

**Inquire UK
and
Inquire Europe
Joint Seminar**

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15 to 17 March 2009

The Sheraton Grand Hotel, Edinburgh

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INTRODUCTION

The joint Inquire UK/Inquire Europe seminar was held at The Sheraton Grand Hotel, Edinburgh from 15 to 17 March 2009. The main focus of the seminar was analysis of the recent financial crisis. Papers on risk management, currency management, hedge funds, pension funds, and small firms, were also featured. Most of the papers presented at the seminar reflected output from Inquire UK and Inquire Europe funded research projects.

Opening the seminar, Dr George Cooper of BlueCrest Capital's after dinner talk discussed the origin of financial crises. He explained the natural tendencies of financial systems to crises and how central bank policy can create crises.

Dr Emanuel Acar of Directional Trading opened the first full day of seminar with his presentation on currency management indices. He explained that failure to account for the number of managers included in the indices and for the correlation of their returns creates serious biases. He proposed a method for correcting the index construction. The method has application beyond currency indices, for example to hedge fund indices in general.

Professor Andrew Lo of MIT then proceeded to give his perspective on the financial crisis. He argued that crises were an inevitable feature of free enterprise and the capitalist system. As a result, rather than try to prevent crises, we should focus on preparing for crises so as to limit the damage caused.

The financial crisis remained in focus as Edward Chancellor of GMO presented his views on the likely path of deleveraging following recent economic and market events. His analysis suggests the major developed economies could take 5 to 7 years to deleverage and are likely to revert to pre-bubble levels of debt.

After lunch, Daniel Hung of Durham University presented his paper on 'sailing with hedge funds in the storm'. He uses higher moments of market returns to replicate hedge fund strategies. The analysis shows that most of the gains from hedge funds both before and after the recent financial crisis could have been obtained by using mechanistic approaches based on publicly available data.

Charlie Cai of University of Leeds then presented the teach-in session on risk aggregation.

Professor Ian Tonks of the University of Exeter ended the first day by presenting his paper on decentralised investment management. Using a large sample of UK segregated pension funds he has been able to show that specialist managers perform better than balanced managers, and that funds with multiple managers tend to have lower risk levels.

Opening day two of the seminar, Professor Bruno Solnik explained how regret theory can be applied to foreign exchange hedging decisions and how the application may help explain the diversity of hedging policies observed in practice.

Professor Andrew Lo of MIT then returned to present his analysis of "what happened to the quants in August 2007". Most equity market neutral funds suffered major losses that month and Professor Lo's analysis suggests unwinding of a large fund may be to blame. There also appears to have been a temporary withdrawal of market making capacity from the market.

Kewei Hou of Ohio State University presented his analysis of the size effect. The size effect, whereby small stocks earn higher returns than large stocks, appears to have faded since the 1980s. Dr Hou showed how the disappearance can be explained by negative profitability shocks experienced by smaller stocks, and positive shocks experienced by larger stocks.

Concluding the seminar, Tobias Adrian of the New York Federal Reserve presented his CoVaR measure which can consider the exposure of a firm to systematic risk and the contribution it makes to systematic risk. The measure can be used to create more countercyclical macro prudential regulation.

THE ORIGIN OF FINANCIAL CRISES

GEORGE COOPER, BLUECREST CAPITAL

In his after dinner talk, George Cooper of BlueCrest Capital discussed the origin of financial crises. Dr Cooper explained that there were two schools of thought in explaining financial crises. The Friedman school holds that markets are inherently efficient, but that we have spoiled this efficiency with government and central bank interference. It is this interference that leads to crises. The alternative Keynes school holds that markets are inherently inefficient and unstable. Under this view, crises are a natural feature of the financial system and we require macroeconomic management through fiscal and monetary policy. A third view, which Dr Cooper referred to as the “mad house” suggests markets are unstable, but that central banks should only stabilise them when the economy is contracting.

Dr Cooper proceeded to explain some fundamental differences between markets for goods and markets for assets. Veblen goods are goods that are purchased for their high prices and where higher prices create higher demand, i.e. conspicuous consumption. Assets are typically purchased for their price changes and hence scarcity generates demand and supply weakens demand. Asset markets behave like Veblen goods. The efficient markets hypothesis was developed from Adam Smith’s analysis of markets for goods and services. The alternative financial instability hypothesis was developed from Hyman Minsky’s analysis of the markets for capital.

How do investors decide when to buy and sell assets? Dr Cooper explained that efficient markets require value driven investors. Investors build models to tell them fair value and trade accordingly. These models include balance sheet, income statement and macroeconomic variables. Where asset prices are used and stocks are repriced based on trades at the margin, this can cause amplification of wealth effects, something which is evident in recent de-leveraging.

