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Quantitative Strategy

Global Markets Research

Academic Insights

Harnessing the best ideas from academia

Welcome to our monthly Academic Insights report

Fresh insights from academia
In our own research, stock-selection factors based on options data are one of our favorites. We have found such signals work well in both the U.S. and European markets. So it is with interest that we review a paper this month that proposes a novel new options-based factor: volatility of implied volatility. This metric is designed to proxy investors' uncertainty about a company, and is shown to be predictive of future stock returns.

Another major theme this month is international diversification. With the financial crisis fresh in the rearview mirror and the European debt crisis still lurking in the background, most of us could be forgiven for being a little skeptical of diversification. However, two interesting papers this month explore changes in international diversification over time, and will offer useful ideas for anyone who trades a global portfolio.

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

- Uncertainty and stock returns
- Is world stock market comovement changing?
- Time-variation in the international diversification benefits
- Categorization bias in the stock market
- Cross-sectional return predictability in China

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 Equity Quantitative Strategy team at (+1) 212 250 8983 or (+44) 20 754 71684, or email us at DBEQS.Global@db.com.

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Introduction

Welcome to *Academic Insights*

We have spent a lot of time researching options factors, so we were interested to see new academic research in this space

Of all the different factors we have studied over the past few years, those based on options data are among our favorites. For example, in the U.S. we showed that certain options-based factors – for example implied volatility skew, one-month change in implied volatility, put-call parity, and the option/stock volume ratio – have good predictive power for future equity returns.[1] We also found that a similar suite of options-based factors work well in Europe, and indeed they are part of our recently launched 3S sentiment-driven stock-selection model for European equities.[2] Given the success we have had with options factors to date, we are always on the lookout for new signals to leverage this data source.

A new paper this month proposes using volatility of implied volatility (vol-of-vol) as a stock-selection signal

Introducing vol-of-vol

So it was with great interest that we read a new paper by Baltussen, Van Bekkum, and Van der Grient [2012] that proposes a new options-based factor: volatility of implied volatility. The idea is that this so-called vol-of-vol measure is a proxy for investors' uncertainty about a particular company. They show that a portfolio that goes long low vol-of-vol stocks and short high vol-of-vol stocks generates significant excess returns. This is an interesting finding because it ties in with the low risk anomaly that is popular right now, i.e. the empirical phenomenon that stocks with *lower* risk (whether it be realized volatility, implied volatility, beta, etc.) tend to *outperform* on average. Now we can add vol-of-vol as another way to play this idea.

Two interesting papers this month study how international diversification has changed over time

International diversification: fact or fiction?

With the financial crisis fresh in the rearview mirror and the European debt crisis still lurking in the background, most of us could be forgiven for being a little skeptical of diversification. After all, one of the most important lessons from the crisis was just how interconnected financial markets and economies are these days. Does this mean that international diversification is dead? Two new papers – one by Chiou and Pukthuanthong [2012] and the other by Blackburn and Chidambaran [2011] – have interesting thoughts on this subject. While the two studies use quite different methodologies, they both focus on changes in international diversification through time and offer food for thought for anyone who invests across countries.

Artificial sector classifications seem to be a necessary evil in finance, but is there a better way?

The dangers of standard sector classifications

It is rare that anyone has anything good to say about the standard sector classification schemes. Invariably they force stocks to fit into artificial buckets that bear only a passing resemblance to the reality. Having said that, most of us have little choice but to use the standard schemes, given the lack of a suitable alternative taxonomy. However, a new paper by Krueger, Landier, and Thesmar [2012] uses a fascinating alternative: they group stocks by the similarity of the text in their 10K filings. This is similar to something we tried in our research using web data.[3] The academic paper shows that stocks initially co-move with their "official" sectors, but then revert to be more in-line with their "true" sectors, as measured by the textual similarity of their 10Ks.

Regards,
The Deutsche Bank Quantitative Strategy Team

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[1] Cahan et al., 2010, "Signal Processing: The options issue", *Deutsche Bank Quantitative Strategy*, 12 May 2010
[2] Avettand-Fenoel at al., 2012, "Introducing the 3S model", *Deutsche Bank Quantitative Strategy*, 26 March 2012
[3] Cahan et al., 2011, "Signal Processing: Quant 2.0", *Deutsche Bank Quantitative Strategy*, 18 November 2011

Five key papers this month

Paper 1: "Uncertainty and stock returns"

- Guido Baltussen, Sjoerd Van Bekkum, and Bark Van der Grient
- SSRN, available at http://ssrn.com/abstract=2023066
- Reviewed by John Chen

This paper adds to the growing body of evidence that suggests options data can be used to forecast stock returns

Why it's worth reading

We have found in our own research that signals from the options market have prediction power in forecasting stock returns, so we are always on the lookout for new options-based signals.[4] This new academic paper proposes a simple but intuitive metric: the volatility of implied volatility (vol-of-vol). They then use this metric as a proxy for investors' expected uncertainty for companies. The empirical study and robust tests show that vol-of-vol significantly predicts month-ahead stock returns, and demonstrate that the information linkages between options and stock markets are strong.

The authors compute a volatility of implied volatility metric, and show that this has predictive power for future stock returns

Data and methodology

The authors collect equity options information from OptionMetrics from January 1996 to September 2009. Price returns are obtained from CRSP and accounting information is extracted from Compustat.

The authors calculate the implied volatility (IV) from at-the-money call option and at-the-money put option, and then define volatility of implied volatility (vol-of-vol) as the standard deviation of daily IV over the past month, normalized by the average IV over the same month. Portfolios are formed based on quantiles of vol-of-vol, and the portfolios' month-ahead returns are compared to check the performance of the factor.

Empirically, low vol-of-vol stocks outperform high vol-of-vol stocks

Results

Empirical results indicate that the low vol-of-vol portfolio outperforms high vol-of-vol portfolio 0.77% monthly on average. This factor has low correlations with other factors, and cannot be explained by traditional pricing models that include factors like size, beta, value, momentum, and short-term reversal factors. They also find that vol-of-vol is also not a risk factor. Two interesting results for real-world investors are (1) that vol-of-vol has more predictive power in large caps, and (2) industry-neutral vol-of-vol portfolios perform even better.

