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Quantitative Strategy
Academic Insights

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Harnessing the best ideas from academia

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Welcome to our monthly Academic Insights report

Each month we survey the academic literature for interesting published and working papers related to quantitative investing. We review five papers in detail and also provide a list of other papers that piqued our interest this month.

Fresh insights from academia

Many firms have emerged from the financial crisis stronger and leaner than before, and are spinning off cash at staggering rates. This has led to a lot of debate as to what firms should do with their massive piggy banks. An interesting paper we review this month shows that, historically at least, a growing cash balance has been positive for subsequent returns.

Another useful paper this month returns to a favorite topic of late: low volatility strategies. The authors show that one can capture all the performance of a global minimum variance strategy by using country-sector indexes rather than trading at the stock level. For global investors who do not want the hassle of holding a plethora of individual names to get exposure to the low volatility anomaly, this paper offers a promising alternative approach.

Key papers this month

This month we focus on five papers spanning a range of topics including alpha generation, portfolio construction, and risk management:

- Changes in cash holdings and stock return predictability in the cross-section
- Country and sector drive low-volatility investing in global equity markets
- Overreacting to a history of underreaction?
- Earnings manipulation and expected returns
- … And the cross-section of expected returns

Upcoming events

We also highlight upcoming conferences and seminars in the quantitative investing space that may be of interest.

The best of the rest

At the back of this report we include abstracts from some additional papers that we think are also quite interesting. These are arranged by topic to make skimming the list quicker. If you need any further information on any of the papers in this report, please contact the Deutsche Bank Quantitative Strategy team at (+1) 212 250 8983 or (+44) 20 754 71684 or (+852) 2203 6990, or email us at DBEQS.Global@db.com.

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A letter to our readers

Welcome to *Academic Insights*

Spring seems to have finally arrived here in New York, so now is an opportune time to do a bit of spring cleaning in our academic research library. This month we tackle some of the interesting academic papers that have been sitting in our "to read" box for the past few months. Like the blossoms in Central Park, we hope some of these inspire a fresh idea or two.

Things are warming up here in New York!

The check is in the mail

Cash holdings are topical right now. Many corporates emerged from the financial crisis in lean, fighting shape and are now spinning off cash at prodigious rates. In fact, the piles of cash have grown so large there is an increasingly vocal chorus demanding more of it be returned to shareholders. However, as quants, rather than join the crowd we'd prefer some empirical analysis first: what can cash holdings tell us about future company performance? An interesting paper by Sodjahin [2013] examines the impact of changes in cash to total assets on future stock returns. They find that firms that grow their cash balances year-on-year earn significantly higher subsequent returns than those that reduce their cash balances. Be careful what you wish for.

Many firms are generating cash at ridiculous rates right now; what should they do with it (other than send it all to your author)?

A practical implementation of global low volatility

Low volatility strategies are very popular right now, and within the low volatility space we are noticing that global low volatility strategies are garnering particular attention. A timely new paper by de Boer, Campagna, and Norman [2013] shows that investors who want to implement a global low volatility strategy do not necessarily need to go down to the stock level to build their portfolios. A more practical way of building the portfolio – which still captures all the benefits of the full-blown solution – is to implement the strategy using sector indexes at the country level. This is useful reading for those building or thinking of building such strategies.

Building a global low volatility strategy can be challenging because it requires holding stocks in lots of countries… or does it?

But wait, there's more

Three other interesting papers also caught our attention. The first, by Milian [2013], tackles the post-earnings announcement drift, or rather the lack thereof. This used to be a staple quant strategy, but in recent years has been arbitraged away to some extent. This paper suggests that this is because investors got so used to the underreaction that now they are overreacting trying to play an underreaction that is no longer there!

Be careful not to overreact to an underreaction that no longer exists!

Another useful and practical paper is by Beneish, Lee, and Nichols [2013]. They propose a better model for detecting accounting fraud, and show that companies that show the characteristics of fraudulent companies underperform, irrespective of whether they are ever actually caught for fraud.

Here's a new and useful model for predicting accounting fraud

Last but certainly not least, a fascinating paper by Harvey, Liu, and Zhu [2013] makes a bold claim: the standard methodology for assessing the significant of a factor in predicting the cross-section of returns (usually some variant of the "t-stat > 2" rule) is flawed. As a result, they conclude that over 50% of discovered "factors" are in fact false positives. This one is definitely food for thought.

Apparently 50 years of finance research has been thrown out the window

Regards,
The Deutsche Bank Quantitative Strategy Team

Five key papers this month

Paper 1: "Changes in cash holdings and stock return predictability in the cross-section"

- William R. Sodjahin
- *Financial Analysts Journal*, Volume 69, Number 1, available at http://www.cfapubs.org/doi/abs/10.2469/faj.v69.n1.1
- Reviewed by Ada Lau and Khoi Le Binh

Why it's worth reading

Cash holdings of a company could provide useful insights into risk and expected returns, because risky companies are less likely to source external funding and are more likely to rely on cash holdings for growth. In this paper, the author considers a more dynamic aspect and argues that change in cash holdings is a good proxy for future investment growth. Interestingly, change in cash holdings could also provide an alpha signal which is orthogonal to that from levels of cash holdings.

Cash holdings are a useful proxy for expected investment growth and risk

Data and methodology

Data for common stocks in 1965-2010 with a December fiscal year end is obtained from CRSP/Compustat Merged Industrial Annual File, where regulated utilities and financials are excluded. Change in cash holdings is measured by the annual differences in the ratio of cash-to-total assets. Investment ratio is measured as the ratio of capital expenditure to net book value of fixed assets at the beginning of fiscal year. Investment growth is the growth rate of the investment ratio. Monthly Fama–MacBeth cross-sectional regressions are done by regressing the returns on change in cash holdings, together with control variables such as size, asset growth, illiquidity and idiosyncratic volatility. To compare the effect of cash holdings on returns, the regression is repeated with change in cash holdings replaced by cash holdings. To show robustness, returns are either excess returns over the risk free rate, the Fama-French risk-adjusted returns or the Carhart four-factor risk-adjusted returns. To avoid having results driven by the 'January effect' where most abnormal returns in small companies occur in January, the regression is repeated excluding January returns. Quintile portfolios are formed by sorting change in cash holdings, and alphas of the quintile portfolios are compared relative to CAPM, Fama-French and Carhart four-factor model.

