

Market Risk Report

December 2006

Executive Summary

- This is your last volatility report of the year. We hope you have enjoyed the issues up to now. From all of us at IRML we wish you a very Merry Xmas and a Happy and Prosperous New Year.
- It's also the first report we've written where we've seen an upswing in volatility, pretty much across all asset classes. Although a bit of a shock, volatility levels still remain low by recent standards. Most assets classes are still less volatile than the average for the year.
- The market's focus continues to be on slowing growth in the US (particularly from the consumer segment), and weak Wal-Mart results caused a big sell-off. However, slower growth implies lower interest rates: consequently bonds have done well.
- Equity volatility rose sharply in the last week of November. However, all regions and all sectors are still below year-average levels of volatility. The higher level of the VIX currently suggests that the market is expecting December to be more volatile than November.
- Bonds rallied at the prospect of rate cuts in the US and volatility remained low. In fact bonds are the only asset class we look at where volatilities didn't rise.
- FX volatility rose only slightly, despite large underlying moves in rates (especially against the dollar). Volatility levels (at 6-8%) are still below year average (8-9%).
- Option volatility would have risen in late November as the volatility of volatility rose sharply. Big downswings in the prices of equities in the Far East and Japan is likely to have caused (equity) calls to go out of the money and puts in the money.
- Commodity volatilities were varied: that of Oil rose despite prices stabilising around \$60; Gold fell despite prices rising.
- Real Estate volatility rose, the US hitting a 12-month high as uncertainty grows
- In summary: volatilities were up, but in general remained at low levels.

Feature Article: The VIX hit a 12-year low. What happened last time?

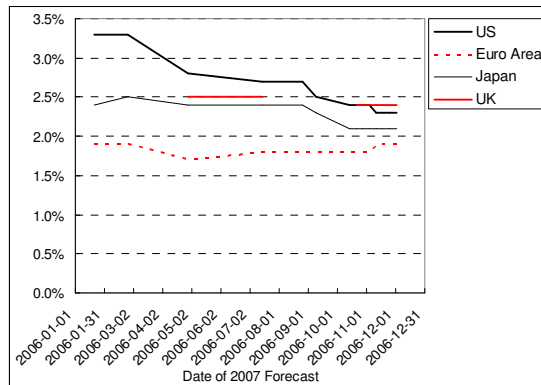
Author: Niall O'Connor

Key News (Major Volatility-Driving Events)

Slowing US, buoyant Europe

GDP forecasts for the Eurozone rose over the last month (from 1.8% to 1.9% for 2007) while those in the US continued to fall (from 2.4% to 2.3% for 2007). The IFO survey in Germany (an excellent leading indicator of industrial production) reached a 15 year high. US housing starts hit a 6-year low.

GDP estimates for 2007 for the US continue to fall while those for the Eurozone rise



Bull Market-Like Conditions ...

Bonds and equities moved upwards together in price during November: continuing to break the trend over the last couple of years of a negative correlation. Although the ride was a lot bumpier in November than December, it was in general still upwards.

... until Wal-Mart

With all eyes apparently still focussed on the US consumer, it was no surprise that Wal-Mart's first

year-on-year domestic sales decline in 10 years spooked the US equity markets, which fell sharply.

The market has been asking the question of whether lower oil prices would offset falling US house prices: Wal-Mart's results suggested they wouldn't.

Oil prices stable

Oil prices continue to hover around \$60, so haven't made the news much in the last month. However, with oil prices flat they are likely to contribute to reduced inflation from now on.

Politics and the Weather

After an eventful summer with conflict in the Middle East dominating headlines, the global political scene since has been much quieter. The slightly greater than expected success of the Democrats in the US buoyed markets, which took the view that a lack of large majorities would paralyse new legal initiatives, strengthening the hand of business.

The hurricane season has also proved very quiet as far as the US is concerned: no hurricanes landed on the US mainland, compared to 4 in each of the previous two years.