These results are consistent with the low volatility anomaly, i.e. the empirical finding that lower risk seems seem to outperform on average

Our take

We think these findings are interesting for two reasons. First, they add further weight to the argument that options data can be useful even for stock investors who can only trade the underlying equity. Second, the fact that *low* vol-of-vol stocks *outperform* is yet another piece of evidence in favor of the so-called low risk anomaly, i.e. contrary to finance theory, investors do not appear to be compensated for holding more risky stocks, regardless of how we choose to measure risk. On average stocks with lower realized volatility, lower beta, lower implied volatility, and – as shown here – lower volatility of implied volatility, all underperform on average in the future.

[4] Cahan et al., 2010, "Signal Processing: The options issue", *Deutsche Bank Quantitative Strategy*, 12 May 2010

Paper 2: "Is world stock market comovement changing?"

- Douglas W. Blackburn and N.K. Chidambaran
- SSRN, available at http://ssrn.com/abstract=2024770
- Reviewed by Yiyi Wang

This paper develops a novel methodology: the Weighted-Generalized Canonical Correlation (W-GCC) to identify the presence of a world factor.

Why it's worth reading

Increasing co-movement in the world stock market has always been a concern as it goes against the diversification that international investment aims to achieve. Surprisingly, the existing literature up to now has found no significant increase in the comovement of country returns from 1980 to 2005[5]. The authors argue such a counter-intuitive result is mainly due to pitfalls in the current approaches used to identify the world comovement – either an extended version of the Fama-French model (allowing for world and local factors), or an APT-style factor model with principal components as factors – both of which suffer from systematic bias in one way or another. To address this issue and circumvent the drawbacks, the authors develop a novel methodology: the Weighted-Generalized Canonical Correlation (W-GCC). The presence of the world factor has important implications for investors looking to diversify internationally and for firms seeking to lower their cost of capital by issuing securities across the world.

The first step identifies the principal components in each country.
The second step searches for a factor specification for each country to maximize the sum of pair-wise correlations.

Data and methodology

The methodology has two steps. First, the authors identify the principal components in each country, noting that the linear transformations of the principal components also constitute a factor model for the country. The second step is to identify a factor specification for each country such that the k^{th} (k=1,2,3,...) factor is highly correlated with the k^{th} factor in all other countries. The process is realized by the GCC method, which sets an objective function maximizing the sum of the pairwise correlations. Moreover, the authors extended the model to the Weighted-GCC, with the weighting scheme chosen to emphasize cross-region correlations and to deemphasize the correlations between countries within the same region, so that the global factor would not be contaminated by the existence of a regional factor.

Both a simulation study and real-life data are employed to test the new method.

To test the efficacy of the new method, both a simulation study and real-life data are employed. The data are a set of weekly stock returns from 23 developed markets in the MSCI World Index, as well as book-to-market and market capitalization at the stock level. The paper also carries out trend tests to study the structural change of the world factor.

The new method proves to be able to capture a less-biased measure of the commonality of the world stock market.

Results

The new method proves to be able to capture a less-biased measure of the commonality of the world stock market. The paper also provides evidence that there was a structural shift in the mid 1990s, with comovement increasing afterwards. Through a case study on Chinese A and B market, it suggests that comovement is more likely driven by investment cash flows.

We believe a similar approach is worth exploring in our country rotation model.

Our take

It is interesting to see an alternative way to construct factors apart from traditional pre-defined rules. This model relies on the data, rather than on an explicit grouping-method, to reveal the inherent connections between countries and regions. For instance, a regional factor in this paper is not confined to the conventional definition based on geographic positions. Instead, it allows groups to endogenously emerge, and hence may well reflect grouping by countries involved in trade agreements. We believe a similar approach is worth exploring in our country rotation model.

[5] Bekaert, G., R. Hodrick, and X. Zhang, 2009, International Stock Return Comovement, *The Journal of Finance*, 64, 2591-2626.

Paper 3: "Time-variation in the international diversification benefits"

- Wan-Jiun Paul Chiou and Kuntara Pukthuanthong
- SSRN, available at http://ssrn.com/abstract=2024336
- Reviewed by Marco Salvini

The authors find positive benefits of global diversification are still available to investors, although the markets are more integrated.

The authors compute two portfolios on a monthly basis: a Maximum Sharpe Ratio Portfolio (MSR) and a Minimum-Variance Portfolio (MVP).

For the MSR portfolio, the allocation across different regions shows that the majority of the investments are small-cap regions

The high dispersion among country returns has been a key factor for asset allocators to increase the level of portfolio diversification.

Why it's worth reading

International diversification is still a key factor for portfolio managers. However, we have observed several issues during the financial crises. The authors find the positive benefits of global diversification are still available to investors, although the markets are more integrated. They analyze the time-variation of optimal international portfolios with various constraints and which economic and financial factors affect more the international diversification benefits.

Data and methodology

The investment universe is based on 34 MSCI country indices from January 1998 to December 2011. The market capitalizations are obtained from the World Federation of Exchanges. The authors compute two portfolios on a monthly basis: a Maximum Sharpe Ratio Portfolio (MSR) and a Minimum-Variance Portfolio (MVP). They take into account the following constraints: short-selling is not allowed for emerging markets and an investor cannot allocate a country in her portfolio more that *N* times *(N = 10, 5, 3)* the weight of its market value. To evaluate the benefits of the portfolio diversification, they regress the portfolio excess-returns relative to a value-weighted world portfolio against six economic and financial groups of variables. Instead of the classical OLS regression they apply the GMM regression. The groups of variables are: change in price level, real sector growth, risk premium and debt yield, equity market condition, and international financial condition. They also include, as a measure of international financial condition, the Pukthuanthong and Roll adjusted R-square (PR R-square) to measure the levels of world integration across countries.