The authors suggest using the change in the cash to total assets ratio as a factor; this is easily constructed from company fundamental data

Results

Regression analysis shows that positive change in cash holdings is a significant predictor for higher forward returns, even when other stock characteristics are controlled. Alphas of the long-short quintile portfolios sorted by change in cash holdings are significantly positive. This spread is much larger and more significant when conditioned on cash constrained companies with low cash holdings, as well as small cap stocks.

The authors find that stocks with positive changes in cash to total assets outperform subsequently

Our take

This paper provides a thorough analysis on change in cash holdings, and show robust results by considering various controls. We find it particularly interesting that the author provides extra analysis based on returns in January, and the "January effect" is so different from the other months that the regression coefficient for change in cash holdings becomes negative, which is not expected. Hence, it is important to investigate this effect and in particular, understand its impact on the backtest results.

This is a simple factor, but appears to work quite well and furthermore is largely uncorrelated with the level of cash holdings

Paper 2: "Country and sector drive low-volatility investing in global equity markets"

- Sanne de Boer, Janet Campagna, and James Norman
- SSRN, available at http://ssrn.com/abstract=2237418
- Reviewed by Rochester Cahan

Why it's worth reading

Low volatility strategies have been one of the most popular allocations in the past few years. Countless empirical studies have shown time and time again that – contrary to finance theory – lower risk stocks tend to outperform higher risk stocks. So do we really need another paper on the topic? It turns out the answer is yes. This interesting study examines the low volatility anomaly globally and comes to an interesting conclusion: much of the anomaly is driven by sector and country selection. This is an important finding from a practical perspective; it suggests much of the benefit of low volatility strategies can be captured without having to hold underlying stocks (instead one can just trade the country- or sector-level indexes via ETFs or futures).

Low volatility strategies are incredibly popular; this paper offers useful ideas on the practical implementation of a global low volatility portfolio

Data and methodology

The study considers the period 1978 to 2012. The authors start with the constituents of the MSCI World index, and construct country-sector level baskets (e.g. U.S. Utilities, Italian Consumer Discretionary, etc.) using capitalization-weighted returns. These country-sector indexes are used as the "assets" in a minimum variance optimization with the usual constraints (long-only, no leverage). The portfolios are rebalanced semi-annually, and the risk model used in the optimization is Axioma's AX-WW 2.1 Global risk model. The authors also consider minimum variance portfolios built only on (1) country indexes, and (2) global sector indexes.

Instead of using individual stocks as the assets in the portfolio, the authors use country-sector indexes

Results

The key result is that the risk-adjusted performance of the minimum variance portfolio built with the country-sector indexes is very similar to the minimum variance portfolio run at the individual stock level. This implies that one can capture the global low risk anomaly by using sector indexes from each country instead of the underlying stocks. With the advent of sector ETFs and futures such an implementation may be easier and cheaper from a practical perspective.

The key result is that the country-sector minimum variance portfolio does just as well as the same portfolio built at the stock level

Another interesting result is that the minimum variance portfolios built using the country indexes or global sector indexes do not performance as well (although they still beat the cap weighted benchmark). The authors rightly point out that this contradicts a finding in Baker et al. [2013] who found that country/sector selection and stock selection contribute about equally.[1] However, the authors in this paper point out they are more focused on the practicalities of implementation rather than the theoretical decomposition of macro and micro effects.

Our take

This is a useful paper for those considering a practical implementation of a global low risk strategy. Building a portfolio of, say, country-level sector ETFs or futures could be a pragmatic way to capture the low volatility anomaly globally without the logistics of having to hold numerous stocks in each country.

This paper is an excellent starting point for exploring a global low volatility implementation

[1] For more details, see our review of that paper in the February 2013 edition of *Academic Insights*.

Paper 3: "Overreacting to a history of underreaction?"

- Jonathan A. Milian
- SSRN, available at http://ssrn.com/abstract=2229479
- Reviewed by Spyros Mesomeris

Why it's worth reading

This paper analyses the autocorrelation in stock market reaction to earnings surprises. Previous literature has shown a strong positive autocorrelation pattern, known as the post-earnings announcement drift (PEAD), resulting from a systematic underreaction of the market to earnings surprises. However, empirically the PEAD has been diminishing in many developed markets, which is what makes this paper's take interesting.

Post-earnings announcement drift is – or should we say was – a classic anomaly

Data and methodology

The paper demonstrates that, in contrast to the previous literature, the PEAD behavior has diminished especially for the stocks that have active exchange-traded options. Two different methods are used to present this. The first method computes the performances of hedge portfolios for two groups of companies, actively and less actively traded in the options market. The portfolios are built as follows: portfolios are constructed based on the deciles of the prior quarter's earnings surprises. The long (short) leg of the hedge portfolios takes long (short) positions in firms in the highest (lowest) decile of the previous quarter's earnings announcement news measure. The second approach is a regression analysis studying the PEAD after controlling for possible predictor variables. The dependent variable in the regressions is a measure of a firm's abnormal two-day compounded return. The independent variables (transformed into decile rankings and rescaled between -0.5 and 0.5) include standard possible return predictors such as size but also option market variables The dataset is sourced from CRSP, I/B/E/S, Compustat and OptionMetrics; it covers the 1996-2010 period, comprising 102,580 quarterly earnings announcements by approximately 2,854 unique firms in the active options sample and 6,310 companies in the sample without active options

In recent years the phenomenon has largely disappeared in many developed markets, and this interesting paper has some suggestions for why

Results

The results for firms with active exchange-traded options are the *opposite* to what was implied by the PEAD phenomenon: within the set of firms with active options, firms in the highest decile of past earnings announcement abnormal returns (past earnings surprise) underperforms firms in the lowest decile by -1.29% (-0.73%). However, from the hedge portfolios analysis, the pattern emerging from the not actively exchange traded firms is still consistent with the PEAD phenomenon. The previous conclusions are also confirmed by the regression analysis. One possible reason for the inconsistency with PEAD, within the set of firms with active options, is that markets tend to overreact to a positive or negative earnings announcement news, resulting in returns at earnings announcement that are too extreme. These excessive price reactions are then corrected at the following earnings announcement causing the documented negative autocorrelation.

