



## Harnessing the best ideas from academia

### 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

In our recent research we studied lead-lag relationships between the returns of economically-linked firms. So we were interested to come across a new academic paper that studies similar themes, albeit from a purely statistical perspective. The authors use a Granger causality test to identify “leader” firms, i.e. firms that drive other company’s returns. Similar to what we found, they also find that important lead-lag relationships often cross sector lines.

### Key papers this month

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

- Low-risk investing without industry bets
  - Cross-firm information flows and the predictability of stock returns
  - Stochastic portfolio theory optimization and the origin of alternative asset allocation strategies
  - GDP mimicking portfolios and the cross-section of stock returns
  - Underestimation bias of risk on optimized portfolios by multifactor risk model
- Upcoming events

### 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](mailto:DBEQS.Global@db.com).

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# A letter to our readers

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## Welcome to *Academic Insights*

Earlier this month, we argued that low volatility strategies were looking a little crowded in the U.S. market.<sup>1</sup> We could probably make the same argument about academic papers about low volatility! Having said that, the first paper we highlight this month is well worth a read, even against the backdrop of an endless supply of such papers.

### Low volatility = value and defensives in disguise?

One of the criticisms often leveled at low volatility or low beta strategies is that they are getting a lot of their performance from exposures to value and stable, defensive industries. A new paper by Asness, Frazzini, and Pedersen [2013] disputes this. They extend their previous “betting against beta” analysis to include an industry neutral version of the strategy, and show that in fact most of the outperformance of the low beta strategy is indeed coming from stock selection, not other exposures.

*Is low volatility just a proxy for stable industries and value? No*

### Follow the leader

In one of our recent research papers, we studied the lead-lag relationships in the returns of economically-linked firms.<sup>2</sup> So we were interested to come across a fascinating paper by Scherbina and Schlusche [2013]. These authors use a purely statistical algorithm to identify “leader” and “follower” firms; leaders are the firms that Granger-cause the subsequent returns of another firm (the follower). Similar to our research, they find that leader-follower relationships often cross sector bounds. Furthermore, they argue that news flow is a potential driver of lead-lag relationships, in the sense that higher news intensity in the leader firm strengthens the results, presumably because there is more information to propagate to the follower firms.

*One interest paper this month studies lead-lag relationships in stock returns, using a purely statistical approach*

### Don't judge a paper by its title

Two papers this month share the award for having the longest title of any papers we've reviewed in a long while. But don't let that put you off, both have useful things to say on the portfolio construction front. The first, by Oderda [2013], is interesting because it takes a theoretical rather than empirical approach to the whole low risk debate. Plenty of papers tell you that historically low risk has worked, but how many tell you why? On the other hand, Minami [2013] studies the old culprit of estimation error in risk models. He finds that the long-only constraint in the minimum variance portfolio actually mitigates a lot of estimation error.

*Don't let long titles put you off, two portfolio construction papers this month are well worth a read*

### GDP, not such a lagging indicator after all

Most of us realize when we start investing that GDP is a fairly useless leading indicator; by the time it is published, the economy has already moved on. However, a new paper by Kroencke, Schindler, Sebastian, and Theissen [2013] shows that certain components of GDP are in fact useful in explaining stock returns.

*It turns out certain parts of GDP are quite useful in explaining stock returns*

Regards,  
The Deutsche Bank Quantitative Strategy Team

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<sup>1</sup> Cahan et al., “The Quant View”, *Deutsche Bank Quantitative Strategy*, 3 May 2013

<sup>2</sup> Cahan et al., “Signal Processing: Uncovering hidden economic links”, *Deutsche Bank Quantitative Strategy*, 24 May 2013



# Five key papers this month

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## Paper 1: “Low-risk investing without industry bets”

- Cliff Asness, Andrea Frazzini, and Lasse H. Pedersen
- SSRN, available at <http://ssrn.com/abstract=2259244>
- Reviewed by Spyros Mesomeris

### Why it's worth reading

The authors review the strategy of buying low-beta stocks while shorting riskier high-beta stocks. Previous literature has shown that the low beta strategy delivers good results mostly due to its exposure to stable industries and value. The authors' conclusions confirm that “betting against the beta” (BAB) has historically delivered good returns. However, they disagree with the view that the good performances is primarily due to the industry exposure (and to value).

*Is the performance of the low beta strategy mainly due to industry exposure and value exposure?*

### Data and methodology

The dataset is sourced from CRSP and from Xpressfeed. The US data (1926-2012) includes common stocks and their betas are computed with respect to the CRSP value-weighted market index. The global equity data (1985-2012) includes common stocks for 20 markets included in the MSCI developed market universe. Betas are computed with respect to the corresponding MSCI local market index. SIC (GICS) codes are used to classify 49 (70) US (Global) industries. The standard BAB strategy is compared to two alternative BAB strategies constructed to have maximum and minimum industry exposure. The standard BAB is long low-beta stocks and short high-beta ones. The stocks are ranked on the basis of their betas at the end of each month. The low (high) beta portfolio is comprised of all stocks with a beta below (above) their country median. In each portfolio, the stocks are weighted by the beta ranks. The long and short portfolios are adjusted so that both sides have a beta of 1. For the industry neutral portfolio, BAB strategies are constructed within each industry and an overall portfolio is built from the industries' BABs. For the maximum industry exposure BAB, value-weighted industry portfolio returns and betas are computed. The final strategy is long-short industry betas. The authors then analyze the level of industry bets of the standard BAB portfolio in a cross sectional and time-series regression framework.

