

Wiley Finance Series

Fixed Income Markets

Management, Trading and Hedging

Second Edition

**MOORAD CHOUDHRY
DAVID MOSKOVIC
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Foreword by **OLDRICH MASEK**

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Fixed Income Markets

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*With contributions from Suleman Baig,
Zhuoshi Liu, Michele Lizzio
and Alexandru Voicu*

WILEY

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For Lindsay . . .

YOU are the best thing that ever happened to me.

—Moorad Choudhry

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Foreword

I have been writing book chapters and forewords covering the fixed income markets anecdotally for over a decade. And like the markets that underlie the various themes I have commented on, the focus of my musings has evolved over this period as well. A consistent theme throughout my annotations, however, has been a basic assertion that the “science” of fixed income investing has been uniquely influenced by mathematics and computing technology. By most accounts, fixed income analytics as a formal study only began to take shape as a proper science during the 1970–1980s; and as with most developing sciences, analytical models rooted in mathematics became the means by which practitioners looked to enumerate the developing fixed income concepts. Interestingly, this was also the period that most would suggest when financial globalisation started. Whilst one can debate whether finance’s coming of age was coincidental with globalisation or perhaps its key driver, it would be hard to argue that the electronic connectivity between borrower and saver has been anything short of revolutionary. Irrespective of the cause or effect, though, the world’s escalating financial interconnectivity certainly warranted, if not necessitated, new thinking around fixed income valuation and risk management.

Consequently, analytical frameworks ranging from portfolio theory (i.e., optimal portfolio construction) to option theory (i.e., human choice) had their origins during this period. While each concept was unique in its own right, the collective insights helped practitioners appreciate that investment framing and decisioning are multivariate problems; financial markets are complex and dynamic by nature. In other words, fixed income value is not static by definition. Thus, rather than continuing to limit investors to simple “point in time” measures of value, valuation theory evolved to capture the effects that second, third, . . . , and Nth order factors have on investment performance over time. In fact, many of the concepts in this book (i.e., duration, convexity, correlation, . . . , optionality) had their genesis during those early days of fixed income science. Although the new theories were helpful in better framing value sensitivity, it was the advent of computing technology that provided for its practical application and mass acceptance. Risk managers could for the first time capture large quantum of diverse information and feed them through the developing mathematical tools in a scalable way. In other words, scenario analysis for fixed income performance became feasible; risk managers had the practical ability to vary inputs (or “conditions”) to build a probabilistic picture of all the potential returns one could possibly expect. The ability to understand the upside and downside sensitivity of an investment to a series of variables (i.e., credit spreads, interest rates, . . . default rates) categorically redefined the fundamental nature of fixed income analysis. Because they could be put into practice, these new theories and capabilities gained broad acceptance, and the creation of a professional industry ensued.

As a statement of fact, there is nothing particularly enlightening or controversial about the above observations. Undoubtedly, it is hard to dispute that the introduction of new valuation theories further empowered through computing would not be accretive to the knowledge base of any subject matter. Surely, research, scientific method, and technology are at the core of any industry's advancement? If so, why then is it that the advances in the field of finance have, by contrast, been so uniquely targeted and discredited since the financial crisis? Keeping in mind, we are already a half a decade on from its commencement and yet still no reprieve from the sceptics. The often accepted notion that finance's technological advancements were the sole catalyst for the crisis should be duly troubling to any impartial observer. Furthermore, the critics openly blame the complexity of derivatives, securitisation, and hybrid capital (collectively "financial engineering") specifically. While these types of oversimplifications make for popular journalism, I would suggest that these criticisms are misdirected and have never been well reasoned in logic or supported in fact.

Certainly, the targeting of the advances in finance seems misplaced when, ironically, many of these instruments have been at the cornerstone of the crisis's prescribed remedies. Governments, for example, have been fulfilling their quantitative easing programs through the purchasing of securitised assets; while troubled banks have been recapitalising themselves through the issuance of new forms of hybrid capital instruments, to name another.

With that irony in mind, it seems odd that the world is yet to move on from the fruitless task of looking to assign culpability for the challenges faced by the global financial system. In my opinion, efforts by critics would be better spent trying to understand the scope of knowledge afforded by the industry's work; the faculty of its tools are powerful and should be embraced. It is easier to identify and take lessons from the crisis when the observations are spanned and compared against the currently accepted analytic frameworks. One should never forget that analytical frameworks are theories that need to evolve; they are not absolute truths. Knowledge and technology are symbiotic creatures that feed off of one another; and like the financial markets mentioned above, share a dynamic relationship.