Dr Cooper then discussed engineering examples related to control system theory. Systems can have damped responses, where disturbances erode through time, or self-amplified responses, where disturbances increase through time. The former resembles the ideas of the efficient markets hypothesis, while the latter resembles the financial instability hypothesis.

If a governing device is introduced to a system, it can over govern, responding too quickly and too harshly, thus producing ever wilder swings in activity. Correct governance produces a series of ever-smaller swings in activity. The financial parallel is that with each successful pre-emption of crisis, e.g. by central bank policy, confidence and willingness to borrow increase. As the debt stock grows, the fiscal and monetary response needed to stabilise the system becomes larger and policy swings grow wilder over time. Ultimately, this can lead to unsustainable debt and debt deflation.

Dr Cooper concluded by outlining the implications for optimal central bank policy. Monetary and fiscal policy is necessary, but should be reactive, not proactive. Small recessions are a price to pay for avoiding larger depressions. Monetary policy should be symmetric, willing to fight excessive credit creation with the same vigour as credit destruction. Monetary policy should occasionally shock market participants to create these results.

CURRENCY MANAGEMENT INDEXES: WHAT DO THEY TELL US?

EMMANUEL ACAR, DIRECTIONAL TRADING

Emmanuel Acar of Directional Trading presented his paper which is joint work with Momtchil Pojarliev of Hermes Fund Managers. Dr Acar explained that his paper looks at issues related to currency management indices, but the work deals with broader issues that have application to hedge fund indices. The motivation for the analysis is that currency manager indexes have shown declining volatility, but the decline cannot be explained by declines in market volatility. Dr Acar's research shows that correcting for the number of managers in the index and for correlation in their returns produces a less biased index.

Important considerations exist in measuring hedge fund performance. One question is what benchmark should be used. Funds are usually compared to their peers. Hedge fund indices can be used, but face problems due to non-completeness, and selection and survival biases. There are also issues in weighting schemes, with equal, median, and asset weight measures all possible. The composition of managers will not be the same across indices and the number of managers included in an index varies through time. Dr Acar argued that, as a result, some form of risk standardisation was required to compare across indices.

Dr Acar outlined that his analysis used data on currency management strategies included in the Barclay Hedge, CISDM and Altvest databases. While these indices track each other broadly, there are some significant differences in the volatility of the indices and the variation through time. The variability of the indices through time also appears greater than the volatility of the underlying currency market.

Dr Acar has analysed the performance of 73 managed account programs ("managers") from SEB. The sample comprises managers with track records of at least four years as at March 2008, and covers data from January 1990 to March 2008. As for the currency indices, the number of managers included in the early years is quite low and the number builds up only in more recent years. The managers in the data vary significantly in their risk levels.

Dr Acar proceeded to explain how he had created his own index from the underlying manager data to analyse index composition issues. Simulation using independent, normally-distributed returns shows that the empirical results are quite different from the simulation results, with the empirical volatilities and skewness typically higher. However, the simulation assumed zero correlation between managers and this might not be a valid assumption. To analyse this, we can use the concept of equicorrelation – assuming all pairs of managers have the same correlation. This also needs to be adjusted for the number of managers, because as the number of managers rises, equicorrelation typically falls.

The results show that adjusting the calculated indices for volatility and for correlation between managers produces an index that more accurately tracks market volatility.

Dr Acar concluded by noting that many indices are ill-conceived because they ignore changing numbers of managers, differing volatility profiles, and dependency between managers. Investors can be misinformed about what was achieved by currency managers and the implications for future performance. A better alternative is to use a weighting scheme that takes account of the number of managers in the index and the correlation of their returns.

PERSPECTIVES ON THE CURRENT FINANCIAL CRISIS

ANDREW LO, MIT LABORATORY FOR FINANCIAL ENGINEERING

Professor Lo of MIT presented his perspective on the recent financial crisis. In opening, he noted that in his opinion crises are an unavoidable consequence of free enterprise and market behaviour. The current crisis is large because the build up has been so long. The most appropriate course for regulatory reform is to try to reduce the damaging effects of financial crises rather than try to prevent the crises from occurring.

Professor Lo outlined that there are many participants in the recent crisis, including homebuyers, commercial and investment banks, investors, rating agencies, regulators and legislators. In summary, the crisis resulted from a low yield environment and the “ownership society” fuelling a housing boom in the late 1990s. Many mortgages were issued as a result of securitisation and the roles of Fannie Mae and Freddie Mac. Many investors began holding mortgage backed securities and some of these securities were leveraged. Interest rates began rising from 2004 and by 2006 house prices were falling and defaults were rising. The losses were magnified by securitisation, leverage and illiquidity. Investors and dealers lost money, which resulted in reduced confidence in the financial system, with further losses, downgrades and fire sales. This led to a “death spiral” of reductions in credit and flights to quality. Regulators then intervened to forestall more serious consequences.