Results

The results of the MSR and MVP portfolio weights allocation are quite interesting. For the MSR portfolio, the allocation across different regions shows that the majority of the investments are small-cap regions such as Latam, Northern Europe, Southern Europe, and Oceania when only short-selling is considered. The upper bound constraints move the portfolio weights towards the large cap countries. We highlight that for no-short selling constraint the average asset allocation is in 3.5 markets. Including the upper bound constraints increases the coverage of the optimal portfolio to 11.5 (*N = 10*), 15 (*N=5*), and 17.4 (*N = 3*). For the MVP portfolio they have similar results. However, geographically, the allocation to Latam and Northern Europe is lighter than the ones of the MSR Portfolio, while the weights in Western Europe and North America are heavier. The regression results show that inflation rate, market cap, volume, and PR R-square are associated with an increase of the Sharpe ratio of the optimal portfolios.

Our take

The results are in line with the analysis we computed when we introduced our country rotation model[6]. Over the last two years, the high dispersion among country returns has been a key factor for asset allocators to increase the level of portfolio diversification.

[6] Mesomeris et al., 2010, "Introducing MCRM: Macromomentun Country Rotation", *Deutsche Bank Quantitative Strategy*

Paper 4: "Categorization bias in the stock market"

- Philipp Krueger, Augustin Landier, and David Thesmar
- SSRN, available at http://ssrn.com/abstract=2034204
- Reviewed by Khoi Le Binh and Ada Lau

This paper shows that investors' reliance on standard industry classifications can lead to an arbitrage opportunity

Why it's worth reading

This paper adds to the behavioral finance literature on the "economics of inattention". The authors show that mispricing occurs when investors wrongly perceive a firm through its official industry rather than the peer group defined on the basis of relevant fundamental information. The categorization bias can be exploited *via* a reversal strategy, and can be used to predict analyst forecast errors.

The authors compare SIC classification to a text-based classification that is derived from the similarity of the text in firms' 10K filings

Data and methodology

The authors define for each firm an official industry using the SIC (2 digit) classification from Compustat, and a fundamental industry using the dynamic Text-based Network Industry Classifications (TNIC) developed by Hoberg and Phillips[7], which relies on a measure of firm similarity based on the text analysis of 10K product descriptions. The study focuses on the period from 1995 to 2009. Prices are obtained from CRSP and analyst data from I/B/E/S. The authors construct 5 sorted portfolios according to the differences between official and fundamental industry weekly returns. Using this signal, the authors regress the long-short portfolio returns on Carhart's 4-factor model. They also consider monthly portfolio returns of 15 double-sorted portfolios which control for size effect, or the degree of official industry follower (OIF). OIF is defined as the volatility-scaled absolute difference between firm returns and official industry returns. Finally, the authors replace returns with the analyst EPS forecast to price (FP) ratio and regress forecast errors on the differences between official and fundamental industry FP, as well as the corresponding measure of OIF.

A reversal strategy based on the divergence between a firm's official industry and its text-based industry generates excess returns

Results

This paper shows that stocks in the same official industry co-move strongly at weekly horizons, but they revert back to their fundamental industry returns over time. The authors show that long-short portfolios based on the divergence between a firm's official and fundamental industry returns, with a formation period of up to 3 weeks, generate significant risk-adjusted excess returns. Reversal is more pronounced for strong industry followers. They also show that differences between official and fundamental industry FP, together with the corresponding measure of OIF, significantly explain the cross-sectional deviations of analyst forecast errors. Robustness tests are done by repeating the analysis with SIC 3 digits and GICS as the official industry.

We have experimented with the idea of using web data to define a company's peer group, which also showed some promise

Our take

Categorization bias leads to the overreaction of investors and analysts to information related to industry peers. We think that it would also be interesting to study and compare other types of categorization. For example, we have recently used structured web data[8] to define timely and meaningful peers. These new techniques to categorize stocks may help us in gaining a better grasp on stock drivers, well beyond traditional industry categorization and/or contexts defined by investment styles.

[7] Hoberg, G. and Phillips, G., 2010, "Product market synergies and competition in mergers and acquisitions: A text-based analysis", Review of Financial Studies 23, 3773-3811

[8] Cahan, R. et al, 2011, "Quant 2.0", *Deutsche Bank Quantitative Strategy*, 18 November 2011

Paper 5: "Cross-sectional return predictability in China"

- Nusret Cakici, Kalok Chan, and Kudret Topyan
- SSRN, available at http://ssrn.com/abstract=2008176
- Reviewed by Miguel Alvarez

The Chinese stock market, like the country as a whole, is becoming increasingly important

Why it's worth reading

This paper is interesting for a number of reasons. First, as the authors point out, the Chinese stock market (i.e. Shanghai and Shenzhen exchanges) now has a market capitalization that ranks just below the NYSE-Euronext and Nasdaq-OMX but above London and Tokyo, so China is an increasingly important part of the global equities market. Second, quantitative investing is rapidly gaining traction in China, and there is anecdotal evidence that a number of Chinese expats who previously managed money quantitatively in offshore markets are now returning home to set up quantitative funds in China. So what works in China from a quant perspective is becoming increasingly relevant. Third, two of the previous papers we reviewed this month discussed international diversification. Given this paper is limited to A-shares (which can only be traded by Chinese citizens), it represents and interesting case study on the reach of international diversification in a quant context; do similar factors work in Chinese A-shares compared to the rest of the world, given that it is effectively walled-off from the rest of the global equity market?

The authors study only A-shares, and conduct the usual asset pricing tests to determine which factors work in China

Data and methodology

The authors use Datastream to collect market and fundamental data for Chinese A-shares (Yuan denominated) that were listed on the Shanghai or Shenzhen exchanges from 1994 to March 2011. Using this data, the authors construct 10 factors that have been shown to predict the cross-section of returns in other markets: size, price, beta, realized volatility, idiosyncratic volatility, 1M reversal, 12M-1M momentum, book-to-market, cashflow-to-market, and earnings-to-price.

The methodology for testing the predictive power of each factor is standard, and relies mainly on two test: the monthly performance of univariate quintile-sort portfolios and monthly cross-sectional regressions of forward returns onto the factors.