Post-announcement returns for stocks with active options are in the opposite direction to the direction of the earnings surprise

Our take

The paper's empirical results are interesting and worth reading, however, what we find the most interesting part is left relatively unexplored: there is not an in-depth analysis of the possible advantages of hedge portfolios built ranking firms which are most (least) likely to overreact to earnings announcement news. Finally, two choices of the analysis are critical (the dataset is short and ends in 2010; only two-day post-announcement returns are considered)

Further analysis showing how a trading strategy based on these ideas would perform would be interesting

Paper 4: "Earnings manipulation and expected returns"

- Messod D. Beneish, Charles M.C. Lee, and D. Craig Nichols
- *Financial Analysts Journal*, Volume 69, Number 2, available at http://www.cfapubs.org/doi/abs/10.2469/faj.v69.n2.1
- Reviewed by John Chen

Why it's worth reading

While regulators and law enforcement constantly battle with accounting fraud – which imposes huge financial costs as well as social costs – quantitative investors are also keenly interested in detecting accounting fraud. The authors of this paper implement a statistical model that has predictive power in detecting accounting fraud for listed companies. Their empirical tests show the Beneish model not only correctly identified 71% of the most famous accounting fraud cases, but also has substantial investment value in out-of-sample tests. Companies with a higher probability of manipulation tend to have lower returns in the next 12 months.

Quantitative investors are always on the lookout for better models for detecting accounting fraud

Data and methodology

The data sample consists of all exchange traded securities in the Compustat database during the period 1993 to 2010, excluding financial companies, companies with less than $100,000 in sales or in total assets, and companies whose market capitalization is less than $50 million. Stocks included in the study also should have stock return data in the CRSP files. All portfolio returns are size-adjusted accumulative returns in the next 12 months.

This paper proposes a useful model that shows good predictive power in detecting accounting fraud before it happens

The authors closely replicated the model as published in Beneish [1999a]. Variables used in the model include the change in receivables to sales, gross margin deterioration, assets distortions, declining depreciation rates, change in administrative and marketing efficiency, accruals, and change in leverage. A probit regression model is built on these eight explanatory variables to estimate the probability of manipulation (M-score). This M-score is then used to identify companies that have potential frauds. Flagged companies and not-flagged companies are grouped into different portfolios, and one-year-ahead size-adjusted returns are computed. The authors further distinguished M-score from other predictors of future returns, including accruals, price momentum, company size, book-to-market ratio, and short-interest ratio.

Results

The test results find that companies flagged as potential frauds earned one-year-ahead size-adjusted returns of -7.5%, while not-flagged companies generated positive returns of 2.4%. The return spread was significant even adjusted for control variables such as size, book-to-market, momentum, accruals, and short interest. The authors also find that the predictive power of the M-score derives from its ability to separate companies whose accruals are more likely to persist from those whose accruals are more likely to reverse. The authors also point out that new earnings manipulation techniques are being adopted and therefore the detection models also need to improve.

A useful result is that firms with the characteristics of fraudulent firms underperform, irrespective of whether they actually are caught for fraud

Our take

This paper is a good addition to the literature that studies the use of forensic accounting in equity investing. It expands the use of earnings manipulation models beyond the usual variables. To our mind, one of the most interesting results is that a company does not have to actually be fraudulent to underperform; even non-fraud firms with the characteristics that suggest likely fraud underperform. This finding lends itself well to a trading strategy.

This new model is an excellent addition to the factor toolbox for quantitative investors

Paper 5: "…And the cross-section of expected returns"

- Campbell R. Harvey, Yan Liu, and Heqing Zhu
- SSRN, available at http://ssrn.com/abstract=2249314
- Reviewed by Mehmet Beceren

Why it's worth reading

This is a rare example of research that is about the research in finance itself. The authors point to the fact that there are hundreds of academic papers and even more factors that attempt to explain the cross-section of stock returns, and discuss whether the standard statistical tests are valid for the interpretation of the results coming from the ever-growing extensive data mining exercise by the finance academics. Overall, this paper is a very good read and an interesting quantitative analysis for the ones that would like to gain some critical perspective to the empirical methods used for the analysis of stock returns. The paper also offers a valuable data set on the bibliography and taxonomy of the factors analyzed in the distinguished finance journals in the last 50 years.

This paper offers a very concise review and an empirical critique of the research literature on factors that explain the cross-section of returns.

Data and methodology

The authors argue that, in the presence of a great number of factors proposed to explain the same or overlapping samples of stock returns, a multiple-testing framework (i.e. simultaneous testing of more than one hypothesis) is warranted to interpret the statistical significance of the proposed factors. The main thesis is that one should focus on controlling the family-wise error rate and the false discovery rate (i.e. the probability of Type 1 errors) in factor analysis. The paper provides a good review of multiple testing methods offered in the literature, and then progresses with the application of the common methods to the sample of the factors published in the research articles since 1967.

The minimization of Type 1 errors and the appropriate cut-off points for t-ratios are critical.

Results

Based on the different types of multiple-testing methodology, the paper derives the t-statistic cut-off points for the factors offered to explain the cross-section of stock returns from 1967 to 2013. The results suggest that today, the cut-off for t-ratio should exceed 3, and according to the estimated false-discovery ratios, more than 50% of 167 published 'statistically significant' factors, are false discoveries. In other words, among the published empirical results with statistical significance, the likelihood of Type 1 errors looks very high.

The cut-off for t-ratios should be much higher than generally used.

Our take

This is a good study that quantifies the warnings of Fama [1991] and Scwert [2003] and probably deserves a read just for that attempt. However, we think, the statistical issues, in general, are not as dramatic as the authors try to sound because the different factors offered in various studies are not likely to be independent but they are only different reflections of a common phenomenon. Therefore the suitability of the suggested multiple-testing framework is another potential academic discussion, in our view. However, we appreciate the rigorous analysis and discussion around some widespread issues related to the sloppy use of statistics in contemporary science.