Professor Lo explained that he would focus on the role of securitisation in the financial crisis, and offer a behavioural interpretation of the crisis and suggestions for regulatory reform.

Securitisation repackages risks to create more homogeneity within categories. This should bring a more efficient allocation of risk, create more risk bearing capacity and provide greater transparency, supporting economic growth. However, successful securitisation requires diversification, accurate risk measurement, normal market conditions, and reasonably sophisticated investors. Professor Lo presented an example illustrating the importance of correlation in securitisation. Assuming independent defaults across securities, CDOs can be constructed with low risk senior tranches and higher risk junior tranches. In some market environments, these tranches have behaved counter intuitively, with low risk tranches falling, while high risk tranches rise. The explanation is that expectations for the correlation of the underlying securities changed, with correlation assumptions revised up. Higher correlation raises the value of high risk tranches and lowers the value of low risk tranches.

Turning to the question of whether the crisis could have been avoided, Professor Lo noted that predictions of real-estate based problems and excessive leverage had been made in 2005. However, it is difficult to find a mechanism to act on this knowledge. Business managers are unlikely to withdraw from profitable areas in advance of the crisis and prolonged success dulls the pain necessary to guard against dangers. Furthermore, many investors expected to be able to exit markets during a gradual decline or had a false sense of security from ratings. Professor Lo argued that human nature made the crisis unavoidable.

It is notable that such crises have happened before. Reinhart and Rogoff (2008) document 18 crises since 1974, including five big bank related crises (Spain 1977; Norway 1987; Finland 1991; Sweden 1991; Japan 1992). These have common themes of rising housing and stock markets, capital inflows, large amounts of public debt, and financial liberalisation.

Professor Lo noted that if crises cannot be avoided, then we should prepare for them, as we might do for a hurricane. Better preparation implies less dislocation. The important issue is to ensure that investors are bearing the appropriate risks, i.e. losses are suffered by those able to bear them. Measures that could have been taken include breaking up financial institutions judged too big to fail. There could also have been improved disclosure and better mark-to-market accounting and risk accounting.

Professor Lo noted that the crisis was consistent with his view of adaptive markets. In this framework, individuals act in their own self-interest, but they also make mistakes and learn and adapt. Competitive forces drive adaptation and innovation, and natural forces shape market ecology. Evolution determines market dynamics.

In concluding, Professor Lo noted that looking ahead fear of the unknown will magnify sub-prime worries. The flight to liquidity is likely to persist and this will create more bank runs. There will be more dislocations to come and the regulatory landscape will change. Adaptation and innovation will be the keys to survival.

Questions and discussion focussed on whether the features of human behaviour discussed in the presentation implied a need for more rules-based regulation. Professor Lo argued that it was better to try to mitigate the consequence of crises than try to prevent them with rules. Some delegates suggested a need to bring back the Glass-Steagall Act which separated retail and investment banking and which was repealed in 1999. Professor Lo also noted that reactions to the financial crisis might follow the cycle of grief, covering denial, anger etc. This perspective might help us anticipate when recovery will come.

THE CREDIT CRISIS: THOUGHTS ON DELEVERAGING

EDWARD CHANCELLOR, GMO

Edward Chancellor of GMO presented his analysis of the likely path of deleveraging following the credit crisis. He began by presenting data showing that in most cases credit bubbles retrace their 5- or 10-year build-ups, with credit to GDP ratios returning to prior levels. Deleveraging tends to be triggered by financial crises and by the collapse of asset bubbles. Some deleveraging episodes have been relatively short – of the order of five years – while others have been long – ten years or more.

Mr Chancellor explained that long deleveraging episodes tended to have been preceded by massive credit booms, high initial leverage, and huge housing booms, with severe housing overvaluation. They tend to have had relatively stable exchange rates and low inflation. Shorter periods of deleveraging are characterised by mild prior credit booms and low initial leverage. Prior housing booms have been moderate, with only mild housing overvaluation. There tends to have been significant currency depreciation and high inflation.

Mr Chancellor showed data revealing that the extent of deleveraging has been closely related to the prior level of credit growth. The larger the credit boom, the longer it takes to unwind. Deleveraging also lasts longer when the debt-to-GDP ratio has been high. The length of deleveraging is also related to the size of the prior housing bubble. In the cases of emerging markets, currency collapse has tended to speed up the deleveraging process, as has inflation.