Valuation factors stand out as the most effective factors in China, although size, and volatility also show some efficacy

Results

The factors that work well in China are price, idiosyncratic volatility, 1M reversal, book-to-market, cashflow-to-price, and earnings-to-price. Among these, the valuation factors show the strongest statistical, and more importantly, economic significance. For example, the monthly return spread between an equally-weighted top quintile and bottom quintile portfolio is 2.4% for cashflow-to-price. Furthermore, the cumulative performance of book-to-market and cashflow-to-market is positive in every calendar year except 2010, so the results are not being driven by a particular time period.

Interestingly, momentum does not work in China

Another interesting result is what is missing from the list; it turns out that 12M-1M momentum does not work in the Chinese A-share universe. However, the authors drill down into this, and do find that momentum becomes significant once size, book-to-market and volatility are controlled for.

The interest in quant investing in China is only going to increase over coming years

Our take

This is an interesting paper that tackles an increasingly important market just as quantitative techniques are becoming more prevalent. It will be interesting to see if these findings being to change as the assets under quantitative management in the market begin to rise. Perhaps we should enjoy these returns while we can!

Upcoming conferences

Europe

Figure 1: European event calendar

Date	Location	Conference
21-23 May 2012	**Monaco**	**FACTSET Symposium**
		http://www.factset.com/campaigns/symposium2012
20-22 June 2012	**Oxford**	**5th Annual Society for Financial Econometrics Conference**
		http://sofie.oxford-man.ox.ac.uk/
27-30 June 2012	**Barcelona**	**European Financial Management Association Annual Meeting 2012**
		http://www.efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2012-Barcelona/2012meetings.shtml
28-30 June 2012	**Samos Island,**	**9th International Conference on Applied Financial Economics**
	Greece	http://www.ineag.gr/AFE/index.php
15-18 August 2012	**Copenhagen**	**39th European Finance Association Annual Meeting 2012**
		http://www.efa2012.org/

Source: Deutsche Bank

North America

Figure 2: North American event calendar

Date	Location	Conference
6-9 May 2012	**Chicago**	**CFA Institute 65th Annual Conference**
		http://www.cfainstitute.org/learning/products/events/Pages/05062012_52432.aspx
11-12 May 2012	**Chicago**	**R/Finance 2012: Applied Finance with R**
		http://www.rinfinance.org/
31 May 2012	**New York**	**SQA "Fuzzy Day": Learning and Adaptation in Financial Markets**
		http://sqa-us.org/
14 June 2012	**New York**	**CQA/SQA Quantitative Trading Seminar**
		http://www.cqa.org/index.php?option=com_content&view=article&id=68&Itemid=93
25-27 June 2012	**Chicago**	**Quant Invest 2012**
		http://www.terrapinn.com/2012/quant-invest-chicago/index.stm
12-13 September 2012	**Chicago**	**CQA Fall Conference**
		http://www.cqa.org/

Source: Deutsche Bank

Asia

Figure 3: Asian event calendar

Date	Location	Conference
7-8 May 2012	**Singapore**	**SKBI Conference on Financial Economics**
		http://www.smu.edu.sg/institutes/skbife/events/SKBI%20Annual%20Conference%202012/index.asp
21-22 May 2012	**Singapore**	**International Conference on Qualitative and Quantitative Economic Research**
		http://www.qq-economics.org/index.html
5-6 June 2012	**Hong Kong**	**Asset Allocation Summit Asia**
		http://www.terrapinn.com/2012/asset-allocation-summit-asia/?pk_campaign=Terr-Listing&pk_kwd=finance+%26amp%3b+investment
8-9 June 2012	**Singapore**	**SMU-ESSEC Symposium on Empirical Finance and Financial Econometrics**
		http://www.smu.edu.sg/institutes/skbife/events/SMU-ESSEC%202012/2012/index.asp
11-13 July 2012	**Phuket,**	**2012 FMA Asian Conference**
	Thailand	http://www.fma.org/Thailand/
19-22 June 2012	**Sydney**	**2012 Quantitative Methods in Finance Conference**
		http://datasearch2.uts.edu.au/qfrc/news-events/events-detail.cfm?ItemId=28330
19-22 June 2012	**Sydney**	**7th World Congress of the Bachelier Finance Society**
		http://www.bfs2012.com/

Source: Deutsche Bank

Other papers of interest

Alpha generation and stock-selection signals

Informed trading in corporate bonds prior to earnings announcements

- Jason Zhanshun Wei and Xing Zhou
- SSRN, available at http://ssrn.com/abstract=2037876
- Abstract: "This paper examines the information content of corporate bond trading prior to earnings announcements. We find that the direction of pre-announcement bond trading is significantly related to earnings surprises. Such linkage is most evident prior to negative news and in high-yield bonds. Further, abnormal bond trading during the pre-announcement period can help predict post-announcement bond returns. Such predictive power of bond trading largely originates from institutional sized trades and is concentrated in the issuer's most actively traded bond. Lastly, even after accounting for transactions costs, informed bond trading can generate significant net profits, especially prior to the release of bad news."

The impact of divergence of opinions about earnings within a social network

- Paul Irvine and Robert Charles Giannini
- SSRN, available at http://ssrn.com/abstract=2024559
- Abstract: "We collect a unique dataset of Twitter posts and use these posts to contrast investors' private opinions about stocks with opinions available in public press releases. This technique allows us to directly measure the divergence of investors' opinions from publicly available information. We find that post-earnings announcement returns are significantly more negative when divergence of opinion is present in the pre-announcement period. These negative post-announcement returns are concentrated in stocks where divergence of opinion is resolved into agreement after the announcement. Consistent with recent theory, investors' opinions can either converge or diverge around earnings announcements and the level of this disagreement is strongly related to volume."