As such, this is why books like this make for worthwhile reading; these types of broad references help contextualise the aggregate body of knowledge that has accumulated around fixed income. A solid understanding of the current thinking is the necessary foundation from which current practitioners and future students can then hope to build better tools. Hence, I challenge the next generation of thought leaders in the field to identify what the key lessons learned from the crisis are; and consequently, help set the direction of where the study of finance should go (i.e., what are the next generation tools needed?).

As the story is still playing out, I don't think it is a cop-out to leave those questions to the next generation; realistically, both those questions are books in themselves and beyond the limits of a foreword. Equally, the debate would be long and fraught with controversy; and for the many that have tried, they invariably take a biased side and create drama out of what should be more of a philosophical message. I have, though, in different forums openly suggested that "financial engineering" in itself was not the root cause of the financial crisis; instead, it was the simple means by which these new tools and technology were employed and understood. Securitisation technology, for example, was not some inherently destructive technology

that created the U.S. subprime crisis; it was bad judgement underpinning poorly underwritten mortgages. Securitisation technology was simply the practical delivery mechanism by which investors could take exposure to the mortgage asset class; the technology in itself didn't change the behaviour of the underlying asset class. So, I would argue that the technology was not flawed; but rather the choice of the investable asset class (or "inputs") were flawed. Practitioners simply lost perspective on the natural limitation of tools; again, their outputs are not absolutes. Perhaps this is where one key message from the crisis lies; or at least the key philosophical one.

So, despite all the advancements in financial thinking; their utility and usefulness are still dependent on human judgment. Judgment in terms of the inputs used as well as judgment as to how the outputs are interpreted. As we look forward, I think it is particularly important that we heed those cautions on the power of financial tools; we are in a period of unprecedented financial experimentation (i.e., global quantitative easing, structural bank reform, automated trading/exchanges). I appreciate that this all sounds like common sense; but, overreliance and underappreciation of the capabilities and consequences of developing technology are not a new challenge for society. In the extreme, atomic energy for instance, has had its moments of glory and shame in history. In spite of those moments, though, we as a society continue to utilise, research, and improve upon its application. Clearly, this is a dramatic comparison; albeit the messaging is the same. Discrediting efforts in science simply because we feel our current capabilities and knowledge are insufficient or incomplete is a societal failure—not one ascribable to the science itself. In that regard, I hope the sceptics will reflect on some of these observations and reorient some of their criticisms toward a more construct tone. Removing such distractions will allow the industry to more appropriately place all its efforts on developing the new tools needed rather than defending itself. It should not be lost on critics that the study of finance is an important science, which has yielded many notable achievements. In the end, advancing our understanding of the world's financial system is in everyone's interest; it is as vital to a healthy society as is energy above.

OLDRICH MASEK

Managing Director, Global Securitised Products
JPMorgan Chase
21 November 2013

The statements, views, and opinions expressed in this foreword are the writer's own and do not necessarily reflect those of his employer, JPMorgan Chase & Co., its affiliates, other employees, or clients.

Preface

The first edition of this book was published precisely 10 years ago. A lot has happened in the debt capital markets since then. The little matter of the global bank crash (in reality, the U.S. and Western European bank crash) had considerable impact, for starters. However fixed income instruments and their analysis have not materially changed from what readers of the first edition would have been familiar with. That said, there are always new things to talk about.

To begin at the beginning, we reprise this text from the Preface of the first edition:

The market in bond market securities, also known as the fixed income market, is large and diverse, and one that plays an important part in global economic development. The vast majority of securities in the world today are debt instruments, with outstanding volume estimated at over \$23 trillion. In this book we provide a concise and accessible description of the main elements of the markets, concentrating on the instruments used and their applications.

Notwithstanding our second sentence, we have had to update a considerable segment of the original text. The book remains broken into four parts, covering introduction to bonds, selected market instruments, derivatives, and trading strategy. However, we have made the book more practical, even more practitioner based, and completely up to the minute. That's why we changed the subtitle of the book from the original "Instruments, Applications, Mathematics" to the still more relevant "Management, Trading, Hedging". And for this I owe much to the co-authors I brought in to assist me with this second edition, namely David Moskovic, Max Wong, Suleman Baig, Zhuoshi Liu, Michele Lizzio, and Alex Voicu. David has a chapter entirely to himself, the excellent value-added that is the final chapter of the book, and also contributes in the chapters on the yield curve, credit derivatives, and securitisation. The others have all fed in their insight and expertise throughout the book chapters, while Messrs. Liu and Lizzio have also contributed to the book's associated website.