On the basis of the extent of the prior credit boom and initial leverage, and the extent of housing overvaluation, we could expect UK and US deleveraging to last until approximately 2015. In Spain and Ireland where the prior boom was larger, a somewhat longer period of deleveraging could be expected, say to 2017.

Mr Chancellor proceeded to discuss his macroeconomic findings. He noted that shorter cycles tend to have V-shaped economic recoveries, while longer episodes can be marked by W-shaped recoveries. Longer deleveraging periods also tend to be associated with prolonged economic weakness. Economic volatility tends to increase during long deleveraging episodes. Deleveraging tends to lower inflation, but can create deflation or hyperinflation. The current policy of quantitative easing may cause currency weakness, boosting inflation.

Deleveraging can be driven by the household or corporate sectors. Mr Chancellor explained that household net worth will fall as asset bubbles deflate, producing a rise in household leverage. Prior to the start of the recent crisis, US savings relative to GDP were two standard deviation below average. Deleveraging tends to be correlated with a rise in household savings. Corporate deleveraging tends to result in a large decline in fixed investment. Household consumption also tends to fall, while government spending rises.

Mr Chancellor noted that trade surpluses normally assist recovery, but in the current case with a weak global economy, the export route may not exist. In deleveraging periods, public debt tends to rise to offset the fall in private debt. Mr Chancellor explained that his investment summary was that in deleveraging periods currencies weaken, while bond yields decline and there can be prolonged stock market volatility. Equity valuations decline, while the housing market doesn't recover until deleveraging is over. Equities tend to trough after about three years and at an average 68% decline in PE ratios from the peak.

SAIL WITH HEDGE FUNDS IN THE STORM? AN ALTERNATIVE APPROACH

CHI-HSIOU (DANIEL) HUNG, DURHAM UNIVERSITY BUSINESS SCHOOL

Chi-Hsiou (Daniel) Hung of Durham University presented his paper which is joint work with Devraj Basu (EDHEC Business School) and Alexander Stremme (Warwick University Business School). The paper is the result of an Inquire UK funded research project.

Introducing the paper, Dr Hung noted that from 1995 to 2005 hedge fund assets rose from \$170bn to \$1tn. Hedge funds run dynamic strategies that have option like features. Their high returns apparently have low systematic risk and hence they can be regarded as alpha generators. The alpha generation means high fees might be justified. However, CAPM might not be a suitable benchmark due to the dynamic and non-linear nature of returns. Dr Hung argued that a benchmark suitable for hedge funds should incorporate both features.

Dr Hung explained that in previous work option payoffs have been used to capture the non-linearity. However, one could also use higher moments of market return. Dr Hung explained that this is important because of evidence that hedge funds deliver returns in the form of alternative beta, possibly using dynamic exposures to systematic factors. This approach is also used as the basis for hedge fund replication strategies. These strategies seek to capture hedge fund returns using low-cost liquid traded factors. However, the performance of hedge funds in 2008 gives a note of caution about the desirability of replicating hedge fund returns.

Dr Hung explained that the idea in his research is to try to capture the essence of what hedge funds do using non-linear exposures to the market and dynamic factor exposures. They first analyse whether higher moments of the market return can capture these non-linearities. They then examine evidence of time variation in the factor exposures. These are combined to create an optimal benchmark using traded versions of the factors.

The research is the first work to try to capture systematically the non-linearities as well as time variation in hedge fund returns. The construction of the benchmark is a more absolute return approach to replication, in contrast to typical factor based approaches. It is a relatively low cost portfolio based on liquid traded assets. Benchmarking hedge funds against this new benchmark gives an idea of the extent to which returns are driven by alternative beta.

Dr Hung explained that their created benchmark is optimal in the sense that it optimally uses the conditioning information, incorporates second and third moments of market return, and time varying factor risk premiums, and thus attempts to capture both the nonlinear and dynamic nature of hedge fund returns.

The analysis uses 12 hedge fund styles indices (equity market neutral; merger arbitrage, etc). They construct dynamic benchmarks using a market factor, skewness and kurtosis factor mimicking portfolios as well as the VIX volatility index. The predictive variables are the return on the 3-month T-bill, the term-spread, the credit-spread and the VIX. These factors are liquid traded factors with relatively low transaction costs. The predictive variables represent readily available public information.

