The Handbook of Insurance-Linked Securities

Edited by

Pauline Barrieu and Luca Albertini

WILEY
A John Wiley and Sons, Ltd., Publication

The Handbook of Insurance-Linked Securities

For other titles in the Wiley Finance series
please see www.wiley.com/finance

The Handbook of Insurance-Linked Securities

Edited by

Pauline Barrieu and Luca Albertini

WILEY
A John Wiley and Sons, Ltd., Publication

This edition first published 2009

Registered office
John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com.

Library of Congress Cataloging-in-Publication Data

The handbook of insurance-linked securities / edited by Pauline Barrieu, Luca Albertini.
p. cm. — (Wiley finance series)
Includes bibliographical references and indexes.
ISBN 978-0-470-74383-6 (cloth : alk. paper) 1. Risk (Insurance)
2. Securities. I. Albertini, Luca. II. Barrieu, Pauline.
HG8054.5.H363 2009
332.63′2—dc22 2009019337

A catalogue record for this book is available from the British Library.

Typeset in 10/12pt Times by Aptara Inc., New Delhi, India
Printed in Great Britain by Antony Rowe Ltd, Chippenhan, Wiltshire

Contents

About the Contributors

Insa Adena heads the Advanced Risk Intermediation team at Allianz SE. This team was created in 2007 to develop innovative solutions for capital management and insurance risk transfer on behalf of Allianz SE and Group subsidiaries, with a focus on capital market-oriented structures. Prior to her current role, Insa was a senior member of the Group Treasury & Corporate Finance team at Allianz SE. Before joining Allianz in 2002, she worked for seven years in the Structured Finance and M&A departments of JPMorgan in London.

Luca Albertini is Chief Executive Officer of Leadenhall Capital Partners, an asset management company dedicated to insurance linked investments strategies. Luca has over 16 years of securitisation experience, having worked at Citibank, GE Capital, Credit Suisse First Boston and at Swiss Re, where he become responsible for the European Insurance Linked Securities team.

Pauline Barrieu is a Reader (Associate Professor) at the London School of Economics. She has two PhDs in Mathematics and Finance. Her research interests are mainly on the study of problems at the interface between finance and insurance, in particular ILS. She also works on quantitative methods for risk measurement and robust decision taking, with applications in finance and environmental economics.

Jean-Luc Besson is a Fellow of the French Institute of Actuaries, holds a PhD in Mathematics and is Chief Risk Officer of SCOR Group and a member of the Group Executive Committee. He has served as a Professor of Mathematics and as Senior Vice President of Research, Statistics and Information Systems at the FFSA (Fédération Française des Sociétés d'Assurance – the Federation of French Insurance Companies).

Adam Blakemore is a partner in the Tax department at Cadwalader, Wickersham and Taft LLP's London practice. He advises on the taxation aspects of a broad range of financing, restructuring and corporate transactions, including the taxation of credit and insurance-linked instruments, financial products and derivatives.

Shlomo Boehm is an associate at Cadwalader, Wickersham & Taft LLP. Shlomo's practice covers a broad range of federal income tax matters, including with respect to derivatives and financial product development, structured finance transactions, investment fund structuring, medium-term note programs, cross-border lending transactions and insurance-linked securities. Shlomo graduated from Ner Israel Rabbinical College in 1999 and from Columbia Law School, where he was a Harlan Fiske Stone Scholar, in 2003.

Ben Brookes originally joined RMS's Analytical Services team in 2004, having previously run a website design and development company, offering content management systems to educational establishments. Ben became manager of the Analytical Services group at RMS in the international region in 2005, providing consultative services to clients to assess their catastrophe risk exposure, and also supporting RMS's work on insurance-linked securities. As a part of this role, Ben managed RMS's graduate training programme in 2005 and 2006. In October 2006, Ben led the creation of RiskMarkets, a new practice within RMS Consulting, with the objective of aiding the rapid growth in the ILS market, as the sector grew following the events of 2004 and 2005 and demand for third party modelling services increased with more frequent cat bond issuance. In this role, Ben has led a significant number of ground-breaking cat bond projects and has worked on more than 20 insurance-linked security engagements, covering structural aspects, risk analysis, rating support, investor marketing and post-event calculation services. Ben has a first class Masters degree in Engineering Mathematics from the University of Bristol.

