



### Article of the month:

#### **FRM Financial Risk Meter**

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***Andrija Mihoci, Michael Althof, Cathy Yi-Hsuan Chen, Wolfgang K. Härdle. (SSRN)***

A daily systemic risk measure is proposed accounting for links and mutual dependencies between financial institutions utilizing tail event information. FRM (Financial Risk Meter) is based on Lasso quantile regression designed to capture tail event co-movements. The FRM focus lies on understanding active set data characteristics and the presentation of interdependencies in a network topology. Two FRM indices are presented, namely, FRM@Americas and FRM@Europe. The FRM indices detect systemic risk at selected areas and identify risk factors. In practice, FRM is applied to the return time series of selected financial institutions and macroeconomic risk factors. Using FRM on a daily basis, we identify companies exhibiting extreme "co-stress", as well as "activators" of stress. FRM is a good predictor for recession probabilities, constituting the FRM-implied recession probabilities. Thereby, FRM indicates tail event behavior in a network of financial risk factors. [Read More](#)

### Actuarial Models

#### **Beta transform and discounted aggregate claims under dependency**

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***Zhehao Zhang, Shuanming Li. (Annals of Actuarial Science, IFA)***

This paper starts with the Beta transform and discusses the stochastic ordering properties of this transform under different parameter settings. Later, the distribution of discounted aggregate claims in a compound renewal risk model with dependence between inter-claim times and claim sizes is studied. Recursive formulas for moments and joint moments are expressed in terms of the Beta transform of the inter-claim times and claim severities. Particularly, our moment's formula is more explicit and computation-friendly than earlier ones in the references. Lastly, numerical examples are provided to illustrate our results. [Read More](#)

#### **Optimal proportional reinsurance with common shock dependence to minimize the probability of drawdown**

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***Xia Han, Zhibin Liang, Caibin Zhang. (Annals of Actuarial Science, IFA)***

In this paper, we study the optimal proportional reinsurance problem in a risk model with two dependent classes of insurance business, where the two claim number processes are correlated through a common shock component, and the criterion is to minimize the probability of drawdown, namely, the probability that the value of the surplus process reaches some fixed proportion of its maximum value to date. By the method of maximising the ratio of drift of a diffusion divided to its volatility squared, and the technique of stochastic control theory and the corresponding Hamilton–Jacobi–Bellman equation, we investigate the optimisation problem in two different cases. Furthermore, we constrain the reinsurance proportion in the interval  $[0,1]$  for each case, and derive the explicit expressions of the optimal proportional reinsurance strategy and the minimum probability of drawdown. Finally, some numerical examples are presented to show the impact of model parameters on the optimal results. [Read More](#)

## **An identity based on the generalised negative binomial distribution with applications in ruin theory**

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**David C.M. Dickson. (*Annals of Actuarial Science, IFOA*)**

In this study, we show how expressions for the probability of ultimate ruin can be obtained from the probability function of the time of ruin in a particular compound binomial risk model, and from the density of the time of ruin in a particular Sparre Andersen risk model. In each case evaluation of generalised binomial series is required, and the argument of each series has a common form. We evaluate these series by creating an identity based on the generalised negative binomial distribution. We also show how the same ideas apply to the probability function of the number of claims in a particular Sparre Andersen model. [Read More](#)

## **Minimizing the probability of lifetime ruin: two riskless assets with transaction costs**

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**Xiaoqing Liang, Virginia R. Young. (*The ASTIN Bulletin, IAA*)**

We compute the optimal investment strategy for an individual who wishes to minimize her probability of lifetime ruin. The financial market in which she invests consists of two riskless assets. One riskless asset is a money market, and she consumes from that account. The other riskless asset is a bond that earns a higher interest rate than the money market, but buying and selling bonds are subject to proportional transaction costs. We consider the following three cases. (1) The individual is allowed to borrow from both riskless assets; ruin occurs if total imputed wealth reaches zero. Under the optimal strategy, the individual does not sell short the bond. However, she might wish to borrow from the money market to fund her consumption. Thus, in the next two cases, we seek to limit borrowing from that account. (2) We assume that the individual pays a higher rate to borrow than she earns on the money market. (3) The individual is not allowed to borrow from either asset; ruin occurs if both the money market and bond accounts reach zero wealth. We prove that the borrowing rate in case (2) acts as a parameter connecting the two seemingly unrelated cases (1) and (3). [Read More](#)

### **Financial Risk**

## **Network Analysis: Defending Financial Stability by Design**

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**Stacey Schreft, Simpson Zhang. (*Office of Financial Research*)**

The financial system operates through complex networks that operational failures can disrupt. Some network structures are more resilient to random failures, for example, from natural disasters. Others are more resilient to targeted incidents, such as hacks. This brief illustrates how network analysis can be used to better understand possible risks to financial stability from such disruptions, and possible defenses. [Read More](#)

## **Analysis of financial events under an assumption of complexity**

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**Yifei Li, John Evans. (*Annals of Actuarial Science, IFOA*)**

The financial system can be shown to be a complex adaptive system consisting primarily of a federation of systems or systems of systems. There are significant similarities between the characteristics of natural systems and financial systems suggesting that the type of analysis employed in understanding natural systems could have application in financial system analysis. Cladistics analysis has been used extensively for analysis of biological systems and has accordingly been used in the social sciences for some years but a rigorous justification for adopting the analysis has not been undertaken. This paper discusses the appropriateness of applying cladistics analysis to financial systems and then considers the appropriate methodology to be adopted for analysis of different financial events. [Read More](#)