*The authors test an industry neutral version of their “betting against beta” strategy, to determine if industry exposures drive performance*

### Results

The results from the cross sectional regressions show that industry exposure explains a significant portion of the betas variation (R squared 25% on average). However, from the time-series regression, the factor loading of the industry-neutral BAB is very significant: this supports the view that the standard BAB performance is mostly due to stock-selection. The portfolios analysis shows that all BAB strategies have delivered significantly positive returns, both in the US and globally (e.g. US standard BAB Sharpe is 0.78; Global standard BAB Sharpe is 0.78). Finally, the authors argue that the reason for the higher returns of industry neutral BAB may be higher tail risks.

*They find that the performance of the low beta strategy is in fact mainly due to stock selection, not industry exposures*

### Our take

The authors' empirical results are interesting and the paper is a good addition to the low-beta anomaly literature. It is interesting to analyze the tail risks of low beta investing: tail risks presence would weaken the concern about the anomaly being arbitrated away.

*This is a useful paper for better understanding what drives the low risk anomaly*



## Paper 2: “Cross-firm information flows and the predictability of stock returns”

- Anna Scherbina and Bernd Schlusche
- SSRN, available at <http://ssrn.com/abstract=2263033>
- Reviewed by Rochester Cahan

### Why it's worth reading

This paper caught our attention because it ties in nicely with some of our own recent work on economic links between companies.<sup>3</sup> In our research, we argued that lead-lag relationships in the returns of economically-related companies need not always be momentum-based (e.g. if your customers are doing well, you should eventually do well). Instead, we took a data-driven approach to identifying the direction of interactions. This interesting academic paper also advocates such an approach; however they choose a Granger-causality methodology instead of the vector autoregressive model that we used.

*This paper explores lead-lag relationships in company returns, using a purely statistical methodology*

### Data and methodology

The basic framework is simple. In every month and for every combination of stocks  $i$  and  $j$ , the authors regress the past monthly returns of  $i$  onto (1) the lag of its own past returns, (2) the lag of  $j$ 's past returns, and (3) the lag of the market's past returns. They use either a 12 or 36 month rolling window to estimate these regressions. Stock  $j$  Granger-causes  $i$ 's return if the absolute value of the t-statistic on the coefficient for  $j$ 's lagged return is greater than two. Then, for each stock at that point in time, the authors identify all so-called *leader* stocks, i.e. all the  $j$ 's that Granger-cause  $i$  at that point in time. The forecast for  $i$ 's month-ahead forward return is taken as the sum across all leader stocks of each coefficient times each leader's current month return. The authors use this aggregate leader signal to form portfolios, which are rebalanced monthly.

*The framework is simple: regress a stock's returns against its own lagged return as well as the lagged return of each other stock in the universe, in turn*

### Results

A hedge portfolio that goes long the decile of stocks with the highest leader-based expected return and short the worse decile generates around 83 bps per month.<sup>4</sup> Another interesting finding is analogous to our own: lead-lag relationships cross industries, and indeed even if the authors force every leader stock to be in a *different* industry from the follower stock, the strategy still works. In other words, cross-industry links are very important. The authors also use the Thomson Reuters News Analytics database (which we also use) to show that the results are stronger when the leader stocks have higher news intensity. This makes sense; the lead-lag effect is often driven by new information about a leader stock that eventually propagates to the followers.

*Similar to our own work, the authors find that cross-industry linkages are really important*

### Our take

This paper uses a purely statistical approach to identify leader stocks, whereas in ours we used a blended economic and statistical approach. The advantage of this paper's approach is that it only requires pricing data, and not the specialized economic database we used; the downside is there is no economic intuition as to why one stock might lead another.

*This paper presents a useful framework for a purely statistical approach, as opposed to our blended statistical/economic approach*

<sup>3</sup> Cahan et al., “Signal Processing: Uncovering Hidden Economic Links”, *Deutsche Bank Quantitative Strategy*, 28 March 2013

<sup>4</sup> Note though that this is generated over an extremely long backtest: 1929-2011. In robustness checks, the authors also look at more recent periods and find that the equally-weighted portfolios still show positive alpha, but some of the value-weighted portfolios do not.



## Paper 3: “Stochastic portfolio theory optimization and the origin of alternative asset allocation strategies”

- Gianluca Oderda
- SSRN, available at <http://ssrn.com/abstract=2261994>
- Reviewed by Yin Luo

### Why it's worth reading

In contrast to most other papers in the risk-based allocation space, Oderda [2013] focuses on the analytical properties using stochastic portfolio theory from first principles. As the author points out, there are countless empirical papers in this space, but few that focus on *why* one portfolio construction method beats another.

*This is one of the few papers in the risk-based allocation space that takes a theoretical instead of empirical approach*

### Data and methodology

The main methodology in this paper is based on the stochastic portfolio theory of Fernholz [2002]<sup>5</sup>. The central assumption in stochastic portfolio theory is the diversity of the financial market, i.e., the market can never be concentrated in a single asset. When one asset (e.g., a company, a country, or an asset class) grows too large, its rate of growth (i.e., return) must decline, otherwise it would simply become the whole market.

