Loss Distribution Approach For Operational Risk Capital

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Estimating Operational Risk Capital with Greater Accuracy, Precision, and Robustness J.D. Opdyke 2014 The largest US banks and Systemically Important Financial Institutions are required by regulatory mandate to estimate the operational risk capital they must hold using an Advanced Measurement Approach (AMA) as defined by the Basel II/III Accords. Most of these institutions use the Loss Distribution Approach (LDA) which defines the aggregate loss distribution as the convolution of a frequency distribution and a severity distribution representing the number and magnitude of losses, respectively. Capital is a Value-at-Risk estimate of this annual loss distribution (i.e. the quantile corresponding to the 99.9%tile, representing a one-in-a-thousand-year loss, on average). In practice, the severity distribution drives the capital estimate, which is essentially a very large quantile of the estimated severity distribution. Unfortunately, when using LDA with any of the widely used severity distributions (i.e. heavy-tailed, skewed distributions), all unbiased estimators of severity distribution parameters appear to generate biased capital estimates due to Jensen's Inequality: VaR always appears to be a convex function of these severities' parameter estimates because the (severity) quantile being estimated is so large and the severities are heavy-tailed. The resulting bias means that capital requirements always will be overstated, and this inflation is sometimes enormous (sometimes even billions of dollars at the unit-of-measure level). Herein I present an estimator of capital that essentially eliminates this upward bias when used with any commonly used severity parameter estimator. The Reduced-bias Capital Estimator (RCE), consequently, is more consistent with regulatory intent regarding the responsible implementation of the LDA framework than other implementations that fail to mitigate, if not eliminate this bias. RCE also notably increases the precision of the capital estimate and consistently increases its robustness to violations of the i.i.d. data presumption (which are endemic to

operational risk loss event data). So with greater capital accuracy, precision, and robustness, RCE lowers capital requirements at both the unit-of-measure and enterprise levels, increases capital stability from quarter to quarter, ceteris paribus, and does both while more accurately and precisely reflecting regulatory intent. RCE is straightforward to explain, understand, and implement using any major statistical software package.

Operational Risk Management I. Moosa 2007-07-03 Written by an experienced academic and practitioner, Operational Risk Management fills a gap in the information available on the Basel 2 Accord and offers valuable insights into the nature of operational risk.

Quantification of Operational Risk under Basel II I. Moosa 2008-10-31 The book presents arguments that are critical of the Basel II Accord, particularly the advanced measurement approach to operational risk. It is argued that the advanced measurement approach is not viable in terms of costs and benefits and is likely to distract financial institutions from the real task of managing operational risk.

Modelling Operational Risk Using Bayesian Inference Pavel V Shevchenko 2011-01-21 The management of operational risk in the banking industry has undergone explosive changes over the last decade due to substantial changes in the operational environment. Globalization, deregulation, the use of complex financial products, and changes in information technology have resulted in exposure to new risks which are very different from market and credit risks. In response, the Basel Committee on Banking Supervision has developed a new regulatory framework for capital measurement and standards for the banking sector. This has formally defined operational risk and introduced corresponding capital requirements.Many banks are undertaking quantitative modelling of operational risk using the Loss Distribution Approach (LDA) based on statistical quantification of the frequency and severity of operational risk losses. There are a number of unresolved methodological challenges in the LDA implementation. Overall, the area of quantitative operational risk is very new and different methods are under hot debate.This book is devoted to quantitative issues in LDA. In particular, the use of Bayesian inference is the main focus. Though it is very new in this area, the Bayesian approach is well suited for modelling operational risk, as it allows for a consistent and convenient statistical framework for quantifying the uncertainties involved. It also allows for the combination of expert opinion with historical internal and external data in estimation procedures. These are critical, especially for low-frequency/high-impact operational risks.This book is aimed at practitioners in risk management, academic researchers in financial mathematics, banking industry regulators and advanced graduate students in the area. It is a must-read for anyone who works, teaches or does research in the area of financial risk.

The Essentials of Risk Management, Chapter 13 - Operational Risk Michel Crouhy 2005-12-14 Here is a chapter from The Essentials of Risk Management, a practical, non-ivory tower approach that is necessary to effectively implement a superior risk management program. Written by three of the leading figures with extensive practical and theoretical experience in the global risk management and corporate governance arena, this straightforward guidebook features such topics as governance, compliance and risk management; how to implement integrated risk management; measuring, managing and hedging market, and more.

