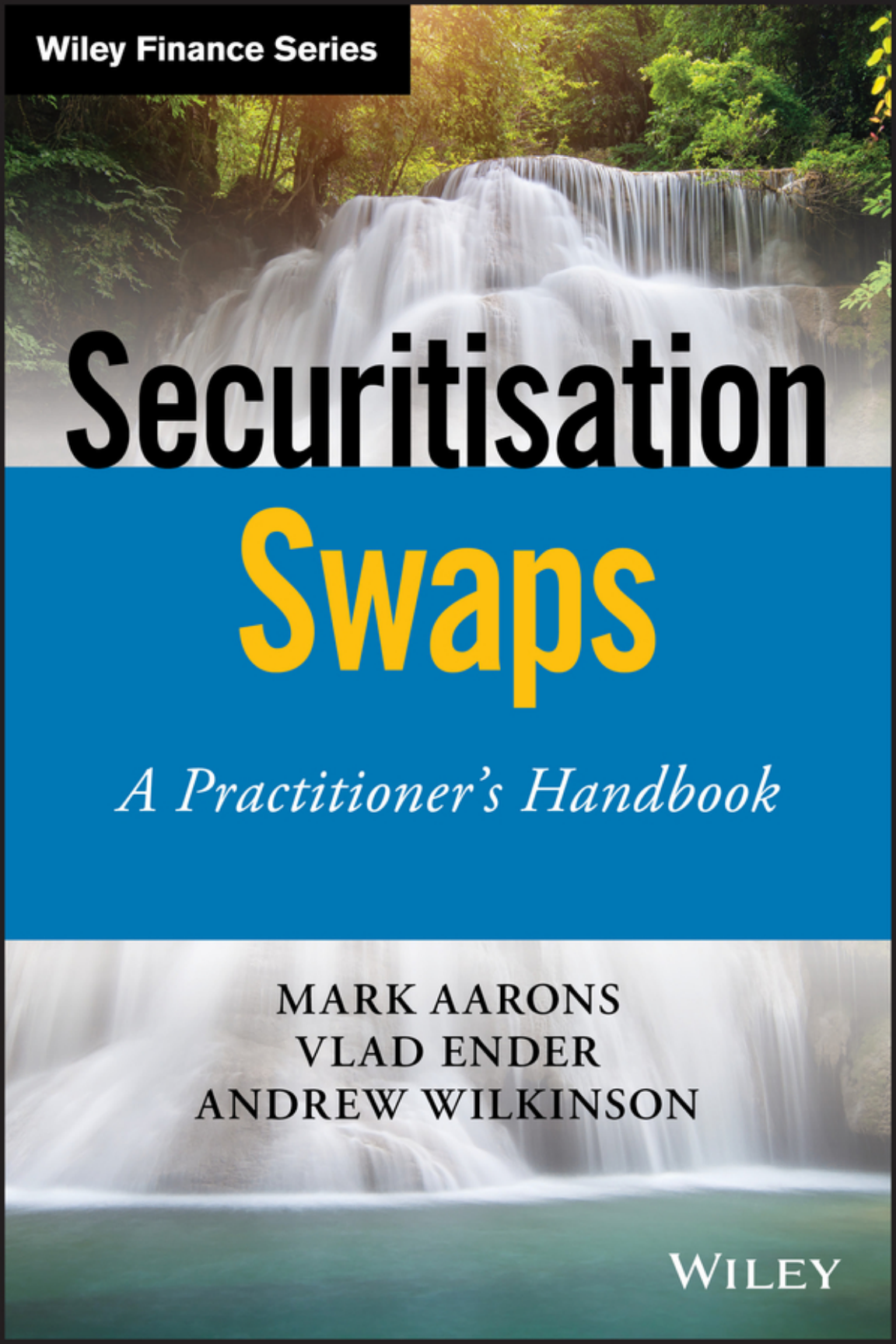
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MARK AARONS
VLAD ENDER
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Securitisation Swaps: A practitioner handbook

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To Suzanne, Alex, Will and Jacqui with love and gratitude

– M.A.

To Irena and Anna – you gave me support and love when I needed it

– V.E.

To Amy, who never fails to shine a guiding light for me

– A.W.