First, Oderda [2013] shows the total return of any asset can be decomposed into the price return, expected cash flow rate of return (e.g., dividend yield for equities), plus half of its expected variance. The price return is very difficult to predict in the short term, but shows a stable pattern over a very long history (e.g., the long-term equity risk premium). The expected cash flow rate of return and variance are easier to predict with historical data. In the benchmark relative optimization (i.e., optimizing information ratio), the author shows that the price return relative to the market (i.e., most of the active return) is hidden inside the dynamics of market capitalization weights, which, if diversity is imposed, can be shown to remain bounded.

*An asset's return can be decomposed into three parts, and optimizing these three parts leads to some surprising results*

Optimizing absolute portfolio wealth is therefore equivalent to maximizing the three components defined above. The author further shows that the maximization of the variance-dependent component leads to the linear combination of the equally-weighted portfolio and the risk parity portfolio. While most of us treat these two strategies as heuristic, Oderda [2013] gives the theoretical underpinnings.

*Optimizing absolute wealth is actually equivalent to maximizing the three components separately*

### Results

Oderda [2013] shows that, given any market capitalization weighted index, the “optimal” portfolio deviates from the benchmark by the linear combination of four sub-portfolios: an equally-weighted portfolio, a risk parity portfolio, a high cash flow rate of return portfolio (e.g., a high income portfolio), and a global minimum variance portfolio. Oderda [2013] proves that an investor can benefit from diversification by adding the four additional building blocks.

*The optimal portfolio is actually a linear combination of: risk parity, equally-weighted, high yield, and minimum variance portfolios*

### Our take

To get a thorough understanding of the paper, readers do need to go through some heavy mathematical derivations. Nonetheless, the fact the theory leads naturally to four common investment portfolios is intriguing, since it implies investors naturally gravitate towards portfolios that also make sense theoretically. We await with interest the author's forthcoming empirical paper.

*This paper is math-heavy, but worth the effort*

<sup>5</sup> See Fernholz, R. E., 2002, *Stochastic Portfolio Theory*, Springer Science + Business Media



## Paper 4: “GDP mimicking portfolios and the cross-section of stock returns”

- Tim A. Kroencke, Felix Schindler, Steffen Sebastian, and Erik Theissen
- SSRN, available at <http://ssrn.com/abstract=2258348>
- Reviewed by Ada Lau

### Why it's worth reading

The Carhart four-factor model is commonly used as a standard for asset pricing. However, it lacks a theoretical foundation for why returns are explained by size, value or momentum factors. Using macroeconomic variables as factors to explain returns is a more appealing approach. This paper digs into the components of GDP and shows that some components could explain the returns of a collection of standard test portfolios, whilst aggregate GDP fails to do so.

*Using macroeconomic factors such as GDP to explain returns is a more appealing approach than the Carhart four-factor model*

### Data and methodology

Annual data for five GDP components (residential investment, durables, non-durables, equipment and software, and business structures) from 1951 to 2010 are obtained from the Bureau of Economic Analysis. As GDP is not tradable, six GDP mimicking portfolios are first constructed by regressing annual real per capita growth rates of GDP and its five components on six Fama-French portfolios (two sorted on size x three sorted on book-to-market) plus the momentum portfolio of “winners minus losers”. Monthly returns of each GDP mimicking portfolio are then taken as the weighted averages of the monthly returns of the seven factor portfolios, with respective weights obtained from the normalized regression coefficients. Then, linear asset pricing factor models based on the market factor and the GDP mimicking factors are expressed in their stochastic discount factor (SDF) representations. Factor loadings and factor risk premia are estimated using GMM (Generalized Method of Moments). Test assets for model estimation include 5x5 Fama-French portfolios sorted on size and book-to-market, 10 portfolios sorted on momentum, and 30 industry portfolios as obtained from the website of Kenneth French.

*GDP mimicking portfolios are constructed by regressing annual real per capita growth rates of GDP and its components on Fama-French portfolios and the momentum portfolio*

*Factor loadings and factor risk premia are estimated using GMM*

### Results

Aggregate GDP does not explain the cross-section of returns, but leading GDP components (residential investment and durables) have good explanatory power for returns of portfolios sorted on size and book-to-market, as well as the momentum portfolios. Lagging GDP components (business structures and equipment and software) explain the returns of momentum portfolios very well, but not those of the size and book-to-market portfolios. The three-factor model including the market factor, the most leading GDP component (residential investment) and the most lagging GDP component (business structures) performs well and is comparable to the Carhart four-factor model. It has good joint explanatory power for the returns of 65 test portfolios based on size, book-to-market, momentum and industry.

*Leading GDP components have good explanatory power for returns of portfolios sorted on size and book-to-market, as well as the momentum portfolios*

### Our take

Supplemented with comprehensive robustness studies, this paper shows interesting evidence that the lead-lag structure in GDP components has important implications in asset pricing. As the authors show, aggregate GDP averages the lead-lag effect and loses the explanatory power for returns; it would be insightful to understand the theoretical arguments as to why GDP components are able to better explain asset prices. Apart from GDP, it could be useful to consider other economic variables which may help to explain returns, for example industry portfolios.