Systematic liquidity risk and stock price reaction to shocks

- Khelifa Mazouz, Dima Alrabadi, and Shuxing Yin
- SSRN, available at http://ssrn.com/abstract=2042890
- Abstract: "This study examines the relationship between systematic liquidity risk and stock price reaction to large 1-day price changes (or shocks). We base our analysis on a yearly updated constituents list of the FTSE All share index. Our overall results are consistent with the price continuation hypothesis, which suggests that positive (negative) shocks will be followed by positive (negative) abnormal returns. However, further analysis indicates that stocks with low systematic liquidity risk react efficiently to both positive and negative shocks, whereas stocks with high systematic liquidity risk underreact to both positive and negative shocks. Our results are valid irrespective of various robustness tests such as size of the shock, size of the firm, month-of-the-year and day-of-the-week effects. We conclude that trading on price patterns following shocks may not be profitable, as it involves taking substantial liquidity exposure."

Behavioral measures of expected market returns

- C. Thomas Howard
- SSRN, available at http://ssrn.com/abstract=2027679
- Abstract: "The impact of investor behavior on equity pricing has been extensively investigated. The conclusion is that investor behavior significantly impacts individual as well as market-wide equity returns. In this study, I add to the behavioral investing literature by introducing Strategy Market Barometers that are based on the extent to which investors are currently rewarding one equity strategy over another. I find that combining US and International Strategy Market Barometer measures with Baker & Wurgler's (2006) Sentiment Index, and other variables, explains 19% to 30% of subsequent S&P 500, Russell 2000, and EAFE annual return variability. Results are statistically and economically highly significant. In several cases, the annual subsequent return advantage of the top 16% over the bottom 16% sentiment and strategy index values reaches an astonishing 37% per annum. These results cannot be explained by trailing market returns nor changing economic conditions. Thus, Strategy Market Barometer and Sentiment Index behavioral measures are predictive of future market returns and therefore provide a measure of expected market returns."

Short-term momentum and reversals in large stocks

- Jason Zhanshun Wei and Liyan Yang
- SSRN, available at http://ssrn.com/abstract=2029984
- Abstract: "Using stocks traded on the NYSE, AMEX and NASDAQ for the period of 1964 to 2009, this study demonstrates that, while momentum prevails among small stocks, momentum and reversals coexist among large stocks for a holding period of up to six months. The momentum/reversal divide is along the volatility dimension: Large-cap/low-volatility stocks exhibit reversals while large-cap/high-volatility stocks experience momentum. Our finding is in sharp contrast with those in the existing literature which mostly documents and explains momentum and reversals for different horizons. We contribute to the literature by 1) uncovering a new empirical regularity which explains why large stocks are generally associated with no or weak momentum in the short-term, and 2) advancing a theoretical model based on "moderated confidence" which can rationalize empirical findings such as the one in the current paper where underreaction and overreaction can occur simultaneously with the same investor."

Asset prices and Google's search data

- Bodo Herzog
- SSRN, available at http://ssrn.com/abstract=2045766
- Abstract: "This paper investigates the relationship of asset price determination via Google data and trading volume. We use weekly data from 2004 to 2010 for 30 international banks. Our study is the first which differentiate between Google's search volume and Google's search clicks. We find that asset prices are positively related to the growth rate of Google's search, trading volume and the level of Google search clicks. Secondly, we find that the absolute level of Google's search volume and Google's search clicks behave differently regarding asset price dynamics. Google's search volume, which measures long-run searches, is negatively related to asset prices and Google's search click is positively related. We conclude that Google's data contain important information for the identification of asset bubbles."

Trends in the cross-section of expected stock returns

- Tarun Chordia, Avanidhar Subrahmanyam, and Qing Tong
- SSRN, available at http://ssrn.com/abstract=2029057
- Abstract: "We find that as markets have become more active and liquid in recent years, many popular return anomalies have materially diminished in strength and significance. Liquid NYSE/AMEX stocks exhibit little of the well-known cross-sectional effects such as momentum, monthly reversals, analyst dispersion, earnings drift, or accounting accruals; and trend regressions indicate that Fama-MacBeth coefficients have attenuated significantly for both NYSE/AMEX and Nasdaq stocks. Portfolio strategies show markedly diminished (and largely insignificant) reward-risk ratios in recent times. Overall, the evidence indicates that pricing efficiency of equities has increased in the regime of markedly higher trading activity."

Optimization, portfolio construction, and risk management

Managing the risk of momentum

- Pedro Barroso and Pedro Santa-Clara
- SSRN, available at http://ssrn.com/abstract=2041429
- Abstract: "Compared to the market, value or size risk factors, momentum has offered investors the highest Sharpe ratio. However, momentum has also had the worst crashes, making the strategy unappealing to investors with reasonable risk aversion. We find that the risk of momentum is highly variable over time and quite predictable. The major source of predictability does not come from systematic risk but from specific risk. Managing this time-varying risk virtually eliminates crashes and nearly doubles the Sharpe ratio of the momentum strategy. Risk-managed momentum is a much greater puzzle than the original version."

CISS – A composite indicator of systemic stress in the financial system

- Daniel Hollo, Manfred Kremer, Marco Lo Duca
- SSRN, available at http://ssrn.com/abstract=2018792
- Abstract: "This paper introduces a new indicator of contemporaneous stress in the financial system named Composite Indicator of Systemic Stress (CISS). Its specific statistical design is shaped according to standard definitions of systemic risk. The main methodological innovation of the CISS is the application of basic portfolio theory to the aggregation of five market-specific subindices created from a total of 15 individual financial stress measures. The aggregation accordingly takes into account the time-varying cross-correlations between the subindices. As a result, the CISS puts relatively more weight on situations in which stress prevails in several market segments at the same time, capturing the idea that financial stress is more systemic and thus more dangerous for the economy as a whole if financial instability spreads more widely across the whole financial system. Applied to euro area data, we determine within a threshold VAR model a systemic crisis-level of the CISS at which financial stress tends to depress real economic activity."