A very good discussion about one of the classic issues in empirical finance.

Upcoming conferences

Europe

Figure 1: European event calendar

Date	Location	Conference
13 May 2013	London	London Quant Group Spring Seminar http://www.lqg.org.uk/spring-seminar-2013/
4-6 June 2013	London	EDHEC-Risk Days Europe 2013 http://www.edhec-risk.com/events/edhec_conferences/europedays2013
26-28 June 2013	Monaco	Factset Symposium www.factset.com/symposium_emea
26-29 June 2013	Reading, UK	European Financial Management Association Annual Meeting http://www.efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2013-Reading/2013meetings.shtml
8-11 September 2013	Monaco	London Quant Group Autumn Seminar http://www.lqg.org.uk/autumn-seminar-2013/
14-16 December 2013	London	Computational and Financial Econometrics http://www.cfenetwork.org/CFE2013/

Source: Deutsche Bank

North America

Figure 2: North American event calendar

Date	Location	Conference
17-18 May 2013	Chicago	R/Finance http://www.rinfinance.com/
23 May 2013	New York	MATLAB Computational Finance Conference http://www.mathworks.com/company/events/conferences/matlab-computational-finance-conference-nyc/
31 May 2013	New York	SQA Fuzzy Day Conference: Sustainable Investing: Hype or Opportunity www.sqa-us.org
13 June 2013	New York	CQA/SQA Trading Seminar www.cqa.org
20 June 2013	New York	Axioma Quant Forum http://www.axiomainc.com/seminars.htm
11 July 2013	Boston	CQA Academic Review Session www.cqa.org
16-18 July 2013	New York	CFA Institute/EDHEC-Risk Advances in Asset Allocation Seminar http://www.cfainstitute.org/learning/products/events/Pages/04152013_77335.aspx
17-19 July 2013	New York	Quant Congress USA http://www.quantcongressusa.com/
8-9 October 2013	New York	EDHEC-Risk Days in North America http://www.edhec-risk.com/events/edhec_conferences/northamericadays2013?newsletter=yes
11 September 2013	Chicago	CQA Fall Conference www.cqa.org
10-12 November 2013	New Orleans	Factset Symposium http://www.factset.com/campaigns/symposium2013

Source: Deutsche Bank

Asia

Figure 3: Asian event calendar

Date	Location	Conference
15-16 May 2013	Singapore	EDHEC-Risk Days Asia http://www.edhec-risk.com/events/edhec_conferences/asiadays2013
19-22 May 2013	Singapore	66th Annual CFA Institute Annual Conference http://www.cfainstitute.org/learning/products/events/Pages/05192013_66150.aspx

Source: Deutsche Bank

Other papers of interest

Alpha generation and stock-selection signals

The volatility effect in emerging markets

- David Blitz, Juan Pang, and Pim Van Vliet
- SSRN, available at http://ssrn.com/abstract=2249660
- Abstract: "We examine the empirical relation between risk and return in emerging equity markets and find that this relation is flat, or even negative. This is inconsistent with theoretical models such as the CAPM, which predict a positive relation, but consistent with the results of studies for developed equity markets. The volatility effect appears to be growing stronger over time, which we argue might be related to the increased delegated portfolio management in emerging markets. Finally, we find that the volatility effect in emerging markets is only weakly related to that in developed equity markets, which argues against a common-factor explanation."

Extreme downside liquidity risk

- Stefan Ruenzi, Michael Ungeheurer, and Florian Weigert
- SSRN, available at http://ssrn.com/abstract=2240825
- Abstract: "We investigate whether investors receive compensation for holding stocks with strong systematic liquidity risk in the form of extreme downside liquidity (EDL) risk. Following the logic of Acharya and Pedersen (2005), we capture a stock's EDL risk by the lower tail dependence between (i) individual stock liquidity and market liquidity, (ii) individual stock return and market liquidity, and (iii) individual stock liquidity and the market return. We show that the cross-section of expected stock returns reflects a premium for EDL risk. From 1969 to 2011, the average future return on stocks with strong EDL risk exceeds that of stocks with weak EDL risk by more than 4% annually, adjusted for the exposures to market return as well as size, value, and momentum. This premium is different from linear liquidity risk and cannot be explained by other firm characteristics and risk factors. Our results show that investors care about extreme joint realizations in liquidity and that asset pricing models that rely on linear sensitivities alone might be misspecified."

Media and Google: The impact of information supply and demand on stock returns

- Yanbo Wang
- SSRN, available at http://ssrn.com/abstract=2180409
- Abstract: "This paper gives the first empirical examination of the joint effect of information supply and demand on stock returns. Unlike previous studies, I examine the relationship between cross-sectional stock returns and "pairs" of shifts in information supply and demand. I use the number of news articles and Google search volume (for a company) as proxies for information supply and demand respectively. The results show that only an upward shift in both information supply and demand predicts future returns among shift pairs. A monthly rebalanced portfolio of buying stocks with this shift "pair" and short selling the other stocks generates an abnormal return between 16% and 22% per year with the Sharpe ratio between 0.85 and 0.9 (compared with a Sharpe ratio of 0.049 for the S&P500 during the same period). The abnormal return increases to between 23% and 34% per year in a subsample of small stocks.

These findings imply that an econometric model with only information supply (demand) under-estimates the price impact of an increase in information supply (demand) when information demand (supply) increases, and over-estimates the impact when information demand (supply) decreases. The results are consistent with the hypothesis that an increase in information supply drives stock prices up only when an increase in information demand confirms that information supply succeeds in raising new investors' awareness and existing investors' additional learning effort. The good news due to ostrich effect can also partially explain the abnormal return, but it only explains a small component of the total abnormal return. The empirical findings affirm the importance of incorporating both information supply and demand in predicting stock returns."