(No) Disasters

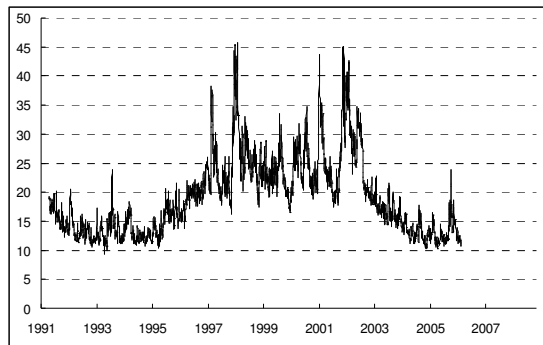
There were no major shocks or disasters during the month.

Feature Article: The VIX hit a 12-year low. What happened last time?

Background

The VIX index (the market's view of short-term volatility of the S&P500 based on options prices) reached its lowest level for 12 years. In fact, the series only dates back to 1992, so it got pretty close to an all-time low.

The VIX is close to an all-time low



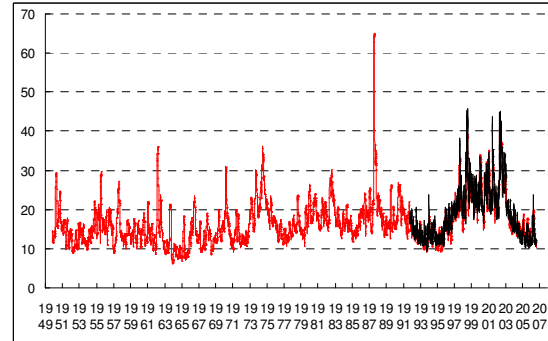
Clearly we should be asking two questions: what happened in around the turn of the century to take (equity) volatility so high, and second, what lessons can we learn from more distant history?

Generating a Longer-Term History

As the VIX only dates back to 1992, it would be useful to re-create data pre-dating this. Fortunately, the VIX is highly correlated to actual short-term historical data.

Although the details of our approximation are not important, they are as follows. The VIX is very well approximated by a 43-day historical average incorporating a 9-day lead. We then use a power law approximation from this moving average to fit the actual VIX data. This is to take into account that the VIX historically has remained at around 10% even when realised volatility has been much lower. This fit produces an r^2 of around 80%. The residual error mainly comes from spikes in the VIX data series during time of extreme market events. This fit is perfectly good enough for us to draw conclusions about market implied volatility forecasts going back to 1950.

VIX plus VIX estimate back to 1950



Observations

The first and most obvious observation is that on a longer-term basis we are not at historical lows of forecast volatility. The 55-year average for our VIX proxy is 16.9%, but essentially it has "traded" in the range of 9-22%. The low of the early 90's is not as low as in the mid-60's.

In fact rather than the last two years looking anomalously low in volatility terms, it appears from the chart that the late 90's to mid-2003 were anomalously high in volatility terms.

Events in the History of Volatility

We would like to explain the main areas of abnormal volatility: spikes in 1962, 1974, 1988 and the high of 1997-2003, and the lows in 1965 and 1992-1996.

Highs:

1962: inflation bottomed 1960-1963 at 1%; 1974: oil price shock, sharp inflationary spike from 4% to 12%; 1988: inflation rising sharply from a low of 2% in 1986; 1997-2003: inflation rising from 1998 low of 1%; the internet bubble

Lows:

1965: inflation rising but still below 2%; markets had risen strongly for 3 years; 1992-1996: inflation was falling rapidly; western economies were gathering steam after a recession

Drivers of Volatility

In general it appears that rising inflation drives the VIX up, and indeed in general the VIX is highest during times of high inflation (although the r^2 of that correlation is very low).



In fact the main pattern is one of uncertainty in outlook of growth. In practice, the VIX is highest at times of impending recession. There is a good correlation between the slope of the US yield curve and the VIX for instance: an inverted yield curve (as now) precedes times of high volatility.

Which of course leads to the obvious question: if the yield curve is inverted, and if the outlook is very uncertain, why is volatility so low?

One possible answer is that the yield curve is only inverted for technical, rather than cyclical reasons. In the UK for instance, pension funds have been buying long-dated bonds to better match assets to liabilities (after equity markets fell) and yields on long dated bonds have fallen. This effect is probably less marked in the US. And of course the European and Japanese yield curves look very different, with normal slopes. So

it is possible to argue that yield curves are not behaving as they normally would, and hence current volatility low levels are consistent with past correlations.

