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Introduction to Bonds

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Agenda

- Company Borrowing
- What is a Bond?
- Types of Bonds
- Bond Terminology
- Bond Market Overview
- Bond Pricing and Quotations
- Corporate Bonds

Group Discussion

- **Scenario: You convinced your family to invest in your idea and have been running your small business for a while, making steady profits**

- **How can you raise the finance to expand?**

Group Discussion

- **Why else might firms want to borrow money?**
- **What are other ways they could do it?**

Why Do Companies Borrow?

Companies borrow money for many different reasons. These can include:

- Start-up capital
- Working capital (day-to-day operations)
- Purchasing equipment
- Buying an asset such as a building
- Project finance
- Corporate actions such as takeovers

Features of a Borrowing Request

In order to decide what the best form of borrowing would be there are a number of important questions that need to be answered. These include:

- What are the funds being used for?
- How big is the transaction?
- How long are the funds needed?
- Are there specific assets involved?

Types of Corporate Borrowing

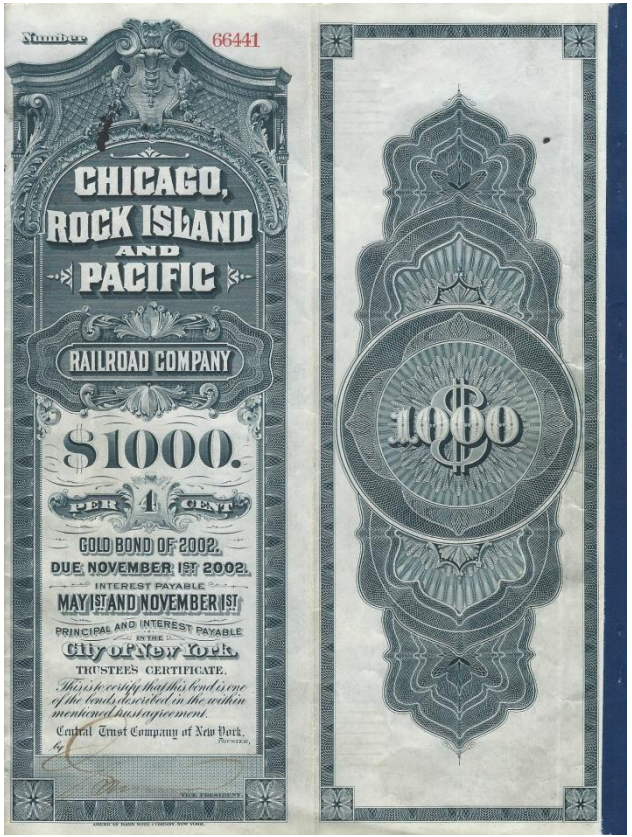
Based on the nature of the borrowing there are a number of potential ways the funds can be raised. These include:

- Term loan (secured or unsecured)
- Revolving credit facility
- Bridge loan
- Letter of credit
- Syndicated loan
- Project finance
- Bond issue

What is a Bond?

A bond is a:

- Long term debt security
- Issued by a borrower to raise long term finance
- Normally negotiable
- Interest bearing where the issuer agrees to pay periodic interest throughout the life of the bond
- The principal is normally repaid at maturity



Source: The Bowles Collection

What is a Bond?

Key Terminology:

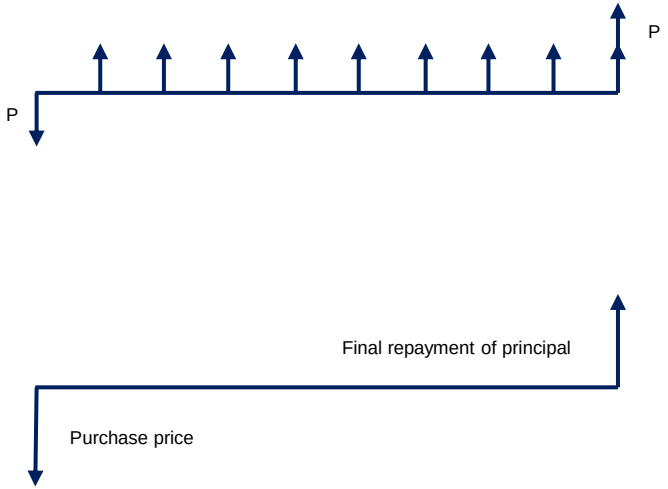
- Issuer: the legal entity responsible for paying the coupons and principal repayment at maturity.
- Coupon: the regular interest payment made throughout the life of the bond:
  - Normally fixed
  - Semi-annual (USA) Annual (Europe)
- Redemption Value: normally the face value but can be different

Source: The Bowles Collection

Types of Bonds - Cashflows

There are many different types of bonds:

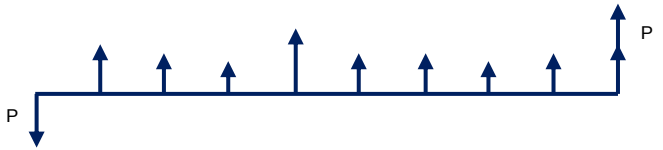
- Standard or Vanilla
  - The coupon is fixed for the life of the bond and 100% of the principal is repaid at maturity
- Zero-Coupon
  - There are no coupon payments during the life of the bond. The investor receives the full principal payment at maturity. The income they receive is the difference between the initial purchase price and the face value at maturity (the discount)