Dynamic stock return-volume relation: Evidence from emerging Asian markets

- Hsin-Yi Lin
- SSRN, available at http://ssrn.com/abstract=2233765
- Abstract: "This paper empirically examines the dynamic stock return–volume relations for six emerging Asian markets: Indonesia, Malaysia, Singapore, South Korea, Taiwan, and Thailand. Evidence is found that trading volume Granger causes stock return in quantiles and the causal effects of volume are heterogeneous across quantiles. This shows that volume carries some information to the return and could be interpreted in light of theoretical models. In addition, we find that there is bi-directional causality between stock return and trading volume in most of the markets. The finding indicates that those Asian emerging markets with different institutions and information flows than more mature markets have present similar causal effects on the stock return–volume relation. Furthermore, the cross-country evidence shows that the US market helps to predict the returns of the emerging Asian markets."

Optimization, portfolio construction, and risk management

Handling risk on/risk off correlation dynamics with correlation regimes and correlation networks

- Jochen Papenbrock and Peter Schwendner
- SSRN, available at http://ssrn.com/abstract=2254272
- Abstract: "In this paper, we present a framework to detect distinct correlation regimes and to analyze the emerging state dependences for a multi-asset futures portfolio from 1998 to 2013. Since the financial crisis in 2008, these correlation regimes are significantly different than before. Cluster tracking shows that asset classes are less separated since 2008 than before. We identify distinct "risk on" and "risk off"-assets with the help of correlation networks. Apart from visualization, we quantify these observations using suitable metrics for the clusters and correlation networks."

Smart beta 2.0

- Noël Amenc, Felix Goltz, and Lionel Martellini
- EDHEC-Risk Institute, available at http://www.edhec-risk.com/latest_news/featured_analysis/RISKArticle.2013-03-18.1335
- Abstract: "EDHEC-Risk Institute is seeking to draw the attention of investors to the risks of traditional smart beta equity indices and propose a new approach to smart beta investing to take account of these risks. This new approach, referred to as "Smart Beta 2.0," detailed in the attached position paper, enables investors to measure and control the risks of their benchmark and revolutionises the offerings of advanced equity benchmarks. Smart Beta 1.0 indices present systematic and specific risks that are neither documented nor explicitly controlled by their promoters. This inadequate level of information and of risk management calls into question the robustness of the performance presented and implies considerable risk-taking that is not controlled by investors when they choose new equity benchmarks. "

The blind side: Managing downside risk in corporate defined benefit plans

- Abdullah Sheikh and Jianxiong Sun
- *Journal of Portfolio Management*, forthcoming, available at http://www.iijournals.com/doi/abs/10.3905/jpm.2013.2013.1.030
- Abstract: "Following the recession of the early 2000s, defined benefit corporate pension plans faced dramatic funding challenges. They had barely recovered before the recession of 2008 to 2009 sent funding ratios tumbling once again. Many plan sponsors must now make larger contributions than they originally budgeted, in order to bring their plans back to full funding. This article aims to deepen the current discussion of risk reduction in the context of defined benefit plans. It investigates two key issues. First, its authors analyze the effect of non-normality of asset returns on a defined benefit pension plan's liabilities. They argue that analytical frameworks that assume normality can lead to an underestimation of downside risk, a concern with regard to contributions. Second, the authors develop a multi-dimensional risk management framework for managing contribution risk."

Systemic risk measures: The simpler the better?

- María Rodríguez-Moreno and Juan Ignacio Peña
- *Journal of Banking and Finance*, Volume 37, Issue 6, available at http://www.sciencedirect.com/science/article/pii/S0378426612001902
- Abstract: "This paper estimates and compares two groups of high-frequency market-based systemic risk measures using European and US interbank rates, stock prices and credit derivatives data from 2004 to 2009. Measures belonging to the macro group gauge the overall tension in the financial sector and micro group measures rely on individual institution information to extract joint distress. We rank the measures using three criteria: (i) Granger causality tests, (ii) Gonzalo and Granger metric, and (iii) correlation with an index of systemic events and policy actions. We find that the best systemic measure in the macro group is the first principal component of a portfolio of Credit Default Swap (CDS) spreads whereas the best measure in the micro group is the multivariate densities computed from CDS spreads. These results suggest that the measures based on CDSs outperform measures based on interbank rates or stock market prices."

Why optimal diversification cannot outperform naïve diversification: Evidence from tail risk exposure

- Stephen Brown, Inchang Hwang, and Francis Haeuck In
- SSRN, available at http://ssrn.com/abstract=2242694
- Abstract: "This paper examines the outperformance of naive diversification relative to optimal diversification. From out-of-sample analysis using portfolios consisting of individual stocks as well as diversified equity portfolios, we find that optimal diversification fails to consistently outperform naive diversification. Our results show that naive diversification increases tail risk measured by skewness and kurtosis and makes portfolio returns more concave relative to equity benchmarks. In addition, tail risk exposure and concavity increases with the number of stocks in the portfolio. These results imply that the outperformance of naive diversification relative to optimal diversification represents a compensation for the increase in tail risk and the reduced upside potential associated with the concave payoff."

The drivers of downside equity tail risk

- Kyle Moore, Pengfei Sun, Casper De Vries, and Chen Zhou
- SSRN, available at http://ssrn.com/abstract=2240135
- Abstract: "We analyze the cross-sectional differences in the tail risk of equity returns and identify the drivers of tail risk. We provide two statistical procedures to test the hypothesis of cross-sectional downside tail shape homogeneity. An empirical study of 230 US non-financial firms shows that between 2008 and 2011 the cross-sectional tail shape is homogeneous across equity returns. The heterogeneity in tail risk over this period can be entirely attributed to differences in scale. The differences in scales are driven by the following firm characteristics: market beta, size, book-to-market ratio, leverage and bid-ask spread."

Risk and the volatility anomaly: A global analysis

- Charles Collver Jr., Jack De Jong, and Darshana Palkar
- SSRN, available at http://ssrn.com/abstract=2236693
- Abstract: "The only true global volatility anomaly is the high variance anomaly. High volatility stocks in the United States earn extremely low returns over time

and investors should shun them. Our tests with data from forty international markets tend to support the U.S. findings. Portfolios of stocks sorted by variance tend to have characteristics similar to portfolios sorted by net variance (upside semi-variance minus downside semi-variance). However, beta and net beta sorted portfolios exhibit notable differences in associated risk proxies such as dispersion, split factor or size. When net variance or net beta is the risk measure, the volatility anomaly generally disappears."