The highlights of this brand new Second Edition include:

- A chapter on convertibles, including the new post-crash-inspired instrument that is the contingent convertible bond (CoCo);
- A section on credit-linked notes (CLNs), and how they are hedged by the issuer; also includes worked examples of CLN repackaged securities and treatment on default;
- A chapter on the hedging, collateral, and correlation issues associated with valuing and managing a portfolio of derivatives;
- An updated chapter on value-at-risk and its shortcomings during the period of the crash;
- Latest developments in debt markets trading and hedging, including multi-currency yield curves, OIS discounting, CSA curves, and collateral management.

The Second Edition also features a companion website with Excel spreadsheet models that the reader should hopefully find very useful, including:

- Two different yield curve models, one incorporating cubic spline methodology and the other Svensson 94 methodology;
- A credit default swap pricing model;
- A convertible bond pricing model;
- An option-embedded bond pricing model, for both callable and puttable bonds.

At the same time we have thinned out, or removed entirely, text and chapters that time has passed by, including those on structured finance and synthetic investment products. As always, readers are encouraged to send in comments and feedback, please feel free to e-mail me directly at mooradchoudhry@gmail.com.

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All the best. . .



Moorad Choudhry
Surrey, England
31st December 2013

About the Authors

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Max Wong is a risk professional with 18 years of experience in financial services, and author of *Bubble Value at Risk: A Countercyclical Risk Management Approach*. He was an open outcry local trader at Simex futures exchange during the Asian crisis (1998) and a quant risk manager during the global financial crisis (2008). He is currently Head of Risk Model Testing at Royal Bank of Scotland in Singapore. He holds a BSc in Physics and MSc in Financial Engineering.

If you want to know the reasons for
The things I feel inside
You can run away and hide if you want to
But if you need me
Show me a way to get through
Cause I've not seen anyone like you
Since I was a man

If you want to know for certain
What is written in my soul
Where my wildest dreams unfold
Like an endless stream
If you need me
Show me a way to walk tall
Cause I'd not seen anything at all
Until I met you

—*If You Need Me*, Gordon Lightfoot © 1980

PART One

H-Mkt BTMM

Introduction to Bonds

In Part One, we describe the key concepts in fixed-income market analysis, which cover the basics of the bond instrument. The building blocks described here are generic and are applicable in any market. The analysis is simplest when restricted to plain-vanilla *default-free* bonds; as the instruments become more complex, we are required to introduce additional techniques and assumptions. Part One comprises five chapters. We begin with bond pricing and yield, followed by traditional interest-rate risk measures such as modified duration and convexity. This is followed by a look at spot and forward rates, the derivation of such rates from market yields, and the concept of the yield curve. Yield-curve analysis and the modelling of the term structure of interest rates is one of the most heavily researched areas of financial economics. The treatment here is kept as concise as possible, which sacrifices some detail, but bibliographies at the end of each chapter will direct interested readers to what are the most accessible and readable references in this area.

While we do not describe specifics of particular markets, it is important to remember that the general concepts discussed here are pertinent to debt markets in every jurisdiction.

The Bond Instrument

Bonds are debt-capital market instruments that represent a cash flow payable during a specified time period heading into the future. This cash flow represents the interest payable on the loan and the loan redemption. So, essentially, a bond is a loan, albeit one that is tradable in a secondary market. This differentiates bond-market securities from commercial bank loans.

In the analysis that follows, bonds are assumed to be default-free, which means that there is no possibility that the interest payments and principal repayment will not be made. Such an assumption is reasonable when one is referring to government bonds such as U.S. Treasuries, UK gilts, Japanese JGBs, and so on. However, it is unreasonable when applied to bonds issued by corporates or lower-rated sovereign borrowers. Nevertheless, it is still relevant to understand the valuation and analysis of bonds that are default-free, as the pricing of bonds that carry default risk is based on the price of risk-free securities. Essentially, the price investors charge borrowers that are not of risk-free credit standing is the price of government securities plus some credit risk premium.

BOND-MARKET BASICS

All bonds are described in terms of their issuer, maturity date, and coupon. For a default-free conventional, or plain-vanilla, bond, this will be the essential information required. Nonvanilla bonds are defined by further characteristics such as their interest basis, flexibilities in their maturity date, credit risk, and so on.