*As aggregate GDP averages the lead-lag effect and loses the explanatory power for returns, it would be insightful to understand the theoretical arguments as to why*





## Paper 5: “Underestimation bias of risk on optimized portfolios by multifactor risk model”

- Seiji Minami
- SSRN, available at <http://ssrn.com/abstract=1950495>
- Reviewed by Miguel Alvarez

### Why it's worth reading

Risk model error in the form of model misspecification and estimation error is known to be a major culprit behind many of the problems underlying optimized portfolios. Academic and practitioner research – including our own – has shown that undesirable portfolio characteristics such as asset concentration, risk underestimation and portfolio misalignment can be attributed to error in the risk model. This paper sheds more light on the subject by investigating the effect of the long-only constraint on the minimum variance portfolio; a special case of an optimized portfolio. The author finds that the constraint helps mitigate the effect of the estimation error in the risk model and ultimately produces less risk biased portfolios. The paper then analyzes the risk bias through the lens of an eigenvector decomposition which provides further insight into the effect of the long-only constraint.

*Risk model error is a major culprit in many problems with optimized portfolios; this paper offers new insights into how to overcome this problem*

### Data and methodology

The author simulates asset returns which follow a traditional multifactor linear return process via means of a multivariate normal distribution. Monte Carlo estimation is then used to form two minimum variance portfolios: a long/short and a long-only version. In addition, the author constructs each of the minimum variance portfolios over two samples: 50 assets and 500 assets. The idea is to check whether the risk bias is dependent on the number of assets used in the optimization. To measure the accuracy of the risk model, the author uses a risk bias statistic which measures the ratio of forecasted risk to realized risk. Last, to garner more insight, the author compares each of the portfolio loadings to the eigenvectors corresponding with the smallest eigenvalues – those associated with significant risk bias.

*The author simulates 50 and 500 stock minimum variance portfolios and checks whether the risk bias is dependent on the number of assets*

### Results

The results point at two important conclusions. First, the analysis shows that long/short minimum variance portfolios are more risk biased than the long-only versions; implying that the long-only constraint mitigates a portion of the estimation error imbued from the risk model in the optimization process. The second result that is of interest is that the risk underestimation gets worse as more assets are added to the optimization. This is actually a result that is consistent with our research and general results from covariance matrix sampling error. Last the eigenvector sensitivity results show that the long/short minimum variance portfolio loads up more strongly than the long-only version on the eigenvectors associated with larger risk bias.

*Two key results: (1) long/short minimum variance is more biased than long-only; (2) risk underestimation gets worse as more assets are added*

### Our take

This paper adds important insight to the error reduction effect of the long-only constraint in optimized portfolios. A similar result was found in Jagannathan and Ma [2003], which analyzed the role of constraints and found similar error-reduction results from the long-only constraint. In fact, they showed that some constraints had the effect of shrinking the covariance matrix, which is a common technique used to reduce its estimation error.

*This is another useful paper for those seeking to better understand the vexing problem of estimation error*





## Upcoming conferences

### Europe

Figure 1: European event calendar

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

Source: Deutsche Bank

### North America

Figure 2: North American event calendar

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

Source: Deutsche Bank



# Other papers of interest

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## Alpha generation and stock-selection signals

### Liquidity as an investment style

- Roger Ibbotson, Zhiwu Chen, Daniel Y.-J. Kim, and Wendy Hu
- *Financial Analysts Journal*, Volume 69, Number 3, available at <http://www.cfapubs.org/doi/abs/10.2469/faj.v69.n3.4>
- Abstract: "Liquidity should be given equal standing with size, value/growth, and momentum as an investment style. As measured by stock turnover, liquidity is an economically significant indicator of long-run returns. The returns of liquidity are sufficiently different from those of the other styles that it is not merely a substitute. Finally, a stock's liquidity is relatively stable over time, with changes in liquidity associated with changes in valuation."

### The remarkable multidimensionality in the cross section of expected US stock returns

- Jeremiah Green, John R. M. Hand, and Frank Zhang
- SSRN, available at <http://ssrn.com/abstract=2262374>
- Abstract: "20 years after Fama & French (1992), we re-measure the dimensionality of the cross-section of expected U.S. stock returns. Using a set of 60 firm-specific return predictive signals (RPS), we find that a remarkably large 26-35 are priced when all 60 RPS are simultaneously projected onto future stock returns during 1980-2012. The hedge returns on multidimensionally priced RPS are up to two-thirds smaller than those of unidimensionally priced RPS; 12-month momentum is marginally negatively, not positively, priced; and Sloan (1996) accruals are not priced at all. Large firms have fewer priced RPS than do small firms and generate lower in-sample optimal RPS portfolio annual returns, but the 16-20 RPS that are priced in large firms explain double the cross-sectional variance in returns of the 24-32 RPS that are priced in small firms. We also show that the explanatory power of RPS is greatest when market uncertainty in the form of dispersion in stock returns is greatest, and that adopting an unrestricted approach to multidimensioning expected returns is more powerful than is grouping RPS into economic categories or extracting RPS common factors. Lastly, we document that the returns to an optimal portfolio of RPS exhibit a sudden, marked and as yet unexplained downward kink beginning Jan. 2004."