The psychology of tail events: Progress and challenges

- Nicholas Barberis
- SSRN, available at http://ssrn.com/abstract=2231781
- Abstract: "Over the past decade, there has been a surge of interest in "tail events" – rare, high-impact events. In this article, I start by summarizing some recent progress in our understanding of the psychology of tail events. I suggest that much of this progress has centered on the concept of "probability weighting" and, in particular, on applications of this concept in various fields of economics. I then describe some major open questions in this area."

The Black-Litterman model: A consistent estimation of the parameter tau

- Erindi Allaj
- SSRN, available at http://ssrn.com/abstract=2231944
- Abstract: "In addition to giving a detailed description and explanation of the Black-Litterman (BL) model, this paper deals with estimation of the parameter tau. This parameter is the most mysterious one in the BL model, as the literature does not provide specific guidance on its calibration. Specifically, I develop an estimation procedure that yields a suitable and consistent estimate of tau, which results in a modification of the original BL model. The approach combines cross-section and time-series regressions, both common approaches to estimating the capital asset pricing model (CAPM). The novelty here consists in utilizing random intercepts when estimating the time-series regressions. In addition, a new definition of beta is derived. Within this framework, the parameter tau is obtained from the cross-sectional regression. The approach is able to capture the serial, cross, and cross-lag correlations of the excess returns. To illustrate the new framework, I provide an empirical application and show that it is easily applicable by portfolio managers."

Asset Allocation and sector/style/country rotation

Long-term asset tail risks in developed and emerging markets

- Stefan Straetmans and Bertrand Candelon
- *Journal of Banking and Finance*, Volume 37, Issue 6, available at http://www.sciencedirect.com/science/article/pii/S0378426612002981
- Abstract: "A power law typically governs the tail decay of financial returns but the constancy of the so-called tail index which dictates the tail decay remains relatively unexplored. We study the finite sample properties of some recently proposed endogenous tests for structural change in the tail index. Given that the finite sample critical values strongly depend on the tail parameters of the return distribution we propose a bootstrap-based version of the structural change test. Our empirical application spans developed and emerging financial asset returns. Somewhat surprisingly, emerging stock market tails are not more inclined to structural change than their developed counterparts. Emerging currency tails, on the contrary, do exhibit structural shifts in contrast to developed currencies. Our results suggest that extreme value theory (EVT) applications in hedging tail risks can assume stationary tail behavior over long time spans provided one considers portfolios that solely consist of stocks or bonds."

Corporate bond risk premia

- Christian Speck
- SSRN, available at http://ssrn.com/abstract=2235168
- Abstract: "This paper investigates the holding period risk premia of U.S. corporate and Treasury bonds. Using excess return regressions, two priced risk factors are derived from yield and macroeconomic data: a priced term risk factor and a priced credit risk factor explain half of the variation in one-year corporate and Treasury excess returns. The information of the term risk factor is not represented by major yield characteristics but is a hidden risk factor whereas the credit risk factor is not hidden. The term risk premium is earned primarily for exposure to inflation and the yield level and the credit risk premium is earned for an exposure to real growth and the credit spread level. The regression results are usefull for the specification of the market prices of risk in affine credit term structure models: The two-factor representation of the risk premium suggests a rank restriction on the market prices of risk and an additional pricing factor to capture the hidden property of term risk."

Trading and market impact

What do we know about high-frequency trading?

- Charles M. Jones
- SSRN, available at http://ssrn.com/abstract=2236201
- Abstract: "This paper reviews recent theoretical and empirical research on high-frequency trading (HFT). Economic theory identifies several ways that HFT could affect liquidity. The main positive is that HFT can intermediate trades at lower cost. However, HFT speed could disadvantage other investors, and the resulting adverse selection could reduce market quality. Over the past decade, HFT has increased sharply, and liquidity has steadily improved. But correlation is not necessarily causation. Empirically, the challenge is to measure the incremental effect of HFT beyond other changes in equity markets. The best papers for this purpose isolate market structure changes that facilitate HFT. Virtually every time a market structure change results in more HFT, liquidity and market quality have improved because liquidity suppliers are better able to adjust their quotes in response to new information."

Moore's law vs. Murphy's law: Algorithmic trading and its discontents

- Andrei Kirilenko and Andrew Lo
- SSRN, available at http://ssrn.com/abstract=2235963
- Abstract: "Financial markets have undergone a remarkable transformation over the past two decades due to advances in technology. These advances include faster and cheaper computers, greater connectivity among market participants, and perhaps most important of all, more sophisticated trading algorithms. The benefits of such financial technology are evident: lower transactions costs, faster executions, and greater volume of trades. However, like any technology, trading technology has unintended consequences. In this paper, we review key innovations in trading technology starting with portfolio optimization in the 1950s and ending with high-frequency trading in the late 2000s, as well as opportunities, challenges, and economic incentives that accompanied these developments. We also discuss potential threats to financial stability created or facilitated by algorithmic trading and propose "Financial Regulation 2.0," a set of design principles for bringing the current financial regulatory framework into the Digital Age."

The shape and information content of a post-MiFID limit order book

- Alfonso Dufour and Satchit Sagade
- SSRN, available at http://ssrn.com/abstract=2232700
- Abstract: "The characteristics of the order flow in limit order markets has been significantly altered since the introduction of Market in Financial Instruments Directive. We revisit issues related to the shape of the limit order book and its information content in a post-MiFID world using message level data from London Stock Exchange's electronic limit order book. We find that the top of the limit order book contains less than £20,000 in depth and the slope of the order book is steep near the top. This has not translated into bad execution performance primarily due to a reduction in average trading size. However, we find that there are instances when the limit order book is extremely thin, especially for lower capitalization stocks. We further observe that the limit order book beyond the best quotes contains information about future short-term price changes. This information, however, is short-lived and can be only exploited in an algorithmic trading environment."

