



TD Economics

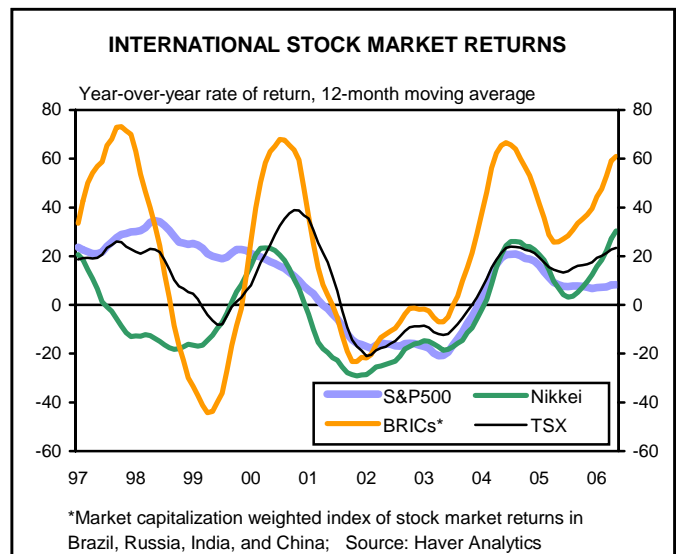
Special Report

August 1, 2006

DA VINCI'S OTHER CODE: INCREASED GLOBAL FINANCIAL VOLATILITY TO COME

Financial markets hate uncertainty. From 2002 through mid-May 2006, global financial markets enjoyed an unprecedented, uninterrupted, universal streak of stellar returns with little volatility. In Canada, annual returns on the S&P/TSX composite index averaged 18 per cent. Mature international stock markets saw triple the annual returns they did over the prior six years, but they were dwarfed by the stratospheric ascent of equity prices in emerging markets (EM's), which shifted from an era of contagious financial crises to almost five years of similarly infectious growth. Markets increasingly moved in lock-step with one another early this decade as the correlation between returns in global markets and the S&P 500 increased by nearly a third. Moreover, volatility – the day-to-day fluctuation of prices in any given market – was down 10 to 30 per cent on average over the historical swings. In other words, returns were strong, they were global, and they were steady.

Many markets have lost ground since May and four years of tranquility have been broken by sharp volatility. This was first seen in EM's, which has led to speculation that this volatility is the result of a repricing of risk in these historically volatile markets. A second related culprit offered for volatility's return is the incentives of investment and hedge fund managers. These managers flocked to risky EM assets when interest rates were low in developed markets. Now that interest rates are rising in the developed world, these same managers are pulling out of EM's. Overall, these two ideas do a good job of explaining the reallocation of investments across borders, but ultimately appear to be more effect than cause.



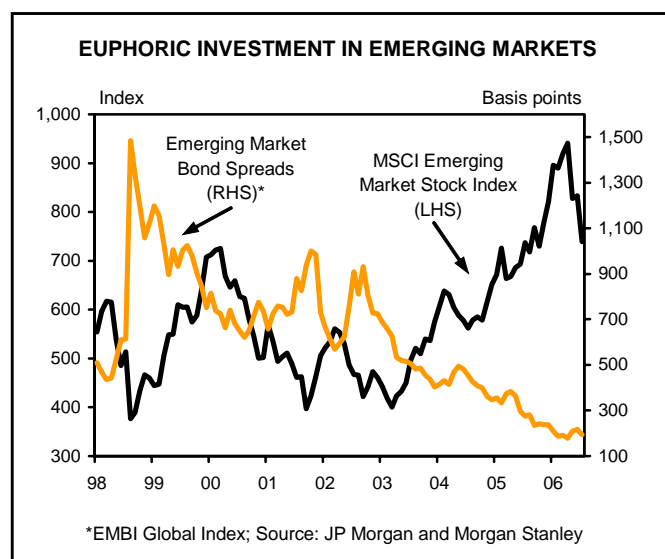
The crucial source of volatility is the end of one of the most stimulative global monetary cycles in history. While a number of central banks around the world lowered interest rates in response to the U.S. recession in 2001, two principal protagonists in the story of ample global liquidity are the U.S. and Japan. This left financial markets flush with cash and global asset prices rose in response. Now that monetary conditions have tightened, asset prices are receding. With future tightening uncertain, markets have become skittish, responding sharply to new information. In fact, there is a strong historical relationship between the U.S. monetary cycle and financial market volatility. More importantly, history suggests that even more financial market volatility is in store for global markets – especially EM's – once the Fed establishes they have reached their peak.