Contents

About the Author

Mark Aarons was Head of FICC Structuring at the National Australia Bank from 2010 to 2017, where he built a leading securitisation swap business in both Australia and the UK. Mark is currently Head of Investment Risk at a leading Australian funds manager and is also an Adjunct Associate Professor in the Centre for Quantitative Finance and Investment Strategies at Monash University. He has degrees in Law and Science from Monash University and a PhD in Mathematics jointly from the Max Planck Institute for Gravitational Physics and the Free University of Berlin, Germany. He resides in Melbourne with his wife and three children.

Vlad Ender is a director at Kauri Solutions, a financial markets consulting practice. Prior to founding Kauri Solutions in 2015, Vlad spent eight years at National Australia Bank's London office. He served as an Executive Director in the FICC Structuring team, providing bespoke derivatives to NAB's clients, including innovative solutions for asset and liability swaps to support RMBS and covered bond issuance by some of the largest UK issuers. Before joining NAB, Vlad was a partner at a New Zealand IT consultancy delivering tailored solutions to the financial sector. Vlad holds an MBA from London Business School and a Masters degree in Computer Science from Charles University, Prague.

Andrew Wilkinson is currently a senior legal counsel in Australia where he specialises in bespoke derivatives and securitisation. Previously, Andrew spent a decade in London working through the financial crisis and beyond for leading law firms Linklaters LLP and Weil, Gotshal & Manges. Through this period Andrew worked on some the most complex and innovative transactions in the market, providing advice to securitisation and covered bond issuers and arrangers across UK, Europe and Asia. He has extensive experience in structured finance, securitisation and derivatives across all asset classes. Andrew holds a Masters of Banking and Financial Services Law from the University of Melbourne and Bachelors degrees in Law and Arts from Monash University.

Foreword

I first met Mark in London in March 2007. He had taken a transfer from head office in Australia to join our UK Market Risk team as a model validation quant. Mark's timing was impeccable – the start of the global financial crisis and one of the most extraordinary chapters in the history of financial markets was only a few months away. By September, depositors were queuing outside Northern Rock and within a year Lehman Brothers would collapse. These events, and those that followed, would shape our careers and lead to the book you hold today.

Shortly after Mark started, chatter about the new 'risk guy' began to emerge. Mostly that he might have a personality, but also that he was a problem-solver, someone eager to learn and work with front office to get things done. It didn't take long for him to make an impression on me either with his enquiring mind and intellect (who gets a maths PhD and a law degree?).

The collapse of Lehman's was the defining moment of the crisis, when the sheer scale of the credit and liquidity binge was finally laid bare for all to see, leaving the financial universe staring into the abyss. It was at this point that I was tasked with taking over the bank's capital markets structuring portfolio. That team had avoided CDOs and CLOs (not the bank however, where we had billions of dollars of CDOs in an SPV) but there was still correlation, credit and funding risk not being captured or valued and requiring serious work to sort out. With that transpired one of the easiest decisions I have ever had to make: just over a year after starting in Market Risk, Mark moved to front office to manage the portfolio.

A few months later Mark and I had a meeting with the Head of Secured Funding of our UK retail bank. Historically we had had little relationship with them, not having the capability to price or book their balance guarantee swaps. That meeting proved to be the genesis of this book. The swap provider to their master trust programme had given notice and no one else would step in (at least not for a price that was anywhere near reasonable). It was left to the parent bank as the AA-rated entity, and more specifically to us, to find a solution. We were going to have to solve the complex quantitative and operational challenges necessary to price, risk manage and book the trades, which this book so comprehensively discusses.

Given the amount and complexity of work involved, Vlad was the ideal additional person to bring on board to work with us on the task at hand. Vlad had started as a programmer consulting to the New Zealand subsidiary of ours a few years earlier. After moving to London, he had shown great aptitude in building the systems for the

nascent inflation swap business. His curiosity and smarts led him to take a keen interest in the structuring and risk management side of that business where his value was soon realised by Sales and Trading.

Over the following months and years, I watched Mark and Vlad break down and solve each of the various challenges discussed in this book. Along with other colleagues, they created a suite of analytics, wrote the code, built interfaces to core bank systems, developed risk and finance policies, worked on the transaction documents with legal counsel, influenced myriad stakeholders to support us and then took it all through the hierarchy of risk committees. All these years later, I can still picture Vlad sitting at his desk in London, headphones on, trying to work out how we would ever get the accompanying basis swap into our systems.