However, to believe this hypothesis, you also have to believe that the uncertainty of future GDP growth is low. This, in our view, is harder to believe, as US GDP estimates continue to be revised downwards.

In the end, you can form your own view. If you believe that the inverted US yield curve is a reflection of a possible significant slowdown in US growth, then volatilities are likely to rise: perhaps substantially. The last times the yield curve was inverted, in 1984, 1993 and 2003 the VIX subsequently spiked up to between 25% and 40%.

Equities

Overview

November saw widely divergent trends: rising markets in North America and Europe, yet strong losses in Japan and the Far East. (Although the Far East did have a 3% rally in the last 2 days of November).

Strong M&A activity continued to prop up equity markets in general.

Mid-summer fears of a hard landing in US GDP growth remain just a memory, but the reality of the situation of genuinely slowing US growth hit the equity markets at the end of the month. The downbeat situation on Main Street visited Wall Street.

Japanese economic indicators continued to look weak hitting the Japanese market.

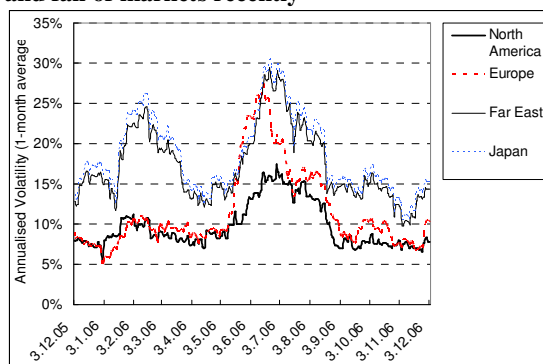
Volatility: Regions

Despite the apparently rapid rise and fall of US and European markets in November, volatility remained low (daily moves were relatively small: the market trended rather than jumped). The declines in Japan and the Far East were less orderly, and volatility rose from year-low levels to 14 and 15% respectively.

Despite our warnings last month of equity volatility potentially falling below FX volatility, normal service has been resumed!

However, despite the rises, volatility still remains below year-average levels for all regions.

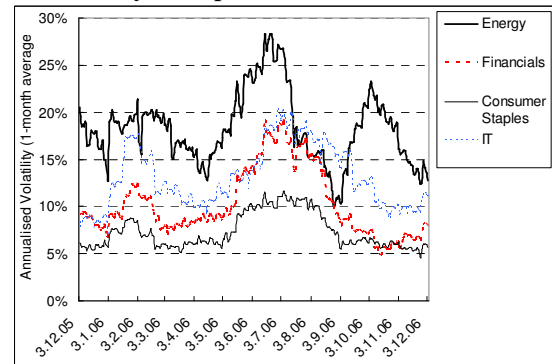
Japan and the Far East volatility rose sharply as markets there fell. US and Europe volatility remained surprisingly low given the rapid rise and fall of markets recently



Volatility: Sectors

Sector-wise, Energy volatility plummeted as the oil price stabilised around \$60. Other sectors saw lower and/or relatively stable volatilities of between 6% and 11%.

Energy sector equity volatility dropped dramatically as oil prices stabilised

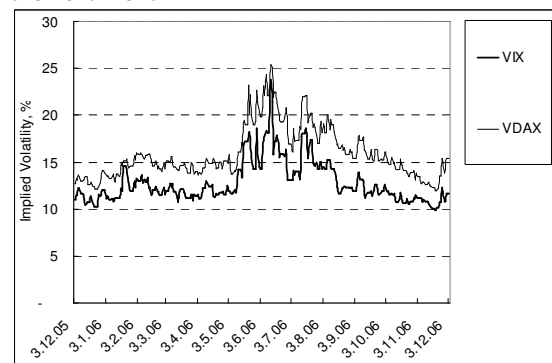


Implied Volatility (Market-Implied Near Term Outlook)

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.

The straight-line fall during October ended abruptly in late November, with the VIX spiking up from a low of under 10% to 12.3% (and the VDAX to 15.4%), both suggesting markets are expected to be even more lively in December than of late.