Figure 1.1 shows screen DES from the Bloomberg system. This page describes the key characteristics of a bond. From Figure 1.1, we see a description of a bond issued by the Singapore government, the 4.625% of 2010. This tells us the following bond characteristics:

Issue date	July 2000
Coupon	4.625%
Maturity date	1 July 2010
Issue currency	Singapore dollars
Issue size	SGD 3.4 million
Credit rating	AAA/Aaa

GRAB		Corp DES	
SECURITY DESCRIPTION		Page 1 / 1	
SINGAPORE GOV'T SIGB 4 % 07/10		107.1500/107.2500 (3.42/3.40) BGN @ 7:00	
ISSUER INFORMATION		IDENTIFIERS	1) Additional Sec Info
Name SINGAPORE GOVERNMENT		ISIN SG4926884703	2) Identifiers
Type Sovereign		SingaporeNX00100T	3) Ratings
Market of Issue DOMESTIC		BB number EC2684420	4) Sec. Specific News
SECURITY INFORMATION		RATINGS	5) Custom Notes
Country SG Currency SGD		Moody's Aaa	6) Issuer Information
Collateral Type BONDS		S&P AAA	7) ALLQ
Calc Typ(926)SINGAPORE GOVT BND		Composite AAA	8) Pricing Sources
Maturity 7/ 1/2010 Series		ISSUE SIZE	9) Related Securities
NORMAL		Amt Issued	
Coupon 4 % FIXED		SGD 3,400,000 (M)	
S/A ACT/ACT		Amt Outstanding	
Announcement Dt 6/23/00		SGD 3,400,000 (M)	
Int. Accrual Dt 7/ 3/00		Min Piece/Increment	
1st Settle Date 7/ 3/00		1,000.00/ 1,000.00	
1st Coupon Date 1/ 1/01		Par Amount 1,000.00	
Iss Pr 99.2500		BOOK RUNNER/EXCHANGE	
NO PROSPECTUS		NOT LISTED	65) Old DES
SHORT 1ST CPN. AVG YLD=4.72%. S\$1BLN 3/3/03, AVG YLD=2.01%			66) Send as Attachment

FIGURE 1.1 Bloomberg Screen DES Showing Details of 4 $\frac{5}{8}$ % 2010 Issued by Republic of Singapore as of 20 October 2003
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Calling up screen DES for any bond, provided it is supported by Bloomberg, will provide us with its key details. Later on, we will see how nonvanilla bonds include special features that investors take into consideration in their analysis.

We will consider the essential characteristics of bonds later in this chapter. First, we review the capital market, and an essential principle of finance, the time value of money.

CAPITAL MARKET PARTICIPANTS

The debt capital markets exist because of the financing requirements of governments and corporates. The source of capital is varied, but the total supply of funds in a market is made up of personal or household savings, business savings, and increases in the overall money supply. Growth in the money supply is a function of the overall state of the economy, and interested readers may wish to consult the references at the end of this chapter, which include several standard economic texts. Individuals save out of their current income for future consumption, while business savings represent retained earnings. The entire savings stock represents the capital available in a market. The requirements of savers and borrowers differ significantly, in that savers have a short-term investment horizon while borrowers prefer to take a longer-term view. The constitutional weakness of what would otherwise be *unintermediated* financial markets led, from an early stage, to the development of financial intermediaries.

Financial Intermediaries

In its simplest form a financial intermediary is a *broker* or *agent*. Today we would classify the broker as someone who acts on behalf of the borrower or lender, buying or selling a bond as instructed. However, intermediaries originally acted between borrowers and lenders in placing funds as required. A broker would not simply on-lend funds that have been placed with it, but would accept deposits and make loans as required by its customers. This resulted in the first banks. A *retail bank* deals mainly with the personal financial sector and small businesses, and in addition to loans and deposits also provides cash transmission services. A retail bank is required to maintain a minimum cash reserve, to meet potential withdrawals, but the remainder of its deposit base can be used to make loans. This does not mean that the total size of its loan book is restricted to what it has taken in deposits: loans can also be funded in the wholesale market. An *investment bank* will deal with governments, corporates, and institutional investors. Investment banks perform an agency role for their customers, and are the primary vehicle through which a corporate will borrow funds in the bond markets. This is part of the bank's corporate finance function; it will also act as wholesaler in the bond markets, a function known as *market making*. The bond-issuing function of an investment bank, by which the bank will issue bonds on behalf of a customer and pass the funds raised to this customer, is known as *origination*. Investment banks will also carry out a range of other functions for institutional customers, including export finance, corporate advisory, and fund management.