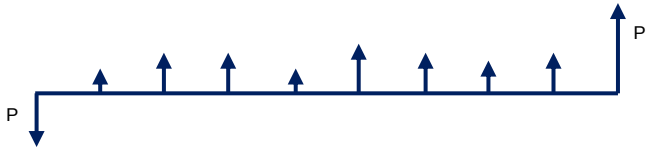
Types of Bonds - Cashflows

There are many different types of bonds:

- Floating Rate Notes
  - The coupon resets on a regular basis linked to a market interest rate (such as Libor)



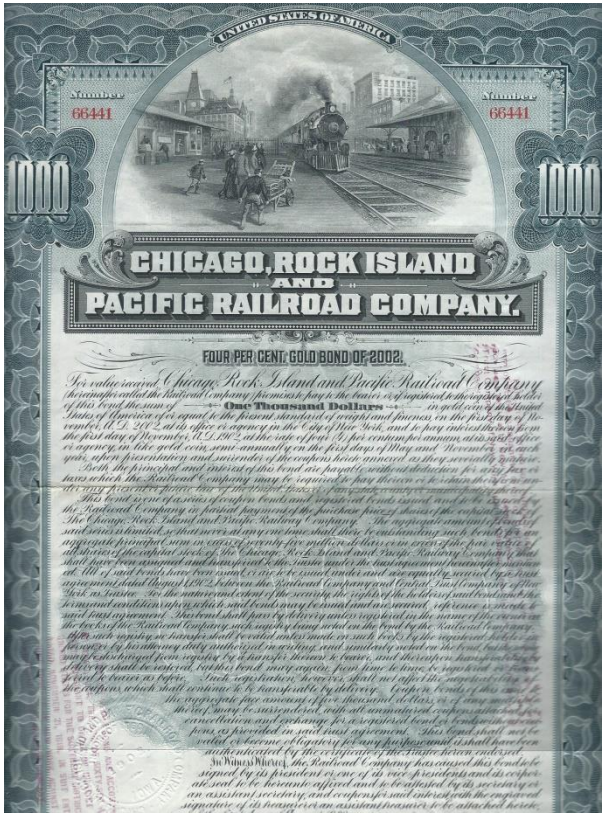
- Inflation Linked
  - There are many variations available. The investor receives a return that is indexed to the level of reported inflation so that the principal and interest payments rise and fall with the rate of inflation.



Types of Bonds – Issuer or Domicile

- Bonds can also be classified based on who the issuer of the bond is:
  - Government (Sovereign)
  - Corporate
  - Supranational
  - Securitization
  - Asset backed
- Or the legal domicile of the bond
  - Domestic
  - Foreign
  - Eurobond

Source: The Bowles Collection



Bond Market Overview

The Capital Markets

The role of the Capital Markets is to facilitate turning long term savings into long term investments.

- The securities traded have original maturities greater than one year.
- These markets represent large scale sources of capital for corporations, financial institutions, agencies and governments.
- Activities are broken down into **Primary Market** and **Secondary Market**.

Primary versus Secondary Markets

Primary Markets

- The market where those that need funding raise money through issuing financial instruments such as stocks and bonds. This is the initial issue of debt or equity securities
  - Initial Public Offerings
  - Private placements
  - Underwritten or ‘best efforts’
  - The issuer receives the funds

Secondary Markets

- The market where existing securities are traded
  - Provides flexibility to investors
  - Organised exchanges or OTC

Market Participants: Issuers

Bond Issuers

- Governments
- Government Agencies
- Corporations
- Banks
- Financial Institutions
- Municipalities
- Special Purpose Vehicles

Issuer Motivations

- Minimum Cost
- Market Access
- Market Size
- Speed & Ease of Issue
- Investor Base
- Simplicity
- Currency Choice

Market Participants: Investors

Bond Investors

- Pension Funds
- Insurance Companies
- Commercial Banks
- Sovereign Wealth Funds
- Financial Institutions
- Hedge Funds
- Corporations
- High Net Worth Individuals
- **Central Banks !!!!!**

Investor Motivations

- Coupon income
- Matching Long Term liabilities with Long Term asset
- Capital Gain
- Statutory requirements
- Liquidity
- Flexibility
- Taxation
- Inventory to sell to other market participants
- **Quantitative Easing !!!!!**

Bond Market Overview

- The bond market represents the largest sector in the global capital markets with over $127trn outstanding.

	Total Debt Securities	Government	Financial Corporations	Non-Financial Corporations
Domestic	102.1	60.6	28.0	13.5
International	25.5	3.8	17.6	4.1
Total	127.6	64.4	45.6	17.6