### Stock return serial dependence and out-of-sample portfolio performance

- Victor DEMiguel, Francisco Nogales, and Raman Uppal
- SSRN, available at <http://ssrn.com/abstract=2258944>
- Abstract: "We study whether investors can exploit stock return serial dependence to improve out-of-sample portfolio performance. To do this, we first show that a vector-autoregressive (VAR) model estimated with ridge regression captures daily stock return serial dependence in a stable manner. Second, we characterize (analytically and empirically) expected returns of VAR-based arbitrage portfolios, and show that they compare favorably to those of existing arbitrage portfolios. Third, we evaluate the performance of VAR-based investment (positive-cost) portfolios. We show that, subject to a suitable norm constraint, these portfolios outperform the traditional (unconditional) portfolios for transaction costs below 10 basis points."



Is there momentum or reversal in weekly currency returns?

- Ahmad Raza, Ben R. Marshall, and Nuttawat Visaltanachoti
- SSRN, available at <http://ssrn.com/abstract=2258253>
- Abstract: "We investigate whether momentum or reversal is the dominant phenomenon in short horizon (one- to four-week) foreign exchange rate returns. We find, based on a broad sample of 63 emerging and developed market currencies, evidence of momentum rather than reversal. Momentum returns are as large as 9% p.a. The short-term momentum effect appears to be robust. Returns are larger in the earlier sub-period but still exist in the more recent period. The strategies are also profitable in US recessions and expansions, and in up and down currency markets."



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## Optimization, portfolio construction, and risk management

### Risk parity, maximum diversification, and minimum variance: An analytic perspective

- Roger Clarke, Harindra de Silva, and Steven Thorley
- *Journal of Portfolio Management*, Volume 39, Number 3, available at <http://www.ijournals.com/doi/abs/10.3905/jpm.2013.39.3.039>
- Abstract: "Analytic solutions to risk parity, maximum diversification, and minimum variance portfolios provide useful perspectives about their construction and composition. Individual asset weights depend on both systematic and idiosyncratic risk in all three risk-based portfolios, but systematic risk eliminates many investable assets in long-only, constrained, maximum-diversification, and minimum-variance portfolios. On the other hand, risk-parity portfolios include all investable assets, and idiosyncratic risk has little effect on weight magnitude. The algebraic forms for optimal asset weights derived in this article yield generalizable properties of risk-based portfolios, in contrast to empirical simulations that employ a specific set of historical returns, proprietary risk models, and multiple constraints. These analytic solutions reveal precisely how various kinds of predicted risk affect the relative magnitude of security weights in each type of risk-based portfolio construction."

### Minimum-variance portfolios based on covariance matrices using implied volatilities: Evidence from the German market

- Mehdi Mostowfi and Carolin Stier
- *Journal of Portfolio Management*, Volume 39, Number 3, available at <http://www.ijournals.com/doi/abs/10.3905/jpm.2013.39.3.084>
- Abstract: "This article compares the performance of minimum-variance portfolios based on four different covariance matrix estimators, using daily return data from the German stock market. To assess whether investing in ex ante minimum-variance portfolios is a recommendable way to achieve efficient portfolios in accordance with Markowitz's mean-variance optimization, the authors benchmark the four portfolios' performance against the German stock index DAX, which also determines the investable universe. This is the first study that uses not only historical volatility and covariance data, but also implied volatilities from the stock options market to estimate the covariance matrix. The article also analyzes how results change when the shrinkage method, suggested by Ledoit and Wolf in a 2003 article published in this journal, is applied to both the historical and the implied volatility estimators. The authors demonstrate that all minimum-variance portfolios outperform the DAX index. The implied-volatility estimator, modified by the shrinkage method, offered the best results in terms of volatility, return, and efficiency ratio. In contrast to previous empirical results, applying the shrinkage method to the historical sample covariance matrix yields little benefit, if any. However, applying the shrinkage method to the implied-volatility estimator significantly improves the quality of the covariance estimation, resulting in improved performance from the minimum-variance portfolio."



### The trend is our friend: Risk parity, momentum and trend following in global asset allocation

- Andrew Clare, James Seaton, Peter N. Smith, and Steve Thomas
- SSRN, available at <http://ssrn.com/abstract=2265693>
- Abstract: "We examine the effectiveness of applying a trend following methodology to global asset allocation between equities, bonds, commodities and real estate. The application of trend following offers a substantial improvement in risk-adjusted performance compared to traditional buy-and-hold portfolios. We also find it to be a superior method of asset allocation than risk parity. Momentum and trend following have often been used interchangeably although the former is a relative concept and the latter absolute. By combining the two we find that one can achieve the higher return levels associated with momentum portfolios but with much reduced volatility and drawdowns due to trend following. We observe that a flexible asset allocation strategy that allocates capital to the best performing instruments irrespective of asset class enhances this further."

### Quantifying tail risk with bad data

- Mattia Landoni and Ravi Sastry
- SSRN, available at <http://ssrn.com/abstract=2265691>
- Abstract: "We document substantial practitioner interest in measures of the downside tail risk of hedge funds, such as maximum drawdown (MDD) and worst one-period loss, together with a general sentiment that volatility does not convey enough information about tail risk. We show that past observed extremes are inappropriate estimators of tail risk, and propose a better, parametric estimator that is simple to implement and needs only short return histories as input. In addition, we characterize the statistical properties of downside risk measures and show that they depend linearly on volatility. Together with evidence that tail shape does not change much across funds, this explains why extreme downside performance measures rank funds similarly to the Sharpe ratio. Finally, we note that using sample standard deviation to estimate volatility when returns have fat tails is problematic. We show that the same technique employed in the paper can be used to improve estimation of the Sharpe ratio and other measures based on volatility."