Dr Hung noted that the 12 styles need only six benchmark portfolios. In outlining the results, Dr Hung explained that for eight of the 12 categories, the benchmark portfolios achieve Sharpe ratios of 0.65 while for the other four they are lower at around 0.38. The benchmark portfolios typically match the median return of the fund sample and in most cases beat the

Sharpe ratio of at least 35% of the funds. The equally weighted portfolios have high alphas with respect to the benchmarks. The benchmarks capture generic aspects of each hedge fund strategy, namely the non-linear dynamic exposures, and are able to replicate these at relatively low cost.

Dr Hung proceeded to show an analysis of the results for the credit crunch period. This shows that some hedge fund categories such as commodity trading advisers, global macro, short selling index, and equity long-short did well over the crunch period. However, over the period each dynamic benchmark achieves a higher Sharpe ratio than the style index. This calls into question the skill levels of fund managers across an entire style.

TEACH-IN SESSION: AN EMPIRICAL COMPARISON OF AGGREGATED RISK MEASURES

CHARLIE CAI, LEEDS UNIVERSITY BUSINESS SCHOOL

Dr Cai of Leeds University Business School presented his teach in session on risk aggregation. Introducing the session, he explained that the risk management process consisted of identification, assessment, monitoring, and control (or mitigation) stages. Various sources of risk exist, such as regulatory risk and reputational risk, as well as market and financial risks. The Basel II regulations attempt to foster a culture of risk management. The three pillars of Basel II are minimum capital requirements, supervisory review, and market transparency based on information disclosure requirements. Traditional tripartite risk analysis considers market risk, credit risk, and operational risk.

Dr Cai explained that a simulation approach to risk management involved elements of estimation, simulation, aggregation, and testing. Risk factors are identified and historical data gathered. The risk factors are then simulated and aggregated into VaR type measures. Testing then involves looking at the effects of business mix and the effect of correlation between different types of risk. Dr Cai explained that there were four risk aggregation methods. These are Hybrid-VaR, Add-VaR, Normal VaR and Copula VaR.

Dr Cai noted that risk aggregation can be used in risk assessment, stress testing, strategic planning, and monitoring and regulation.

Finally, Dr Cai noted that he had made a simulation SAS program available for Inquire members and it could be downloaded from www.charlieXcai.info/research/risk.

PENSION FUND RISK-TAKING AND PERFORMANCE UNDER DECENTRALISED INVESTMENT MANAGEMENT

IAN TONKS, XFI, UNIVERSITY OF EXETER

Ian Tonks of Xfi, University of Exeter presented his paper which is joint with David Blake (Cass Business School), Allan Timmermann (University of California at San Diego) and Russ Wermers (University of Maryland). The paper is the result of an Inquire UK funded research project.

Professor Tonks explained that the research project investigated two major shifts in decentralised and delegated portfolio management of UK segregated pension funds. These are the switch from balanced to specialist mandates, and the use of multiple managers. The research considers the performance of balanced vs. specialist managers and the risk characteristics of funds with multiple managers. In the asset management sector, there are high powered incentives operating, with money allocated to better performing managers and away from managers with poor performance.

Under decentralised investment management, each fund employs multiple asset managers to implement and execute investment strategies in separate asset classes. There are various types of mandate in the marketplace. Balanced mandates involve one fund manager investing across the full range of assets, and being responsible for market timing and stock selection. In specialist mandates, the manager is assigned to a single asset class and the plan sponsor decides on the strategic asset allocation. In multi-asset mandates, one manager is responsible for between two and six asset classes. In the data used in the study, there is a pronounced move from balanced to specialist management and from single to multiple managers.

Professor Tonks explained that the data had been provided by BNY Mellon (formerly CAPS) and comprised quarterly returns on 2385 UK pension funds from March 1984 to March 2004. The fund mandates are held by 364 fund management houses, both in-house and external. The total assets amount to approximately £350bn in 2004.

Professor Tonks argued that previous work on performance had not distinguished the type of mandate. The hypotheses in the current analysis predict that specialist fund managers will display stock selection abilities, while balanced fund managers will exhibit market timing abilities. Furthermore, given that specialist fees exceed balanced fees, the gross (i.e. pre-fee) performance of specialist managers will exceed that of balanced managers. We would also expect to find that the greater the number of managers employed by a fund, the higher the abnormal performance of each manager and the lower the volatility of each manager's returns. Finally, there should be a negative relationship between peer-adjusted performance and the probability of a manager being replaced.

In discussing the results, Professor Tonks showed that for UK equities, specialist mandates have significant positive four-factor alphas and also appear to have market timing (beta shifting) abilities. The results for multi-asset mandates are weaker but still positive, while the results for balanced managers are not statistically significant.

While specialist managers appear to do better, there is no evidence that the number of managers employed by a fund has an effect on the results of those managers (i.e. there is no competition effect). There is, however, clear evidence that the risk level of a fund falls as more managers are employed. Risk is also lower for larger funds.