Sylvain Coriat is the head of Life Operations of AXA Cessions (i.e. the entity in charge of implementing the risk transfer decision for all AXA entities – be it through reinsurance or a capital market solution). As such, he manages the Life reinsurance flows of the AXA group, supports all AXA entities in the pricing of their products and supervises the underwriting and claims management processes of AXA at the group level. Sylvain holds an MSc in Engineering from Ecole Centrale Paris, an MSc in Finance and Economics from the London School of Economics and an MBA from INSEAD. He is a Fellow of the French Institute of Actuaries.

Guy Coughlan is Managing Director and Global Head of LifeMetrics and ALM Advisory within J.P. Morgan's Pension Solutions Group. As a specialist in ALM and risk, Guy has been involved in advising corporations, pension funds and insurers on strategic risk management, asset-liability management and capital structure. For the past three years he has been focusing on pension ALM as part of the Pension Solutions Team and led the development of LifeMetrics, an open-source platform for longevity risk management that includes longevity indices. Guy joined J.P. Morgan in 1994, initially within the Fixed Income Research department. Here he worked on projects involving optimal investment strategies, the development of RiskMetrics and built J.P. Morgan's FourFifteen risk analysis tool. In 1996 he moved to head the newly formed Risk Management Products group, which was later spun off from J.P. Morgan as The RiskMetrics Group. In 1998 he founded J.P. Morgan's ALM Advisory team. Prior to joining J.P. Morgan his previous experience includes working for a major oil company. Guy holds a BSc (Honors) degree from the University of Western Australia, a DPhil (PhD) in physics from Oxford University in the UK and an MBA. He is a member of the editorial board of the *Journal of Corporate Treasury Management*.

Nicola Dondi is an analyst in the Insurance Financing Group, Investment Banking Division, of Goldman Sachs International in London. Nicola holds a degree in Finance from Bocconi University, Milan, and a Masters in International Affairs from the Institut d'Etudes Politiques de Paris. Nicola has executed a number of insurance-related financing transactions, including the first ever sidecar by a Lloyds of London insurer, Panther Re for Hiscox plc, a \$1bn catastrophe bond shelf programme for Glacier Re and a \$400m Catastrophe Loan for Hannover Re. Nicola is also involved in asset– liability management transactions for European life insurers, particularly in the context of risk management and asset optimisation, and on M&A transactions involving insurance companies in Europe.

Jennifer Donohue is qualified as a barrister and as a solicitor. She is a partner and leads the transactional and regulatory insurance and reinsurance team of Simmons & Simmons, London. Her career has included advising, for a number of years, the UK Government on negotiation, drafting and implementing of the Insurance Single Market Directives. She advises on corporate and structuring aspects for insurance groups and solvency and forensic issues for life and non-life insurance companies. Jennifer advises regularly on insurance-linked securities and the dividing line between credit default swaps and other capital market instruments and insurance.

Emmanuel Durousseau is a fellow of the Institut des Actuaires. He began his insurance career in 1999 at MMA in Toronto, joining SCOR in 1994 as an underwriter and pricing actuary in the Alternative Risk Transfer department. In 1999, he became Managing Director at Commercial Risk Capital Markets, acting as an actuary/quantitative analyst in the Weather Derivative and Integrated Products division. Since 2005, he has been Retrocession Manager of SCOR.

Michael Eakins is an Executive Director in the Insurance Financing Group of Goldman Sachs and a Fellow of the Institute of Actuaries. Michael has executed a number of insurance-related financing transactions, including the first ever sidecar by a Lloyd's of London insurer – Panther Re for Hiscox plc, a $1bn cat bond shelf programme for Glacier Re and a €400m embedded value securitisation for Bank of Ireland. Michael is also involved in asset–liability management transactions for European life Insurers – particularly in the context of risk management and asset optimisation. Michael has previously spoken at industry conferences on the subject of insurance securitisation.

Matthew Feig is a senior associate in the New York office of the international law firm of Cadwalader, Wickersham & Taft LLP. His practice is concentrated in structured finance, corporate finance and corporate law. He has particular expertise in risk-linked securities and nontraditional structured finance products. He represents global investment banks, major reinsurance companies, large public and private companies and institutional investors in connection with securities, commercial and acquisition finance transactions. Mr Feig received a BFA from New York University and a JD from Columbia Law School, where he was a three-time Harlan Fiske Stone Scholar and a Michael Sovern Scholar.