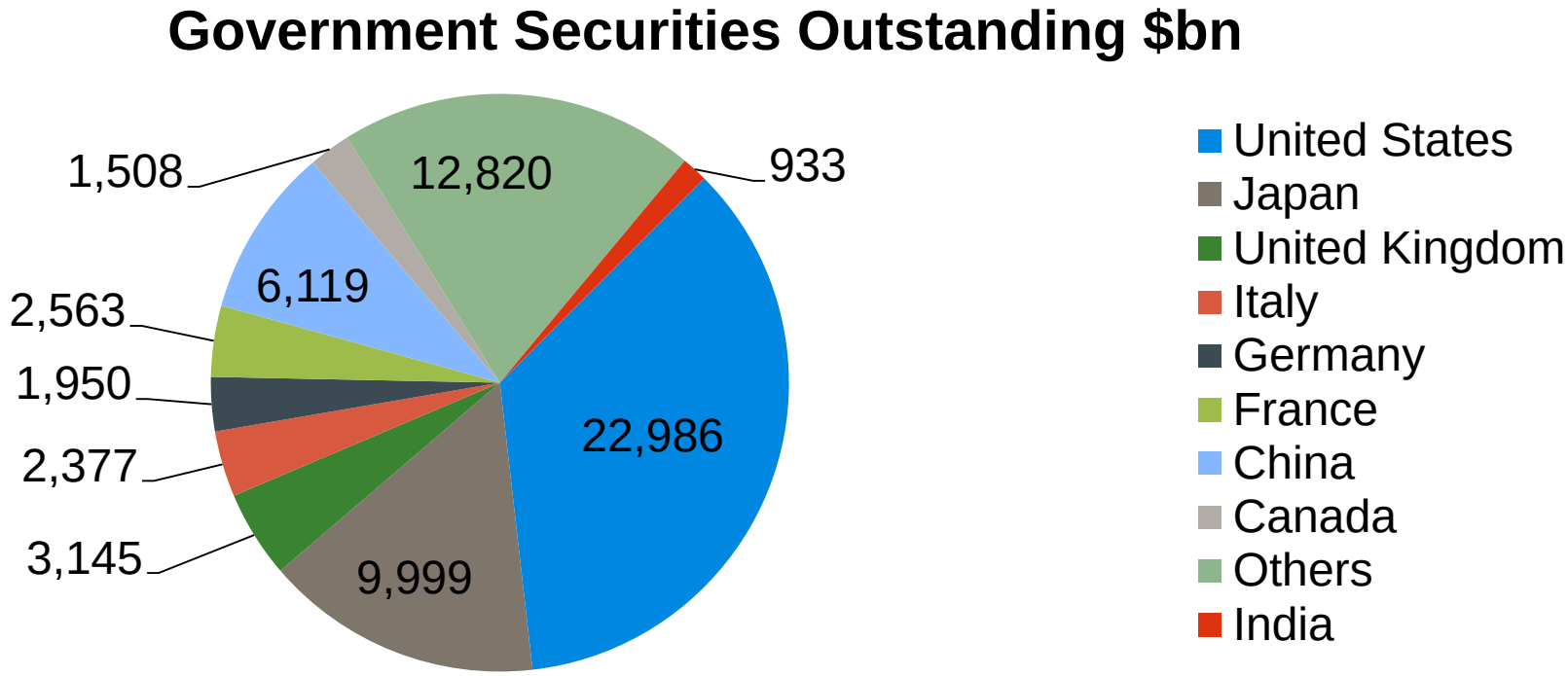
Source: BIS Quarterly Review December 2020, Data as at June 2020

Government Bonds

Key Features

- Government bonds typically represent the largest sector of each countries bond market.
- The government bond curve is the interest rate benchmark from which other bonds and derivatives are priced.
- They are normally very liquid and actively traded.
- The worlds major bond markets are traded 24 hours.
- Although many maturities of government bonds exist, financial markets focus on a small number of key maturities. These are known as the “benchmark” bonds.
- Other bonds are ‘off-the-run’