Fundamental Aspects of Operational Risk and Insurance Analytics Marcelo G. Cruz 2015-01-20 A one-stop guide for the theories, applications, and statistical methodologies essential to operational risk Providing a complete overview of operational risk modeling and relevant insurance analytics, Fundamental Aspects of Operational Risk and Insurance Analytics: A Handbook of Operational Risk offers a systematic approach that covers the wide

range of topics in this area. Written by a team of leading experts in the field, the handbook presents detailed coverage of the theories, applications, and models inherent in any discussion of the fundamentals of operational risk, with a primary focus on Basel II/III regulation, modeling dependence, estimation of risk models, and modeling the data elements. Fundamental Aspects of Operational Risk and Insurance Analytics: A Handbook of Operational Risk begins with coverage on the four data elements used in operational risk framework as well as processing risk taxonomy. The book then goes further in-depth into the key topics in operational risk measurement and insurance, for example diverse methods to estimate frequency and severity models. Finally, the book ends with sections on specific topics, such as scenario analysis; multifactor modeling; and dependence modeling. A unique companion with Advances in Heavy Tailed Risk Modeling: A Handbook of Operational Risk, the handbook also features: Discussions on internal loss data and key risk indicators, which are both fundamental for developing a risk-sensitive framework Guidelines for how operational risk can be inserted into a firm's strategic decisions A model for stress tests of operational risk under the United States Comprehensive Capital Analysis and Review (CCAR) program A valuable reference for financial engineers, quantitative analysts, risk managers, and large-scale consultancy groups advising banks on their internal systems, the handbook is also useful for academics teaching postgraduate courses on the methodology of operational risk.

Loss Distribution Approach for Quantifying the Operational Risk Capital Charge Omar Briceño C. 2014 Advanced Measurement Approach (AMA) has been addressed by the Basel Committee in document International Convergence of Capital Measurement and Capital Standards. Financial institutions must meet certain criteria to obtain regulatory approval.This paper proposes a logical structure to quantify the operational risk capital charge with a Loss Distribution Approach (LDA), including

techniques and mathematical proofs for better aid.
Loss Distribution Approach for Operational Risk Antoine Frachot 2007 In this paper, we explore the Loss Distribution Approach (LDA) for computing the capital charge of a bank for operational risk where LDA refers to statistical/actuarial methods for modelling the loss distribution. In this framework, the capital charge is calculated using a Value-at-Risk measure. In the first part of the paper, we give a detailed description of the LDA implementation and we explain how it could be used for economic capital allocation. In particular, we show how to compute the aggregate loss distribution by compounding the loss severity distribution and the loss frequency distribution, how to compute the total Capital-at-Risk using copulas, how to control the upper tail of the loss severity distribution with order statistics. In the second part of the paper, we compare LDA with the Internal Measurement Approach (IMA)proposed by the Basel Committee on Banking Supervision to calculate regulatory capital for operational risk. LDA and IMA are bottom - up internal measurement models which are apparently different. Nevertheless, we could map LDA into IMA and give then some justifications about the choice done by regulators to define IMA. Finally, we provide alternative ways of mapping both methods together.
Scenario Analysis for Modelling Operational Losses in the Absence of Data Enrique Jose Jimenez-Rodriguez 2009 The transposition of the European Directive on Basel II has been recently done by the Circular 3/2008 on Minimum Capital Requirements of the Bank of Spain. This new regulatory framework has encouraged the Spanish banking sector to evolve to sophisticated techniques for managing operational risk more effectively. According to the Committee, the Loss Distribution Approach (LDA) seems to be the most suitable methodology for estimating the Capital at Risk (CaR). In this paper, we conduct a Scenario Analysis combined with the LDA to calculate the capital charge for operational risk, and more specifically, for the Internal

Fraud event type. The Scenario Analysis is an essential technique when lacking of data in order to complete the Internal Operational Loss Database (IOLD). We apply this analysis in the case of the IOLD provided by a Spanish saving bank. Since there is only one observation recorded due to the Internal Fraud and, being aware of the under-reporting phenomenon, we design two hypothetical scenarios to offset the missing data. Furthermore, we also develop a stress-testing to calibrate the potential impact on CaR due to mechanical changes in both scale and shape parameters of the severity distribution. As a result, we find a positive relationship between the degree of asymmetry and kurtosis that characterized the loss distribution and the capital consumption.

