IRML

Market Risk Report
April 2007

Executive Summary

- March was a month of mixed messages. Equity markets had been sent tumbling at the end of February by Alan Greenspan's discussion of a possible US recession. But weak US economic data encouraged the Fed to remove its tightening bias and equity markets made up almost all their losses during March. However, recent economic news can be read either bullishly or bearishly. Volatility remained high, but was generally confined to the equity markets, Japan and the US.
- Equity markets rose almost as fast as they had fallen. Volatility hit a 12-month high in North America, but not in Europe or Japan. Although the VIX rose, it did not even make the levels seen last spring.
- Despite concerns over the sub-prime lending market in the US, the bond market was much calmer than equities. Volatilities remain around 12-month averages, and spreads over governments actually fell in March with the EMBI spread reaching a 12-month low of just 170bp.
- FX volatility remained low, except for the Yen. The Dollar weakened following weak economic data in the US.
- Option volatility was high judging by high volatility of implied volatility and large and rapid price swings in equity markets.
- Commodities also had low volatility. As the market's focus seemed to be elsewhere, volatility remained close to or below 12-month averages, and Gold hit a new 12-month low of 11%.
- Real Estate prices floundered after a strong run over the last year: volatility rose with Japan and the US hitting 12-month highs.

In this month's issue: Trading Volatility: A Closer Look at the VIX Index

Author: Niall O'Connor

IRML

Key News (Major Volatility-Driving Events)

Mixed Messages

The Fed removed its tightening bias, then seemed to backtrack slightly. US housing market data and durable goods orders were weaker than expected, reinforcing views of an impending slowdown (although GDP forecasts remain relatively bullish: see below). There's plenty for both bulls and bears.

As we pointed out last month, although the fall in the Dow in February was the largest one-day drop since 2003, most major markets have rallied so strongly recently that they are now back to their levels of early-January, and all are up on the year. And some, but by no means all, of the complacency over volatility has gone: the VIX reached nearly 20%, from just at 10% in February, although it has subsequently fallen back to below 15%.

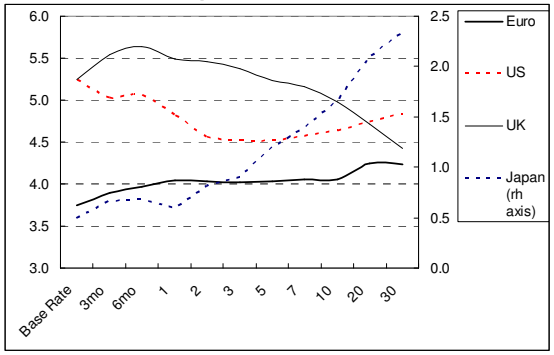
Yen volatility continues

The large gyrations in the Yen appeared to abate somewhat, but volatility remains high. Maybe the carry trade is not dead yet?

The bond market takes the opposite view?

All major country yield curves steepened during the month, in particular the inversion of the US and UK yield curves reduced by around 20bp.

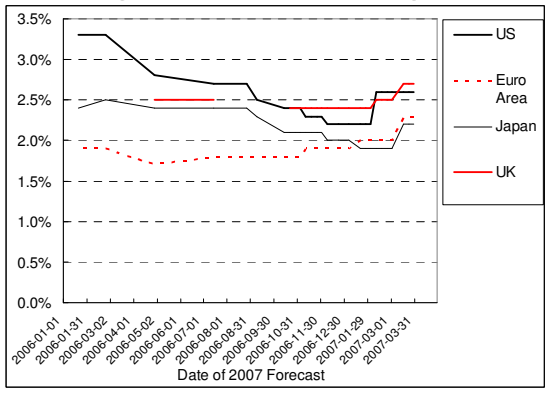
Yield curves suggest inflationary pressures in the UK, but a weaker growth environment in the US



GDP growth forecasts are still positive…

Against the negative economic news, GDP growth estimates remain bullish. The consensus 2007 growth estimate for Japan remains at 2.2% and for the Euro area at 2.3%. Although US numbers have not been revised upwards, growth is still forecast at healthy levels of 2.6% for 2007, and 2.9% for 2008.

