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* New to the second edition.

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Stanley has 25 years of experience in this field, including 14 years at BNP Paribas and previously at McKinsey & Company, Royal Bank of Scotland and Canadian Imperial Bank of Commerce. He has a PhD in physics from Boston University, a BSc in physics from Belgrade University and speaks French, Spanish, Serbo-Croatian and Italian. At the Saïd Business School, Stanley teaches two courses with Dimitrios Tsomocos and Manos Venardos: "Financial Crises and Risk Management" and "Fixed Income and Derivatives".

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Abbreviations

AFOLU	Agriculture, forestry and other land use
ALM	Asset and liability management
ALRG	Asset/liability refinancing gap
APV	Adjusted present value
ATMF	At-the-money forward
CCBA	Climate Community & Biodiversity Alliance
CCDS	Credit contingent default swap
CDS	Credit default swap
CEO	Chief executive officer
CFaR	Cashflow-at-risk
CFO	Chief financial officer
CFRM	Corporate financial risk management
CoD	Cost of debt
CPI	Consumer price index
CRO	Chief risk officer
CSA	Credit support annex
CSR	Corporate social responsibility
CVA	Credit valuation adjustment
EaR	Earnings-at-risk
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, tax, depreciation and amortisation
ECB	European Central Bank
EM	Emerging market
EMIR	European Market Infrastructure Regulation
Eonia	Euro Overnight Index Average
EPS	Earnings per share
EqaR	Equity-at-risk
ESOP	Employee stock ownership plan
ETO	Early termination option
EU ETS	European Union Emissions Trading System
Euribor	Euro Interbank Offered Rate
EV	Enterprise value

EWS	Early warning signal
FCF	Free cashflow
FEER	Fundamental equilibrium exchange rate
FFO	Funds from operations
Fintech	Financial technology
FM	Frontier market
FRN	Floating rate note
FRTB	Fundamental Review of the Trading Book
FVA	Funding valuation adjustment
FX	Foreign exchange
G-SIB	Global systemically important bank
GAAP	Generally accepted accounting principles
GCC	Gulf Cooperation Countries
GHG	Greenhouse gas
IC	Interest cost
ICaR	Interest cost at risk
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
ISDA	International Swaps and Derivatives Association
KASE	Kazakhstan Stock Exchange Equity
KPI	Key performance indicator
KR	Kaminsky and Reinhart
KVA	Capital value adjustment
LaR	Leverage-at-risk
LCR	Liquidity coverage ratio
Libor	London Interbank Offered Rate
LR	Leverage ratio
LTV	Loan-to-value
LVA	Liquidity valuation adjustment
M&A	Mergers and acquisitions
MB	Mandatory break
MBA	Master of Business Administration
MEHC	Middle Eastern Holding Company
MFE	Master of Financial Economics
MiFID	Markets in Financial Instruments Directive
MM	Modigliani–Miller
MRP	Market risk premium
MTM	Mark-to-market

MTN	Medium-term note
MVA	Margin value adjustment
NAIRU	Non-accelerating inflation rate of unemployment
NDF	Non-deliverable forward
NFA	Net foreign asset
NGO	Non-governmental organisation
NPV	Net present value
OIS	Overnight indexed swap
OTM	Out-of-the-money
OTMF	Out-the-money forward
PBT	Profit before tax
PFE	Potential future exposure
PV	Present value
R&D	Research and development
RAV	Regulatory asset value
RCF	Revolving credit facility
REDD	Reducing emissions from deforestation and degradation
REER	Real effective exchange rate
ROC	Receiver operating characteristic
ROIC	Return on invested capital
RPI	Retail price index
RSI	Relative strength indicator
SDR	Special drawing rights
Sonia	Sterling Overnight Index Average
SPA	Share and purchase agreement
TRS	Total return swap
UNFCCC	United Nations Framework Convention on Climate Change
VaR	Value-at-risk
VCS	Voluntary Carbon Standard
VER	Verified Emission Reduction
VWAP	Volume-weighted average price
WACC	Weighted average cost of capital
WTI	West Texas Intermediate