Operational Risk Capital Provisions for Banks and Insurance Companies Edoh Fofo Afambo 2006 This dissertation investigates the implications of using the Advanced Measurement Approaches (AMA) as a method to assess operational risk capital charges for banks and insurance companies within Basel II paradigms and with regard to U.S. regulations. Operational risk has become recognized as a major risk class because of huge operational losses experienced by many financial firms over the last past decade. Unlike market risk, credit risk, and insurance risk, for which firms and scholars have designed efficient methodologies, there are few tools to help analyze and quantify operational risk. The New Basel Revised Framework for International Convergence of Capital Measurement and Capital Standards (Basel II) gives substantial flexibility to internationally active banks to set up their own risk assessment models in the context of the Advanced Measurement Approaches. The AMA developed in this thesis uses actuarial loss models complemented by the extreme value theory to determine the empirical probability distribution function of the overall capital charge in terms of various classes of copulas. Publicly available operational risk loss data set is used for the empirical exercise.

Implication of Alternative Operational Risk Modeling Techniques Patrick de Fontnouvelle 2005 "Quantification of operational risk has received increased attention with the inclusion of an explicit capital charge for operational risk under the new Basle proposal. The proposal provides significant flexibility for banks to use internal models to estimate their operational risk, and the associated capital needed for unexpected losses. Most banks have used variants of value at risk models that estimate frequency, severity, and loss distributions. This paper examines the empirical regularities in operational loss data. Using loss data from six large internationally active banking institutions, we find that loss data by event types are quite similar across institutions. Furthermore, our results are consistent with economic capital numbers disclosed by some large banks, and also with the results of studies modeling losses using publicly available "external" loss data"--National Bureau of Economic Research web site.

Guide to Optimal Operational Risk and BASEL II Ioannis S. Akkizidis 2005-11-01 Guide to Optimal Operational Risk and Basel II presents the key aspects of operational risk management that are also aligned with the Basel II requirements. This volume provides detailed guidance for the design and implementation of an efficient operational risk management system. It contains all elements of assessment, including operational risk i

The Quantification of Operational Risk Using Internal Data, Relevant External Data and Expert Opinion Dominik Lambrigger 2014 To quantify an operational risk capital charge under Basel II, many banks adopt a Loss Distribution Approach. Under this approach, quantification of the frequency and severity distributions of operational risk involves the bank's internal data, expert opinions and relevant external data. In this paper we suggest a new approach, based on a Bayesian inference method, that allows for a combination of these three sources of information to estimate the parameters of the risk frequency and severity distributions.

Operational Risk Anna S. Chernobai 2008-05-14 While operational risk has long been regarded as a mere part of "other" risks--

outside the realm of credit and market risk--it has quickly made its way to the forefront of finance. In fact, with implementation of the Basel II Capital Accord already underway, many financial professionals--as well as those preparing to enter this field--must now become familiar with a variety of issues related to operational risk modeling and management. Written by the experienced team of Anna Chernobai, Svetlozar Rachev, and Frank Fabozzi, Operational Risk will introduce you to the key concepts associated with this discipline. Filled with in-depth insights, expert advice, and innovative research, this comprehensive guide not only presents you with an abundant amount of information regarding operational risk, but it also walks you through a wide array of examples that will solidify your understanding of the issues discussed. Topics covered include: The main challenges that exist in modeling operational risk. The variety of approaches used to model operational losses. Value-at-Risk and its role in quantifying and managing operational risk. The three pillars of the Basel II Capital Accord. And much more.

Quantitative Operational Risk Models Catalina Bolancé 2012-02-15 Using real-life examples from the banking and insurance industries, Quantitative Operational Risk Models details how internal data can be improved based on external information of various kinds. Using a simple and intuitive methodology based on classical transformation methods, the book includes real-life examples of the combination of internal data and external information. A guideline for practitioners, the book begins with the basics of managing operational risk data to more sophisticated and recent tools needed to quantify the capital requirements imposed by operational risk. The book then covers statistical theory prerequisites, and explains how to implement the new density estimation methods for analyzing the loss distribution in operational risk for banks and insurance companies. In addition, it provides: Simple, intuitive, and general methods to improve on internal operational risk assessment Univariate event loss severity distributions analyzed using semiparametric models Methods for the introduction of underreporting information A practical method to combine internal and external operational risk data, including guided examples in SAS and R Measuring operational risk requires the knowledge of the quantitative tools and the comprehension of insurance activities in a very broad sense, both technical and commercial. Presenting a nonparametric approach to modeling operational risk data, Quantitative Operational Risk Models offers a practical perspective that combines statistical analysis and management orientations.