Nasty or naughty: Predictability of cash flow and earnings management

- Xuehui Han
- SSRN, available at http://ssrn.com/abstract=2027738
- Abstract: "China has emerged as an important financial market in recent years, although it is still fairly closed but opening up at a steady pace. Unfortunately, the information on the quality of the listed companies' financial reports is very limited. In this paper, we approach this topic from the angle of testing the association between predictability of the future cash flow and earnings management by using the financial reports issued by the Stock Exchange Market Index companies in China under the analytical framework of random-walk sales and the associated accruals. After detailed analysis of the fitness of the model both on aggregated market level and on individual company level, we apply simulations in an effort to reveal the unobservable earnings management and in an effort to reach a deeper understanding of Chinese style accounting management behavior. We found that (1) in distinction from the common conception of "nasty" financial information in China's capital market, the future cash flow of Chinese companies is actually predictable from the accrual components; (2) the "naughty" earnings smoothing behavior is indeed prevailing in China at least for the Stock Market Index companies which tend to use the previous period's performance as a target to smooth the earnings."

Tail risk reduction strategies

- Lerby Murat Ergun and Philip Stork
- SSRN, available at http://ssrn.com/abstract=2029490
- Abstract: "We analyze a number of systematic investment strategies that intend to reduce tail risk. Using Extreme Value Theory, we calculate Value at Risk and Expected Shortfall measures. A CAPM and down- and upside beta framework is used to study investment returns over different asset classes. We find that some mechanical strategies generate average compounded returns similar to those of the buy-and-hold strategy, and that tail risks are indeed reduced significantly."

A dynamic inflation hedging trading strategy using a CPPI

- Nicolas Fulli-Lemaire
- SSRN, available at http://ssrn.com/abstract=2033166
- Abstract: "This article tries to solve the portfolio inflation hedging problem by introducing a new class of dynamic trading strategies derived from classic portfolio insurance techniques adapted to the real world. These strategies aim at yielding higher returns on a risk-adjusted basis than regular inflation hedging portfolio allocation while achieving a lower cost than comparable option–based guaranteed real value strategies."

Asset allocation and sector/style rotation

Risk premia harvesting through momentum

- Gary Antonacci
- SSRN, available at http://ssrn.com/abstract=2042750
- Abstract: "Momentum is the premier market anomaly. It is nearly universal in its applicability. Rather than focus on momentum applied to particular assets or asset classes, this paper explores momentum with respect to what makes it most effective. We do this first by introducing a hurdle rate filter before we can initiate long positions. This ensures that momentum exists on both an absolute and relative basis and allows momentum to function as a tactical overlay. We then explore the factor most rewarded by momentum - extreme past returns, i.e., price volatility. We identify high volatility through the paired risk premiums in foreign/U.S. equities, high yield/credit bonds, equity/mortgage REITs, and gold/Treasury bonds. Using modules of asset pairs as building blocks lets us isolate volatility related risk factors and use momentum to effectively harvest risk premium profits."

Stock market co-movement in Latin America

- Otavio De Medeiros
- SSRN, available at http://ssrn.com/abstract=2032137
- Abstract: "This paper investigates co-movement in five Latin-American stock markets (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela) using common factor analysis. The common factors are obtained using principal component analysis (PCA) and therefore account for the maximum portion of the variance present in the stock exchanges investigated. We test for co-movement in different periods so as to ascertain any changes that have taken place from one period to the next. In particular, we examine rolling windows with 5-year, 3-year, 2-year, and 1-year periods. We also specify and estimate a vector autoregressive model and test for co-movement between the eight markets during the sample period by means impulse response functions. The results of both methods show that comovement between the exchanges over the entire sample period does not converge. However, we find evidence of an increasing co-movement from 2002 to 2008, which implies a growing integration between these markets. However, the trend towards increasing integration between the stock markets seems to have suffered a setback in 2008 due to the world financial crisis. Since then, a possible resume to the trend of increasing integration is unclear. The impulse response analysis shows that Argentina, Brazil, Chile, Colombia, Mexico and Peru present moderate response to shocks in each other's markets and very low responses to shocks in Ecuador and Venezuela's markets. Also, responses of Ecuador and Venezuela's market returns to shocks in the other markets are very low."

The credit risk premium and return predictability in high yield bonds

- Jason Thomas
- SSRN, available at http://ssrn.com/abstract=2037495
- Abstract: "I demonstrate that much of the time series variation in the credit spread on high yield bonds is attributable to changes in the "credit risk premium" rather than changes in expected default losses. The credit risk premium is the expected excess return investors earn from bearing default risk on high yield bonds. I find that the credit risk premium on high yield bonds averages about 2.4 percent per year, accounts for 43 percent of high yield credit spreads, on average, and predicts excess returns on high yield bonds. I also find that the excess returns on lower rated credits (B and CCC, relative to BB) are more sensitive to variation in the credit risk premium. The credit risk premium increases with the conditional volatility of default losses and decreases with aggregate

consumption growth. The evidence suggests that conventional measures of economic risk are able to explain the sizeable increase in credit spreads in the fall of 2008."

Tactical asset allocation using relative strength

- John Lewis
- SSRN, available at http://ssrn.com/abstract=2025699
- Abstract: "This paper presents the results of several relative strength (momentum) tactical asset allocation strategies tested in a real world portfolio management setting. Monte Carlo simulations are used to determine the possible range of outcomes if a portfolio manager selects a subset of high relative strength (momentum) asset classes over time. A testing protocol that rebalances the portfolio on a continuous basis is also used to simulate real world portfolio management practices."

Equities' exposures to currencies: Beyond the loglinear model

- Kris Boudt, Faug Liu, and Piet Sercu
- SSRN, available at http://ssrn.com/abstract=2035347
- Abstract: "It has been surprisingly difficult to demonstrate non-zero currency exposures for individual stocks, and a recent study even finds that the absolute value of estimated exposure is a better predictor than the value itself. We argue that the value of the international-trade option should be convex in the exchange rate so that exposure depends on the exchange rate level. Since spot rates move slowly, exposure could then differ substantially across samples. Many large companies, in addition, must be ambidextrous - positively exposed in some activities, and negatively in others. We derive a class of tractable regression models and find that the standard loglinear regression is invariably beaten by the proposed alternative. However, too often we detect at least a partial concavity."