James Frazier is a partner in the New York office of the international law firm of Cadwalader Wickersham & Taft LLP. He specialises in the area of ERISA and employee benefits, with a large part of his practice devoted to advising clients on the application of ERISA's fiduciary standards and prohibited transaction provisions to transactional and regulatory activities. This includes counseling financial services firms regarding the structure of investment vehicles and products offered to employee benefit plans, and the provision of investment management and brokerage services. He earned his BA from the University of North Carolina, his JD from the University of Arkansas School of Law, and an LLM in Taxation and Certificate in Employee Benefits Law, as well as an LLM in Labor Law, from the Georgetown University Law Center.

Harish Gohil is a senior director within the European insurance team of Fitch Ratings, based in London. He joined the agency in October 2002, and is responsible for overseeing a team of analysts covering a broad geographical range of life and non-life insurers within EMEA. He also heads up Fitch's EMEA Life Insurance analysis and ratings. One of Harish's key responsibilities is coordinating the analysis and ratings of European insurance-linked securities (ILS), liaising closely with colleagues in the US and in Structured Finance. Prior to joining Fitch, Harish was at Prudential plc, where he was one of a small central team of senior actuaries supporting the actuarial director. His actuarial experience in the industry includes product pricing and profitability, statutory valuation reporting, financial reporting, capital management and with-profits issues. Harish is a graduate of the London School of Economics. He is a qualified actuary, holding the professional designation Fellow of the Institute of Actuaries.

Guillaume Gorge works as AXA Property & Casualty Chief Risk Officer. He was previously Deputy CEO of AXA Cessions, the internal reinsurer of AXA. He graduated from ENSAE Paris Tech and is a member of the French Institute of Actuaries. He has written various papers on reinsurance, catastrophe risks, climate change and risk management. He lectures on reinsurance, securitisation and risk management at ENSAE.

Jay Green is a Vice President in the Capital Markets Insurance Solutions group of Swiss Re, specialising in the origination and structuring of insurance-linked securities, derivatives and related products. Jay joined Swiss Re in 2001 and has been structuring insurance-linked capital market products for six years. He holds a BBA in Finance from the University of Wisconsin.

Dominik Hagedorn holds an MSc in Financial Economics from Maastrict University. Dominik is an analyst with Munich Re's Risk Trading Unit, which he joined in May 2007. He is responsible for market research and company analysis.

Katharina Hartwig has worked, since 2002, in Group Legal Services of Allianz SE and advises, as senior legal counsel, on insurance-linked securitisation transactions of Allianz SE and subsidiaries. In 2007/2008 she was seconded for six months to the World Economic Forum where she was project manager for the Forum's project on the Convergence of Insurance and Capital Markets. Before joining Allianz, she was an associate in the M&A practice of Shearman & Sterling in Düsseldorf and Paris.

Cameron Heath is a Director of Standard & Poor's Insurance Ratings group in London. Cameron is the lead analyst of insurance-linked transactions in Europe, with particular emphasis on the non-life sector. He is also the Global Head of Non-Life Reserving for Insurance Ratings and a member of the Run-off Payment Assessment (RPA) team. Cameron is a Fellow of the Institute of Actuaries and holds a degree in Accountancy and Finance. He joined Standard & Poor's in June 2005, having spent ten years working in the UK insurance sector, largely in the London market.

Christian Heigl is a non-life actuary with Munich Re's Risk Trading unit. Amongst his duties is the modeling and pricing of ILS products as well as Munich Re's internal and external retrocession pricing. He joined Munich Re in 1999 as Casualty actuary performing different pricing, reserving and modeling tasks. Before starting in the Risk Trading unit he was working in the Corporate Underwriting department as project leader for the development of pricing and reserving tools as well as for Munich Re's central underwriting platform. Christian was born in 1971 near Munich and studied mathematics and computer science at the Technische Universität München. He holds a PhD in mathematics and has been a member of the German Actuarial Association (DAV) since 2003.

Oliver Iliffe is an associate in the Tax department at Cadwalader, Wickersham and Taft LLP's London practice. Oliver has advised on the UK taxation aspects of offshore catastrophe bond issuances. He also advises on the UK taxation aspects of debt securitisations, cross-border debt finance transactions, repo financing and corporate debt restructurings.

Douglas J. Lambert is a Vice President in the Insurance Products team within Morgan Stanley's Structured Solutions Group, focusing on bringing alternative capital sources to insurance risk concentrations. Specifically, he specialises in structuring catastrophe bonds, sidecars and other insurance-linked capital market products. He works with both life and non-life insurance risks and he has experience with captive insurer formation in domestic and foreign domiciles. Prior to joining Morgan Stanley in 2006, Mr Lambert worked at Citigroup in derivatives and structured products, concentrating on structured credit and interest rate and currency derivatives used in corporate risk management. He holds an AB in economics from Princeton University.