2007 GDP growth estimates remain high

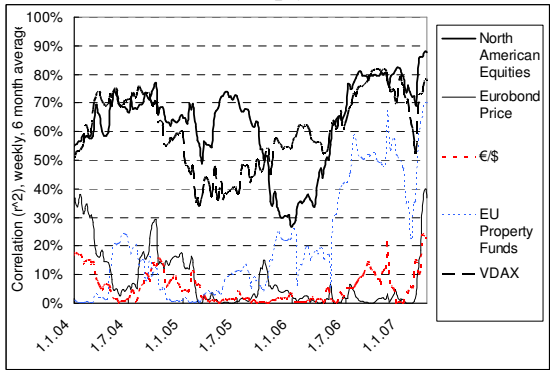


Correlations stay high

Market correlations remain very high. European equities have a correlation of 90% with North America, 80% with the VDAX and 70% with property shares. Even bonds have now become 40% (negatively) correlated with equities.

The message remains from last month that diversification is very hard to find at present.

Correlations between the European equity market and other asset classes have stayed high. Bond correlation has risen sharply



Oil prices stay higher

Tensions in the Middle East remain high, and so is the oil price again, at around $65. However, the market doesn't seem to be focussing on oil, and it is worth bearing in mind that the oil price is still down on a year ago, so it is likely it will actually be deflationary from now on.

Trading Volatility: A Closer Look at the VIX Index

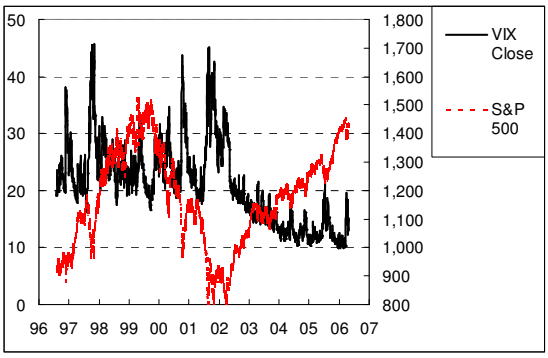
Overview

Asset managers continue to look for new potential sources of investment performance, particularly in areas that might potentially be uncorrelated with the more conventional asset classes. Volatility is one such asset class, and its slightly unusual properties, in particular negative correlation to the equity markets, has made it increasingly interesting.

The VIX

The CBOE has produced the VIX index of S&P 30-day implied volatility since 2003. (The old version the OEX VIX was launched in 1993 and the CBOE now also provides back-calculated data for the VIX going back to 1986.)

In simple terms the VIX is the market's view of expected volatility on the S&P500 over the next 30 days, and is a very useful barometer of the market's view on the S&P.



VIX Behaviour

The VIX traded typically in the low 20%'s during the 90's, with occasional spikes up as high as 45% during more extreme market events such as the LTCM/Russian crisis in 1998, September 11th 2001 and the bottom of the market in 2002.

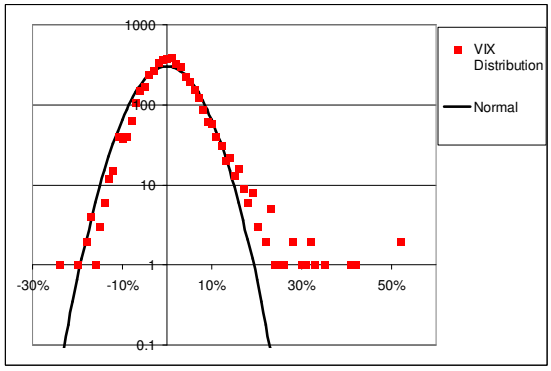
However, since the market started its latest rally in 2003, the VIX has fallen every year and on occasions has traded below 10%. There were two recent spikes this spring and last spring, but on each occasion it peaked at only around 20%.

Several theories have been given for this secular trend, but the most convincing one is that globalisation has led the volatility of GDP growth to be lower and hence the ability to forecast of growth and profits is much higher than it used to be. Care must be taken with this argument though: although the VIX is at low levels by the standards of the last 10 years, it would have been similarly low in the period 1993-1995, a period of very high uncertainty in GDP growth.