Global markets come together

EM equity returns have traditionally shown wider swings than developed markets. While some relationship in returns across countries has always been visible, these returns have increasingly moved in unison. In fact, comparing 1995-2001 (early period) with the period since then, the correlation between monthly returns in international equity markets and the U.S. S&P 500 have increased substantially, with only a few exceptions, and for EM's as a whole, returns were nearly twice that seen in mature markets (MM's). With commodity demand in India and China growing by 15-25 per cent, resource-rich EM's benefited greatly and certainly justified some of the increases seen there. It is also no coincidence that Canada and Australia – two MM's with large commodity sectors – saw the largest returns among their peers.

GLOBAL CHANGES IN INTL EQUITY MARKETS 1995-2001 vs. 2002-MAY 2006				
	Increase in:		Returns***	
	Vola- tility*	Corre- lation**	1995- 2001	2002- May 06
DJ Global	-4%	20%	7%	6%
Mature Markets[^]	-10%	29%	4%	12%
S&P 500	-9%	...	14%	2%
TSX	-22%	30%	7%	18%
Nikkei	-13%	41%	-11%	10%
Australia	-26%	19%	3%	17%
DAX	8%	46%	9%	9%
CAC	-5%	39%	9%	9%
FTSE100	-5%	-1%	7%	7%
Emerging Markets[^]	-28%	34%	-3%	22%
Korea	-27%	73%	-11%	21%
Indonesia	-22%	12%	-22%	34%
Thailand	-36%	37%	-25%	23%
Singapore	-36%	13%	-5%	12%
Argentina	-6%	-17%	-6%	12%
Mexico	-40%	-8%	6%	20%
Turkey	-35%	86%	6%	19%
South Africa	-9%	12%	-6%	28%
BRIC composite^{^^}	-33%	12%	4%	29%
Brazil	-31%	25%	2%	24%
Russia	-46%	-21%	17%	45%
India	-25%	45%	-7%	27%
China	-29%	144%	15%	1%

*Standard deviation of daily returns. (-) indicates fall in volatility
**Correlation with monthly returns in the S&P 500. (+) indicates local and U.S. returns moved increasingly in unison.
***Average annual returns over period in US\$. [^]Simple average.
^{^^}Mkt-cap weighted. Source: Bloomberg and author's calculations.



Almost as noteworthy as the stellar demands was the constancy of it. Day to day volatility in stock prices was nearly a third less than the early period for EM's and ten per cent less for MM's. And once again, Canada and Australia stand out with the largest reduction in volatility among MM's. Yet, the broad-based shift in equity markets towards high returns, increased correlation, and decreased volatility suggests commodities are only part of the story.

Falling Emerging Market Risk Premia

While EM's have been a prime beneficiary of the increased demand for commodities, it is how they have spent that windfall that sets the last five years apart from the previous thirty. EM's have been able to dispel the specter of the costly 1990's financial crises by reducing the level of government debt and increasing the level of international reserves on hand. Over the last four years, external debt as a share of exports has fallen from its peak of 175 per cent in 1998 to just 75 per cent in 2006. Since the foreign currency gained from exports is needed to service external obligations, financing is more secure. At the same time, developing countries have more than quadrupled the pace at which they accumulate reserves – adding nearly \$2 trillion – strengthening their safety net should the waters get rougher.