James Langston is an associate in the New York office of the international law firm of Cadwalader, Wickersham & Taft LLP. Mr Langston's practice is concentrated in the area of corporate law. Mr Langston represents large corporate entities, global investment banks, major reinsurance companies and private equity funds and their portfolio companies. He received a BA from the University of North Carolina and his JD from the University of North Carolina School of Law.

Kirsty Maclean is a lawyer, formerly practising in the transactional insurance and reinsurance team of international law firm Simmons & Simmons in London. She advises clients regularly on a wide range of transactions, in particular mergers and acquisitions, advisory work in respect of authorisations and prudential regulation, setting up insurance companies and offshore captives as well as corporate reorganisations and restructurings. Kirsty has a particular interest in the development of insurance-linked securities and has advised on a number of derivative structures and spoken on the point at conferences in London. Kirsty has also spent time in the capital markets team of Simmons & Simmons, advising on a range of debt and equity capital market issuances. Kirsty is a non-practising attorney of the High Court of Cape Town and was a lawyer with a top South African commercial firm before joining Simmons & Simmons. She graduated from the University of Cape Town with a Bachelor of Arts (psychology) and a Bachelor of Laws.

Chris Madsen is the Group Vice President of AEGON NV in The Hague, the Netherlands. A Danish and American citizen, he has over 18 years of experience in the re(insurance) and pension industry. He completed his Masters in Financial Engineering at Princeton University, USA, and he is an Associate of the Society of Actuaries and a Chartered Financial Analyst. He started his professional career in New York with PricewaterhouseCoopers, and subsequently worked in various roles as Consulting Actuary and Principal. He moved back to his native Denmark in 2003 with General Electric's Insurance Solutions group until joining AEGON NV in The Hague in April, 2007. At AEGON, Mr Madsen has responsibility for enhancing the AEGON Group's risk and capital profile through reinsurance and securitisation from a Group Risk perspective. He is a Member of AEGON's Treasury Risk and Capital Committee.

Alison McKie has been the Managing Director of the Global Life & Health Risk Transformation team at Swiss Re for the last 2.5 years, focusing on the transformation of Swiss Re's life and health business through selective risk transfer to the capital markets and through external retrocession. The role entails evaluation of internal and external risk appetites across the full spectrum of risks inherent in life and health contracts; determining appropriate transformation mechanisms for Swiss Re to achieve its strategic goals through active capital and risk management. Previously Alison was the Chief Financial Officer for Swiss Re Life & Health Limited. Alison joined Swiss Re in 2003 as the Finance Director for the Global Life & Health Business

Group having started her career at PricewaterhouseCoopers, where she focused on the insurance industry, working in both an audit and advisory capacity and on M&A transactions.

David S. Miller is a partner at Cadwalader, Wickersham & Taft, LLP. Mr Miller is a former chair of the New York State Bar Association's Tax Section. He is ranked the top tax lawyer in the United States by United States Lawyer Rankings, a ranking guide established by a consortium of US corporations. He is listed in Chambers Global's *The World's Leading Lawyers*, Chambers USA: *America's Leading Lawyer*, *The Best Lawyers in America*, and *The Legal 500*. Mr Miller is the author of a number of articles and book chapters and is a recipient of The Burton Award for Legal Achievement, which recognises exceptional legal writing. He is a member of the Tax Forum. A summa cum laude graduate of the University of Pennsylvania, Mr Miller graduated from Columbia University Law School, where he was a Notes and Comments Editor of the *Columbia Law Review* and a Harlan Fiske Stone Scholar. He was a clerk to the Honorable Mary M. Schroeder of the US Court of Appeals for the Ninth Circuit during the year following law school. He received his LLM. in Taxation from New York University School of Law.

Jean-Louis Monnier is head of European ILS in the Capital Markets Insurance Solutions group of Swiss Re, with responsibilities for distribution, origination and P&C structuring in Europe. Jean-Louis joined Swiss Re in 2002 and first developed ALM hedges for life insurance companies before specialising in the placement of insurance risk with capital market investors and the development of new risk transfer initiatives in bond or derivative form. Jean-Louis has 15 years' experience in marketing structured assets and risk transfer solutions to European financial institutions. Prior to joining Swiss Re, he worked in the derivatives solutions groups of Gen Re Securities, CIBC World Markets and Société Générale. He holds an MBA from ESSEC business school in France.