Turning to hiring and firing decisions, Professor Tonks showed that the firing of managers is typically preceded by four quarters of poor excess returns.

In conclusion, Professor Tonks noted that his research has examined the properties of decentralised investment management. Analysis done by mandate type identifies significant performance benefits from specialist mandates. There is no evidence of market timing skills for balanced mandates. Pension funds using multiple managers allocate lower risk budgets to each, and the allocation of funds is sensitive to past performance.

APPLYING REGRET THEORY TO INVESTMENT CHOICES: CURRENCY HEDGING DECISIONS

BRUNO SOLNIK, HEC -PARIS AND HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Bruno Solnik of HEC -Paris and Hong Kong University of Science and Technology presented his paper which is joint with Sébastien Michenaud (HEC - Paris and University of Lugano). The paper is the result of an Inquire Europe funded research project.

Introducing the paper, Professor Solnik explained that the objectives of the paper were to consider investor behaviour and attitudes to risk in the context of foreign exchange hedging. He noted that currency risk can be significant for international portfolios. There are many variables such as purchasing power parity and interest rate differentials that influence exchange rates, but short-term variations in rates are hard to predict.

While currency changes are volatile, currency risk can be hedged quite cheaply. Currency risk is significant in global bond portfolios, but less significant in well-diversified global equity portfolios. Currency hedging does not materially change the correlation of domestic and foreign stocks, but it does increase the correlation of domestic and foreign bonds.

Professor Solnik noted that the currency decision is basically a simple one of deciding what proportion of the foreign asset value should be hedged against currency risk. International assets could be fully hedged, partially hedge, or not hedged. Traditional finance relies on expected utility maximisation using expected return and risk. Black has developed this into an equilibrium model where there is a universal optimal hedging ratio of approximately 70%.

In practice, investors have home-biased portfolios and tend to follow a two-step process. First, the international asset weightings are decided, and then some amount of the international exposure is hedged. If currency risk premiums are zero and asset returns are uncorrelated with currency movements, the optimal hedge ratio is 100%. The optimal ratio will differ from 100% if there is a correlation between asset returns and currency movements, or if the currency risk premium is different from zero. Inspection of data shows the actual hedging approaches taken by international investors are very diverse.

Professor Solnik explained that regret is the emotion of pain and anger when, with hindsight, we observe that we took a bad decision in the past. The anticipation of future regret can lead to investors taking particular courses of action with their investments. Regret is relevant in considering currency hedging policy. Professor Solnik proceeded to show the regret function, where utility is a function of a traditional utility function and a regret function, which compares achieved performance to some alternative benchmark that could have been chosen.

Professor Solnik argued that regret theory could explain some of the observed diversity in currency hedging practice. Regret would exist where the foreign currency appreciates and the portfolio had been hedged, or where the foreign currency depreciates and the portfolio was unhedged. In the case where regret aversion dominates everything, the optimal hedge ratio is 50%. This is a common approach in practice. Optimal hedging can be shown to be equal to 100% + a regret term + a speculative term + a covariance term. This model can be used in practice to derive an optimal hedging strategy.

WHAT HAPPENED TO THE QUANTS IN AUGUST 2007? EVIDENCE FROM FACTORS AND TRANSACTIONS DATA

ANDREW LO, MIT LABORATORY FOR FINANCIAL ENGINEERING

Andrew Lo of the MIT Laboratory for Financial Engineering presented his paper, which is joint with Amir Khandani (MIT Laboratory for Financial Engineering). Professor Lo explained that the presentation was his analysis of the “quant quake” that took place in August 2007. It was an attempt to conjecture what had happened based on the limited facts available.

Professor Lo explained the motivation was that most quantitative funds performed poorly in August 2007. Specifically, funds suffered losses from 7-9 August and then there was a large reversal on 10 August. Some of the most consistently profitable funds were affected and the moves seemed to affect only quant funds, especially equity market neutral funds. There was no real market news to explain the price movements. The event raises questions about whether quant approaches are “dead” and about whether the events can be repeated and what can be done about it. The main problem for analysis is lack of publicly available data.

The key tool in the analysis, Professor Lo explained, is a simulation of a basic mean-reversion strategy with a one day horizon. The strategy has typically been profitable (before transaction costs) but the profitability has declined through time in recent years. The decline in profitability has been against the background of significant increases in the volume of assets employing market neutral and long-short equity strategies. As returns have fallen, participants may have been increasing leverage in order to maintain returns to their investors.