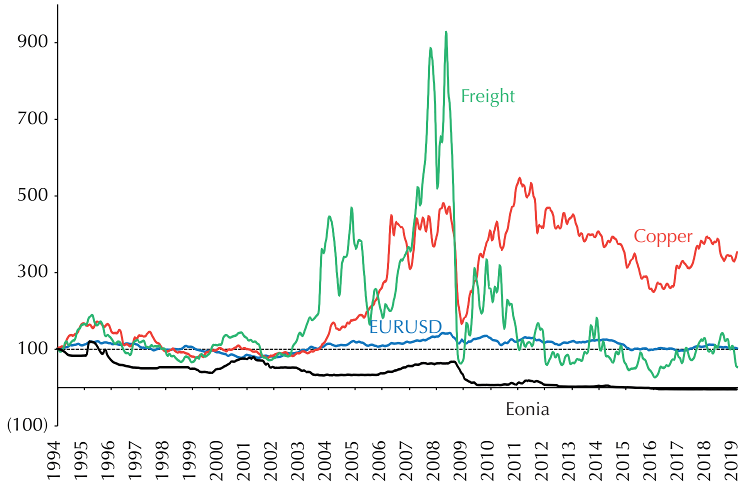
Foreword

A word of advice: it's always better to agree to write the foreword to a book that will have little success than one that will be popular with readers. In the first case, you'll make the authors happy and that will be that, but for the second they'll ask you to write new prefaces for each new edition and, as the book is successful, they'll keep coming back for more! As evidenced by this second edition, *The Handbook of Corporate Financial Risk Management* has been successful because it has the rare quality of delivering what its title promises in a very clear and understandable way.

This new edition is not just the first edition with a quick fresh coat of paint, it is practically a new book, with 20 new chapters added by the authors. After reading them, you'll be prepared to tackle topics such as deal contingent hedging in M&A transactions, hedge dilution risk or high carry currencies, do some stake building, have a view on your optimal cash position, etc. Over the years, managing financial risks has accounted for an ever-increasing share of the workload of any Treasurer or chief financial officer (CFO), and this is unlikely to change any time soon. Our world has become riskier and more complex. For just one example of the various financial risks, take a look at the performance of copper, freight, short-term interest rates and the EURUSD exchange rate since 1994 (see Figure F.1).

Companies around the world are impacted by these and numerous other market variables, and risk managers have to tackle them all in order to mitigate their impact on financial results and the financial position of their firms. Stanley Myint and Fabrice Famery have conducted a thorough analysis of the many financial risks facing companies, and most importantly of how to identify, measure, reduce or eliminate them. Some are obvious, such as currency risk in the luxury sector, some are more intricate, such as the currency risk on leverage, or counterparty risk, and some are pressing, such as offsetting carbon emissions or managing the depegging risk.

Figure F.1 Market data history



Source: Factset – London Metal Exchange, Baltic Dry Index

Having spent thousands of days thinking about how to help companies address financial risks that they sometimes have not even identified, how to present solutions in a clear and understandable way, and how to outsmart the competition and win advisory mandates from clients, Stanley and Fabrice are now able to deliver a handbook – ie, a book that examines the key issues and presents practical solutions. All the chapters are example-based and very pragmatic, and each ends with useful and hands-on recommendations.

Stanley and Fabrice are successful in business because their clients continue to appreciate their ideas. They have the ability to identify areas of academic research that can be of use for solving new problems, or opening new fields such as optimal debt duration or how to optimise the fixed–floating policy. To these problems, they apply academic rigour and often advanced analytical techniques, such as Monte Carlo simulations or the efficient frontier.

The end result is very clear and readable, and I have no doubt that financial managers, once they have read this important book, will keep it close at hand, as I myself did with previous unpublished versions when I was working as an M&A specialist, and subsequently the first edition. Advanced finance students will discover an intellectually challenging world in which there are so many different situations that one can never be bored. They may even be tempted to start their professional careers in this expanding field.

Enjoy this handbook, likely to be one of your best investments ever, before you buy the third edition in a few years' time!

Pascal Quiry
BNP Paribas Professor of Finance at HEC Paris
June 2019

Introduction

WHAT HAS CHANGED IN THE SECOND EDITION

There are two main reasons that made us think about writing a second edition. Since the first edition of this book was published in 2012, much has changed in the world of corporate risk: the macroeconomic situation, for instance, due to low interest rates in the eurozone and higher rates in the US. Has this changed our view on the optimal fixed-floating mix? We decided to find out.

We also received many comments from our readers about parts of the first edition that could be expanded or clarified. For example, xVA charges, introduced after 2008 became a major consideration for long-dated derivatives, but there was no mention of them in the first edition. This omission has now been rectified.

We have added new chapters on equity risks, carbon emissions, risks from pegged currencies, optimal cash position and optimal leverage, and many others, 20 chapters in total. We also eliminated 12 chapters that do not seem relevant today. Other chapters have been radically rewritten and expanded for easier comprehension and completeness. Therefore, the book you now hold is much bigger and very different than the first edition.