Andreas Müller is Head of Origination/Distribution/ILS Investments with Munich Re's Risk Trading Unit. Andreas joined Munich Re in 1998 in the Finite Reinsurance/Alternative Risk Transfer division. Before taking over the responsibilities of his current function at the Risk Trading Unit, he was in Munich Re's Group Transactions division working on the Mergers & Acquisitions and Corporate Finance side. He is the author of various publications on risk management, alternative risk transfer and life insurance and holds a PhD in economics.

Mark Nicolaides is a London-based partner with Latham & Watkins, an international law firm which specialises in structured finance with specific expertise in structuring and documenting investment vehicles and asset-backed securities backed by a wide variety of assets, including insurance receivables, IP royalty streams, European multi-country trade receivables and other loan and lease receivables. He is at the forefront in developing capital market-based longevity products. He also has broad experience in repurchase agreements and commodities and equities derivatives. In addition to his transactional practice, Mr Nicolaides is considered one of the leading experts on the Basel II Accord regarding regulatory capital requirements for banks, and represented the European Securitisation Forum in connection with its development and in connection with its implementation within the EU. As co-chair of the Legal, Regulatory and Capital Committee of the European Securitisation Forum, he is also active in developing a securitisation framework for the Solvency II Directive regarding regulatory capital requirements for insurance companies within the EU. Mr Nicolaides has been recognised by Chambers as a leading lawyer for capital markets securitisation (2008), and by *Legal 500* as a leading lawyer for securitisation (2008). His work developing longevity securities and longevity derivatives for Pensions First Limited was ‘Highly Commended’ by the *Financial Times* in its 2008 Innovative Lawyers Awards.

Norman Peard is Director of the Insurance and Pensions Solutions Group at Credit Suisse, London. Norman is an actuary with over 20 years’ insurance and capital markets experience. His career has included roles with leading global actuarial consultants to the insurance and pensions industry, global reinsurers, investment banks and in financial regulation. He has worked to develop and implement nontraditional reinsurance and capital market-based solutions, including insurance-linked securitisation and has also contributed to the development of policy as to the regulatory treatment of insurance-linked securitisation in the UK as well as broader insurance regulatory policy. He has been closely involved with the Europe-wide Solvency II project and has represented the UK on the CEIOPS Pillar 1 Working Group. In his role at Credit Suisse, Norman combines his actuarial, insurance technical, commercial and regulatory experience to develop solutions for capital and risk management for insurance and pensions industry participants. Born in Dublin, Ireland, Norman is a graduate of Trinity College Dublin with an MA and Gold Medal in mathematics. Amongst the European actuarial bodies, he is a Fellow of the Institute of Actuaries and a Fellow of the Society of Actuaries in Ireland. Amongst the North American bodies, he is an Associate of the Society of Actuaries.

Kenneth R. Pierce is a partner with the law firm of Mayer Brown and is co-head of the US insurance and reinsurance practice. He has over 20 years’ experience as a reinsurance professional, serving the industry as an attorney and as an investment banker. Mr Pierce has structured dozens of complex reinsurance-capital market convergence transactions, including several sidecar transactions, handling all aspects including financial structuring, legal, tax, accounting and the entire securitisation and capital markets distribution process. He has also developed innovative reinsurance products (patent pending on two products) and has structured captive and reinsurance transformer vehicles. He has equivalent experience in handling all facets of complex reinsurance disputes, arbitration and litigation, in connection with virtually every type of reinsurance product, including property, casualty, life, annuity, surety, financial guaranty and other lines. In addition, Mr Pierce has counseled clients on a wide array of insurance and reinsurance regulatory matters, including issues at the intersection of derivatives and reinsurance.

Georg Rindermann is Project Manager in the Reinsurance Department of Allianz SE and a member of the Advanced Risk Intermediation team. He is responsible for the origination, structuring and execution of insurance-linked securitisation transactions of Allianz SE and Group subsidiaries. Prior to his current role, he worked as assistant to the Board of Management of Allianz SE. Before joining Allianz in 2004, Georg worked as an assistant lecturer in International Business at the University of Münster. He holds a doctoral degree in Business Administration from the University of Münster and a double diploma in Business Administration from the universities of Frankfurt and Paris-Dauphine.

David Ross currently works as a Senior Actuary within the Risk Analytics division of Torus Insurance. His responsibilities at Torus include risk pricing, with a focus on energy and industrial property lines, and building and embedding the company’s internal capital model. David joined Torus from the reinsurance broking firm Guy Carpenter, where he spent five years working as an actuary focussing on retrocession and capital markets products. He worked on the modelling and structuring of several ILS issues, including Bay Haven and Fremantle. David started his career at KPMG in 2000 and qualified as an actuary in 2003.