The VIX has some interesting properties.

- It is quite strongly correlated, but in a negative direction, to equity markets (-0.8 correlation typically). This comes about because bull runs generally see declining and low volatility, while sharp downward corrections generally cause sharp upward spikes in volatility. Likewise it is positively correlated to credit, especially lower grades, e.g. BB, CDX
- It is highly volatile. While S&P500 historical volatility is around 14% at present, VIX volatility is over 250%.
- As can clearly be seen from its historical chart, it is mean-reverting (negatively auto-correlated). Since 2000 it has rarely dropped below 10%, and has rarely gone above 40%.
- It has a strong positive skew to its distribution. Long periods of low levels are interspersed with strong upward spikes during market corrections (e.g. LTCM in 1998, or at the end of February 2007).

Daily VIX Returns Distribution vs Normal Distribution (1990-March 2007) (Note log vertical axis)



Trading Volatility

The VIX Index itself (the VIX "cash") is not tradable. The tradable instruments are futures and European options on the VIX, all traded on CBOE exchanges. Liquidity is not particularly high, especially in the exchange-traded market. There is however also a large OTC market in addition. Note that for technical reasons contracts expire on Wednesdays (not Fridays as with most other derivatives).

As the VIX is mean reverting, the futures generally trade higher than the VIX when the VIX is low (because the expectation is that it will rise), and lower than the VIX when the VIX is high (as the expectation is that it will fall). Thus it is harder to profit from rising volatility in quiet times than might be imagined when simply looking at the cash price: futures already price in the likelihood of a spike. Maintaining a long position requires rolling a futures position, which historically has cost around 0.7 volatility points per month. For instance, on 26th February 2007, the day before markets fell sharply, the VIX closed at 11.2%. The March future was trading at 11.4%, the April at 12.5% and February 2008 at 15.4%. The April 2007 future is actually down 10% since its launch in October 2006.

Hedging with the VIX

Concern over a market correction is clearly high at present: for instance S&P puts are still very expensive. So the VIX looks like a useful instrument to hedge downside risk: it tends to rise sharply on market corrections.

It does indeed look like a good hedge, but we do wonder whether it's the right instrument for the job. Given its less than perfect correlation with markets in general and its low liquidity, we would question whether just shorting an index future might not be as good and cheaper an approach.

IRML

Equities

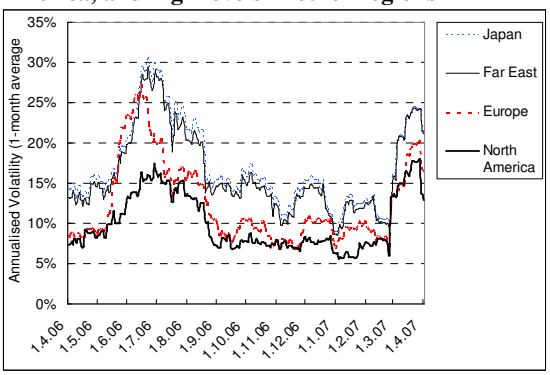
Overview: Crisis averted, at least for now

After taking a 6-8% hit from February peaks to March lows, equity markets staged an impressive recovery in the second half of March after the Fed appeared to remove its tightening bias. They finished the month around 2% down from their peaks, but are all up on the year. Bear in mind that was an all-time high for the Dow Jones too.

Volatility: Regions

Of course the large market gyrations led to higher levels of volatility. Levels rose to (a 12-month-high of) 18% in North America, and 20% in Europe and 24% in Japan

Volatility reached a new 12-month high in North America, and high levels in other regions

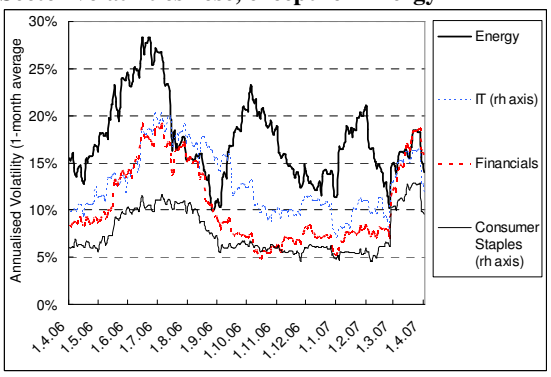


Note: based on MSCI regional indices

Volatility: Sectors

Sector volatilities were also high, although the lower oil price, and the lessened focus on oil as the key driver of markets now meant that the Energy sector actually had volatility below 12-month averages. Consumer Staples briefly hit a 12-month high: all others remained above 12-month averages.