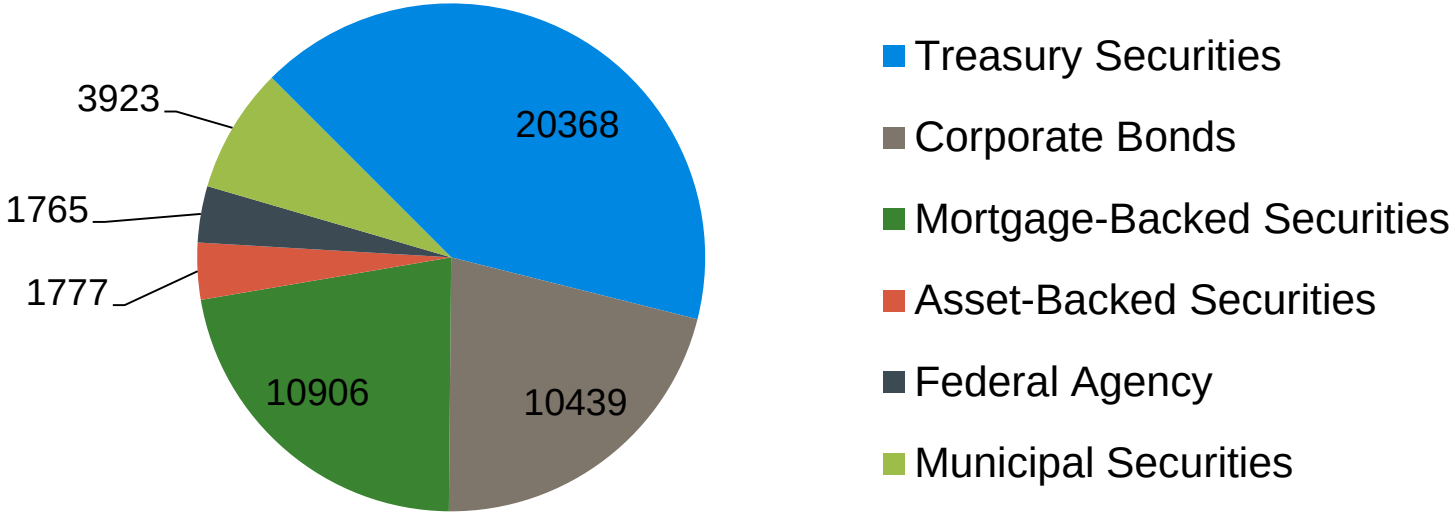
Government Bonds Outstanding



Source: BIS Quarterly Review December 2020, Data as at June 2020

US Bond Market

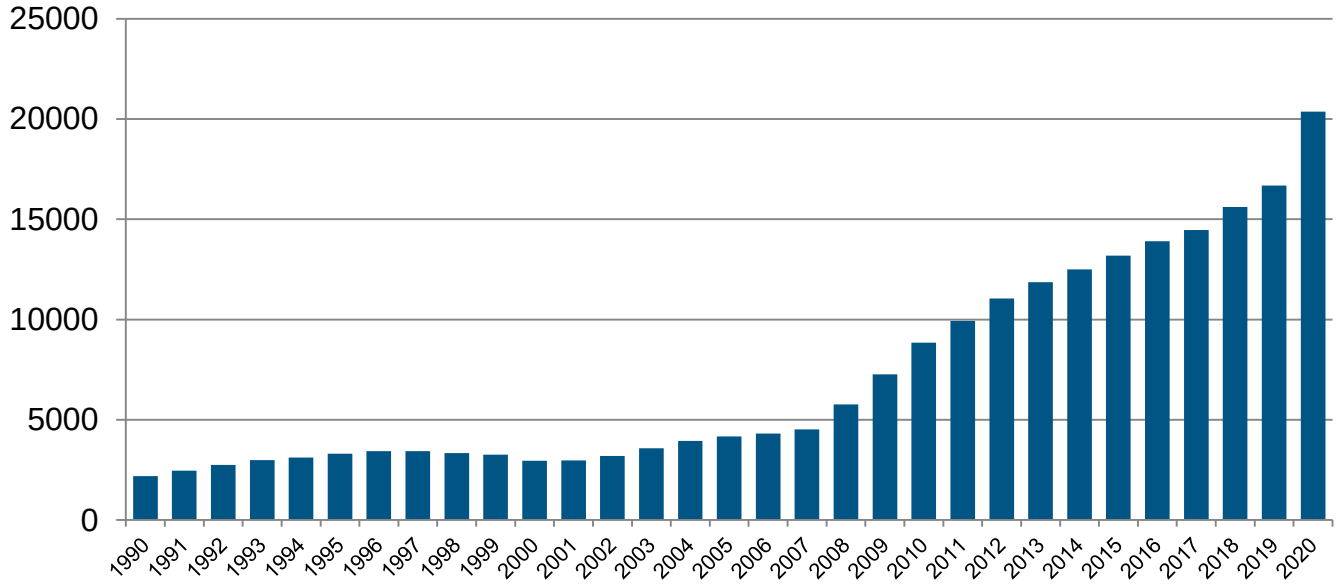
- The US bond market is the largest and most developed in the world, including significant non-government sectors.



Source: SIFMA Research Quarterly, Fixed Income 3rd Quarter 2020

US Bond Market

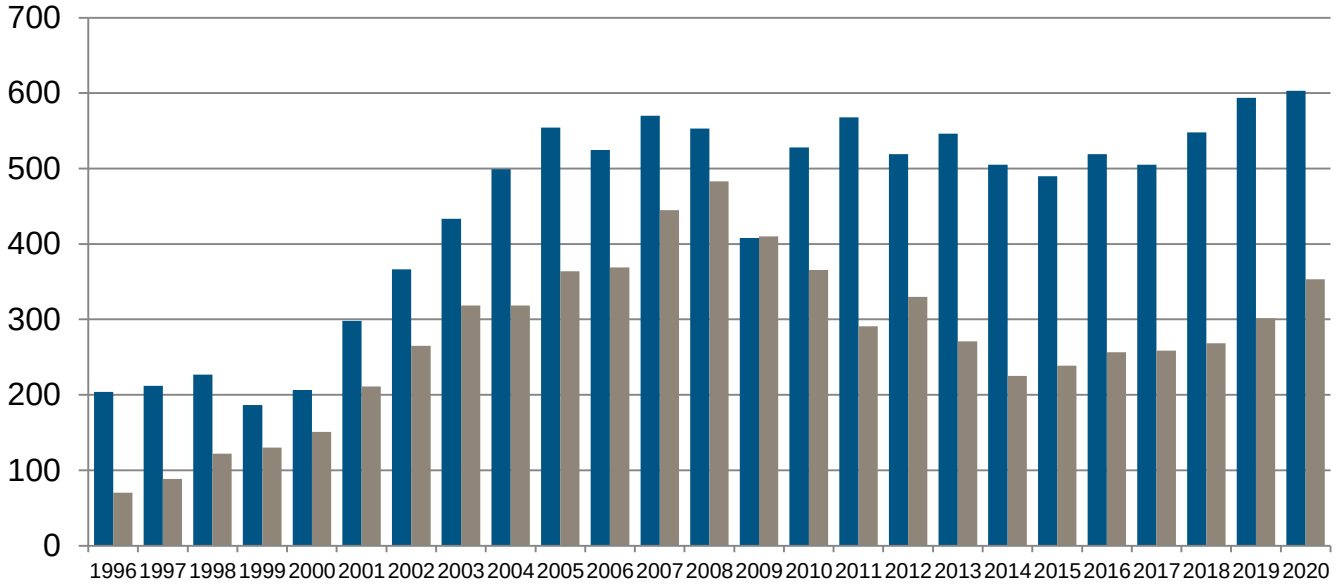
- The volume of outstanding treasury securities has grown at an alarming rate since the financial crisis and is expected to grow substantially with the trillions of debt financed stimulus in response to COVID-19.