Operational Risk Management in Banks Giuliana Birindelli 2017-07-26 This book focuses on several topical issues related to the operational risk management in bank: regulation, organisation and strategy. It analyses the connections between the different key-players involved in the operational risk process and the most relevant implications, both operational and strategic, arising from the implementation of the prudential framework.

Implementing Loss Distribution Approach for Operational Risk Pavel V. Shevchenko 2014 In order to quantify the operational risk capital charge under the current regulatory framework for banking supervision, referred to as Basel II, many banks adopt the Loss Distribution Approach. There are many modeling issues that should be resolved to use this approach in practice. In this paper we review the quantitative methods suggested in the literature for the implementation of the approach. In particular, the use of Bayesian inference that allows one to take expert judgement and parameter uncertainty into account, modeling dependence, and inclusion of insurance are discussed.

Goodness-of-Fit Tests and Selection Methods for Operational Risk Sophie Lavaud 2015 Within the Loss Distribution Approach (LDA) framework, the required capital is the 99.9% Value-at-Risk of the annual loss distribution which is based on the fit of severity and frequency distributions using internal data. Supervisory guidelines

for the Advanced Measurement Approaches address the issue of the sensitivity of goodness-of-fit (GOF) tests to the sample size, the number of parameters estimated and to the tail of the distributions. They suggest that a bank should consider selection methods that use the relative performance of the distributions at different confident levels. In this paper, a study is conducted to investigate selection methods such as the Bayesian Information Criterion and the violation ratio as alternatives to the GOF tests. Attention is also given to the main properties of the usual GOF tests performed in operational risks in order to figure out the cases where the sensitivity raised by the guidelines is encountered and if those tests could be reliable though.

Estimation of Operational Risk Capital 2008
Towards Operational Risk Management Jimmy Skoglund 2013 The New Basel Capital Accord presents a framework for measuring operational risk which includes four degrees of complexity. In this paper we focus on a mathematical description of the Loss Distribution Approach (LDA), being the more rigorous and potentially more accurate approach towards which most (advanced) institutions will be striving. In particular the aim of this paper is to show how a basic quantitative interpretation of LDA, focusing on the mere numerical measurement of operational risk, may be generalized to include factors of some practical importance. These include; endogenization of the operational risk event via the concept of key risk driver, a flexible co-dependence structure and a clear statement of the objective and scope of the operational risk manager.

Operational Risk Toward Basel III Greg N. Gregoriou 2009-03-03 This book consists of chapters by contributors (well-known professors, practitioners, and consultants from large and well respected money management firms within this area) offering the latest research in the OpRisk area. The chapters highlight how operational risk helps firms survive and prosper by givingreaders the latest, cutting-edge techniques in OpRisk management. Topics discussed include: Basel Accord II, getting ready for the New Basel III, Extreme Value Theory, the new capital requirements and regulations in the banking sector in relation to financial reporting (including developing concepts such as OpRisk Insurance which wasn't a part of the Basel II framework). The book further discussed quantitative and qualitative aspects of OpRisk, as well as fraud and applications to the fund industry.

Credit Risk Management Tony Van Gestel 2008-10-23 Credit Risk Management: Basic Concepts is the first book of a series of three with the objective of providing an overview of all aspects, steps, and issues that should be considered when undertaking credit risk management, including the Basel II Capital Accord, which all major banks must comply with in 2008. The introduction of the recently suggested Basel II Capital Accord has raised many issues and concerns about how to appropriately manage credit risk. Managing credit risk is one of the next big challenges facing financial institutions. The importance and relevance of efficiently managing credit risk is evident from the huge investments that many financial institutions are making in this area, the booming credit industry in emerging economies (e.g. Brazil, China, India, ...), the many events (courses, seminars, workshops, ...) that are being organised on this topic, and the emergence of new academic journals and magazines in the field (e.g. Journal of Credit Risk, Journal of Risk Model Validation, Journal of Risk Management in Financial Institutions, ...). Basic Concepts provides the introduction to the concepts, techniques, and practical examples to guide both young and experienced practitioners and academics in the fascinating, but complex world of risk modelling. Financial risk management, an area of increasing importance with the recent Basel II developments, is discussed in terms of practical business impact and the increasing profitability competition, laying the foundation for books II and III.