Trading and market impact

Execution risk in high-frequency arbitrage

- Roman Kozhan and Wing Wah Tham
- SSRN, available at http://ssrn.com/abstract=2030767
- Abstract: "In this paper, we investigate the role of execution risk in high-frequency trading through arbitrage strategies. We show that if rational agents face uncertainty about completing their arbitrage portfolios, then arbitrage is limited even in markets with perfect substitutes and convertibility. Using a simple model, we demonstrate that this risk arises from the crowding effect of competing arbitrageurs entering the same trade and inflicting negative externalities on each other. Our empirical results provide evidence that support the relevance of execution risk in high-frequency arbitrage."

The volume clock: Insights into the high frequency paradigm

- David Easley, Marcos M. Lopez de Prado, and Maureen O'Hara
- SSRN, available at http://ssrn.com/abstract=2034858
- Abstract: "Over the last two centuries, technological advantages have allowed some traders to be faster than others. We argue that, contrary to popular perception, speed is not the defining characteristic that sets High Frequency Trading (HFT) apart. HFT is the natural evolution of a new trading paradigm that is characterized by strategic decisions made in a volume-clock metric. Even if the speed advantage disappears, HFT will evolve to continue exploiting Low Frequency Trading's (LFT) structural weaknesses. However, LFT practitioners are not defenseless against HFT players, and we offer options that can help them survive and adapt to this new environment."

Optimal execution horizon

- David Easley, Marcos M. Lopez de Prado, and Maureen O'Hara
- SSRN, available at http://ssrn.com/abstract=2038387
- Abstract: "We introduce the OEH model, which determines the optimal trading horizon for an order, contingent on volatility and toxicity in the market, trading range, order size and risk aversion. The optimal trading horizon is an input required by many optimal execution strategies, thus OEH provides a complement rather than a substitute for those models. From a theoretical perspective, OEH explains why market participants may rationally 'dump' their orders in an increasingly illiquid market. OEH is shown to perform better than participation rate schemes. We argue that trade side and order imbalance are key variables needed for modeling market impact functions, and their dismissal may be the reason behind the apparent disagreement in the literature regarding the functional form of the market impact function. An implementation of OEH is provided, in Python language."

Finance theory and techniques

Value investing: Investing for grown ups?

- Aswath Damodaran
- SSRN, available at http://ssrn.com/abstract=2042657
- Abstract: "Value investors generally characterize themselves as the grown ups in the investment world, unswayed by perceptions or momentum, and driven by fundamentals. While this may be true, at least in the abstract, there are at least three distinct strands of value investing. The first, passive value investing, is built around screening for stocks that meet specific characteristics – low multiples of earnings or book value, high returns on projects and low risk – and can be traced back to Ben Graham's books on security analysis. The second, contrarian investing, requires investing in companies that are down on their luck and in the market. The third, activist value investing, involves taking large positions in poorly managed and low valued companies and making money from turning them around. While value investing looks impressive on paper, the performance of value investors, as a whole, is no better than that of less "sensible" investors who chose other investment philosophies and strategies. We examine explanations for why "active" value investing may not provide the promised payoffs."

Are REITs real estate? Evidence from international sector level data

- Martin Hoesli and Elias Oikarinen
- SSRN , available at http://ssrn.com/abstract=2034377
- Abstract: "The aim of this study is to examine whether securitized real estate returns reflect direct real estate returns or general stock market returns using international data for the U.S., U.K., and Australia. In contrast to previous research, which has generally relied on overall real estate market indices and neglected the potential long-term dynamics, our econometric evaluation is based on sector level data and caters for both the short-term and long-term dynamics of the assets as well as for the lack of leverage in the direct real estate indices. In addition to the real estate and stock market indices, the analysis includes a number of fundamental variables that are expected to influence real estate and stock returns significantly. We estimate vector error-correction models and investigate the forecast error variance decompositions and impulse responses of the assets. Both the variance decompositions and impulse responses suggest that the long-run REIT market performance is much more closely related to the direct real estate market than to the general stock market. Consequently, REITs and direct real estate should be relatively good substitutes in a long-horizon investment portfolio. The results are of relevance regarding the relationship between public and private markets in general, as the 'duality' of the real estate markets offers an opportunity to test whether and how closely securitized asset returns reflect the performance of underlying private assets. The study also includes implications concerning the recent financial crisis."

Robust anomalies? A close look at accrual-based trading strategies

- Steven Taylor and Leon Wong
- SSRN, available at http://ssrn.com/abstract=2042893
- Abstract: "The last 40 years have seen an extensive literature documenting so-called anomalies in major capital markets. Evidence of 'abnormal' returns associated with trading strategies based on readily observable phenomena such as accounting-based data involves experimental design choices that can be expected to influence the results. We show how evidence of an accrual anomaly in Australia is sensitive to research design specifications such as the choice of proxy for total accruals; the definition of abnormal returns (i.e. the return generating model); the impact of data trimming as a response to exceptionally large returns; and the choice between value and equal weighting of returns. We show that research design choices do matter and help reconcile conflicting

prior evidence of any accrual anomaly in Australia. More broadly, our results suggest the need for caution in drawing inferences from trading strategy tests which claim to identify anomalies."

Betting against beta and the cross-section of hedge fund returns

- Alexander Eisele
- SSRN, available http://ssrn.com/abstract=2026601
- Abstract: "This paper demonstrates that the loading on a factor long low beta stocks and short high beta stocks has significant explanatory power in the cross-section of hedge fund returns. Hedge funds with a high loading on this factor outperform funds with a low loading on this factor by 6% annually using raw returns and by 10% on a risk-adjusted basis. Using data on hedge fund stock holdings and drawing from recent work in asset pricing the paper shows that the demand for beta is driven by the use of leverage and the contractual relationship between hedge fund managers and investors."