Source: SIFMA Research Quarterly, Fixed Income 3rd Quarter 2020

US Bond Market

- Average daily treasury trading volume has exceeded $500bn most years since 2005. The daily trading volume of other types of bonds is also substantial, the vast majority of which (over 80%) is agency MBS



Source: SIFMA Research Quarterly, Fixed Income 3rd Quarter 2020

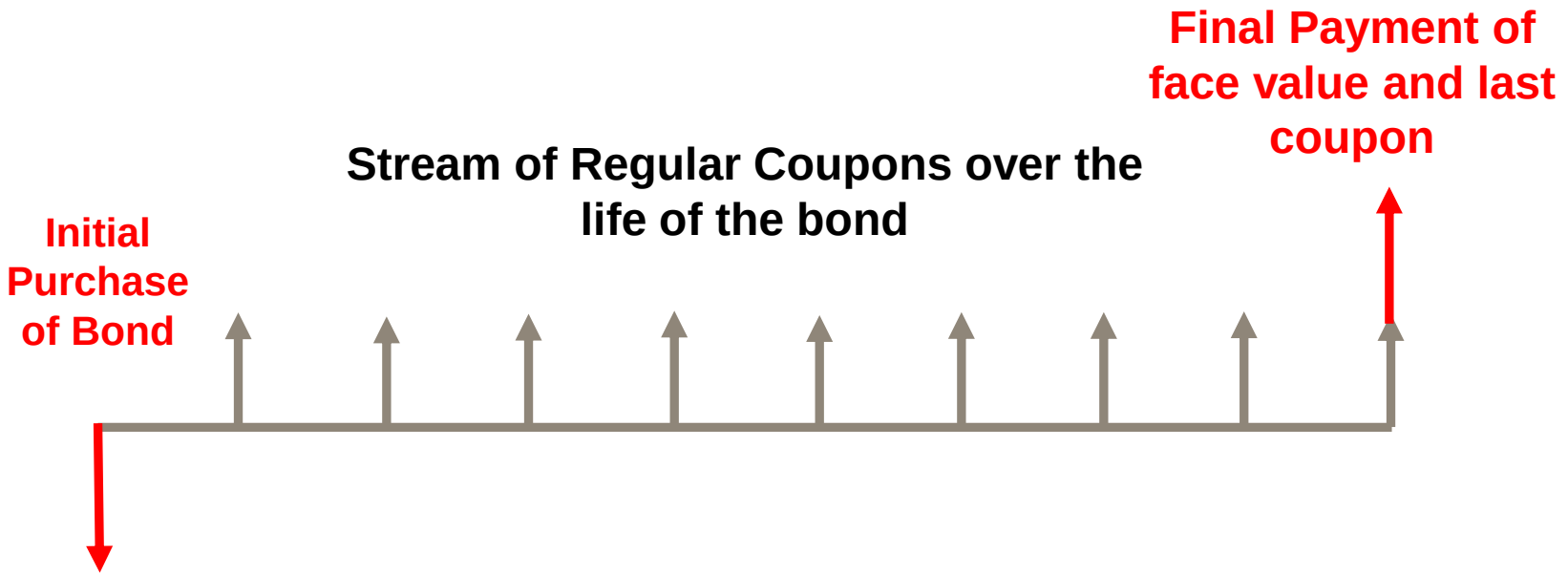
Bond Pricing

Debt Securities Characteristics

- They are issued with a fixed "Face Value" or redemption value.
- They mature at some specified future date, at which point the principal (the amount of the face value) is repaid to the holder.
- They normally pay fixed amounts of interest (coupons), during their life and this is established at the time of issue.
- Their market value can differ from their face value depending upon the coupon and how it compares with current market interest rates.

Vanilla Bond Cash Flows

- All of the cash flows on a normal (or vanilla) bullet bond are set at the time of issue.



Bond Pricing Terminology

Coupon

- Fixed rate of interest payable on the bond
- Paid annually or semi-annually
- Set at launch of bond and does not change over the life of the bond
- Expressed as a percentage i.e. 5.00% p.a.
- This is the interest amount that the borrower pays

Price

- A means of expressing the value of a bond in today's market
- Expressed per 100 face value (100 = par) i.e. price of 97.95 or 105.00 (percentage of face value)
- Constantly changing as a function of demand and supply. Influenced by the level of interest rates, credit quality and general market confidence.

Yield

- Effective return on a bond with a certain coupon at today's price
- Inversely related to price

Bond Pricing

- Bonds are traded on the basis of their “Price per 100” of face value. This represents the sum of the discounted cash flows

Example: Valuing a three year annual coupon bond

$$\frac{\text{Coupon 1}}{(1+y)^1} + \frac{\text{Coupon 2}}{(1+y)^2} + \frac{\text{Coupon 3}}{(1+y)^3} + \frac{\text{Principal}}{(1+y)^3}$$

- “*y*” represents the yield in the market for the bond in question. This is known as the **“yield to maturity”.**

The Bond Pricing Formula

$$P = \sum_{t=1}^{T} \frac{C}{(1+y)^t} + \frac{F}{(1+y)^T}$$

C = Coupon Payment per period

F = face value (or par value) of the bond

P = current price

y = yield to maturity (per period)

T = number of periods

- It is important to note that the coupons and yields are expressed ‘per period’ in the formula, not per annum. If a bond pays coupons semi-annually then the C and y are simply divided by 2

Price versus Yield

Bond Price

- Bond prices are expressed in terms of the price you will pay today per 100 of face value.
- For example a price of 97.50 means that you will pay $97.50 today for every $100 of face value you have purchased.