Simeon Rudin is a partner in, and head of, the structured finance team at Freshfields Bruckhaus Deringer LLP. He specialises in insurance-linked securities and other structured insurance transactions, structured products, derivatives and tax-based structured finance. He acted as lead legal adviser on the structuring and implementation of the four public listed embedded value transactions in the UK and Ireland – Mutual Securitisation (the first embedded value securitisation), Gracechurch Life Finance (the first whole business embedded value securitisation), Box Hill Life Finance (the first embedded value securitisation by a life assurer) and Avondale Securities (the first synthetic embedded value securitisation). In addition, he has advised on a variety of other transactions in the life sector (for example, financial reinsurance, structured pension buy-outs and longevity swaps) and non-life sector (including the FIFA Golden Goal transaction and a securitisation of a US P&C book for a European insurer). Simeon is co-chair of the European Securitisation Forum's Solvency II Working Group, which was established with a view to ensuring that securitisation and derivatives were accepted as risk mitigation techniques along with more standard reinsurance in the Solvency II Directive.

Steven Schreiber is a Principal and Consulting Actuary with Milliman, Inc. He co-manages the life and health consulting practice in Milliman's New York office and has been with Milliman for over 20 years. Much of Steve's time over the past several years has been spent advising insurance companies, banks and financial guarantors on capital market securitisations and private structured transactions relating to reserve redundancies, VIF transactions (including closed block transactions) and mortality catastrophe bonds. Steve has also been advising clients on longevity transactions in the UK. He also provides consulting services to his clients on merger and acquisition transactions, mutual merger transactions, Mutual Holding Company conversions and demutualisations. Steve spent three years in Milliman's Tokyo office in the late 1990s and continues to work with clients on projects in Japan and in other markets outside the US. He is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries.

Gerold Seidler has more than 30 years' experience in the insurance industry, with more than 20 years at Munich Re (in underwriting and actuarial functions) and nearly ten years with different direct insurers. For the past two years, Gerold has been Chief Actuary in the Risk Trading Unit. Gerold has a university degree in mathematics.

Jonathan Spry is a Senior Vice President of GC Securities Ltd; the European Capital Markets affiliate of Guy Carpenter & Company Ltd. Jonathan has responsibility for capital markets advisory and the origination, structuring and execution of cat bonds and other innovative insurance-linked securities and the capital raising associated with reinsurance sidecars and start-ups. Jonathan was previously a Director and Head of the Insurance Linked Securities team in Standard & Poor's Insurance Ratings Group in London. At S&P Jonathan had primary analytical responsibility for rating life and non-life insurance securitisation and played an important role in the development of rating criteria for insurance securitisation, cat bonds and CDOs of insurance risk globally. Jonathan was also a member of Standard & Poor's Enterprise Risk Management team, with a particular focus on ALM, credit risk, catastrophe risks and economic risk models. Prior to joining Standard & Poor's in 2003, Jonathan held positions at Morgan Stanley, Nat West and Bank of Tokyo-Mitsubishi, where he was responsible for structuring and executing a number of corporate finance and structured finance transactions. Jonathan is a well-known speaker at conferences and has contributed to numerous articles on the topic of insurance-linked securities. He was *Insurance Day* magazine's London Market awards 'Young Broker of the Year' in 2008.

John Stroughair is the VP for Risk Markets at RMS; his responsibilities include ILS modeling and the development of parametric indices, and he is also responsible for Miu, RMS's ILS portfolio management tool. Prior to joining RMS, he was a Managing Director of Oliver Wyman. He was with Oliver Wyman from 1993 until the end of 2007 and has over 14 years' consulting experience in risk management. He has worked extensively on risk management issues for the corporate and investment banking areas of many of the leading banks in both the US and Europe. He has also worked with several leading energy firms in Europe on issues regarding trading risk management and on enterprise risk management. Before entering the Financial Services Industry, John worked for the UK Defence Ministry on issues relating to strategic planning. He holds a PhD in Theoretical Physics from Case Western Reserve University, Cleveland, Ohio, an MA in Physics from Cambridge University and an MBA with a major in Finance from the Wharton school of the University of Pennsylvania.