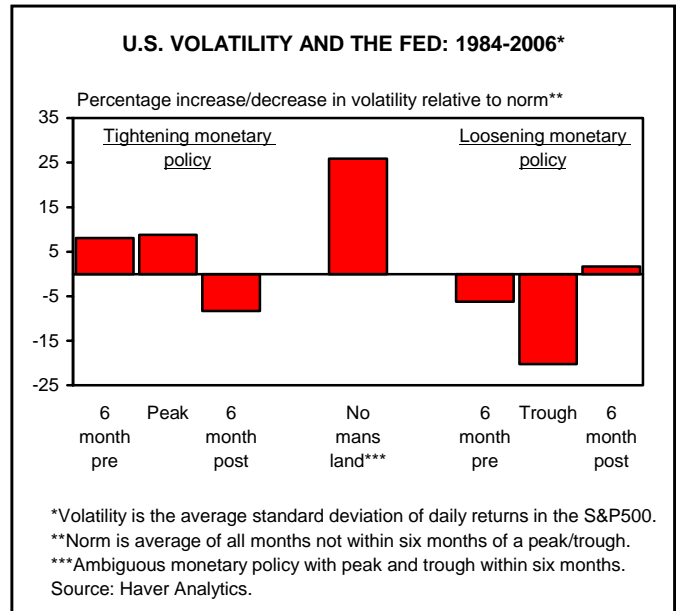
With EM solvency showing steady improvement since the end of 2001, the relative risk in holding EM debt over more established countries fell. This is clearly seen in the secular decline in EM bond spreads over U.S. Treasuries.

This euphoria quickly spread to the stock markets in these countries, and buoyed by strong prospects for commodity demand and reduced risk, the party was on. EM spreads ultimately bottomed out at just 1.75 per cent above that of low-risk U.S. government debt – a very narrow margin after accounting for the reduced liquidity and still positive probability of default risk in EM debt relative to its U.S. cousin.

As for volatility, there's little reason to suspect reduced risk premiums in EM's filter back to developed markets. There was also no change in EM solvency in 2006 to justify volatility's hasty return. Moreover, looking ahead, there is less and less utility of further reductions in EM debt. Also, since international reserves must be liquid enough to respond to potential crises, the returns are relatively low and are costly to accumulate indefinitely. Therefore, while risk premiums may explain some of the past reduction in EM volatility, there is little reason to expect any future reduction in EM volatility through this channel and the search for the ultimate catalyst marches on.

Enter Hedge Funds Stage Left

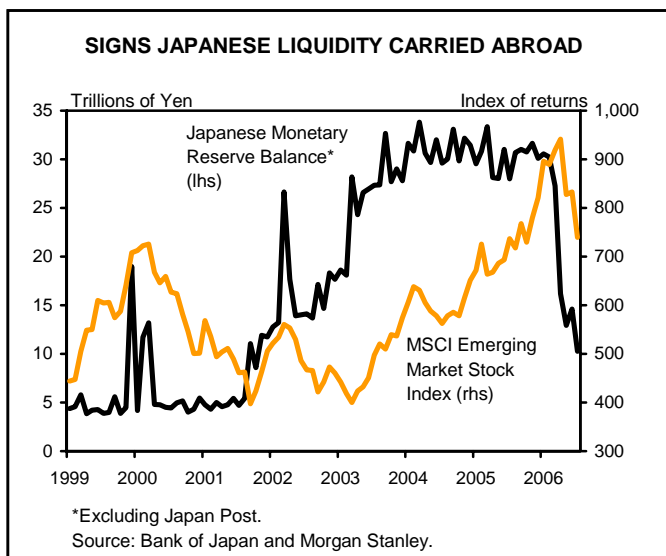
Conspiracy theories surrounding hedge funds are nothing new. We know investors are compensated for owning risky assets, and higher returns entice individuals to take on greater risk. Returns in the stock market are an example of taking on some additional risk for the prospect of additional reward. In the case of hedge fund managers, their compensation comes not only from their total return but by how much they can beat these standard returns (in