The rest is history. Approvals were granted and our first UK securitisation swap took place shortly after. This new capability, when allied to our AA rating at a time when the incumbent, lower-rated swap providers were pulling out, was to prove a compelling proposition. Over the following years we built out a strong distribution capability and went on to close numerous notable and high-profile transactions, both for our own issuance and as a third-party swap provider in both the UK and Australia. Throughout this period there was no guide book or paper we could find to teach us how to price balance guarantee swaps. To the best of my knowledge there still isn't – which is what makes this book so invaluable.

Around the same time I met Mark, a young lawyer was also embarking on a similar journey. Andrew arrived in London from Australia in early 2008 to join the structured finance team of a leading law firm, just in time for the financial crisis. As the crisis began to take hold Andrew found himself right in the middle of it, whether it be advising financial institutions to access the emergency liquidity measures introduced by Bank of England or working on the Lehman Brothers administration itself. As the focus shifted from deal origination to restructuring, Andrew was on the frontline, working on many innovative solutions to address the issues arising from the crisis. This proved to be the perfect breeding ground for when he later came to work with Mark back in Australia to help navigate the complex legal and regulatory framework, which has since burgeoned around both securitisation and derivatives.

On reflection, there are several points to make. Firstly, we came to appreciate the elegance of securitisation and to distinguish it from the seemingly non-existent credit standards of sub-prime securitisation. Amongst other benefits, securitisation allows non-bank lenders to flourish and provide finance to many who are viewed as 'non-conforming' by high street banks. Secondly, and where this book is of such value, secured financing treasury teams often do not have the ability to price or challenge swap pricing. Instead, the focus is on the headline coupon or floating margin. What really matters is the landed cost of funds inclusive of swap execution cost. For that to occur, each of the features of the swap have to be priced and negotiated. I would also commend this book to those in bank securitisation relationship teams – the ability to understand and challenge their traders swap pricing is now at hand!

In my experience, quantitatively talented people are not that unique. What is unique however is when, together with that, they also have ambition, resilience, wit and, most importantly, the ability to distil complex quantitative topics into simple, concise and easily understandable points. It is these attributes that enabled us to take complex risk features through a conservative risk environment and it is the same attributes that make this book so compelling. I may be biased, but Mark, Vlad and Andrew have done an outstanding job in the quality and breadth of content and its sheer accessibility.

Chauncy Stark
Sydney, July 2018

Acknowledgements

As many authors before us have observed, writing a book has turned out to be a significantly larger task than first imagined. It is a good thing that many authors only realise this in hindsight, else there may be considerably fewer books! It is therefore with great pleasure that we acknowledge the following people for their invaluable assistance to us over this journey, for their thoughtful comments and expert insight across quantitative finance, securitisation origination, derivatives and securitisation law, product control, risk management and structuring. We sincerely thank: Craig Stevens, David Addis, Dmitry Pugachevsky, Glen Rayner, Jamie Ng, Jenny Schlosser, Michael Liberman, Robert Phillips and Rohan Douglas. Any errors that remain are solely our own. We would also like to thank Alan Brace for permission to quote his mixed measure result in Chapter 5 and Quantifi for providing analytics for an XVA example in Chapter 7.

We also wish to thank many of our former/current colleagues and friends for assisting the build out of a successful securitisation swaps business. Particular thanks are due to Chauncy Stark and Lee Kelly for their vision, leadership, support and business acumen; Tony Kelly, Grant Armstrong and Andrew Downes for their outstanding skill, dedication and good humour; Jacqui Fox and Sarah Samson for their fantastic collaboration and leadership in building Australia's top-rated securitisation origination business; and Dennis Craig for his high calibre expertise and support. We also acknowledge our other wonderful colleagues in the departments of Risk, IT, Legal, Finance, Treasury, Operations and Front Office and our many clients across financial institutions in Australia and the United Kingdom.

CHAPTER 1

Introduction

There are literally trillions of dollars of face value of swaps embedded in securitisation and covered bond structures globally. These embedded swaps – which we shall call *securitisation swaps* – have several highly distinctive features that make them quite different from other derivatives. Despite these differences and the sheer size of the market, securitisation swaps have long been neglected in both the practitioner and academic literature.