Other financial intermediaries will trade not on behalf of clients but for their own *book*. These include *arbitrageurs* and speculators. Usually such market participants form part of investment banks.

Investors

There is a large variety of players in the bond markets, each trading some or all of the different instruments available to suit their own purposes. We can group the main types of investors according to the time horizon of their investment activity.

Short-term institutional investors. These include banks and building societies, money-market fund managers, central banks, and the treasury desks of some types of corporates. Such bodies are driven by short-term investment views, often subject to close guidelines, and will be driven by the total return available on their investments. Banks will have an additional requirement to maintain *liquidity*, often in fulfilment of regulatory authority rules, by holding a proportion of their assets in the form of easily tradable short-term instruments.

Long-term institutional investors. Typically these types of investors include pension funds and life assurance companies. Their investment horizon is long term, reflecting the nature of their liabilities; often they will seek to match these liabilities by holding long-dated bonds.

Mixed horizon institutional investors. This is possibly the largest category of investors and will include general insurance companies, most corporate bodies, and sovereign wealth funds. Like banks and financial-sector companies, they are also very active in the primary market, issuing bonds to finance their operations.

Market professionals. This category includes the banks and specialist financial intermediaries mentioned earlier, firms that one would not automatically classify as “investors” although they will also have an investment objective. Their time horizon will range from one day to the very long term. Proprietary traders will actively position themselves in the market in order to gain trading profit, for example in response to their view on where they think interest rate levels are headed. These participants will trade directly with other market professionals and investors, or via brokers. Market makers or *traders* (called *dealers* in the United States) are wholesalers in the bond markets; they make two-way prices in selected bonds. Firms will not necessarily be active market makers in all types of bonds; smaller firms often specialise in certain sectors. In a two-way quote the *bid price* is the price at which the market maker will buy stock, so it is the price the investor will receive when selling stock. The *offer price* or *ask price* is the price at which investors can buy stock from the market maker. As one might expect, the bid price is always higher than the offer price, and it is this *spread* that represents the theoretical profit to the market maker. The bid-offer spread set by the market maker is determined by several factors, including supply and demand, and liquidity considerations for that particular stock, the trader’s view on market direction and *volatility* as well as that of the stock itself and the presence of any market intelligence. A large bid-offer spread reflects low liquidity in the stock, as well as low demand.

As mentioned earlier, *brokers* are firms that act as intermediaries between buyers and sellers and between market makers and buyers/sellers. Floor-based stock exchanges such as the New York Stock Exchange (NYSE) also feature *specialists*, members of the exchange who are responsible for maintaining an orderly market in one or more securities. These are known as *locals* on the London International Financial Futures and Options Exchange (LIFFE). Locals trade securities for their own account to counteract a temporary imbalance in supply and demand in a particular security; they are an important source of *liquidity* in the market. Locals earn income from brokerage fees and also from pure trading, when they sell securities at a higher price than the original purchase price.

Markets

Markets are that part of the financial system where capital market transactions, including the buying and selling of securities, takes place. A market can describe a traditional stock exchange; that is, a physical trading floor where securities trading occurs. Many financial instruments are traded over the telephone or electronically; these markets are known as *over-the-counter* (OTC) markets. A distinction is made between financial instruments of up to one year’s maturity and instruments of over one year’s maturity. Short-term instruments make up the *money market* while all other instruments are deemed to be part of the *capital market*. There is also a distinction made between the *primary market* and the *secondary market*. A new issue of bonds made by an investment bank on behalf of its client is made in the primary market. Such an issue can be a *public* offer, in which anyone can apply to buy the bonds, or a *private* offer where the customers of the investment bank are offered the stock. The secondary market is the market in which existing bonds and shares are subsequently traded.

WORLD BOND MARKETS

The origin of the spectacular increase in the size of global financial markets was the rise in oil prices in the early 1970s. Higher oil prices stimulated the development of a sophisticated international banking system, as they resulted in large capital inflows to developed country banks from the oil-producing countries. A significant proportion of these capital flows were placed in *eurodollar* deposits in major banks. The growing trade deficit and level of public borrowing in the United States also contributed. The past 20 years has seen tremendous growth in capital markets volumes and trading. As capital controls were eased and exchange rates moved from fixed to floating, domestic capital markets became internationalised. Growth was assisted by the rapid advance in information technology and the widespread use of financial engineering techniques. Today we would think nothing of dealing in virtually any liquid currency bond in financial centres around the world, often at the touch of a button. Global bond issues, underwritten by the subsidiaries of the same banks, are commonplace. The ease with which transactions can be undertaken has also contributed to a very competitive market in liquid currency assets.

