Fixed-Income Securities: Defining Elements

Abstract

12a	Calculate and interpret price, income and cross-price elasticities of demand and describe factors that affect each measure
12b	Compare substitution and income effects
12c	Distinguish between normal goods and inferior goods
12d	Describe the phenomenon of diminishing marginal returns
12e	Determine and interpret breakeven and shutdown points of production
12f	Describe how economies of scale and diseconomies of scale affect costs

Contents

1. Overview of a Fixed-Income Security

A **bond** is a contractual agreement between the issuer and the bondholders. The most important features of bonds include the *issuer*, *par value*, *coupon rate*, *frequency* and *currency denomination*. These features determine the scheduled cash flows and thus the expected and actual returns.
Bonds also include *legal*, *regulatory* and *tax* considerations. The *contingency provisions* are options that may affect the bond's scheduled cash flows and give certain rights to the issuer or bondholders.

1.1 Bond Structure

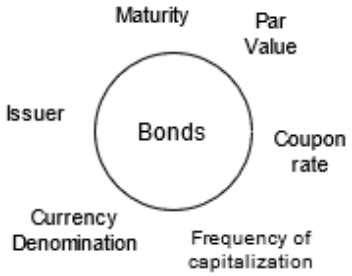

Figure 1. Structure Overview

1.1.1 The Issuer

The issuer can be classified in the types of issuing entities and its creditworthiness.

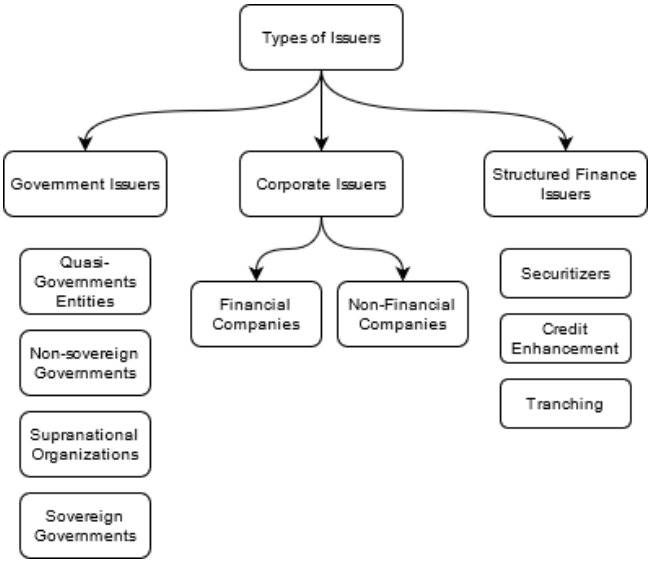

Figure 2. Types of Issuers Overview

Types of issuers

- **Supranational Organizations**, such as the World Bank and European Investment Bank
- **Sovereign governments** or national governments
- **Non-Sovereign governments** - local governments such as states, regions or cities
- **Quasi-government entities** - are agencies owned or sponsored by governments
- **Companies**, such as private corporate issuers. Companies can be classified into *financial issuers* and *non-financial issuers*.
- **Special legal entities** such as securitizers

Credit Worthiness Another classification regarding issuers is the issuers credit worthiness, judged by credit rating agencies.

- **Investment-Grade Bonds**
- **Non-investment-Grade Bonds or Speculative Bonds**

1.1.2 Maturity

The maturity date refers to the date when the issuers is obligated to redeem the bond by paying the outstanding principal amount. The **tenor** is the time remaining until the bond's maturity date. Maturity of bonds range from overnight to 30 years or longer.
When it comes to maturity, bonds can be classified as:

- **Money Market Securities**, when the maturity of the issuance is 1 year or less
- **Capital Market Securities**, when the maturity is longer than 1 year
- **Perpetual Bonds** is the particular class of bonds where there is no stated maturity

1.1.3 Par Value

The **principal amount**, **principal value** or **principal** of a bonds is the amount that the issuer compromises to pay the bondholders on the maturity date. This amount is also referred as **par value**, **face value**, **nominal value**, redemption value or maturity value.
The par value is often quoted as a percentage of their par value. For example, assuming that a bonds par value is 1000, a quote of 95 means that the bond is trading at 950.

1.1.4 Coupon Rate & Frequency

The **coupon rate** or **nominal rate** of a bond is the interest rate that the issuer agrees to pay each year until the maturity date. The annual amount is the **coupon**, which is the coupon rate multiplied by the principal amount.

- **Fixed-rate bonds** also called **plain vanilla bonds** or **conventional bonds** pay a fixed rate of interest
- **Floating-rate notes** (FRN's) or **floaters** pay a variable rate of interest. The coupon rate of FRN includes two components: **reference rate** (like LIBOR) and **spread**, a fixed amount determined at issuance based on the credit ratings.
- **Zero-coupon bonds** or **pure discount bonds** are bonds that do not make periodic payments. Instead, they are issued at a discount to par value and redeemed at par, the difference in between is the implicit coupon rate.