Rick Watson is Managing Director and head of the European Securitisation Forum, where he leads industry-wide efforts to promote education, understanding and development of cash and structured products business among its 160-strong member base. He is actively involved with a variety of industry initiatives to address the credit markets turmoil. Previously, Rick was Managing Director and Head of Structured Finance for FGIC UK Limited in London. Prior to joining FGIC, Rick was Head of ABS and CDOs at HSBC Bank plc, where he led a pan-European team of originators of consumer, CDOs and other products. He held a similar position at Bear Stearns in London, and was previously Executive Director at UBS Limited and at Morgan Stanley and Freddie Mac. Rick received an MBA from the Fuqua School of Business at Duke University. He was co-chair of the ESF's Legal and Regulatory Committee from 2000–2004. In January 2006, he co-edited the Euromoney Books publication *Asset Securitisation and Synthetic Structures: Innovation in the European Credit Markets*.

Malcom Wattman is a partner in the New York office of the international law firm of Cadwalader, Wickersham & Taft LLP. His practice is concentrated in structured finance, securities, corporate finance and corporate law. He has been instrumental in the development of new structured finance products for more than 25 years. For the past decade he has specialised in the structuring and documentation of risk-linked securities and nontraditional structured finance products. He represented sponsors, issuers or underwriters on a majority of the catastrophe bond transactions and has been instrumental in assisting clients with the development of new concepts in this evolving market. He represents investment banks, reinsurance companies, public and private companies and institutional and individual investors in connection with public offerings and private placements of debt, equity and structured securities, credit agreements, acquisitions and dispositions, contracts and general corporate and commercial matters. Mr Wattman received a BS from the University of Buffalo and his JD from Fordham University Law School. He held positions in engineering, finance and consulting prior to joining Cadwalader, Wickersham & Taft LLP. He has served as a director of several private corporations and presently serves as a trustee of not-for-profit organisations.

Jillian Williams has over 12 years' experience in catastrophe modelling, actuarial pricing and consulting in the insurance/reinsurance sector. Prior to joining Leadenhall Capital Partners she was Senior Vice President at Instrat, the modelling and actuarial department of Guy Carpenter, specialising in Capital Markets, Retro, Property and Marine classes. Among other things she has managed projects in ILS, Retro and overseen the analysis and development for new Property & Casualty business opportunities. Prior to Guy Carpenter, Jillian worked at Fidelity Investment as Performance Measurement Analyst.

Tibor Winkler is one of the veterans of the ILS space, with over 11 years of transaction and business development experience. Working as a senior model developer at EQECAT involved in consulting projects, he turned his focus to the space in the late 1990s. Initially he carried out trigger development, design and execution of risk analyses and marketing for cat bonds. At EQECAT he worked on the first modelled-loss transaction, Namazu Re in 1999. From 2000 to the end of 2008 he worked as Director of Risk Markets at RMS. Until 2006 he worked on cat bonds and private transactions in increasingly senior roles; his name is associated with the first parametric Europe Wind trigger, used in Prime Capital in 2000, the first Europe Wind securitisation for a corporate client, Pylon Ltd in 2003, the first parametric earthquake transaction to take account of ground motion uncertainty, GI Capital in 2004, and many others. After five years of designing and executing innovative solutions for transactions, he took up a client development function in 2006 and became one of the principal drivers behind Miu and Paradex at RMS. From 2006 to the end of 2008 he was the leader in charge of expanding RMS's core client base to the capital markets. He holds a PhD and an MSc in Earthquake Engineering from the University of Tokyo and an MSc in Structural Engineering from the Technical University of Budapest.

Acknowledgements

This project would not have been possible without the energy, time and effort of all the contributors, who have supported us in our initiative despite the difficult environment and busy schedules of year-end 2008. We would like to thank all of them for having completed their contributions, almost always within the tight timeframe we imposed on ourselves, and for the quality of the work done. We thank also those who believed in the project, but could not stay with us to see it finished due to events affecting their organisations, and are very grateful for the support of those who stepped in to complete the relevant chapters.

Special thanks are due to our editor, Caitlin Cornish, who has been extremely supportive, immediately and throughout this adventure. We are also very grateful to Andre, Anne-Marie and Annie, who have contributed to this project by working on the butterfly effect, and have been of constant and essential support; and to Claudia Ravanelli, for her patience and infallible support.

Editing this handbook required the editors to dedicate a considerable amount of time (which we found very exciting and professionally very rewarding) and we are very grateful to our colleagues for their patience, support and advice throughout the period.

Finally, a special thank you to Josie Green, who, without realising it, is at the origins of the whole project.