Sector volatilities rose, except for Energy

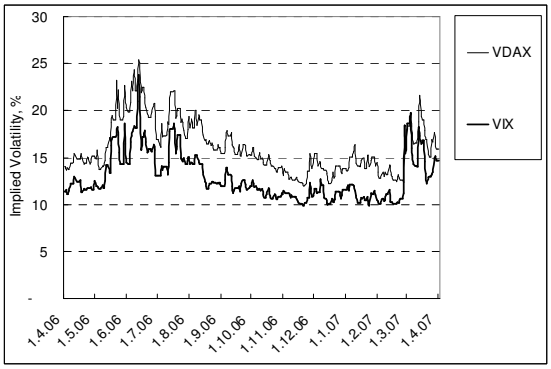


Implied Volatility (Market-Implied Near Term Outlook)

The VIX and VDAX indices show the expected volatility of the S&P500 and DAX respectively over the next 30 days based on options' prices.

Both spiked dramatically at the end of February. Although both remain above 12-month averages (of 12.9% and 16.0%) neither got to the high levels seen last spring.

The VIX (US) and VDAX (Germany) are both implying that equity volatility will remain higher over the next month



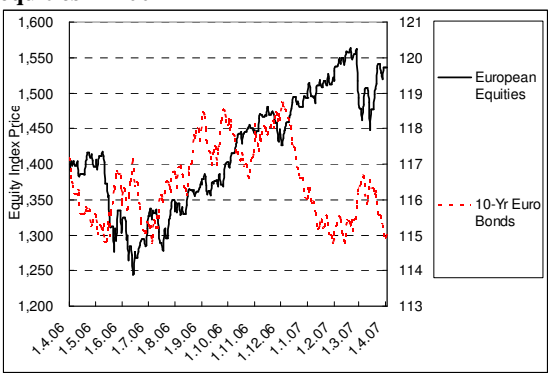
As noted last month: futures markets have been pricing in a significant increase in the VIX for many months. It was very difficult to profit from this rise. Downside protection remains very expensive (see section on options).

Fixed Income (10 Year Government Bonds)

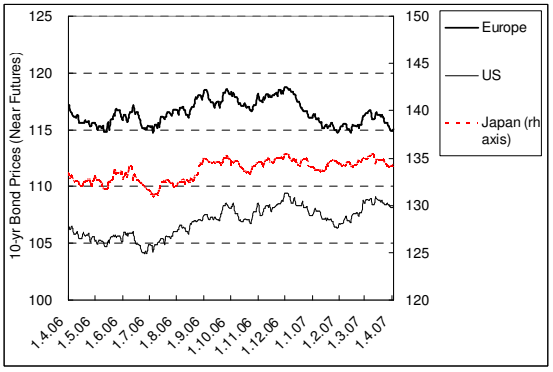
Prices

Bonds and equity prices were positively correlated for most of 2006. This relationship reversed at the start of this year as fears over a growth slowdown intensified. Prices fell at the start of the year, but recovered as equity markets fell. Over the last month they fell as equity markets recovered.

Bonds have become negatively correlated with equities in 2007



10-Year bond prices fell as equity markets recovered



Interest Rate Expectations

In general yields rose at the long end of all curves.

US markets firmed their view of a rate cut within the next few months as the Fed minutes suggested an end to the tightening bias. 3 year bonds are yielding just 4.5% now.