### Advances in portfolio risk control: Risk! Parity?

- Winfried G. Hallerbach
- SSRN, available at <http://ssrn.com/abstract=2259041>
- Abstract: "Spurred by the increased interest in applying "risk control" techniques in an asset allocation context, we offer a practitioner's review of techniques that have been newly proposed or revived from academic history. We discuss minimum variance, "1/N" or equal-weighting, maximum diversification, volatility weighting and volatility targeting – and especially "risk parity", a concept that has become a real buzz word. We provide a taxonomy of risk control techniques. We discuss their main characteristics and their pluses and minuses and we compare them against each other and against the maximum Sharpe Ratio criterion. We illustrate their implications by means of an empirical example. We also highlight some important papers from the vast and still growing literature in this field. All in all, this note serves as a practical and critical guide to risk control strategies. It may help you to demystify risk control techniques, to appreciate both the "forest" and the "trees", and to judge these techniques on their potential merits in practical investment applications."



#### On the epidemic of financial crises

- Nikolaos Demiris, Theodore Kypraios, and L. Vanessa Smith
- SSRN, available at <http://ssrn.com/abstract=2249030>
- Abstract: "This paper proposes a framework for modelling financial contagion that is based on SIR (Susceptible-Infected-Recovered) transmission models from epidemic theory. This class of models addresses two important features of contagion modelling, which are a common shortcoming of most existing empirical approaches, namely the direct modelling of the inherent dependencies involved in the transmission mechanism, and an associated canonical measure of crisis severity. The proposed methodology naturally implies a control mechanism, which is required when evaluating prospective immunisation policies that intend to mitigate the impact of a crisis. It can be implemented not only as a way of learning from past experiences, but also at the onset of a contagious financial crisis. The approach is illustrated on a number of currency crisis episodes, using both historical final outcome and temporal data. The latter require the introduction of a novel hierarchical model that we call the Hidden Epidemic Model (HEM), and which embeds the stochastic financial epidemic as a latent process. The empirical results suggest, among others, an increasing trend for global transmission of currency crises over time."



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## Asset Allocation and sector/style/country rotation

### Liquidity-driven dynamic asset allocation

- James Xiong, Rodney Sullivan, and Peng Wang
- *Journal of Portfolio Management*, Volume 39, Number 3, available at <http://www.ijournals.com/doi/abs/10.3905/jpm.2013.39.3.102>
- Abstract: "The authors propose a model of portfolio selection that adjusts an investor's portfolio allocation in accordance with changing market conditions and liquidity environments. They found that market liquidity provides a useful leading indicator in dynamic asset allocation. Specifically, market-liquidity risk-premium cycles anticipate economic and market cycles. Investors can therefore avoid markets with low liquidity premiums, waiting for more favorable circumstances to extract liquidity risk premiums. The result meaningfully enhanced portfolio performance through economic and market cycles, and is robust to transactions costs and alternate specifications."

### Investing under inflation risk

- George Crawford, Jim Kyung-Soo Liew, and Andrew Marks
- *Journal of Portfolio Management*, Volume 39, Number 3, available at <http://www.ijournals.com/doi/abs/10.3905/jpm.2013.39.3.123>
- Abstract: "Inflation, a quiet but growing concern, is complicated by its predictable timing and severity. A survey of 110 years of inflation data suggests that Treasury bills track inflation better than do equities or bonds, a robust result across 19 countries. In the period from 1980 to June 2012, evidence exists for including alternatives to Treasury bills, such as Fama-French's HML and SMB as well as some stealth fighters. In the same period, evidence suggests that TIPS and trend-following strategies appear to help track inflation in the absence of Treasury bills. Gold and real estate, though popular, are unlikely to be good inflation hedges. Results suggest that an observer can track inflation, but should use methodologies that include dynamic weighting schemes because the relationship between inflation, assets, and investment strategies is very complex."

### The tortoise and the hare: Risk premium versus alternative asset portfolios

- Ron Bird, Harry Liem, and Susan Thorp
- *Journal of Portfolio Management*, Volume 39, Number 3, available at <http://www.ijournals.com/doi/abs/10.3905/jpm.2013.39.3.112>
- Abstract: "Does diversification using a basket of the most common alternative investments outperform diversification using low-cost, liquid risk premia? Investment banks have recently begun offering access to such risk premia at low cost. First, the authors confirm that alternative assets may reduce portfolio risk, based on historical experience. Second, they compare the risk-reduction benefits of alternative investments and risk premium portfolios out of sample, using equally weighted and least-risk optimized portfolios. They find that risk premia diversify more efficiently than do alternative asset portfolios. The authors suggest that an optimal portfolio combines the benefits of both risk premium and alternative asset portfolios, as some alternative assets (such as timber or managed futures) continue to provide exposure to unique sources of return."





#### Factor-based asset allocation vs. asset-class-based asset allocation

- Thomas Idzorek and Maciej Kowara
- *Financial Analysts Journal*, Volume 69, Number 3, available at <http://www.cfapubs.org/doi/abs/10.2469/faj.v69.n3.7>
- Abstract: "This article addresses the issue of the alleged superiority of risk-factor-based asset allocations over the more traditional asset-class-based asset allocation. The authors used both an idealized model, capable of precise mathematical treatment, and optimizations based on different periods of historical data to show that neither approach is inherently superior to the other. Although the authors appreciate the role of risk models in portfolio management, they urge caution with respect to unwarranted claims of their dominance."