Bond Yield

- The yield to maturity on a bond is the annual rate of return expressed as a percentage
- This is the internal rate of return that equates the future cash flows to the current price of the bond.

Price versus Yield

Price and yield are inversely related

- When yields are low, bond prices are high
- When yields are high, bond prices are low

Example

- Consider the case of a 3 year, 5% annual coupon bond.
- How will the price of the bond change if yields are at:
  - 4%
  - 5%
  - 6%

Price versus Yield

Year	Cash Flow	Yields at 4%	PV	Yields at 5%	PV	Yields at 6%	PV
1	5	$\frac{1}{(1.04)}$	4.808	$\frac{1}{(1.05)}$	4.762	$\frac{1}{(1.06)}$	4.717
2	5	$\frac{1}{(1.04)^2}$	4.622	$\frac{1}{(1.05)^2}$	4.535	$\frac{1}{(1.06)^2}$	4.450
3	105	$\frac{1}{(1.04)^3}$	93.345	$\frac{1}{(1.05)^3}$	90.703	$\frac{1}{(1.06)^3}$	88.160
Total			102.775		100.00		97.327

Corporate Bonds

Corporate Bonds

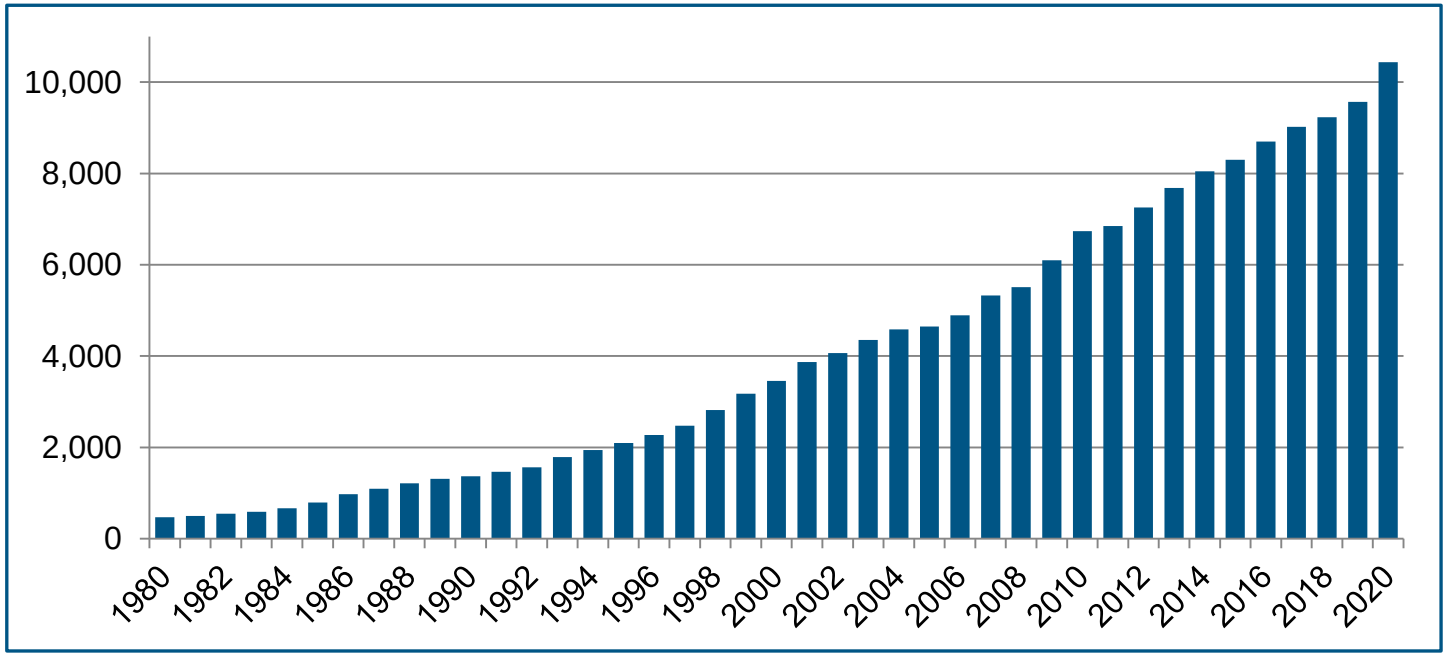
- The corporate bond market is used by companies to raise medium and long term financing.
- One major difference when compared to government bonds is the issuance process. Corporate bonds are not auctioned, but instead sold via a syndication or private placement process.
- Corporate Bonds come in many forms
  - Standard fixed rate coupon
  - Floating rate notes
  - Domestic, foreign or Eurobond
  - Medium term notes (MTN's) which are issued on tap via an established programme
- Coupons can be semi-annual or annual and calculations are normally based on a 30/360 basis

Corporate Bonds

- Corporate bonds are normally issued via a syndication like process.
- The company looking to borrow the money will appoint a bank or investment bank as “Lead Manager” for the bond issue.
- Apart from arranging all of the legal documentation, the lead manager is also responsible for forming a syndicate of banks that together will place and underwrite the bond issue.
- The syndicate will undertake a book building process by which they will build up a ‘book’ of buyers willing to purchase the bonds.
- At issue they will set the final price of the bonds and any unsold bonds they will need to purchase themselves.