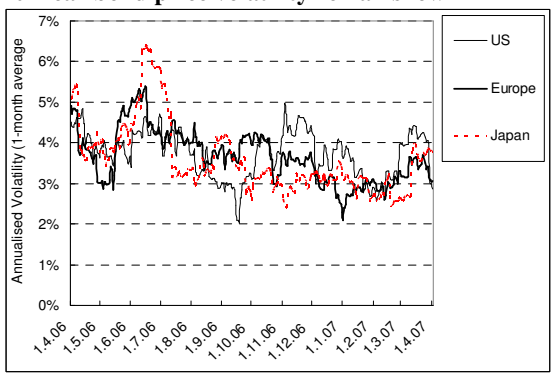
In the UK the market still expects rates as high as 5.75% within 6 months (although probably falling again in 2008), and yields at the long end rose again.

In Europe the yield curve looks more "normal" (upward sloping) and rate rise expectations remain with rates expected to rise from 3.5% to 4-4.25% within a year.

Volatility

Bond price volatility remained relatively low at between 3.0 and 3.8%: around 12-month average levels.

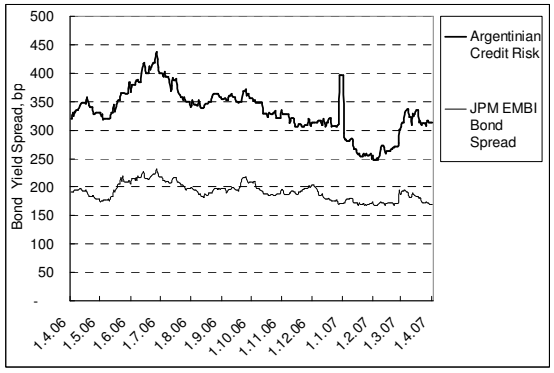
10-Year bond price volatility remains low



Spreads

Despite the concerns in the US over sub-prime mortgage lending, spreads of Emerging Market bonds over Developed (JPMorgan EMBI index) fell to just 170bp. Argentinean spreads stayed over 300bp. The bond markets are suggesting low fear levels.

The absolute levels are still low by recent standards, and it would appear risky bonds have little more volatility than risk-free.



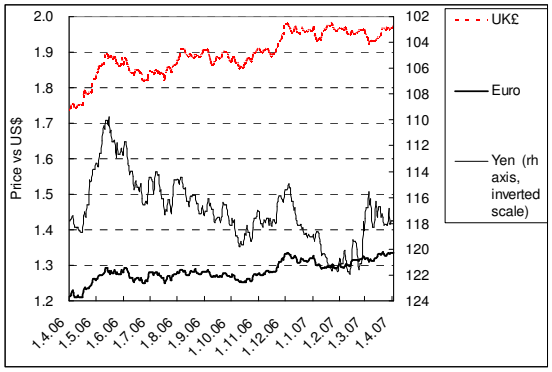
FX

Prices

Weak US economic data forced the Dollar down. Against the Dollar, the Pound remained strong, the Euro strengthened and the Yen's strong fluctuations appeared to abate, settling at around 118.

Turbulence in the Yen carry trade seems to continue to be the main driver of the oscillations: on one hand people are setting up carry trades, weakening the Yen, on the other are investors betting that the large carry trade positions will have to be unwound putting upward pressure on the Yen.

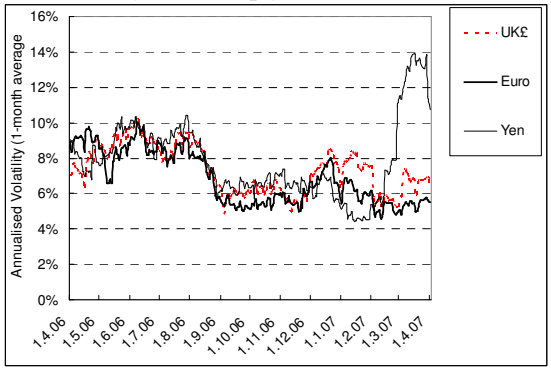
The Dollar weakened. Yen fluctuations reduced



Volatility

As can be easily seen by the eye from the previous chart, the Euro and Pound volatility remained low against the Dollar: in fact Euro volatility at just 5.5% remains below its 12-month average. Yen volatility dropped but remained unusually high at 10.8%.