Using a return multiplier of four (or 8:1 leverage) for 2007 the naïve contrarian strategy would have been expected to show a daily mean return of 0.6%, with a standard deviation of 2.1%. On the 8 August 2007, the return from the strategy was a negative two standard deviation event. The following two days experienced consecutive negative five standard deviation events, followed by a large positive reversal. However, many funds had cut risk levels following the sharp falls and did not benefit much from the reversal.

Analysis of broader market conditions shows that market moves over the period in question were not extreme, with most markets moving by modest, normal amounts. The contrarian strategy has been ok during previous financial crises, such as the 1998 LTCM crisis.

Professor Lo then outlined his “unwind hypothesis”. This suggests that the losses were due to the rapid unwinding of a large market neutral quant fund. This liquidation may have been forced, e.g. due to sub-prime losses, and hence made at firesale prices. The initial losses caused other funds to reduce risk and deleverage, in turn causing further losses. The root cause may be quant portfolio managers using similar factors to each other.

Professor Lo explained that he had created a series of factor-based strategies to analyse the events. The long/short factors cover book-to-market; earnings-to-price; cashflow-to-price; price momentum; and earnings momentum. S&P 1500 stocks are ranked monthly based on the factors and long-short positions taken using the equally-weighted 10th and 1st deciles. Analysis of daily returns over 2007 shows evidence of unwinding of strategies based on the factors beginning in June. A similar analysis done with intra-day tick data shows losses suffered by the factor portfolios in the relevant days in August and the subsequent reversal.

Professor Lo then explained that the price effects may have been exacerbated by a withdrawal of market making capacity. In recent years, hedge funds and proprietary trading desks have competed with traditional market makers and provided liquidity to the market. An analysis of market-making profits, based on a simulated strategy of buying losers and selling winners over various short-term horizons from five minutes to an hour, shows profits falling in the relevant days in August 2007. The price pattern suggests non-traditional market makers may have left the market during mid-August, either due to losses sustained earlier in the week, or because unrelated losses in their organisations required them to cut back trading capital.

Summarising, Professor Lo explained his analysis suggests the lessons from August 2007 are that quant strategies are not the main issue, rather the issues are liquidity and credit. The long/short equity space is more crowded now than, for example, in 1998, and in general, hedge fund strategies are more crowded and more connected, using similar factors. Hedge funds provide significant amounts of liquidity. Unlike banks, they can withdraw liquidity suddenly leading to market dislocations such as seen in August 2007. Simulating strategies can yield insights into market dynamics. Finally, Professor Lo noted that his analysis and measures were indirect and that it would be interesting to hear direct accounts from market participants with first-hand knowledge.

In questions, professor Lo was asked for his advice to quant fund managers operating in the crowded market. He noted that managers need to be aware of the size of the market, and that strategies may be becoming more effective as money has left the sector. Managers should also look for new factors to trade.

RESURRECTING THE SIZE EFFECT: FIRM SIZE, PROFITABILITY SHOCKS AND EXPECTED STOCK RETURNS

KEWEI HOU, FISHER COLLEGE OF BUSINESS, OHIO STATE UNIVERSITY

Kewei Hou of Fisher College of Business, Ohio State University presented his paper which is joint with Mathijs van Dijk (Rotterdam School of Management, Erasmus University). The paper is the outcome of an Inquire Europe funded research project.

Introducing the paper, Dr Hou noted that Banz (1981) first documented that small firms tend to earn higher returns than big firms. This idea has been developed in numerous papers and now included in multi-factor asset pricing models, such as the Fama-French model. However, the underlying source of the size effect is debated and the literature has dried up in recent years.

Several studies note that the size effect disappeared after the early 1980s. Dr Hou showed data illustrating a cyclical pattern of small firm returns, with periods of positive size premium followed by periods of negative size premium.

Dr Hou explained that realised stock returns are a noisy measure of expected stock returns and that realised returns can deviate from expected returns for prolonged periods of time. Realised stock returns are equal to expected returns + cash flow shocks + discount rate shocks. Firm-level returns are primarily driven by cash-flow shocks. Even if the expected returns on small firms exceed those of big firms, the observed size premium may be negligible when small firms experience negative cash flow shocks and / or big firms experience positive shocks.

Dr Hou asked if the disappearance of the size effect could be due to shocks to the cash flows of small and big firms. Alternatively, the significant size effect of the 1960s and 1970s could be driven by differences in cash flow shocks rather than in expected returns. The contribution of the current research is that it is the first paper that explicitly adjusts realised returns for cash flow shocks in order to arrive at a more accurate measure of expected return. The results show that the distinction between realised returns and expected returns matters for asset pricing.