## **VAR lookbacks should shift dynamically, research suggests**

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*Alexander Campbell. (Risk.net)*

Calculating value-at-risk using historical data involves finding a way between two common pitfalls. If the window of historical data considered is too small, the result will be extremely volatile, as the dataset of daily data points will turn over rapidly. But if too long a lookback is used, the danger is it includes data that is no longer relevant, because it comes from a period in history that is too remote to be comparable to the present day. [Read More](#)

## **Investments**

### **The Volatility Effect Revisited**

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*David Blitz, Pim van Bliet, Guido Baltussen. (SSRN)*

High-risk stocks do not have higher returns than low-risk stocks in all major stock markets. This paper provides a comprehensive overview of this low-risk effect, from the earliest asset pricing studies in the nineteen seventies to the most recent empirical findings and interpretations since. Volatility appears to be the main driver of the anomaly, which is highly persistent over time and across markets, and which cannot be explained by other factors such as value, profitability, or exposure to interest rate changes. From a practical perspective, we argue that low-risk investing requires little turnover, that volatilities are more important than correlations, that low-risk indices are suboptimal and vulnerable to overcrowding, and that other factors can be efficiently integrated into a low-risk strategy. Finally, we find little evidence that the low-risk effect is being arbitrated away, as many investors are either neutrally positioned, or even on the other side of the low-risk trade. [Read More](#)

### **Applying Behavioral Finance to Investments: The Existence and Importance of 'Investment Tribes'**

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*Sid Muralidhar, Arun Muralidhar. (SSRN)*

Investment organizations are complex to understand because decisions are the aggregation of multiple individuals who influence the process. This applies to organizations that apply both quantitative and qualitative investment approaches because the first step in a quantitative approach is still a qualitative statement of the investment hypothesis that is then formalized by the models. Increasingly, finance practice is starting to incorporate behavioral finance insights and recognize that individuals are not “rational utility maximizers”, but rather complex psychological beings that can exhibit non-traditional behaviors. Kahneman-Tversky (KT) introduced this notion of individuals being “humans” and not “econs” but made broad generalizations about behaviorally affected decisions (BADs) and did not provide a methodology to examine individual biases. A technique has been proposed to use KT’s questions to provide individual behavioral diagnostics and previous research demonstrated dramatic differences within and across groups based on age, gender, and financial literacy, especially for gambles based on prospective gains and losses. [Read More](#)

## **ERM**

### **Leveraging Technology To Drive Sustainable ERM Initiatives**

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*Joshua Newsum. (Risk Management Magazine)*

Many promising enterprise risk management (ERM) programs are launched as a disciplined process for an organization to understand and address critical exposures. However, they often become difficult to maintain beyond the initial phases as key team members need to focus attention on their primary job responsibilities. [Read More](#)

## Banking

### **An analysis of the feasibility of an extreme operational risk pool for banks**

**Yifei Li, Neil Allan, John Evans. (*Annals of Actuarial Science, IFOA*)**

Operational risk events in banks include extreme events with significant losses being incurred and with substantial impact on share prices. A pooling arrangement between banks that would be able to reduce overall costs and reduce share price impacts would seem desirable, but one of the major inhibiting factors to establish the feasibility of such a pooling arrangement is that statistical models of these extreme events are difficult to build with any reliability. This paper uses both quantitative and qualitative analysis of operational risk losses for EU and US banks over the period 2008–2014 to establish the feasibility of creating a pooling arrangement between the banks and concludes that such an arrangement might be feasible but would require compulsory membership of the pool and capping of losses. [Read More](#)

### **Trending topics: Machine Learning, Fintech, Sustainability, and Emerging Risks**

### **Insurers Brace for Emerging 5G Risks**

**Morgan O'Rourke. (*Risk Management Magazine*)**

According to Swiss Re Institute's recent SONAR report on emerging risk trends, however, the new technology may also introduce risks that could significantly impact the insurance industry. For example, cyber exposures will be dramatically increased as hackers will be able to exploit device vulnerabilities more easily and launch attacks more quickly and at greater volume, making them harder to defend against. [Read More](#)

### **A green game changer**

**Joe McHale, Nadia Humphreys. (*IPE*)**

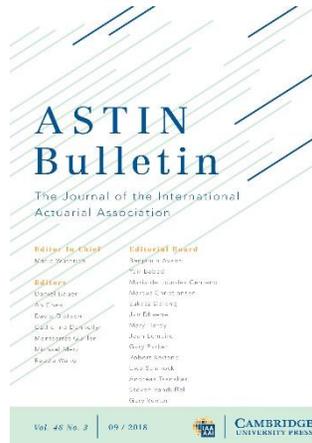
Before legislative work came to a halt for the recent EU elections, the European Parliament voted through regulations introducing stronger sustainable finance requirements for buy-side firms. When they take effect, most likely between 2020 and 2022, European asset managers will have to disclose how they integrate sustainability risks into their decision-making process. [Read More](#)

### **Resources (click upon an image to access)**

#### **The Actuary Magazine:**



#### **ASTIN Bulletin:**



#### **Irish SoA Database:**