The world bond market has increased in size more than 15 times in the past 30 years. As at the end of 2013, outstanding volume stood at over \$25 trillion.

The market in U.S. Treasury securities is the largest bond market in the world. Like the government bond markets in the United Kingdom, Germany, France, and other developed economies, it is also very liquid and transparent. Of the major government bond markets in the world, the U.S. market makes up nearly half of the total. The Japanese market is second in size, followed by the German market. A large part of the government bond market is concentrated therefore in just a few countries. Government bonds are traded on major exchanges as well as *over-the-counter* (OTC). Generally OTC refers to trades that are not carried out on an exchange but directly between the counterparties. Bonds are also listed on exchanges.

Companies finance their operations in a number of ways, from equity to short-term debt such as bank overdrafts. It is often advantageous for companies to fix longer-term finance, which is why bonds are so popular. Bonds are also attractive as a means of raising finance because the interest payable on them to investors is tax deductible for the company. Dividends on equity are not tax deductible. A corporate needs to get a reasonable mix of debt versus equity in its funding however, as a high level of interest payments will be difficult to service in times of recession or general market downturn. For this reason the market views unfavourably companies that have a high level of debt. Corporate bonds are also traded on exchanges and OTC. One of the most liquid corporate bond types is the *Eurobond*, which is an international bond issued and traded across national boundaries. Sovereign governments have also issued Eurobonds.

OVERVIEW OF THE MAIN BOND MARKETS

So far we have established that bonds are debt capital market instruments, which means that they represent loans taken out by governments and corporations. The duration of any particular loan will vary from 2 years to 30 years or longer. In this chapter we introduce just a small proportion of the different bond instruments that

trade in the market, together with a few words on different country markets. This will set the scene for later chapters, where we look at instruments and markets in greater detail.

Domestic and International Bonds

In any market there is a primary distinction between *domestic* bonds and other bonds. Domestic bonds are issued by borrowers domiciled in the country of issue, and in the currency of the country of issue. Generally they trade only in their original market. A *Eurobond* is issued across national boundaries and can be in any currency, which is why they are also sometimes called *international* bonds. It is now more common for Eurobonds to be referred to as international bonds, to avoid confusion with “euro bonds”, which are bonds denominated in *euros*, the currency of 17 countries of the European Union (EU). As an issue of Eurobonds is not restricted in terms of currency or country, the borrower is not restricted as to its nationality either. There are also *foreign* bonds, which are domestic bonds issued by foreign borrowers. An example of a foreign bond is a *Bulldog*, which is a sterling bond issued for trading in the United Kingdom (UK) market by a foreign borrower. The equivalent foreign bonds in other countries include *Yankee* bonds (United States), *Samurai* bonds (Japan), *Alpine* bonds (Switzerland) and *Matador* bonds (Spain).

There are detail differences between these bonds, for example in the frequency of interest payments that each one makes and the way the interest payment is calculated. Some bonds such as domestic bonds pay their interest *net*, which means net of a withholding tax such as income tax. Other bonds including Eurobonds make *gross* interest payments.

Government Bonds As their name suggests, government bonds are issued by a government or *sovereign*. Government bonds in any country form the foundation for the entire domestic debt market. This is because the government market will be the largest in relation to the market as a whole. Government bonds also represent the best *credit risk* in any market as people generally do not expect the government to go bankrupt. As we see in a later chapter, professional institutions that analyse borrowers in terms of their credit risk always rate the government in any market as the highest credit available. While this may sometimes not be the case, it is usually a good rule of thumb.¹ The government bond market is usually also the most *liquid* in the domestic market due to its size and will form the benchmark against which other borrowers are rated. Generally, but not always, the yield offered on government debt will be the lowest in that market.

United States Government bonds in the United States are known as *Treasuries*. Bonds issued with an original maturity of between 2 and 10 years are known as *notes* (as in “Treasury note”) while those issued with an original maturity of over

¹ Occasionally one may come across a corporate entity that one may view as better rated in terms of credit risk compared to the government of the country in which the company is domiciled. However, the main credit rating agencies will not rate a corporate entity at a level higher than its country of domicile.