Semi-parametric and Non-parametric Estimation of the Operational Risk and Expected Shortfall: Simulation and Empirical

Evidence Ainura Tursunalieva 2012 Due to the large losses incurred in recent times by internationally active banks and other financial institutions in many industrialised countries, the recent literature has paid a considerable amount of attention to measuring and managing operational risk (OR). The OR is defined as the difference between the 99.9% quantile and the mean of the loss distribution. In other words, the OR is the unexpected loss, measured with a high degree of confidence. In their recent document, Basel Committee on Banking Supervision (2011) emphasised the need for a reliable OR estimate on which to base the calculation of the economic capital charge required to cover operational losses.There are both pros and cons associated with the advanced measurement approach (AMA), which is currently widely used. Since the report by Basel Committee on Banking Supervision (2004), academics and practitioners have studied the applicability and flexibility of AMA for modelling the severity of operational losses, and have also contributed to the further development of AMA. However, Basel Committee on Banking Supervision (2011) recently provided new guidelines for estimating OR that can lead to an optimum level of capital requirement for banks. According to these guidelines, the tail of the severity loss distribution needs to be modelled adequately, capturing the high skewness and kurtosis of the loss distribution. In addition, scenario and sensitivity analyses have to be conducted, and a range of possible estimates of OR should be produced, rather than reporting only a single point estimate of OR.The objective of the thesis is to adapt and study the performances of some recent advanced semi-parametric and non-parametric methods for modelling and estimating heavy-tailed severity distributions, which can be used under Loss Distribution Approach in compliance with the quantitative AMA standards. AMA allows banks and financial institutions develop their own methods to calculate OR. Therefore, the emphasis of this thesis is to provide banks and financial institutions with the detailed analysis of the performance of various non-parametric methods which have been proposed in the statistics literature recently in the context of a heavy-tailed distribution. The attractive feature of these non-parametric methods is that there is no need to estimate the entire loss distribution, or even its right tail - a key part of the distribution used in the estimation of OR. This thesis pays a considerable amount of attention to estimating the key parameters, such as the threshold loss and the tail index, which are used in estimating the economic capital requirement. The existing AMA for estimating OR has some weaknesses: the expected loss, computed as the simple sample average of operational losses, is biased and inconsistent, since the loss distribution is right heavy-tailed. It is difficult to assess the reliability of the OR estimate when only a point estimate of OR is reported. It is more informative to report either the standard error or an interval estimate of the underlying true OR. This thesis proposes improvements aimed at overcoming these weaknesses.The objectives of this thesis are to: (i) propose some improvements to recently developed advanced semi-parametric and non-parametric methods for estimating OR; (ii) construct unbiased and consistent point and interval estimates for the mean of a heavy-tailed loss distribution; (iii) conduct a simulation study in order to assess the finite sample properties of the interval estimate of the mean of a right heavy-tailed distribution, in terms of coverage probabilities and lengths; (iv) construct point and interval estimates of the 99.9% quantile (operational value at risk, OpVaR) of a heavy-tailed distribution, and conduct a simulation study to assess the accuracy of interval estimates for the quantile; and (v) provide a step-by-step approach to estimating the two downside risks, OR and the expected shortfall, by using the methods adapted and studied in this thesis. These methods are illustrated by applying them to some business losses in the US. This thesis finds that the sample mean estimate and the adjusted mean (unbiased and consistent) estimate of the expected loss

(that is, the population mean of the loss distribution) can differ considerably, depending on the size of the tail index that measures the tail thickness. The heavier the tail of the loss distribution, the larger the difference between the two mean estimates, with the latter being larger than the former; the estimates are close to each other if the loss distribution is close to normal. These findings indicate that the regulatory capital requirement can be overestimated, if the expected loss is not estimated appropriately. The coverage and other properties of the empirical likelihood-based confidence interval estimate of the mean are good when the tail index is not close to one. On the other hand, when the tail index is very close to one, the sub-sampling bootstrap based interval estimate can be used. In addition, the results of the simulation study indicate that the data tilting method, which is the weighted empirical likelihood method, produces reliable confidence interval estimates for the 99.9% OpVaR. This method is attractive because it gives nearly zero weights to losses in the non-tail region and large weights to losses in the tail region - an important region when estimating OR. The methods studied in this thesis are applied to the estimation of OR and the expected shortfall of some business losses in the US. To help practitioners who are working with heavy-tailed distributions, a step-by-step approach to constructing the point and interval estimates of operational risks is provided. The empirical results indicate that the operational risk and expected shortfall are close to each other when the tail index is close to two, which indicates that the loss distribution is close to normal. On the other hand, if the tail index is close to one, which indicates that the loss distribution is close to stable, then the expected shortfall can be noticeably greater than the OR. These findings have implications for risk management and regulators. Since the 2008 financial crisis, regulators would like to see large businesses and banks allocating large amounts of capital. The findings of this thesis show that if the tail index is close to one, then the expected shortfall provides a better cushion than does OR, while the economic regulatory capital can be based on either the expected shortfall or OR when the tail index is close to two.