Out-of-sample equity premium predictability and sample split invariant inference

- Gueorgui I. Kolev
- SSRN, available at http://ssrn.com/abstract=2024573
- Abstract: "Out-of-sample methods play important role in the modern equity premium predictability debate. However, how do we split the available sample into in-sample estimation period and out-of-sample evaluation period? I show that for all predictors there exist some sample splits, for which a researcher who wants to show that returns are not predictable, can show that. Similarly, for some predictors there exist plenty of sample splits for which a researcher who wants to show that returns are predicable, can show that too. So a researcher can easily find out-of-sample evidence for whatever she wants to find. Here I propose two conceptually simple and computationally intensive solutions to the sample split choice problem. The first is to report in graphical form the out-of-sample predictability criteria for every possible sample split. The second is to calculate across all possible sample splits some summary statistic of an out-of-sample predictability criterion and to determine for inferential purposes the distribution of this statistic under the null of no return predictability by bootstrap simulation. I implement the methods I propose for a comprehensive set of 21 equity premium predictors. I find that the traditional predictors perform occasionally very well, i.e., there are a lot of real time investors that could have benefited from conditional predictions on out-of-sample basis. I do not find dramatic disagreement between in-sample predictability tests and out-of-sample predictability tests, when the sample split invariant mean and maximum test that I propose are used."

Ambiguity aversion and variance premium

- Jianjun Miao, Bin Wei, and Hao Zhou
- SSRN, available at http://ssrn.com/abstract=2029296
- Abstract: "This paper offers an ambiguity-based interpretation of variance premium - the difference between risk-neutral and objective expectations of market return variance - as a compounding effect of both belief distortion and variance differential regarding the uncertain economic regimes. Our approach endogenously generates variance premium without imposing exogenous stochastic volatility or jumps in consumption process. Such a framework can reasonably match the mean variance premium as well as the mean equity premium, equity volatility, and the mean risk-free rate in the data. We find that about 96 percent of the mean variance premium can be attributed to ambiguity aversion. Applying the model to historical consumption data, we find that variance premium mostly captures depressions, deep recessions, and financial panics, with a post war peak in 2009."

Information vs. risk-sharing: Trading and home bias

- Xi Dong
- SSRN, available at http://ssrn.com/abstract=2024473
- Abstract: "Using a methodology based on recent liquidity/microstructure models, this paper examines the volume and return relation in foreign and domestic stocks traded in the U.S. market. I find returns on high volume days for foreign stocks tend to reverse while returns on high volume days for U.S. domestic stocks tend to continue relatively. For foreign stocks with shares traded both in their home markets and in the U.S. markets, returns on high volume days for the shares traded in the U.S. tend to reverse while returns on high volume days for the shares traded in their home markets tend to continue relatively. These patterns are all stronger for stocks from underdeveloped countries, which U.S. investors know less information about than developed countries. The findings suggest that investors' demand shocks for foreign stocks in their portfolios are more driven by risk-sharing/liquidity while they are more likely to trade domestic stocks for speculating on private information. The results are consistent with the information-based explanation of home bias."

Dissecting market efficiency

- Rasa Karapandza and Jose M. Marin
- SSRN, available at http://ssrn.com/abstract=2024552
- Abstract: "In this paper we introduce a new methodology to test market efficiency and to assess the performance of the most widely accepted asset pricing models. The methodology is used to test the semi-strong form of market efficiency in the context of publicly available accounting information. Instead of testing for a given type of accounting information that can generate abnormal excess returns according to some asset pricing model, we simultaneously test for a large set of types of accounting information in the context of several asset pricing models. The results of the study are quite negative for both the MEH and the standard asset pricing models used to test it. The evidence clearly suggests that market inefficiency is not a matter of a few isolated cases of known pricing anomalies, but a broad and general phenomena, and that the standard asset pricing models are faulty, as they fail to meet minimum requirements of true asset pricing models."

Is error term residual?

- Jun Hu
- SSRN, available at http://ssrn.com/abstract=2032360
- Abstract: "Following Fama-French (1993), most researchers try to find new risk factors to complement the Fama-French three factors model. Most of them implement by ranking on the desirable risk factors or regression on the risk factors, and then check the beta or risk premium is significant from zero or not, and assess by the increment of the R2 or/and closer of alpha to zero. However, does adding new factors can really solve the puzzle? Unfortunately, this paper's answers is no. By regression individual's (or portfolio's) excess return on the risk factors and rank the error term from the regression, then construct portfolios based on the ranking, you will get the result very similar to that you directly rank the average return of the portfolios. And by constructing portfolios with various kinds of strategies the result is unchanged and robust. That is similar error term have similar return, but this pattern isn't persistent. When you rank on lag of (at least 1-12 is) error term or return this pattern disappears. This again, however, means no risk factors missing. This is because if there is missing factor, this pattern may survive when rank on lag due to the persistence of risk factor to some extent. Therefore, this pattern is like a puzzle."

Derivatives and volatility

Assessing models of individual equity option prices

- Gurdip Bakshi, Charles Cao, and Zhaodong Zhong
- SSRN, available at http://ssrn.com/abstract=2038551
- Abstract: "This article investigates option models in the encompassing class of stochastic volatility, return-jumps, and volatility-jumps. Relying on individual equity options on the 50 most active firms and maximum likelihood estimation method, we obtain several findings. First, while stochastic volatility is as important for individual equity options as it is for index options, return-jumps and volatility-jumps are also essential in pricing individual equity options. Second, the double-jump model improves pricing performance beyond return-jumps absent volatility-jumps, and beyond volatility-jumps absent return-jumps. Third, between return-jumps and volatility-jumps, the former is empirically more relevant than the latter for pricing options; and fourth, the inverse link between volatility-jumps and return-jumps is instrumental for explaining the valuation of deep out-of-money puts and the option dynamics of firms with high kurtosis."

Understanding ETNs on VIX futures

- Carol Alexander and Dimitris Korovilas
- SSRN, available at http://ssrn.com/abstract=2043061
- Abstract: "This paper aims to improve transparency in the market for direct, leveraged and inverse exchange-traded notes (ETNs) on VIX futures. The first VIX futures ETNs were issued in 2009. Now there are about 30 of them, with a market cap of about $3 billion and trading volume on some of these products can reach $5 billion per day. Yet volatility trading is highly complex and regulators are rightly concerned that many market participants lack sufficient understanding of the risks they are taking. We recommend that exchanges, market-makers, issuers and potential investors, as well as regulators, read this paper to improve their understanding of these ETNs."

Appendix 1

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