WHAT HAS NOT CHANGED: MOTIVATION FOR THE BOOK

This Handbook is based on real-life client discussions we had in the Risk Management Advisory team at BNP Paribas between 2005 and 2018. We noticed that corporate treasurers and chief financial officers (CFOs) often have similar questions on risk management and capital structure, and that these questions are rarely addressed in the existing literature.

This situation can, and should, lead to a fruitful collaboration between companies and their banks. Companies often come with the best ideas, but do not have the resources to test them. Leading banks, on the other hand, have strong computational resources, a broader sector perspective, extensive experience in internal risk management, and the ability to develop and deliver solutions. Therefore, if they make an effort to understand a client's problem in depth, they may be able to add considerable value.

The Handbook is the result of such an effort over 14 years and covering hundreds of largest European corporations from all industrial sectors. Its subject is corporate financial risk management – ie, the management of financial risks for non-financial corporations. While there are many papers on this topic, they are generally written by academics and rarely by practitioners. If we contrast this with the subject of risk management for banks, on which many books have been written from the practitioners' perspective, we observe a significant gap. Perhaps this is because financial risk is clearly a more central part of business among banks and asset managers than in non-financial corporations. However, that does not mean that financial risk is only important for banks and asset managers. Let us look at one example.

Consider a large European automotive company with an operating margin of 10%. More than half of its sales are outside Europe, while its production is in euros. This exposes the company to currency risk. Annual currency volatility is of the order of 8%; therefore, if the foreign revenues fall by 8% due to foreign exchange (FX), this can almost wipe out the net profits.[1] Clearly an important question for this company is, "How can we manage our currency risk?".

Another example: a European investment-grade telecom operator with EUR 10 billion of total debt. Annual interest cost for this company can easily exceed 2% of its debt – ie, EUR 200 million per year. As the interest rate curves are normally upward sloping, the company has a choice of fixing the debt, which normally results in a higher interest rate, or leaving the debt floating, in which case the interest rate risk is higher. The choice, normally referred to as the fixed-floating proportion, is not an easy one, and again is evidently important for the company.

Another reason why corporate risk management has so far attracted relatively little attention in the literature is that, although the questions asked are often simple (eg, "Should I hedge the translation risk?" or "Does hedging transaction risk reduce the translation risk?"), the answers are rarely simple, and in many cases there is no generally accepted methodology on how to deal with these issues.

Therefore, where does the company treasurer go to find answers to these kinds of questions? General corporate finance books are usually very shy when it comes to discussing risk management. Two famous examples of such books devote only 20–30 pages to managing financial risk out of almost 1,000 pages in total. Business schools generally do not dedicate much time to risk management, especially in the corporate context.[2] This is a great missed opportunity, and means that corporate risk managers have to learn on the job.

This does not mean that the subject of corporate risk management has been entirely neglected in recent literature. There are a couple of books (and many articles) that cover this topic, and we will now briefly review some of them.

OVERVIEW OF PREVIOUS LITERATURE

We are aware of five English language books dedicated to corporate financial risk management (CFRM) besides the present volume, but none since the late 2000s: Jameson (1997), Brown and Chew (1999), Culp and Miller (1999), Triana (2006) and Leautier (2007). Other books have a significant part dedicated to the topic: Petit (2007) and Papacostas and Tonin (2018). In addition, there are many academic articles, many of which we will mention in the text.

The literature on CFRM takes one of the following four formats.

- ❏ Theory: Conditions under which risk management adds value in companies (ie, when it reduces the tax or probability of financial distress, or when it improves a company's investment decisions), how much risk a company should have and similar issues.
- ❏ Practice: How specific techniques and products (for instance, credit derivatives or interest rate swaps) are used in companies to manage financial risks.
- ❏ Surveys: Periodic surveys performed by academic institutions, banks and consultancies in which a sample of companies is asked multiple choice questions about various aspects of their risk management practice.
- ❏ Case studies: Concrete examples of how companies manage their financial risks.

SCOPE OF THE BOOK

So, how does the present volume fit within the existing literature? Our book is entirely devoted to real-life case studies of companies managing financial risk, but it also provides our views on the best way to deal with those situations. The book is therefore partly descriptive, but largely prescriptive. The reader will find here answers to the most commonly asked practical questions about financial risk. Some of the situations will be brief (eg, how to obtain a credit rating) and some will require a significant amount of thought and detailed quantitative analysis (eg, how to improve your fixed-floating mix and duration), but all are based on real-life situations that our corporate clients have faced over the years.