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

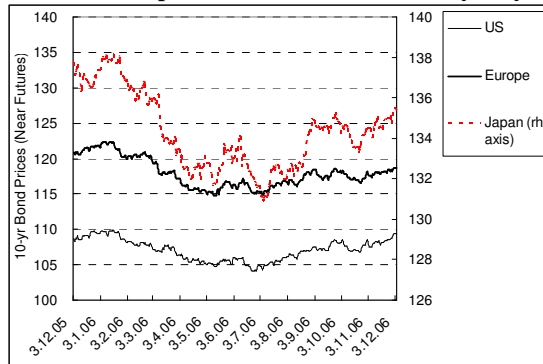


Fixed Income (10 Year Government Bonds)

Prices

In October the markets finally seemed to take the view that economic growth wasn't going to slow dramatically in the short term. The Fed kept rates on hold, and the bond markets rallied slightly during October picking up further from their July lows. In November weaker economic data in the US suggested that the bulls on growth weren't going to have their day either: indicators continue to look weak and corporate results weren't great either. Bond prices rose and yields fell in all major regions.

10-Year bond prices have rallied since early July



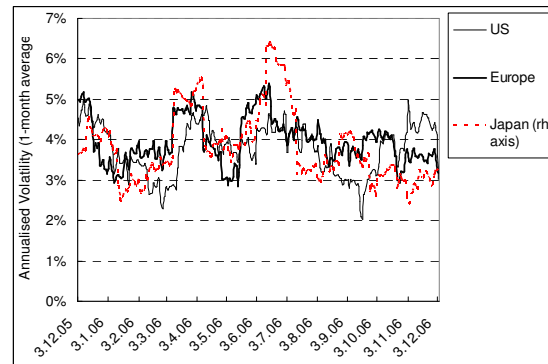
Interest Rate Expectations

US markets seem to indicate a rate cut is actually a possibility (although it was being talked down in the US in order to avoid further downward pressure on the \$), whilst in the UK rate rises are still anticipated up to 5.25%, and in Europe the yield curve looks more "normal" (upward sloping) with rates expected to rise to 3.75% within a year.

Volatility

Volatilities in general were flat over the month. However, US volatility rose as conflicting data reports arrived. 10-year bonds in all major regions saw volatilities at 3.2-4.2%.

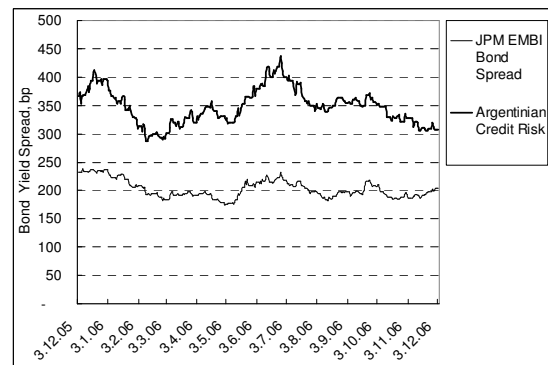
10-Year bond price volatility remains subdued, except in the US where it rose at the start of the month



Spreads

After a long and continuous decline over the last 5 years, spreads of Emerging Market bonds over Developed (JPMorgan EMBI index) have remained relatively flat over the year, and have even fallen in the last month. Argentinean spreads for instance are only 325bp.

This suggests that the market is not pricing in significantly more volatility in 10-year bonds if they are Emerging Markets rather than Developed.



FX

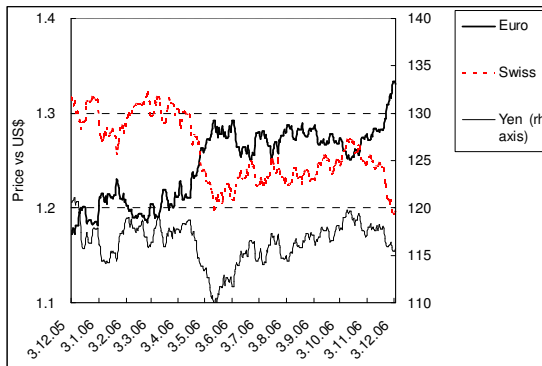
Prices

Interest rate differentials finally seemed to get their way as hawkishness in the UK and Europe versus a slowing growth outlook in the US (and even views of a rate cut there) pushed the Euro up sharply through 1.3 against the dollar.