US Corporate Bonds Outstanding

- The US corporate bond market has experienced steady growth for many years.



Source: SIFMA Research Quarterly, Fixed Income 3rd Quarter 2020

Pricing Corporate Bonds

- The yield on a corporate bond is normally analysed relative to the equivalent maturity government benchmark bond.
- The difference in yield between the government bond and the corporate bond is known as the credit spread.
- This spread changes constantly and is driven by:
  - The perceived credit quality of the issuer
  - The degree of risk appetite/risk aversion in the market
- Credit spreads reflect the likelihood of default
  - Credit spreads increase as credit quality worsens
  - Credit spreads decrease as credit quality improves

Corporate Credit Ratings

- Companies that issue debt securities need to be rated.

Investment Grade

High Yield

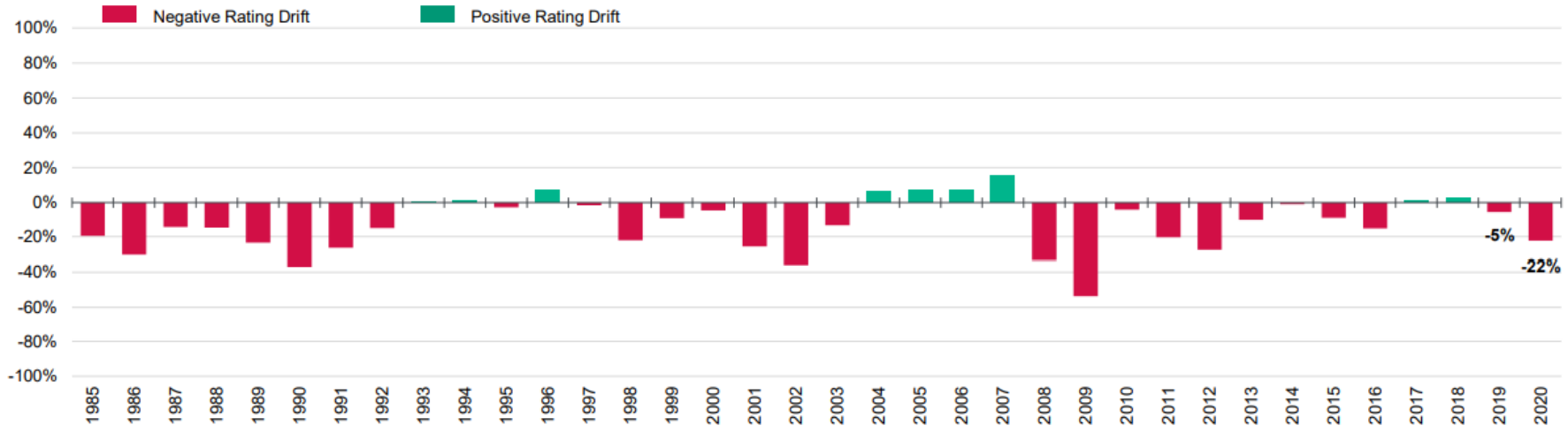
- These ratings assess the borrowers credit worthiness and thus the risk associated with the bond.

Moody's	S&P	Fitch	
Aaa	AAA	AAA	Prime
Aa1	AA+	AA=	High Grade
Aa2	AA	AA	
Aa3	AA-	AA-	
A1	A+	A+	Upper Medium Grade
A2	A	A	
A3	A-	A-	
Baa1	BBB+	BBB+	Lower Medium Grade
Baa2	BBB	BBB	
Baa3	BBB-	BBB-	
Ba1	BB+	BB+	Non- investment grade speculative
Ba2	BB	BB	
Ba3	BB-	BB-	
B1	B+	B+	Highly Speculative
B2	B	B	
B3	B-	B-	
Caa1	CCC+	CCC	Substantial Risk
Caa2	CCC		Extremely speculative
Caa3	CCC-		In default with little prospect of recovery
Ca	CC		
	D	D	In default

Ratings Changes

- Trends in rating changes are strongly related to the macro economic environment.