Statistical Analysis of Operational Risk Data Giovanni De Luca 2020-02-24 This concise book for practitioners presents the statistical analysis of operational risk, which is considered the most relevant source of bank risk, after market and credit risk. The book shows that a careful statistical analysis can improve the results of the popular loss distribution approach. The authors identify the risk classes by applying a pooling rule based on statistical tests of goodness-of-fit, use the theory of the mixture of distributions to analyze the loss severities, and apply copula functions for risk class aggregation. Lastly, they assess operational risk data in order to estimate the so-called capital-at-risk that represents the minimum capital requirement that a bank has to hold. The book is primarily intended for quantitative analysts and risk managers, but also appeals to graduate students and researchers interested in bank risks.

Measuring and Managing Operational Risk Paola Leone 2017-12-26 This book covers Operational Risk Management (ORM), in the current context, and its new role in the risk management field. The concept of operational risk is subject to a wide discussion also in the field of ORM's literature, which has increased throughout the years. By analyzing different methodologies that try to integrate qualitative and quantitative data or different measurement approaches, the authors explore the methodological framework, the assumptions, statistical tool, and the main results of an operational risk model projected by intermediaries. A guide for academics and students, the book also discusses the avenue of mitigation acts, suggested by the main results of the methodologies applied. The book will appeal to students, academics, and financial supervisory and regulatory authorities.

Economic Capital Ashish Dev 2004 This new multi-contributor

title will enable you to better analyse and evaluate economic capital in order to implement more effective risk management strategies within your business. Economic Capital is the definitive reference on this increasingly important area of finance.

Operational Risk in Bank Governance and Control Enzo Scannella 2015 Operational risk management in banking has assumed such importance during the last decades. It has become increasingly important to measure, manage, and assess the impact of operational risk in the economics of banking. The paper aims to demonstrate how an effective operational risk management provides mitigating effects on Capital-at-Risk in banking. The paper provides evidences that an implementation of an operational risk transfer strategy reduces bank capital requirement and capital costs. The paper adopts the loss distribution approach, the Monte Carlo simulation, and copula methodologies to estimate the regulatory capital and simulate the operational risk transfer strategy in banking.

Operational Risk Control with Basel II Dimitris N. Chorafas 2003-10-06 Operational Risk Control with Basel II, provides a sound methodology for operational risk control and focuses on management risk and ways to avoid it. The book explains why and how information technology is a major operational risk and shows how to integrate cost control in the operational risk perspective. It aslo details analytical approaches to operational risk control, to help with scorecard developments, explains the distinction between High Frequency Low Risk and Low Frequency High Risk events and provides many case studeies from banking and insurance to demonstrate the attention operational risks deserve. Assists risk professionals in preparing their institution to comply with the New Capital Adequacy Framework issued by the Basel Committee on Banking Supervision, which becomes mandatory from January 1, 2006 Readers benefit from a significantly broader viewpoint on types of operational risks, operational risks controls, and results to be expected from operational risk management -

compared to what the reader may gain from books previously published on this same topic

Operational Risk Carol Alexander 2003 Developments in IT and e-commerce, large-scale mergers and acquisitions, andincreased outsourcing all suggest that operational risk exposures are substantialand growing. In recent years, bankers and financial professions have recognizedthe crucial and growing importance of operational risk management, and thefield is currently undergoing a surge of innovation and development. In thisauthoritative, up-to-date book, Operational Risk, leading operational riskmanagement expert Carol Alexander brings together contributions from theworld's leading experts to identify today's best practices for measuring andmanaging operational risks, and assessing them in the broader context of allrisk.

Estimation of Truncated Data Samples in Operational Risk Modeling Bakhodir Ergashev 2014 This paper addresses challenges of estimating operational risk regulatory capital when a loss sample is truncated from below at a data collection threshold. Recent operational risk literature reports that the attempts to estimate loss distributions by the maximum likelihood method are not always successful under the truncation approach that accounts for the existence of censored losses - the likelihood surface is sometimes ascending with no global solution. The literature o ers an alternative called the shifting approach, which estimates the loss distribution without taking into account censored losses. We present a necessary and su cient condition for the existence of the global solution to the likelihood maximization problem under the truncation approach when the true loss distribution is lognormal, and derive a practically explicit expression for the global solution. We show by a simulation study that, as the sample size increases, the capital bias by the truncation approach declines while the bias by the shifting approach does not.