A stronger Euro and weak Japanese economic data led the Yen to reach new 8-year lows against the Euro of ¥154.

Weaker US data pushed the dollar down to close to a 14-year low against the Pound (\$1.985). There's almost never been a better time to do the Christmas shopping in New York!

The range-bound behaviour of currencies relative to the dollar broke in November



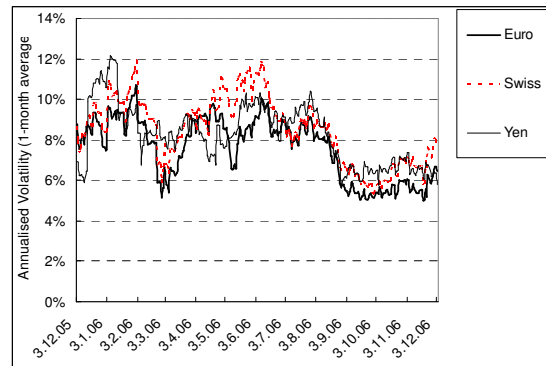
Volatility

As a direct result of their range-bound behaviour, FX volatility remained very low during October. However, despite breaking out of these ranges in November, trends have been gradual rather than sudden, and volatility has actually remained relatively low.

The major currencies are now at around 6-8% volatility, compared to one-year averages of 8-9%.

As equity volatility rose sharply, North American equities (in Dollars) are now once again much more volatile than Euros (in Dollars).

Currency volatility has remained low despite large directional moves



Equity Options

Note on Treatment

Options are complicated beasts, so we have to 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.

Implied volatility (via the option Vega) drives all 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 position volatility). As a proxy for this, we look at the 30-day price swing of various market indices. Note that Calls and Puts will respond in opposite fashions: calls becoming more volatile as prices rise.

Note on Convertibles

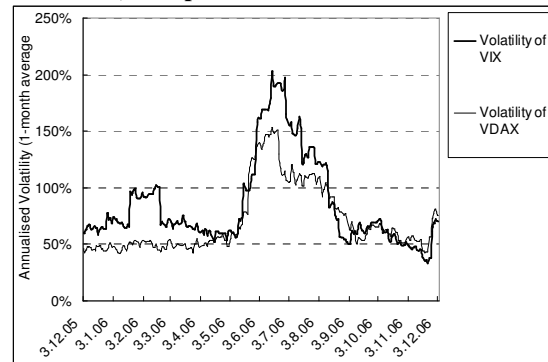
Convertibles are in effect a combination of a bond and a call option, with the bond portion usually making little contribution to the instrument volatility. As such, convertible portfolios volatilities will behave similarly to call option portfolios, and the above commentary applies to convertibles as well as options.

Volatility of Implied Volatility

Perhaps unsurprisingly, the chart of this looks similar to the VIX and VDAX themselves, showing a peak in late June and a large drop of volatility since then. October and most of November were stable. However, a spike in late November took levels well above 12-month lows, suggesting option volatility has risen now.

However, like most other assets classes, levels are still below year-average.

Option and convertible price volatility has fallen since June, but spiked in late November

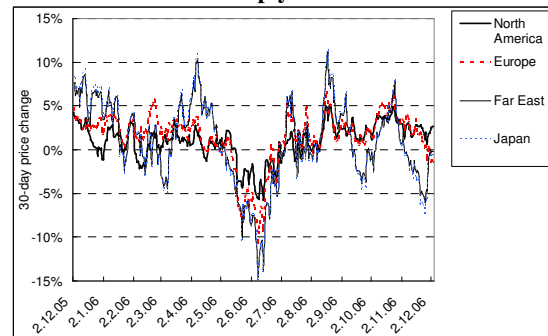


Major Price Swings

(Equity) prices started rising again in October, bringing most calls into the money and puts out of the money.

By contrast, in November prices fell significantly in the Far East and Japan. This can cause large swings in option deltas and hence higher option volatility. North America and Europe saw smaller changes, so option deltas with underlyings in these regions should have been more stable.