The focus of the book is the management of financial risks – ie, funding, interest rate and inflation, currency, credit, commodity and equity risks. We do not cover non-financial risks (eg, business and operational risks), which are normally outside of the scope of the financial department. We also do not talk about insurance contracts.

Finally, we do not spend a lot of time explaining the details of financial derivatives, for two reasons. First, most corporate treasurers and CFOs are familiar with most types of financial derivatives (see Figure 1.4 in Chapter 1). Second, the vast majority of derivatives used by corporate treasuries are those that tend to get a hedge accounting treatment under the International Financial Reporting Standards (IFRS), which usually excludes complex derivatives. This does not mean that structured products should be excluded from the toolbox of the corporate risk manager, but (as discussed in Chapter 9) they should always be compared to simpler products. Only if the simpler product does not satisfy the same genuine purpose as the structured one, should its use be considered.

In addition, this book is primarily about corporate problems and how to solve them. Most of the time, we noticed that the key question is not what kind of product (whether it is a derivative or a cash instrument) is used, but how it is used. For us, derivatives are just one of the means by which a corporate risk can be reduced, but nothing more.

TARGET AUDIENCE

This book is targeted to everyone who is interested in the subject of corporate risk management, and in particular four groups of readers:

- corporate treasurers, CFOs, chief risk officers (CROs), chief executive officers (CEOs), financial directors, Treasury dealers and anyone else who deals with the management of financial risks in non-financial companies;[3]
- management consultants, pension consultants and any other company advisors on the subject of risk;
- corporate bankers, coverage officers, corporate financiers, private equity investors, capital markets and derivatives marketers covering non-financial companies; and
- academics and students in the field of corporate risk management.

For the sake of concreteness, most examples in this book are based on European companies, but the ideas and concepts apply to companies in any territory.

MATHEMATICAL ASSUMPTIONS AND REQUIRED KNOWLEDGE

Corporate treasurers and CFOs have to be familiar with many areas in order to manage financial risk. The three main ones are corporate finance, financial derivatives and accounting. We assume a basic knowledge of corporate finance at the level taught on a typical MBA course, including a familiarity with the concept of the "efficient frontier". Another important concept to which we refer many times is value-at-risk (VaR), cashflow-at-risk (CFaR) and earnings-at-risk (EaR). We give a quick overview of these in Appendix 2 to Chapter 1, and for more detail reader can consult one of the many books devoted to VaR, such as Dowd (1998) or Jorion (2006).

In some chapters, we refer to specific financial products, especially FX or interest rate derivatives. Unlike the solutions and situations, which are specific to the client situations we describe, these derivatives are fairly standard and we assume that the reader is familiar with them. If not, the standard reference is Hull (2017). That book also provides a good initial overview of Monte Carlo simulations, to which we refer many times. For a much more comprehensive overview of this technique, see Jäckel (2002).

We do not assume any specialised accounting knowledge, but there are many cases when we refer to the accounting treatment under the relevant accounting standards (IFRS).[4] While detailed knowledge of the accounting framework is not necessary to understand most of the ideas in the book, it will certainly help in applying them to the corporate framework. For specific applications to corporate risk management, see Ramirez (2016). Please be mindful that the accounting considerations mentioned in this book are based on our understanding of IFRS as risk management practitioners. The accounting for the solutions mentioned in this book should be validated by auditors prior to implementation.

A technically minded reader will note that we do not always assume a risk-neutral distribution, but in fact rely on a historical distribution in many cases. This will particularly be the case in Part II on interest rate risk.

WHERE DO WE GO FROM HERE?

One of the most obvious trends in corporate risk management is digitisation, both of company data and as a means of executing risk management strategies. We expect this trend to continue, leaving treasurers with more time to focus on the optimisation of their risk management strategies.

Constantly changing regulation has been a big part of both the banking and corporate landscape in recent years. Our expectation is that the flood of regulation introduced will slow down over the next few years as the existing regulation is implemented and monitored.

Geopolitical challenges have shaped the world over the past several years, and caused significant volatility in market parameters and earning expectations. At the time of writing, some of the big geopolitical problems impacting corporates include the trade war between the US and China, and Brexit. In today's highly connected world, any information is distributed almost instantaneously and impacts the market to the extent it was not anticipated.

Low interest rates and quantitative easing have been part of our macroeconomic environment for several years, but at the time of writing the question is how soon this benevolent environment will end, and what will be the impact on corporates. Also, emerging market currency risk was particularly significant during the summer of 2018, when currencies (including the Turkish lira, Argentine peso and Indian rupee) experienced great volatility. After having spoken to clients with exposures in many of these economies, we realise how difficult it is to hedge them, and at the same time how important these exposures are to them.

