ticker	Company Name	Yield
ACH	Aluminum Corp. of China	7.30%
CEO	CNOOC Ltd. (oil and gas)	1.90%
PTR	Petro China Co.	2.70%

Three high-yield Chinese stocks

Let's take a closer look at these three stocks and their risk levels:

Ticker	Beta	Standard Deviation	Average Annual Return
ACH	225%	40%	60%
CEO	125%	29%	39%
PTR	171%	31%	50%

Trailing 2.5 years through 6/30/2007

If you thought the volatility was high for our China funds, these will really wake you up. These three stocks have an enormous amount of volatility and they have been generating returns that are unsustainably high even for these levels of volatility. If you created a portfolio that is made up of 1/3 of each of these stocks, you end up with historical average return of 50% per year, with a standard deviation of 29% per year.

	PGJ	FXI	GCHAX	ACH	CEO	PTR
PGJ	100%					
FXI	90%	100%				
GCHAX	94%	90%	100%			
ACH	77%	73%	73%	100%		
CEO	70%	81%	65%	56%	100%	
PTR	75%	78%	71%	54%	83%	100%

Correlations in total return over trailing 2.5 years

Further, these stocks have quite high correlations with the three funds (above).

Correlations of between 70% and 80% do not represent tremendous opportunities to damp the volatility in Chinese equity holdings. This is not, in fact, too surprising given that CEO and PTR are both holdings of FXI and PGJ.

As you might expect, the high correlations and the high volatilities in the individual stocks suggest that these stocks will not help to manage total volatility in the China-focused ETF's. To estimate the future risk and return of various strategies on a forward-looking basis, I have used Quantext Portfolio Planner (QPP), a portfolio planning tool. The projected future risk and return for various China-focused investments are shown below:

Portfolio	Projected Standard Deviation	Projected Annual Return	Two Sigma Event
Equal Weight PGJ and FXI	33%	19%	-47%
GCHAX	25%	15%	-35%
Equal Weight ACH, CEO, and PTR	48%	29%	-67%
70% FXI and 10% each of ACH, CEO, PTR	39%	23%	-55%

Projected future standard deviation and annual return for Chinese assets

The table above also shows the annual loss associated with a bad 'two sigma' event, which means a year when returns deviate by two standard deviations from the average. This will happen about 2.5% of the time—i.e. you have a 2.5% chance of ending up with returns as bad as this in any given year. It is also worth noting from the table above that the projected future returns for these Chinese assets are high—but still well below where it has been for several years. These results suggest that the dividend paying stocks

mentioned by Mr. Altucher actually amplify total volatility rather than reducing it. Perhaps the lesson here is that is tricky to extrapolate qualitative strategies from domestic markets to an emerging market.

The projected volatility numbers above look high—and they are. But let us not forget that FXI dropped more than 9% in a single day at the end of February 2007. The projected volatility numbers are very low compared to this. If we look at daily returns on FXI from Jan 1, 2007 through June 30, 2007 we find something quite striking. The fifth percentile daily return is -3.4%. This means that for 2007, you have a 1-in-20 chance of losing 3.4% or more in a day with FXI. QPP's projections for FXI suggest a fifth percentile daily return of -3.2%. For this same historical period, the estimated 1% percentile is -5.5% for daily return. The 1% percentile from the projected volatility is -4.2%.

In deriving the projected future volatility of these Chinese assets, I checked the options prices generated by QPP against the most liquid options quotes on FXI for expirations in January 2008 and January 2009.

<http://finance.yahoo.com/q/op?s=FXI&m=2009-01>

<http://finance.yahoo.com/q/op?s=FXI&m=2008-01>

The average difference between the QPP-generated prices for puts and calls was 6% for \$110 strike price. I used the \$110 strike price because this was the most liquid option. To obtain the good agreement with the options prices, I had to reduce the automatically generated projections for the volatility in FXI. If I simply used the baseline automatically generated results from QPP, the underlying volatility is considerably higher than the volatility implied by the options prices. When I use the automatically-generated results, the projected daily 1% percentile daily return is -5.7% and the projected 5% percentile daily return is -4.2%.

If the paragraph above has some unfamiliar terms in it, you may want to read the following article:

<http://www.quantext.com/RiskOutlookFeb07.pdf>

In a nutshell, here is what it means. If you want to know the market's consensus view on volatility for an asset, you can look at the prices of options on that asset. Options prices can be used to calculate an 'implied volatility' that is the volatility in the asset that explains the prices at which options are trading. So, when I reconcile my forward projections of volatility with options prices, this means that my projections are generally consistent with where the market is trading volatility.

Overall, a quantitative perspective generally supports a conservative view of investing in China: it is a high return/high risk endeavor. China has a good story, but one's enthusiasm for that story has got to somewhat tempered by the historical and forward-looking volatility. From my analysis using QPP, I don't see how the 'flight to quality' strategy proposed by Mr. Altucher will work—at least in terms of the stocks that Mr. Altucher mentions. Now, I am by no means an expert on China, foreign currency, or political risk. I can see some interesting opportunities in China for sophisticated investors who will trade volatility or manage risk in sophisticated ways. For most investors, the question will be whether to invest in China or to invest that same money more broadly across several emerging markets or in other assets with similar portfolio benefits. The solution really depends on how an investor needs to shape his or her portfolio in terms of total risk and return. China has lower correlation to U.S. domestic markets and higher volatility than a more diversified emerging market fund like EEM. Whether or not adding China to your portfolio makes sense really requires a solid understanding of the overall risk-return balance in a portfolio, as well as a clear-eyed view of the levels of volatility can be encountered.

Quantext Portfolio Planner is a portfolio management tool. Extensive case studies, as well as access to a free extended trial, are available at <http://www.quantext.com>