#### Strategic allocation to commodity factor premiums

- David Blitz and Wilma De Groot
- SSRN, available at <http://ssrn.com/abstract=2265901>
- Abstract: "Investors may wonder whether the traditional arguments for investing in commodities still apply, as the return, diversification and inflation-hedging potential of commodities appear to have declined. In this study, we take a fresh look at the strategic allocation to commodities, considering not only the commodity market portfolio, but also various other factor premiums documented to exist in the commodities market. We find that a commodity factor portfolio consisting of the momentum, carry and low-volatility factor premiums exhibits a significantly better risk-adjusted performance than a conventional commodity portfolio. We also find that only such a commodity multi-factor portfolio adds value in the strategic asset allocation. As the traditional commodity market portfolio appears to deserve little or no role at all in the strategic asset allocation, we argue that investors should not postpone the consideration of alternative commodity factor premiums to a later stage of the investment process."

#### Which fundamentals drive exchange rates? A cross-sectional perspective

- Lucio Sarno and Maik Schmeling
- SSRN, available at <http://ssrn.com/abstract=2266284>
- Abstract: "Standard present-value models suggest that exchange rates are driven by expected future fundamentals, implying that exchange rates contain information about future fundamentals. We test this key empirical prediction of present-value models in a sample of 35 currency pairs ranging from 1900 to 2009. Employing a variety of tests, we find that exchange rates have strong and significant predictive power for nominal fundamentals (inflation, money balances, nominal GDP), whereas predictability of real fundamentals and risk premia is much weaker and largely confined to the post-Bretton Woods era. Overall, we uncover ample evidence that future macro fundamentals drive current exchange rates."

#### A tactical approach to managing interest rate risk in investment portfolios

- Patrick Beaudan
- SSRN, available at <http://ssrn.com/abstract=2264512>
- Abstract: "This paper presents a simple approach to dynamically embed the risk of rising interest rates in any investment portfolio that includes fixed income securities. It illustrates the approach using a singular perturbation of U.S. treasury rates that can be used either to stress-test investment strategies,



or to incorporate an investor's view on likely future interest rate moves in portfolio allocation decisions. This approach can be used by both discretionary and systematic investors without restriction on or prejudice to the particular investment philosophy that is employed."

#### Commodities as inflation protection

- Andrew Marks, George Crawford, Jim Kyung-Soo Liew
- SSRN, available at <http://ssrn.com/abstract=2262475>
- Abstract: "Inflation degrades the function of the U.S. dollar as a storehouse of value. The goods and services which constitute the cost of living become more expensive in dollar terms. Commodities, and gold in particular, are often recommended to hedge that risk. Our work casts that popular advice into doubt, showing that inflation hedging with commodities is difficult, risky, and ultimately unreliable. Buy and hold strategies are impractical for many, and inflation hedging with commodities requires bold and successful management, together perhaps with good luck. Examining fifty-three years of spot prices for forty-five commodities and fourteen commodity aggregate indices, we find that owning certain things – specific commodities – rather than dollars would have been a better storehouse of value in the inflationary 1970s and in the brief period of high inflation from 1989-90. However, various commodities performed very differently in different periods, and some of the best in one period proved to be the worst in another. A basket of commodities to protect against inflation would be difficult to construct and in result. Furthermore, the precious metals, while often cited as inflation hedges, carry significant timing risks. Finally, a diversified basket of energy commodities has performed well under historical inflation, but carries its own risks."

#### The demand for emerging market bonds

- Zaghun Umar
- SSRN, available at <http://ssrn.com/abstract=2260208>
- Abstract: "We study the multi-period asset allocation problem for emerging market investors whose asset menu consists of stocks, bonds and bills. We consider two types of emerging market investors: domestic investors (with returns in local currency) and international investors who can invest in US and emerging markets assets (with returns in US dollars). In developed markets, long-term government bonds are often considered attractive investment options for risk-averse investors. Our results show that emerging market bonds with a maturity of one year and longer can be attractive for domestic and international investors with different risk preferences, in both the short run and the long run."

#### 10 years later: Where in the world is equal weight indexing now?

- Liyu Zeng and Frank Luo
- SSRN, available at <http://ssrn.com/abstract=2257481>
- Abstract: "Often the most powerful investment ideas are simple. The S&P 500 EWI 10 years ago pioneered the simple concept of equal weighted indexing. It has now expanded in the U.S. into the S&P 100, a MegaCap index, S&P MidCap 400 and S&P SmallCap 600. The equal weighting idea has also been applied to international equities, as well as in other asset classes such as fixed income indices and commodity indices. It has become one of the most popular alternatively-weighted ideas. While the headline cause of asset flows has been outperformance over market-cap indices, sophisticated investors have realized that equal weighting creates a different set of risk factor exposures than market



cap weighting that seem to have worked over the long-term as noted in the paper. Furthermore, the concept randomizes factor mispricings in the market, and it can serve as a performance benchmark for alternative-weighted indices.”