OVERVIEW OF TOPICS COVERED

We start the book with two introductory chapters (new to the second edition), "Theory and Practice of Corporate Risk Management" and "Theory and Practice of Optimal Capital Structure". These introduce the underlying economic theory via simple models and provide an overview of the existing academic literature.

After that, the rest of the book is organised into seven sections, according to the main situation that they are designed to address. Each starts with an introduction to the kind of risk covered, which is then followed by a range of cases related to it. Since every company's situation is different, these examples are not meant to be exhaustive about all possible issues a company may face, but rather to illustrate the kind of techniques that can solve them. We find that a systematic approach to the problem is a necessary first step, so in many chapters we start by giving a detailed process chart that lists the necessary steps to arrive at an answer.

Part I deals with a variety of issues related to corporate funding via fixed income instruments, with a particular focus on unsecured debt. The cases in this section are intended to help companies who either plan to issue debt or borrow in the loan market from the initial stages (eg, obtaining a credit rating) up to the optimisation of cash position, leverage or debt duration for companies with existing debt.

Part II deals with the next set of issues once the corporate debt structure is in place. At this point, the interest rate risks are introduced and must be managed. The first six chapters focus on the interest rate risk on the debt side of the balance sheet, while the last looks at both assets and liabilities.

Part III is devoted to the management of currency risk, the most common risk affecting companies. We gather here a variety of topics, ranging from management of translation versus transaction risk to a discussion of depegging risk in pegged currencies.

Part IV deals with credit risk – ie, the risk of default by financial counterparties. This kind of risk has come to the forefront of corporate attention since the credit crisis in 2008–09 and again as a result of the European sovereign crisis in 2010–12. Examples in this part of the book should help companies to manage their credit and counterparty risk on deposits and derivatives.

In Part V, we talk about risk management within the context of mergers and acquisitions (M&A). In such situations, companies often focus on the deal execution first and funding second, while the risk management is the last priority. In the examples discussed here, we show how risk management can be an important part of the overall M&A process and how to go about implementing it.

Part VI is focused on commodity risk management. As we explain in the introduction to this part of the book, management of commodity risk is not too different from the management of currency risk; we therefore focus only on the key differences.

Part VII (new in the second edition) covers the management of risk related to listed equities, via what is known as "strategic equity solutions". Our three short chapters do not do justice to this hugely interesting topic, but are meant to provide a sense of the main considerations for companies who have equity exposure.

HOW TO NAVIGATE THIS BOOK

Depending on your interest, you can read this book either by part or by topic covered, or simply dip into individual chapters in any order. For the first-time reader, we suggest reading introductory chapters first, while an experienced corporate treasurer with limited time could start from Chapters 10, 17, 31 and 34.

Since the chapters are based on real client problems, many of them cover more than one kind of situation. For example, Chapter 33 on "Risk Management for M&A" could be in the part on currency risk or in the one on M&A-related risks. We have decided to place it in M&A since this is the main focus of the chapter. However, it could also be of interest to someone who is primarily interested in currency risk.

We hope that you will find this diverse collection of corporate stories stimulating and useful. If you have any questions regarding an issue that is not described in the book, we would be very interested to hear about it.

WEBSITE

We invite the reader to utilise the free companion website which accompanies this book, www.corporateriskmanagement.org. There, you will find lecture notes and exam questions, as well as models used in this book. There will also be periodic updates on new topics not covered in *The Handbook of Corporate Financial Risk Management* 2nd edition. Much like the book this website should prove a useful resource to corporate treasurers, CFOs and other practitioners as well the academic readers interested in corporate risk management.

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Finally, by far the biggest thanks go to our corporate clients (too many to mention here) who have provided the idea for all the cases discussed in this book, and without whom this book would never have been written. To protect their confidentiality, we have changed the client names and financial information in all cases. Most of the time, we also changed the industrial sector, except where the sector is key to the situation described.

Of course, all the errors are the responsibility of the authors.

The views expressed in this book are the authors' own and do not necessarily reflect the views of our employer, BNP Paribas.

1 Assuming that the costs have not changed, and that all other lines in the income statement are unchanged, the impact would be to reduce the net profit by a factor of four.
2 There are exceptions to this rule – for instance, the Saïd Business School at the University of Oxford has offered an elective course on financial crises and risk management to MBAs (Master of Business Administration) and MFEs (Master of Financial Economics) since 2014.
3 For simplicity, for the rest of the book we will call this first group treasurers and CFOs.
4 See www.ifrs.org.