1

Introduction

Pauline Barrieu[a] and Luca Albertini[b]

There has been much said about the convergence of the insurance industry with the capital markets. Such convergence has taken many forms, and of the many attempts, some have been more successful than others. Insurance-linked securities, often referred to as ILS, have proven to be one of the most successful manifestations of this convergence, of how capital market technologies can find applications within the insurance industry, and how insurance-related risk can be transferred to capital market investors. As outlined in later contributions, there were approximately $13 billion of tradable non-life insurance-linked securities and $24 billion in tradable life insurance-linked securities as of the end of 2008. In addition, whilst traded insurance-linked securities are the most visible and headline-catching forms of risk transfer to the capital markets, there are a number of other forms of placement of insurance risk into the capital markets, including:

- Private placements of insurance-linked securities (also called ‘club deals’) which involve a small number of skilled investors, and which are estimated to be of significant size.
- Sidecars on non-life insurance risk, which reached an estimated $6 billion of capacity after Hurricane Katrina, and found new interest in 2008 with reduced retrocession capacity being available in the market.
- Insurance-linked derivatives, which are mostly over-the-counter contracts in life and non-life risk, transacted by financial institutions, brokers and regulated exchanges.
- Weather derivatives, also available via financial institutions, brokers and regulated exchanges.
- Traded life insurance policies – life settlements – which have been warehoused in significant size by financial institutions and are being distributed to capital markets as well as private investors.
- Collateralised reinsurance and industry loss warranties (ILW), which are typically reinsurance contracts but frequently backed by capital market investors (such as dedicated insurance-linked securities investors and hedge funds) which fund the collateral posting and assume the ultimate risk of the relevant insurance events.

The outstanding capacity deployed by capital market investors on the above mix of instruments was estimated to be well above $50 billion in 2008.

[a]London School of Economics
[b]Leadenhall Capital Partners

The Handbook of Insurance-Linked Securities Edited by P. Barrieu and L. Albertini

Moreover, the market has been enriched by a wider and deeper range of market participants over the last decade:

- Each year, new *originators* have approached the insurance-linked securitisation market, including a number of insurance and reinsurance companies, corporations and government institutions.
- Some of these originators who have tapped the insurance-linked securities market with a transaction have then sponsored *new transactions* covering new risks or *repeat transactions* on the same perils, thus capitalising on their positive experience with the technology, and in some cases have established *risk trading units* with the task of constantly monitoring opportunities for purchasing or ceding risk to the capital markets.
- A number of *modelling* and *actuarial firms* have the ability to perform risk analysis on different life and non-life risks with the rigour and methodology needed to describe them to capital market investors.
- A growing *number of risks* have been modelled for capital market transactions, thus enriching the potential for diversified exposures for investors.
- Diverse range *investors* have approached life and non-life insurance-linked securities across the risk spectrum. Investor types have ranged from money market managers, pension funds, banks, other institutional investors, insurance and reinsurance companies to a growing number of asset management companies dedicated to investing only in insurance-linked securities risk.
- There is a larger community of *arrangers*, *financial institutions* and *brokers* who have equipped themselves for origination and structuring of transactions, secondary trading of insurance-linked securities and in some cases providing secondary market pricing indications (although not yet at the level of market making).

After a decade of continuous growth, the insurance-linked securities market is now at a stage of consolidation of its past successes and further expansion, despite the recent turmoil in the capital markets, as discussed later in various chapters of the book. However, one could argue that the actual size of the market is still very small compared to its full potential. Supporting market participants with a transparent discussion on various aspects of this market and introducing insurance-linked securities to a wider class of originators and investors are essential in making this niche market more understandable, more transparent and more accessible. This is really what has motivated us in undertaking this project and what we would like to achieve with this handbook.

The main objective of this handbook is to present the state of the art in insurance-linked securitisation, by exploring the various roles for the different parties involved in the transactions, the motivation for the transaction sponsors, the potential inherent pitfalls, the latest developments and transaction structures and also the key challenges faced by the market.

To do so, we have decided to gather specialists with different backgrounds and experts with many years of experience in this field, representing the various perspectives and aspects of this market. Each chapter is therefore a contribution by one or several experts in insurance-linked securitisation. As a result, this book presents an independent view on the sector, with contributions from some of the key market players who have agreed to support our initiative. On the other hand, due to the healthy growth of the market and to the number of credible market players, it has not been possible to include all of those institutions that would have been able to provide valuable contributions within the targeted size of this handbook.