Quantile Distance Estimation for Operational Risk Vincent Lehérissé 2014 Within the loss distribution approach framework,

the required capital is the 99.9% value-at-risk of the annual loss distribution, which is based on the fit of the severity and frequency distributions using internal data. The severity estimation is the most difficult to undertake because of the specificity of operational risk data, which sometimes makes common techniques, such as maximum likelihood and the generalized method of moments, unreliable. This paper adapts an alternative method called quantile distance estimation - which is based on the minimization of a distance between empirical and theoretical quantiles - to operational risk modeling in the loss distribution approach framework. We calibrate the different parameters that enable this approach to be used for operational risk and then perform a study comparing it with the common estimation methods that use real data sets from the industry. We show that quantile distance estimation compares favorably with the other methods in an operational risk context.

Advances in Heavy Tailed Risk Modeling Gareth W. Peters 2015-05-05 A cutting-edge guide for the theories, applications, and statistical methodologies essential to heavy tailed risk modeling Focusing on the quantitative aspects of heavy tailed loss processes in operational risk and relevant insurance analytics, Advances in Heavy Tailed Risk Modeling: A Handbook of Operational Risk presents comprehensive coverage of the latest research on the theories and applications in risk measurement and modeling techniques. Featuring a unique balance of mathematical and statistical perspectives, the handbook begins by introducing the motivation for heavy tailed risk processes in high consequence low frequency loss modeling. With a companion, Fundamental Aspects of Operational Risk and Insurance Analytics: A Handbook of Operational Risk, the book provides a complete framework for all aspects of operational risk management and includes: Clear coverage on advanced topics such as splice loss models, extreme value theory, heavy tailed closed form loss distributional approach models, flexible heavy tailed risk models, risk measures, and

higher order asymptotic approximations of risk measures for capital estimation An exploration of the characterization and estimation of risk and insurance modelling, which includes sub-exponential models, alpha-stable models, and tempered alpha stable models An extended discussion of the core concepts of risk measurement and capital estimation as well as the details on numerical approaches to evaluation of heavy tailed loss process model capital estimates Numerous detailed examples of real-world methods and practices of operational risk modeling used by both financial and non-financial institutions Advances in Heavy Tailed Risk Modeling: A Handbook of Operational Risk is an excellent reference for risk management practitioners, quantitative analysts, financial engineers, and risk managers. The book is also a useful handbook for graduate-level courses on heavy tailed processes, advanced risk management, and actuarial science.

Risk Management in Financial Institutions J.H.M. van Grinsven 2010-01-28 Risk managers are under pressure to compete in a competitive environment while solidly honoring their obligations and navigating their business safely toward the future. Paramount to their success is the ability to identify, formulate, assess and communicate value propositions to their stakeholders. This book presents valuable insights from principal researchers and practitioners from leading financial institutions. They provide many insightful ideas, concepts and methods to help shape or reshape value propositions.

Measuring Operational and Reputational Risk Aldo Soprano 2009-04-20 How to apply operational risk theory to real-life banking data Modelling Operational and Reputational Risks shows practitioners the best models to use in a given situation, according to the type of risk an organization is facing. Based on extensive applied research on operational risk models using real bank datasets, it offers a wide range of various testing models and fitting techniques for financial practitioners. With this book, professionals will have a foundation for measuring and predicting

these important intangibles. Aldo Soprano (Madrid, Spain) is Group Head of operational risk management at UniCredit Group.

Operational Risk Andreas Jobst 2007-10-01 This paper investigates the generalized parametric measurement methods of aggregate operational risk in compliance with the regulatory capital standards for operational risk in the New Basel Capital Accord ("Basel II"). Operational risk is commonly defined as the risk of loss resulting from inadequate or failed internal processes and information systems, from misconduct by people or from unforeseen external events. Our analysis informs an integrated assessment of the quantification of operational risk exposure and the consistency of current capital rules on operational risk based on generalized parametric estimation.