The coronavirus pandemic led to a rise in rating downgrades
Percent of one notch

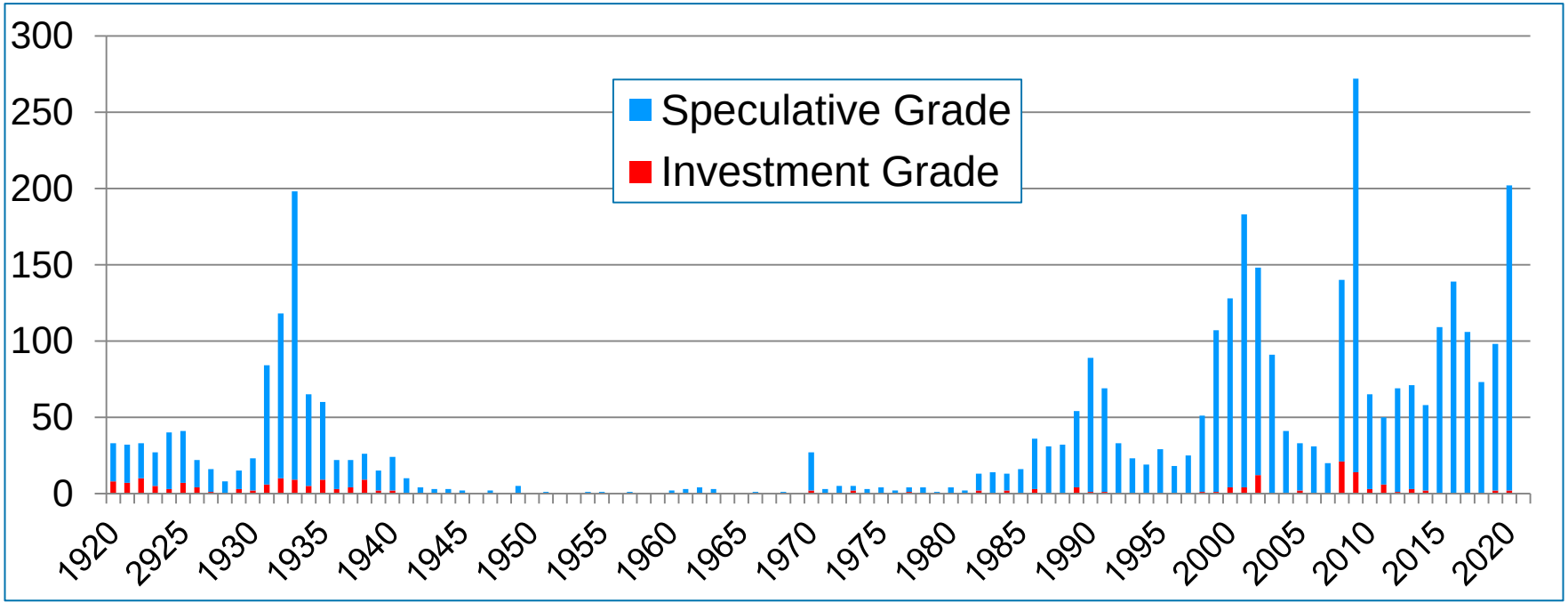


* Rating drift is measured by the average upgraded notches per issuer minus the average downgraded notches per issuer.
Source: Moody's Investors Service

Source: Moody's Annual Default Study 2021

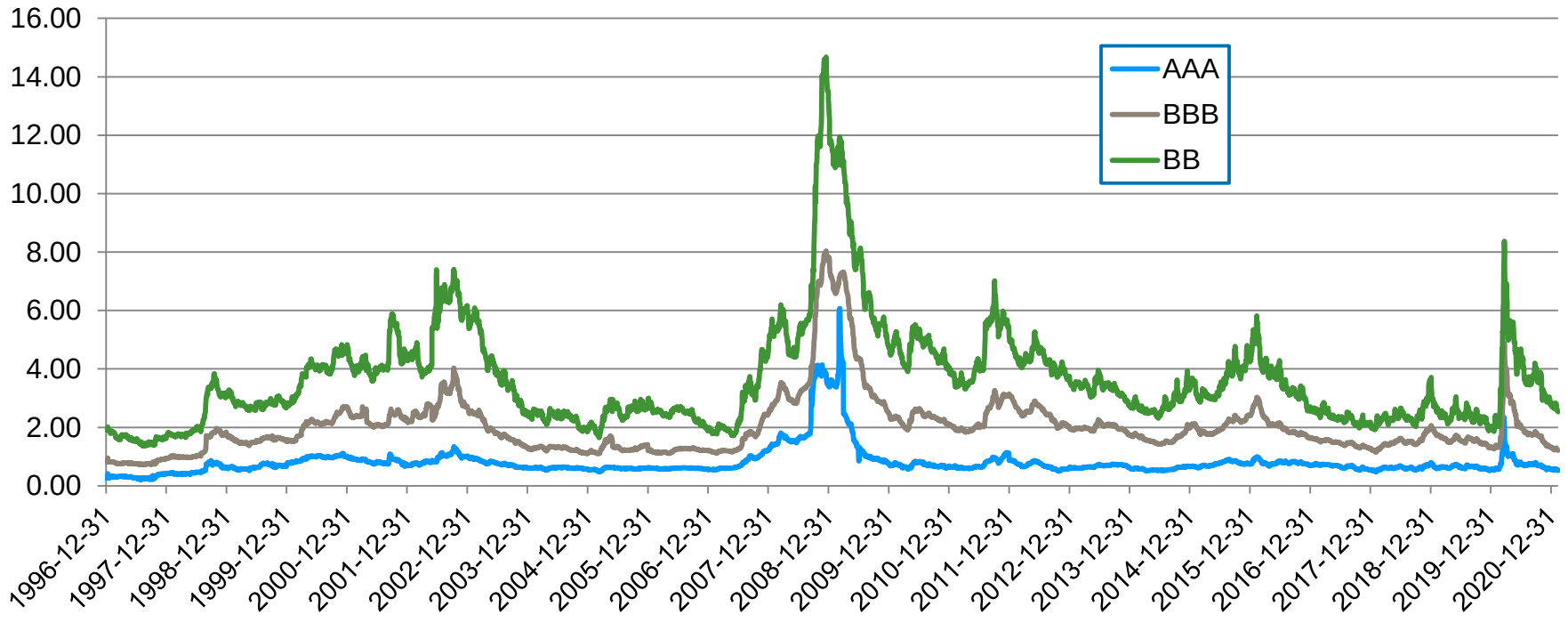
Corporate Defaults Per Year: 1920-2020

- The spike in corporate defaults due to COVID-19 was quite dramatic.



Source: Moody's Annual Default Study 2021

AAA, BBB and BB Credit Spreads



Source: FRED Database, Federal Reserve Bank of St. Louis