Amongst the participants of structured funding markets the emphasis is (rightly) on the funding task for originators and the relative value proposition for investors. Much attention and discussion are lavished on the size of the coupon on residential mortgage-backed securities (RMBS), asset-backed securities (ABS) and covered bonds and whether it is tighter or wider than recent comparable issuance. Yet for originators the key metric is not the coupon but rather the landed cost of funds, that is the cost of funding once all expenses, including swap fees, are included.[1] This is almost never publicly disclosed – but that certainly does not diminish its central importance. In this vein, securitisation swaps deserve more prominence as they are, in many cases, a material proportion of the overall funding cost.

In addition to impacting the landed cost of funds, securitisation swaps incorporate new risks and complexity into structured funding transactions. For instance, a credit rating downgrade of the swap provider can, in certain circumstances, lead to a downgrade of the associated bonds without any change in the creditworthiness of the underlying loan pool. Securitisation swaps can also be a significant impediment to restructuring deals,[2] which can blindside investors who aren't fully aware of the consequences of having swaps embedded in structured funding deals.

It therefore makes good sense for practitioners to understand how securitisation swaps are priced, what risks they carry and how the price and risk varies across the

[1]For banks, who must hold credit risk capital against loans on their balance sheet, the landed cost of funds should also include the cost of capital *savings* from transferring securitised loans off their balance sheets. This does not apply to non-bank originators.

[2]For example, the Federal Reserve Bank of New York's Maiden Lane III portfolio of legacy AIG assets faced these problems. See https://tinyurl.com/y9bmg7c6.

myriad structuring options. As for any financial instrument, the pricing depends on the qualitative and quantitative nature of the risks being transferred. So, understanding the risk management of securitisation swaps by those who provide them is useful knowledge. It is the authors' contention that having a deeper understanding of the structuring, pricing and risk management of securitisation swaps will be of great benefit to everyone involved in structured funding, whether directly or as a service provider.

What makes securitisation swaps different? Securitisation swaps are different because they are inextricably linked to the inner workings of the underlying structured funding. The dynamics of the underlying loan pool and cash flow waterfalls – which are usually highly tailored – need to be incorporated in to the modelling of the swaps. This is in contrast to derivatives used by corporations, fund managers and other entities to manage risk. For example, consider a fund manager who owns USD200 million of offshore assets and hedges them back to domestic currency with foreign exchange (FX) forwards. It doesn't matter if the offshore asset is a portfolio of stocks or a power station, the FX forward is a simple currency risk management overlay, which can be easily bolted-on. In contrast, securitisation swaps are not bolted-on, but *embedded*.

The embedding of swaps in securitisation and covered bond structures is designed to remove market risk from funding deals. When underlying cash flows change, whether due to prepayment rates in the loan pool, a trigger feature in a cash flow waterfall or the originator hasn't called its bonds at a call date, any associated securitisation swap will have its cash flows altered in lockstep. This de-risking of structured funding enables the issuance to receive a very high credit rating – often AAA – from credit rating agencies. In turn, these very high ratings enable structured funding to be a highly efficient form of funding for banks and non-bank lenders.

Imagine if a securitisation swap was not in place on a structured funding issuance into, say, US dollars (USD) from a sterling (GBP) denominated loan pool. The currency volatility would expose the US investors to significant potential loss without any deterioration in the credit risk of the underlying pool of assets. For example, in 2008, GBP plunged 30% in value from buying around 2.00 to 1.35 USD in a matter of months. Removing this currency risk is an absolute necessity for any issuer hoping to achieve a AAA rating on such bonds. Likewise for interest rate risk and other market risks. But market risk can only be *totally* removed if the swap provides a *perfect hedge* – and this requires the swap cash flows to be in total alignment with the underlying cash flows from the structured funding vehicle.

Of course, the converse of the de-risking of structured funding deals is that the provider of the swap is assuming those risks. It goes without saying that anyone assuming such complex cross-asset risks needs to have significant expertise or else they could incur very material financial losses and risk management pain. This is equally true no matter whether the swap provider is also the originator or whether it is a third-party provider.