Operational Risk Modelling and Management Claudio Franzetti 2016-04-19 Taking into account the standards of the Basel Accord, Operational Risk Modelling and Management presents a simulation model for generating the loss distribution of operational risk. It also examines a multitude of management issues that must be considered when adjusting the quantitative results of a comprehensive model. The book emphasizes techniques that can be understood and applied by practitioners. In the quantitative portions of the text, the author supplies key concepts and definitions without stating theorems or delving into mathematical proofs. He also offers references for readers looking for further background information. In addition, the book includes a Monte Carlo simulation of risk capital in the form of a run-through example of risk calculations based on data from a quantitative impact study. Since the computations are too complicated for a scripting language, a prototypical software program can be downloaded from www.garrulus.com Helping you navigate the tricky world of risk calculation and management, this book presents two main building blocks for determining how much capital needs to be reserved for operational risk. It employs the loss distribution approach as a model for calculating the risk

capital figure and explains risk mitigation through management and management's actuations.

Dependence of Operational Losses and the Capital at Risk Ganna Reshetar 2008 This paper addresses the issue of dependence between operational losses and how it can be accounted for in the value of capital at risk associated with operational risk. In contrast to the Loss Distribution Approach described by regulators in Basel II, our model accounts for the underlying dependence between aggregate losses of different classes of risk. For the first time in this research area, we model this dependence, assuming that it is driven by both, dependence between loss frequencies and dependence between loss severities. The model implementation shows that values of capital at risk obtained based on the Loss Distribution Approach are different than values obtained using our approach. This finding reveals that accounting for loss dependence in capital at risk computations is important for both banks and regulators. This is because a capital charge against operational losses should reflect true operational risk exposure of a bank. When correctly computed across all banks this would help to preserve stability in the banking and financial sectors of the economy.

Estimation of Operational Risk Capital Charge under Parameter Uncertainty Pavel V. Shevchenko 2009 Many banks adopt the Loss Distribution Approach to quantify the operational risk capital charge under Basel II requirements. It is common practice to estimate the capital charge using the 0.999 quantile of the annual loss distribution, calculated using point estimators of the frequency and severity distribution parameters. The uncertainty of the parameter estimates is typically ignored. One of the unpleasant consequences for the banks accounting for parameter uncertainty is an increase in the capital requirement. This paper demonstrates how the parameter uncertainty can be taken into account using a Bayesian framework that also allows for incorporation of expert opinions and external data into the

estimation procedure.

Operational Risk Modeling in Financial Services Patrick Naim 2019-04-08 Transform your approach to oprisk modelling with a proven, non-statistical methodology Operational Risk Modeling in Financial Services provides risk professionals with a forward-looking approach to risk modelling, based on structured management judgement over obsolete statistical methods. Proven over a decade's use in significant banks and financial services firms in Europe and the US, the Exposure, Occurrence, Impact (XOI) method of operational risk modelling played an instrumental role in reshaping their oprisk modelling approaches; in this book, the expert team that developed this methodology offers practical, in-depth guidance on XOI use and applications for a variety of major risks. The Basel Committee has dismissed statistical approaches to risk modelling, leaving regulators and practitioners searching for the next generation of oprisk quantification. The XOI method is ideally suited to fulfil this need, as a calculated, coordinated, consistent approach designed to bridge the gap between risk quantification and risk management. This book details the XOI framework and provides essential guidance for practitioners looking to change the oprisk modelling paradigm. Survey the range of current practices in operational risk analysis and modelling Track recent regulatory trends including capital modelling, stress testing and more Understand the XOI oprisk modelling method, and transition away from statistical approaches Apply XOI to major operational risks, such as disasters, fraud, conduct, legal and cyber risk The financial services industry is in dire need of a new standard — a proven, transformational approach to operational risk that eliminates or mitigates the common issues with traditional approaches. Operational Risk Modeling in Financial Services provides practical, real-world guidance toward a more reliable methodology, shifting the conversation toward the future with a new kind of oprisk modelling.

Loss Distribution Approach for Operational Risk Capital Modelling Under Basel II Pavel V. Shevchenko 2017 The management of operational risk in the banking industry has undergone significant changes over the last decade due to substantial changes in operational risk environment. Globalization, deregulation, the use of complex financial products and changes in information technology have resulted in exposure to new risks very different from market and credit risks. In response, Basel Committee for banking Supervision has developed a regulatory framework, referred to as Basel II, that introduced operational risk category and corresponding capital requirements. Over the past five years, major banks in most parts of the world have received accreditation under the Basel II Advanced Measurement Approach (AMA) by adopting the loss distribution approach (LDA) despite there being a number of unresolved methodological challenges in its implementation. Different approaches and methods are still under hot debate. In this paper, we review methods proposed in the literature for combining different data sources (internal data, external data and scenario analysis) which is one of the regulatory requirement for AMA.