the hedge fund world, the standard returns are known as beta while the excess returns are known as alpha). A manager may simply be skilled at picking under-valued assets and get excess return in this way. But when interest rates are low, the manager's compensation will also be low unless he or she finds a way to take on additional risk and "build alpha." This can be done by selling assets such as credit default swaps that gain the manager a nominal fee in return for selling insurance against a low-risk, high-cost event. Alternatively, managers may finance risky business ventures or provide liquidity to historically illiquid markets – like EM's – but both of these channels are less profitable when borrowing is cheap. So the environment of the last four years required hedge funds to flood the market with even more liquidity to generate alpha, further depressing global volatility. But estimates from 1998 suggest that hedge funds' assets are only 1/200th of the assets controlled by traditional institutional investors in MM's. Moreover, only a quarter of hedge fund assets are invested outside of the U.S. and substantially less than this are invested in EM's. Ultimately, hedge funds are not the culprit for the return of global volatility. Indeed, they are just an actor in the larger plot: loose monetary policy.

The Global Environment of Loose Monetary Policy

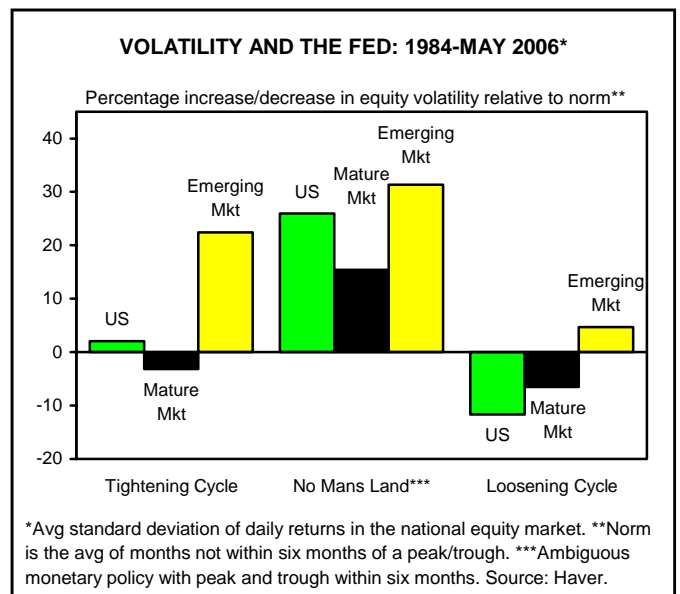
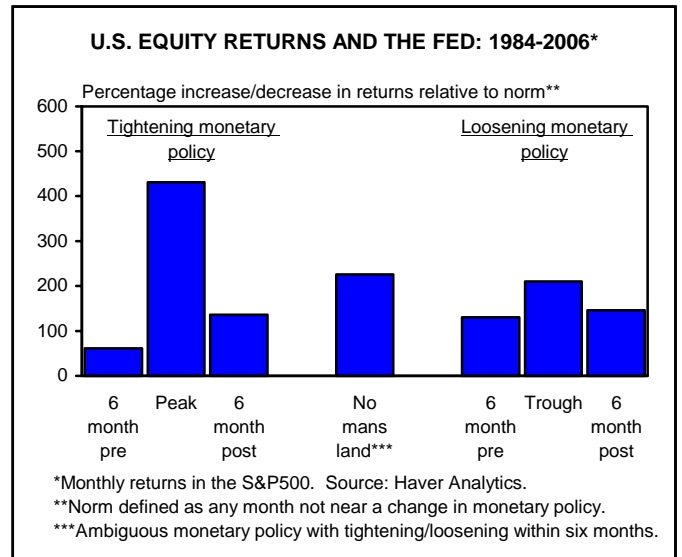
In the wake of 9/11, the tech bubble, and the brief U.S. recession, the U.S. Federal Reserve dropped the federal funds rate to just 1.00 per cent with central banks around the world quickly following suit. In Japan, the global



slowdown complicated the fight against deflation and the Bank of Japan (BoJ) was forced to take drastic actions to create inflation, injecting large amounts of cash directly into the economy. This ample liquidity made its way out of Japan in the form of the carry trade – borrow cheap in Japan and invest abroad. But in March, the BoJ announced the end of quantitative easing and wary of rising interest and exchange rate costs on their Yen-denominated debt, investors began to unwind EM positions. Like hedge funds, cross-border foreign-currency lending cannot be measured with any accuracy; however, in this case, the second-hand evidence is compelling. The fact that the EM sell-off followed closely on the heels of the BoJ’s announcement is certainly “interesting” at the least. But is it a market mover?