Significant downward price swings during June gave way to relatively flat markets since. However Asian markets fell sharply in November

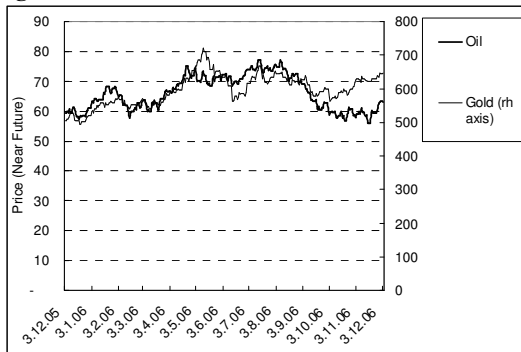


Commodities

Prices

After the sharp drop in commodity prices in September, October and November were more stable, with continuing benign weather conditions (i.e. no major land-falling hurricanes in the US). Speculative positions on commodities may also have largely unwound now.

Oil prices have stabilised; Gold prices are rising again

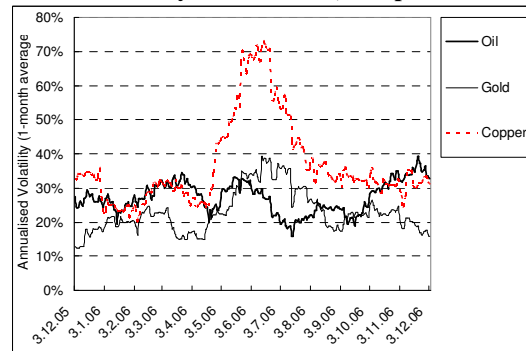


Volatility

The very high volatility levels at the peak of the market in June have now subsided, and volatility levels are back close to year-averages, or in the case of Gold year-lows.

Oil is the exception, where volatility has risen over the last month: volatility is now at 34% against a year-average of 27%.

Volatility levels for major commodities are now back to close to year-low levels, except for Oil





Real Estate (Real Estate Share Prices)

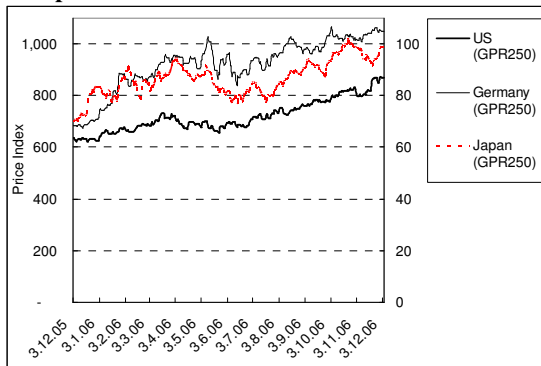
Note

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.

Prices

Prices have continued to rise in November in the US and Germany, but fell in Japan in line with the stockmarket there. Recent weakness in US residential property data still doesn't look as if it has filtered through to the listed property market.

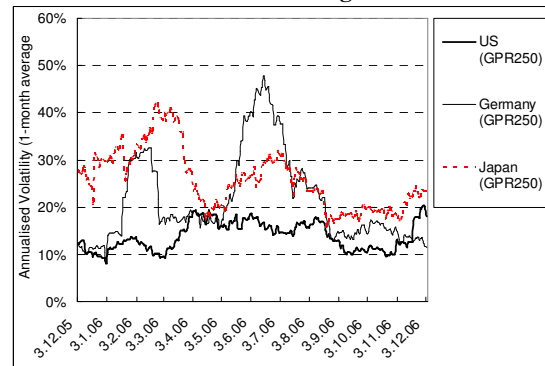
Real Estate prices in general continued to rise during November, but with flatter property prices in Japan



Volatility

Real Estate price volatility rose slightly towards the end of November, and in the US actually reached a year-high, albeit one which at 20% is still lower than those in Japan and Germany. This is probably a belated reflection of the weakening residential market there.

Real Estate volatility levels climbed from 12-month lows. The US hit a 12-month high





Notes

Definitions

To avoid repetitions, the term volatility refers to annualised, 30-day average realised volatility in local currency unless otherwise specified.

Charts show data up until 1st December 2006 and the commentary was written on 4th December 2006.

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.

© Independent Risk Monitoring Ltd - December 2006

This document is the property of Independent Risk Monitoring and should not be copied or distributed to any third party without the prior consent of Independent Risk Monitoring Limited – please contact us re distribution rights.