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## Trading and market impact

### Stock price movements with asymmetric information

- Kun Tracy Wang and Walter Wang
- SSRN, available at <http://ssrn.com/abstract=2263631>
- Abstract: "We examine the strategies of different types of investors (the insider, the information follower, and the price follower) who have asymmetric information about future news events and how these strategies affect stock prices. We show that stock price jumps occur when the insider receives accurate inside information or a low expected news event happens. In addition, the stock trading volume increases when the insider has private information. Our empirical tests show that the trading volume is high before and after stock price jumps. In this model, the price follower is in a disadvantaged position, which can be alleviated by the competition between the insider and the information follower."



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## Finance theory and techniques

### Equity returns and the business cycle: The role of supply and demand shocks

- Alfonso Mendoza Velazquez and Peter Smith
- SSRN, available at <http://ssrn.com/abstract=2265674>
- Abstract: "The equity premium in the UK appears to have risen significantly since the start of the financial crisis and the associated extended recession. This paper examines the relationship between the business cycle and equity market returns to see how robust this association is. Several classifications of UK business cycle quarters are examined and related to the returns from an investment strategy which buys the market one or more quarters after a business cycle quarter and holds it for one year. Official business cycle dating methods as well as identified structural macroeconomic shocks are examined. The findings are that there is clear evidence for counter-cyclicality in excess returns. Returns are significantly higher in the year following a recession rather than an expansion quarter. There is also a significant difference in the pattern of returns if the downturn in the quarter is the result of a supply or demand shock. Negative supply shocks are found to have an especially large and significant counter cyclical impact on returns. This paper analyses a long period of UK data for determining realised returns using revised data as well as expected returns using a shorter dataset of real-time data. The paper finds similar results for the two datasets suggesting that realised and expected returns may not be so different from one another. The paper also assesses the ability of the models to forecast outside of their sample period."

### The role of information intermediaries in financial markets

- Michal Dzielinski
- SSRN, available at <http://ssrn.com/abstract=2266173>
- Abstract: "Studying a large sample of announcements made by US companies I find that announcements containing bad news are longer and less focused on the originating company than good news. The pattern is pervasive and suggests companies attempt to "package" bad news and mitigate its negative impact. The paper also examines how news agencies react to company news. It appears that news agencies step in and cut through the packaging by reporting bad company news in a much more concise and focused way. There are measurable benefits to this kind of "unpackaging" activity - by processing company news and making it more transparent news agencies significantly contribute to the resolution of asymmetric information. This is the first paper to compare the language of company news and associated agency reports and analyze the implications for the information environment."

### Do U.S. macroeconomic surprises influence equity returns? An exploratory analysis of developed economies

- Brian M. Lucey, Ali Nejadmalayeri, and Manohar Singh
- Abstract: "Given the dominant role the U.S. economy plays in global trade, we explore how U.S. macroeconomic surprises affect stock markets in ten major developed economies as well as in China and India. We do not find strong enough evidence to conclude that US macro shocks materially and consistently influence equity returns and volatilities in the economies studied. Consistent with previous research, it appears that only in few markets are return levels materially influenced by macro surprises generated in the U.S. Also, only a small number of macro shocks seem to be of any consistent significance. For returns levels, inflation, productivity, consumer confidence, and retail sales



seem to matter. At the same time, conditional volatilities appear to be influenced by inflation, retail sales, durable goods, industrial production, consumer confidence, gross domestic product, and trade balance surprises. Finally, our exploratory analysis indicates that the degree of bilateral trade connectedness may partially explain the extent to which macroeconomic surprises are transmitted across countries.”

#### Idiosyncratic volatility, measurement frequency and return reversal

- Xiafei Li
- SSRN, available at <http://ssrn.com/abstract=2257825>
- Abstract: “This paper examines whether the negative relation between idiosyncratic volatility and expected returns is due to stock return reversals as argued by Fu (2009) and Huang, Liu, Rhee and Zhang (2010). Controlling the return reversal effect, it shows that stocks with different past returns have different relations. The positive relation is mainly driven by stocks with low past returns, while the negative relation is result from stocks with high past returns. Additionally, the relation is very sensitive to the measurement frequency of idiosyncratic volatility, and the daily realized idiosyncratic volatility measure is a better proxy for the expected idiosyncratic volatility than the monthly measure. By employing an exponential generalized autoregressive conditional heteroskedasticity-in-mean (EGARCH-M) model, this paper finds a strong positive relation between time-varying risk premium and idiosyncratic volatility for portfolios containing stocks with low past returns and small portfolio, and a negative relation for growth portfolio.”



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## Derivatives and volatility

### Dynamics of interest rate swap and equity volatilities

- Antonio Mele, Yoshiki Obayashi, and Catherine Shalen
- SSRN, available at <http://ssrn.com/abstract=2255584>
- Abstract: "While CBOE's VIX index is widely acknowledged as a broad-based investor "fear gauge" for its strong inverse relationship with major equity indexes, one cannot necessarily expect it to translate to the level of future turbulence or investor risk aversion in fixed-income markets. Indeed, expected volatilities in equity and interest rate markets as measured respectively by CBOE's VIX and their newly-launched swap rate volatility index - SRVX - exhibit significantly distinct behaviors. The two indexes react to different events and risk factors, thereby providing investors with complementary diversification, hedging, and risk-taking tools."





# Appendix 1

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