Before judging new-age arguments for why it’s different this time, a look at the largest economy in the world reveals an all-too-common plot twist – the U.S. did it. Over the last 22 years, volatility in the U.S. market has been nearly 10 per cent higher during the “Fed-watching” stage as interest rates near their peak. Even at the peak, volatility notches higher until confirmation of the peak comes just a few months later when rates begin their descent. Also, it is the uncertainty, not the level of rates themselves that’s the important factor. This is why we have seen the most volatility in “no man’s land” when the Fed’s policy is uncertain and peaks and troughs are within six months of each other.

The implication for returns is less clear. Some volatility appears acceptable looking at average volatility and returns over the course of a month, but returns quickly trail off as volatility picks up. Five of the top 10 largest one-day increases in the S&P 500 have come in high-volatility months; however, all of the top 10 largest daily declines (and 17 of the top 20) have also come in these months. On the other hand, once the Fed stops raising rates, it is with the understanding that economic growth



will slow in the near future and keep prices in check. It is odd then that the rate of return in the S&P 500 has been five times higher than the norm once the Fed has signaled economic growth will soon slow. And returns are three times the norm when the Fed is in no man’s land. In fact, the mathematically-inclined might look at the chart of equity returns and wonder how they can all be above average since average implies some are above and some are below. The answer is that the increase in the rate of return is relative to the norm, which is defined as those periods not within six months of an interest rate peak or trough. In other words, when monetary policy is on auto-pilot, equity returns have been historically low. It is only with the risk of change that higher returns have been seen.

	Average Monthly	
	Volatility*	Return**
Lowest Volatility	0.50	1.34
Modest Volatility	0.66	1.83
Medium Volatility	0.80	1.17
Moderate Volatility	1.01	0.63
Highest Volatility	1.63	-0.68

*Standard deviation of monthly return. **Month-on-month return in the S&P 500. Source: Bloomberg.

Central bankers may be responsible for more drama than we've been led to believe.

The Denouement

In order to claim success in the hunt for the source of global volatility, our answer must explain three factoids: the exceptionally low volatility world-wide for several years, the recent acceleration in volatility, and the focus in EM's. In fact, equity markets in the U.S. and other MM's have historically had less volatility during the U.S. monetary loosening cycle than at any other point. In EM's, volatility has been at its lowest when U.S. policy is on autopilot, such as the 17 consecutive rate increases by the Fed over the last two years, and at its next lowest point when U.S. monetary policy is stimulative. This would characterize U.S. monetary policy from 2002 through early-2006, exactly when EM's saw their rise. Moreover, given the exceptionally low trough in interest rates, exceptionally low volatility is not unreasonable. Although it took some time, the Fed is now at or near their peak. With uncertainty and tightening upon us, volatility has

returned and the largest increase at this stage has historically been seen in EM's.

Every play has its bit actors and certainly the other factors examined have had some role to play. The synchronicity of global monetary policy, such as that in Japan, did magnify these effects. And with the Fed being one of 16 central banks to raise interest rates in June, this magnification is now working in reverse. With the BoJ and European Central Bank set to raise interest rates modestly over the next six months, global tightening has not yet run its course. U.S. monetary policy – and perhaps the economic trends it is assumed to lead – ultimately appears to be the chief antagonist. Our belief is that the Fed has already reached their peak in this cycle. Even if the Fed surprises us and goes once or twice more, there is little debate that we are within six months of the peak. This means that we should expect this volatility to remain – if not increase – at least until interest rates begin to fall, which is unlikely to come until late this year, or more likely, early next year. Financial markets may be in for a bumpy ride.

Richard Kelly, Economist
416-982-2559

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