Yen volatility rose sharply



IRML

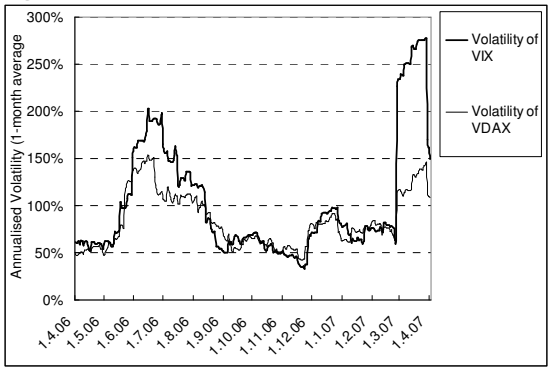
(Equity) Options

Volatility of Implied Volatility

Perhaps unsurprisingly, the chart of volatility of implied volatility looks similar to the VIX and VDAX, showing a peak in late June 2006 (then, as now, as a result of fears over US slowdown) and a big spike in volatility in March 2007.

Perhaps the most dramatic chart in our report, the volatility of volatility of the VIX hit a new 12-month high of nearly 280%. The uncertainty appeared higher in the US than Europe: the volatility of the VDAX is at just 109%, not far above the 12-month average of 84%.

Volatility of volatility spiked to new 12-month highs



This large upswing in volatility will have increased the price of options, in some cases dramatically. This is particularly the case for out-of-the money puts, which traded at up to 22% for downside protection on the S&P 500. Even now downside protection on the S&P costs upwards of 18%.

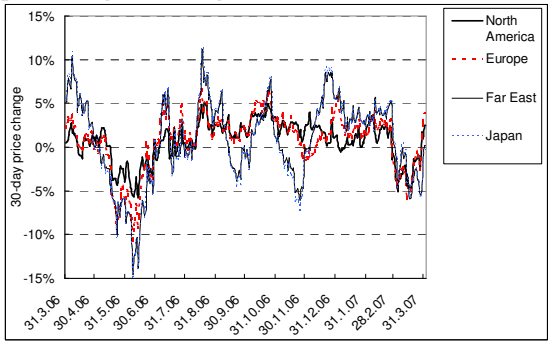
Likewise, the delta of far out-of-the-money options could increase quite significantly, and with it the option's volatility.

(Equity) Price Swings

Equity prices swung down strongly, then into positive territory during March.

This suggests that (equity) option deltas would have been quite volatile over the last month, potentially swinging in and out of the money quite rapidly.

Equity prices swung strongly negative, then positive again during March



Note on Treatment

Options show more complex behaviour than the other instruments we look at in this report, so we make some simplifying assumptions. As Calls and Puts are in effect polar opposites and in and out of the money options behave very differently, it is hard to generalise all options' behaviour. However, we look at the two key drivers: volatility of implied volatility and major price movements of the underlying security.

Implied volatility (via the option Vega) drives option prices, so a big indicator of option price volatility is the "volatility of implied volatility".

Of course the biggest driver of individual option prices is the movement of the underlying (via the option Delta): a move in either direction will cause the option to go in or out of the money (and a corresponding change in the option Delta and price volatility). As a proxy for this, we look at the 30-day price swing of equity market indices; options on bonds or FX could of course behave differently. Calls and Puts will respond in opposite fashions: calls becoming more volatile as prices rise.

Note on Convertibles

Convertibles are in effect a combination of a bond and a call option, with the bond portion usually making little contribution to the instrument volatility unless the option is out of the money. As such, convertible portfolios volatilities will normally behave similarly to call option portfolios, and this commentary can be applied to convertibles as well as options.

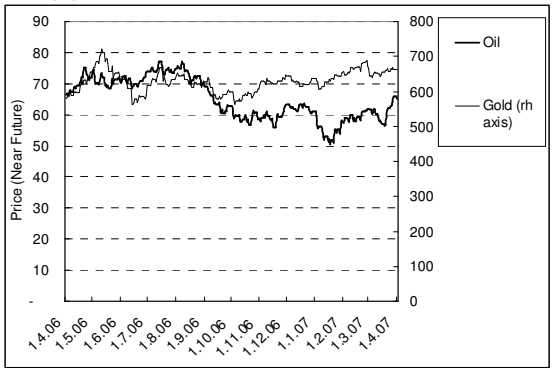
Commodities

Prices

Oil prices rose as tensions over the Iranian capture of British sailors remained high. Gold again looked like a safe-haven asset and prices crept upwards.