Dr Hou explained that his sample period runs from 1963 to 2005 and is split into two subperiods: 1963-1984 and 1984 to 2005. The analysis uses monthly returns from CRSP for NYSE, AMEX and NASDAQ stocks, as well as COMPUSTAT earnings data.

Initial analysis of the data shows a positive small firm effect in the first subperiod, but a much smaller effect in the second period. The change appears driven by higher returns from big firms in the latter period.

Dr Hou then outlined the approach he takes for measuring cash flow shocks. He estimates a cross-sectional model of profitability based on Fama and French (2000), and uses this model to compute expected profitability for year $t+1$. The model uses independent variables observed at the end of year t to forecast year $t+1$. The profitability shock for year t is the difference between realised and expected profitability. The model appears to do a good job of capturing the market's expectations about profitability, with an average R-squared of 60%. Furthermore, profitability shocks are not predictable based on past shocks.

Further analysis shows that profitability shocks are positively and significantly correlated with contemporaneous stock returns. However, expected profitability does not predict stock returns. Overall, the analysis shows that small firms do not outperform large stocks after 1984. Small firms experience negative profitability shocks after 1984 while large firms experience positive shocks. Profitability shocks have a significant impact on realised stock returns.

Dr Hou then raised the question to what extent can the disappearance of the size effect be attributed to differences in profitability shocks between small and large firms. The answer to this requires that we adjust individual stock returns for the price impact of profitability shocks and then re-estimate the size effect. The results show a robust size effect after 1984 after adjusting for the price impact of profitability shocks. The differing profitability shocks appear to be explained by new listing effects, greater competition, and by industry differences between small and large stocks.

Concluding, Dr Hou summarised that small firms did not outperform large firms in the 1980s and 1990s. This was because small firms experienced large negative shocks to their profitability in the early 1980s, while large firms experienced positive profitability shocks. Returns that are adjusted for the price impact of profitability shocks show a significant size effect in both halves of the 1963 to 2005 sample period.

COVAR

TOBIAS ADRIAN, FEDERAL RESERVE BANK OF NEW YORK

Tobias Adrian of the Federal Reserve Bank of New York presented his paper which is joint with Markus Brunnermeier of Princeton University. The paper is the result of an Inquire Europe funded project.

Dr Adrian explained that current bank regulation looks at the risk of each bank in isolation using measures such as value-at-risk (VaR). The focus is mainly on the asset side of the balance sheet and the liability side and maturity mismatches are largely ignored. Dr Adrian explained that there were two main challenges. First, there was a need to focus on externalities and to measure the contribution a firm makes to systematic risk. Secondly, there is a need for countercyclical regulation.

In terms of externalities, where a firm has a maturity mismatch and uses leverage, there is a potential 'firesale' externality, whereby the need to sell off assets at firesale prices depresses prices for others institutions. There is also a 'hoarding' externality, where the micro prudent response of hoarding funds is not macro prudent. In terms of procyclicality, the current system creates a loss spiral, where initial losses create funding problems, which require reduced positions which may further depress prices.

Dr Adrian explained that the CoVaR measure dealt with externalities by attempting to measure the contribution of an institution to systemic risk. CoVaR is equal to VaR conditional on an other institution being in distress at its VaR level. Exposure CoVaR looks at which institutions are most exposed if there is a systemic crisis. Contribution CoVaR looks at which institutions contribute most (in a non-causal sense) to systemic risk.

Dr Adrian then outlined the quantile regression approach used in his analysis.

The empirical part of the paper uses weekly returns of NY Fed primary dealers from 1986 to 2008. The commercial and investment banks are sorted into quintile portfolios based on maturity mismatch, liquidity, size, book-to-market, and equity volatility. The analysis is also applied to the CSFB/Tremont hedge fund indices from 1994 to 2008.

The initial analysis shows a fairly weak relationship between VaR and CoVaR. Furthermore, VaR does not capture the systemic risk contribution of institutions. A final strand of the analysis looks at time variation in CoVaR, linking the risk measures to macro factors such as the VIX index, 3-month yield, repo-spread, credit-spread, and term-spread. The VIX of the stock market is the important time series variable.

In terms of implications for regulation, Dr Adrian noted that regulatory charges on CoVaR may introduce pro-cyclicality. The way out of this is to link and predict changes in CoVaR to frequently observed characteristics such as maturity mismatch and leverage.

In concluding, Dr Adrian noted that macro-prudential regulation should focus on externalities and that some measure of systemic risk is required, such as the CoVaR measure he proposes. Countercyclical regulation can be put in place by finding variables that predict average CoVaR. Overall, the VaR measure is not sufficient and has an incorrect focus. CoVaR is a more appropriate measure and can be calculated using quantile regressions.