Finance theory and techniques

Trend-based conditional asset pricing: Explaining the cross-section of technical analysis profitability

- Fuwei Jiang
- SSRN, available at http://ssrn.com/abstract=2254798
- Abstract: "This paper develops a trend-based conditional asset pricing framework, which can be applied to explain the cross-section of asset returns and evaluate the performance of asset managers. I use the moving average (MA) indicators of the aggregate market portfolio to identify the up and down price trends of the stock market. The market and size premiums under the up price trends are substantially higher than those under the down trends, so that portfolios with high (low) market or size betas under up (down) trends will generate higher unconditional expected returns. I then model the trend-based conditional betas as linear functions of lagged market MA indicators. The trend-based conditional asset pricing framework has significant explanatory power for the cross-sectional technical analysis profitability anomaly and momentum anomaly."

The opportunistic reporting of material evens and the apparent misconception of investors' reaction

- Benjamin Segal and Dan Segal
- SSRN, available at http://ssrn.com/abstract=2255345
- Abstract: "Using a comprehensive sample of non-earnings 8-K filings from 1996 to 2011, we examine whether firms engage in opportunistic reporting of mandatory and voluntary news. We find strong evidence of opportunistic reporting of negative news, especially among public firms. Public firms are more likely to delay disclosure of negative news, report negative news after trading hours, and report on the last day of the week. We also find evidence of opportunistic bundling of news. Our findings support the notion that managers engage in strategic disclosure by delaying or obfuscating negative news in order to mitigate the potential market reaction. Factors such as the risk of litigation, information asymmetry, and corporate governance influence reporting behavior. Further analysis of the market reaction to opportunistic disclosure uncovers no evidence of investor inattention or under-reaction."

Assessing the quality of Asian stock market indices

- Narasimhan Padmanaban, Masayoshi Mukai, Lin Tang, and Véronique Le Sourd
- EDHEC-Risk Institute, available at http://www.edhec-risk.com/edhec_publications/all_publications/RISKReview.2013-03-05.5835
- Abstract: "There has been increasing demand for equity indices in Asia. This is because global investors wish to benefit from the region's growth, and consequently from its financial markets. As many US- and Europe-based investors do not have the expertise to conduct stock picking in Asia, equity investments are often passive for Asian-oriented portfolios. Therefore, the question of index quality in Asia is an important issue. This study addresses that question by focusing on three aspects: efficiency, concentration and stability. The study reports the results for 10 major Asian stock market indices over the past decade."

What is driving the price-to-earnings ratio: The effect of conservative accounting and growth

- Martin Staehle and Niklas Lampenius
- SSRN, available at http://ssrn.com/abstract=2239208
- Abstract: "Forward price-to-earnings ratios (PE ratios) play a central role in financial analysis and valuation. They are used to value comparable firms or to inform about mispriced stocks. We show that past investment growth and conservative accounting hinder a straightforward interpretation of the PE ratio. We analytically derive accounting-based explanations for cross sectional differences of PE ratios and analyze properties of their time series, such as volatility and mean reversion. Further, we illustrate the influence that management can take on the PE ratio by choosing accounting and investment policies. Our analysis identifies variables that drive the PE ratio and that could be used as empirical proxies to evaluate the magnitude of accounting-based influences."

Dividend growth predictability: Isn't it there?

- Abhay Abhyankar and Pedro Angel Garcia-Ares
- SSRN, available at http://ssrn.com/abstract=2239227
- Abstract: "We study the predictive ability of dividend yield for both dividend growth and for returns. We propose an alternate construction of the dividend growth series that is weighted in a similar manner to the other two series; aggregate returns and the dividend yield. This adjusted dividend growth series reflects the dividend pattern of firms seen in the data. Using standard predictive regressions, we find, in striking contrast to existing research, strong evidence for the predictability of dividend growth during in the post-WW II period. We explore possible reasons underlying this finding. Taken together our results imply that changing patterns in dividend growth predictability are related to differences between dividend payments by large and small firms."

Equity Risk Premiums (ERP): Determinants, estimation and implications: The 2013 edition

- Aswath Damodaran
- SSRN, available at http://ssrn.com/abstract=2238064
- Abstract: "Equity risk premiums are a central component of every risk and return model in finance and are a key input in estimating costs of equity and capital in both corporate finance and valuation. Given their importance, it is surprising how haphazard the estimation of equity risk premiums remains in practice. We begin this paper by looking at the economic determinants of equity risk premiums, including investor risk aversion, information uncertainty and perceptions of macroeconomic risk. In the standard approach to estimating equity risk premiums, historical returns are used, with the difference in annual returns on stocks versus bonds over a long time period comprising the expected risk premium. We note the limitations of this approach, even in markets like the United States, which have long periods of historical data available, and its complete failure in emerging markets, where the historical data tends to be limited and volatile. We look at two other approaches to estimating equity risk premiums – the survey approach, where investors and managers are asked to assess the risk premium and the implied approach, where a forward-looking estimate of the premium is estimated using either current equity prices or risk premiums in non-equity markets. In the next section, we look at the relationship between the equity risk premium and risk premiums in the bond market (default spreads) and in real estate (cap rates)

and how that relationship can be mined to generated expected equity risk premiums. We close the paper by examining why different approaches yield different values for the equity risk premium, and how to choose the "right" number to use in analysis."

Economic uncertainty and the cross-section of hedge fund returns

- Turan Bali, Stephen Brown, and Mustafa Caglayan
- SSRN, available at http://ssrn.com/abstract=2235787
- Abstract: "This paper estimates hedge funds' exposures to alternative measures of economic uncertainty and examines the performance of these uncertainty betas in predicting the cross-sectional variation in hedge fund returns. Economic uncertainty is measured by the time-varying conditional volatility of financial and macroeconomic variables associated with business cycle fluctuations. The results indicate a positive and significant link between uncertainty beta and future hedge fund returns. Funds in the highest uncertainty beta quintile generate 5.5% to 7.5% more average annual returns compared to funds in the lowest uncertainty beta quintile. After controlling for a large set of fund characteristics and risk factors, the positive relation between uncertainty beta and future returns remains economically and statistically significant. Hence, economic uncertainty is a powerful determinant of the cross-sectional differences in hedge fund returns."