However, the market's focus no longer appears to be on Oil, so the impact of its recent rise in price was not felt elsewhere.

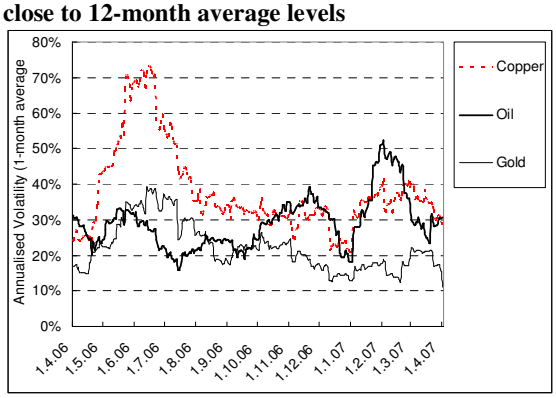
Oil prices stayed higher; Gold prices continue rising gently



Volatility

Volatility of commodities remained quite low during March. In fact Gold volatility actually hit a 12-month low of 11%.

Volatility levels for major commodities are now close to 12-month average levels



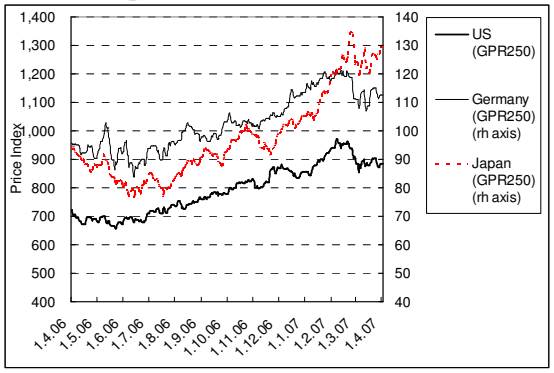
Real Estate (Real Estate Share Prices)

Prices

Prices stabilised in March after a strong run over the last year.

Recent weakness in US residential property data may finally have dented the listed property market.

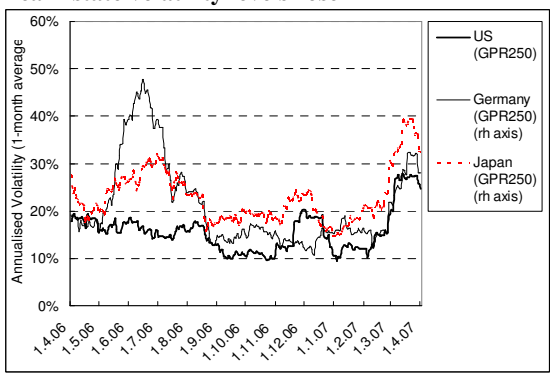
Real Estate prices continued to rise



Volatility

Prices were volatile during March, and after a long period of stability volatility levels rose sharply with Japan hitting a new 12-month high of 40% and the US a 12-month high of 28%.

Real Estate volatility levels rose



Note

Note that for property we just look at indices of the share prices of property companies, and not the underlying property directly, for which little good data is available. This is usually consistent with funds which tend to invest in property indirectly, e.g. via REIT's.

IRML

Notes

Definitions

To avoid repetitions, the term volatility refers to annualised, 30-day average realised volatility in local currency unless otherwise specified. As such it may be lower than, and lag, shorter-term market volatility in times of high market volatility.

Charts show data up until 2nd April 2007 and the commentary was written on or before 3rd April 2007.

Disclaimer

The commentary does not constitute and is not intended to constitute investment advice.

Any views expressed in this report are based on historical market data and as such cannot be interpreted as being forward-looking, or to constitute forecasts. Past movements are not necessarily indicative of future movements.

Employees of IRML may hold positions in securities mentioned.

All expressions of opinion reflect the judgment of IRML at this date and are subject to change. Information has been obtained from sources considered reliable, but we do not guarantee that the report is accurate or complete.

This document is not for US clients or distribution to the US.