Indexing and stock price efficiency

- Nan Qin and Vijay Singal
- SSRN, available at http://ssrn.com/abstract=2229263
- Abstract: "Indexing has experienced substantial growth over the past two decades because it is an effective way of holding a diversified portfolio while minimizing trading and taxes. In this paper, we focus on one negative externality of indexing: the effect on efficiency of stock prices. Based on a sample of S&P 500 index constituents over 1993 to 2011, we find that greater indexing leads to less efficient stock prices. We attribute our findings to uninformed passive trading and to reduced incentives for information acquisition and arbitrage induced by the passive nature of indexing. The relationship cannot be explained by persistence in price efficiency, size, idiosyncratic volatility, or potential reverse causality, and only partially by liquidity."

What does the volatility risk premium say about liquidity provision and demand for hedging tail risk?

- Jianqing Fan, Michael Imerman, and Wei Dai
- SSRN, available at http://ssrn.com/abstract=2234438
- Abstract: "This paper examines the volatility risk premium, defined as the difference between the expected future volatility under the physical measure and the risk-neutral expectation. This risk premium represents the price of volatility risk in financial markets. It is standard to use the VIX volatility index to proxy the expectation under the risk-neutral measure. Estimation under the physical measure is less straightforward. Using ultra-high-frequency transaction data on SPDR, the S&P500 ETF, we implement a novel approach for estimating integrated volatility on the frequency domain which allows us to isolate microstructure noise from the true volatility. Once we compute the volatility risk premium, we perform a comprehensive econometric analysis to help identify its determinants. We find that analyzing the sign and magnitude components of the volatility risk premium provides greater insight into the

underlying economic drivers, most notably supply and demand forces in the market for hedging tail risk as well as the role of intermediaries in this market. Our results are consistent with previous studies and are able to reconcile different interpretations of the volatility risk premium in the literature."

Excess autocorrelation and mutual fund performance

- Xi Dong and Massimo Massa
- SSRN, available at http://ssrn.com/abstract=2232397
- Abstract: "Informed institutional investors' strategic stealth trading has been argued to induce positive autocorrelation in their portfolio returns. Conversely, can one make use of the degree of portfolio return autocorrelation to infer relatively informed/skillful institutional investors? We propose an autocorrelation-based measure of mutual fund portfolio returns, termed the excess autocorrelation – the difference between the autocorrelation of actual fund portfolio return and that of the return on a portfolio that invests in the previously disclosed fund holdings. We document that funds with high excess autocorrelation persistently create value. Our main result shows that the excess autocorrelation predicts fund performance."

Derivatives and volatility

The VIX, the Variance Risk Premium and stock market volatility

- Geert Bekaert and Marie Hoerova
- SSRN, available at http://ssrn.com/abstract=2252209
- Abstract: "We decompose the squared VIX index, derived from US S&P500 options prices, into the conditional variance of stock returns and the equity variance premium. The latter is increasing in risk aversion in a wide variety of economic settings. We tackle several measurement issues assessing a plethora of state-of-the-art volatility forecasting models. We then examine the predictive power of the VIX and its two components for stock market returns and economic activity. The variance premium predicts stock returns but the conditional stock market variance predicts economic activity, and is more contemporaneously correlated with financial instability than is the variance premium."

Easy volatility investing

- Tony Cooper
- SSRN, available at http://ssrn.com/abstract=2255327
- Abstract: "For many decades the only way to invest in volatility has been through trading options, futures, or variance swaps. But in recent years a number of volatility-related exchange traded Funds (ETFs) and Exchange Traded Notes (ETNs) have been launched which make volatility trading accessible to the retail investor and fund managers without the need to access futures markets. Our objective is to devise a trading strategy using them. We document where volatility returns come from, clearing up some misconception in the process. Then we illustrate five different strategies that will appeal to different investors. Four of the strategies are simple to describe and implement. All of the strategies have had extraordinary returns with high Sharpe Ratios and low correlation to the S&P5'08 in some cases negative correlation. The returns seems to be too good to be true – like picking up $100 bills in front of a steamroller – so we have a detailed discussion on the risks and the nature of the steamroller. We illustrate how these strategies can be incorporated into existing portfolios to reduce portfolio risk especially in times of crisis. They have positive exposure to the markets during good times and negative exposure during bad times. Unfortunately they do not always provide absolute returns and while reducing net portfolio drawdowns they can themselves have significant drawdowns. Still, we suggest that a traditional 60% equities, 40% bonds portfolio should be adjusted to 55% equities, 35% bonds, and 10% volatility."

Volatility of volatility and tail risk premiums

- Yang-Ho Park
- SSRN, available at http://ssrn.com/abstract=2236158
- Abstract: "This paper reports on tail risk premiums in two tail risk hedging strategies: the S&P 500 puts and the VIX calls. As a new measure of tail risk, we suggest using a model-free, risk-neutral measure of the volatility of volatility implied by a cross section of the VIX options, which we call the VVIX index. The tail risk measured by the VVIX index has explanatory power for future tail risk hedge returns. Specifically, consistent with the literature on rare disasters, an increase in the VVIX index raises the current prices of tail risk hedges and thus lowers their subsequent returns over the next three to four weeks.

Furthermore, we find that volatility of volatility risk and its associated risk premium both significantly contribute to the forecasting power of the VVIX index, and that the predictability largely results from the integrated volatility of volatility rather than volatility jumps."

The importance of the volatility risk premium for volatility forecasting

- Marcel Prokopczuk and Chardin Wese Simen
- SSRN, available at http://ssrn.com/abstract=2236370
- Abstract: "Recent papers report that volatility risk is priced in most markets. Yet, existing studies ignore this non-zero volatility risk premium when employing option implied volatility (under the risk-neutral measure) in order to forecast realized volatility (under the physical measure). In this paper, we empirically study the role of the volatility risk premium in volatility forecasting. To do so, we introduce a non-parametric and parsimonious adjustment to account for the volatility risk premium. Our evidence is compelling: the risk premium adjusted option implied volatility performs significantly better than its unadjusted counterpart. Our findings are robust across loss functions and volatility estimators."

Appendix 1

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