1.1.5 Currency Denomination

The currency of issue may affect bond's attractiveness. If the currency is not liquid or freely traded, or very volatile relative to major currencies (subject to high inflation), investments in that currency will not appeal to many investors.
Therefore, issuers may choose to issue in foreign currency in order to reduce the perceived risk for investment and decrease yields.

- **Foreign-currency bonds** are bonds issued in another currency other than the domestic country of the issuer
- **Domestic-currency bonds** are bonds issued in the same currency as the issuer
- **Dual-currency bonds** are special bonds which make coupon payments in one currency and pay the par value in another currency
- **Currency option bonds** give the option to bondholders to chose the currency in which they want to receive interest payments and principal repayments.

1.1.6 Yield

The yield - **current yield** or **running yield** - accounts for the rate of return in a bond at the current price. It is the rate of return at the spot market. For example, if a bond as a coupon rate of 6% and par value of 1000 and price of 1010, the current

yield is 5.94% (60/1010).
A frequent measure of a bond across it's life is **yield to maturity** (YTM) which essentially is a bond's internal rate of return (IRR) if held to maturity and all interest payments and the repayment of principal are made.

2. Legal, Regulatory and Tax Considerations

2.1 Bond Indenture

The **bond indenture** or **trust deed** is the legal contract that describes the form of the bond, the obligations of the issuer and the rights of the bondholders. The indenture is written in the name of the issuer and references:

- legal identity of the issuer and its legal form (ex: LLC)
- coupon-rate
- maturity
- bond schedule
- contingency provisions disclosure
- funding sources for interest and principal payments
- collateral (if any)
- credit enhancements (if any)
- covenants (if any)

Collaterals are assets or financial guarantees underlying the debt obligations; **Credit enhancements** are provisions that may be used to reduce credit risk and **covenants** are clauses that specify the rights of the bondholders and any actions that the issuers is obligated to perform or prohibited from performing.
The indenture is held by an intermediate entity - the **trustee**. The trustee is a financial institute with trust powers. In short, trust powers and legal materials which intent to make just distributions of income and principals, not only between bondholders and issuers but only between bondholders and other bondholders (the *beneficiaries*).
The trustee's roles are, among others:

- monitor that the issuer complies with the obligations specified in the indenture
- maintain required documentation and records
- managing collateral (such as appraisal)
- invoicing the bondholders the interest and principal payments
- calling meetings between bondholders to discuss material actions
- bring legal actions against the issuer in the behalf of the bondholders

2.1.1 Legal Identity of the Bond Issuer and its Legal Form

Subsidiaries For corporate bonds the issuer usually is the corporate legal entity - Apple, Volkswagen AG (the parent legal company). However, bonds are sometimes issued by a subsidiary. In this case, investors should look into the credit quality of the subsidiary, unless the indenture specifies that the bond liabilities are guaranteed by the parent.

Holding Companies Bonds can also be issued by holding companies, which is the parent legal entity for a group of companies, rather than its operating companies. Holding companies can be substantially different from operating companies, as holdings have fewer assets to call on should it default, investors have higher level of credit risk than if the bonds were issued by operating companies.

Special Purpose Entities In ABS (Asset Backed Securities) the financial institution, also called **sponsor** or originator, creates a legal entity responsible for the securitization process. The sponsor transfers the assets to the SPV and the SPV issues new securities to fund the transfer. This transfer of assets is considered a legal transaction and therefore both the ownership rights and legal responsibilities are transferred. These special entities are also called **bankruptcy remote vehicles** because in the event of the sponsor to fail, the SPV retains the ability to pay interest and principal payments.
SPV removes the bankruptcy risk of the sponsor.

2.1.2 Source of Repayment Proceeds

The indenture also describes how the issuer intents to service its debt commitments, either making interest payments and repay the principal.

Supranational Organizations Generally the source of repayment of supranational organizations such as IMF and World Bank Group is either the repayment of previous loans issued or the paid-in capital from its members.

Sovereign bonds Sovereign Bonds are backed by the "full faith and credit" of national governments. That is, the faith of bondholders in the ability of government's to raise tax revenues and print money.

Non-sovereign government bonds There are essentially 3 major source types of repayment for non-government debt:

- the cash flow of the project the bond issue is financing - which implies that the internal rate of return has to be higher than the IRR of the bonds for the bond's maturity
- it's ability of general taxing
- the ability of raising funding from special taxes or fees established specifically for that exact purpose

Corporate bonds Corporate bonds are primarily financed by the ability of the issuer to generate cash flows from operations.

2.1.3 Collateral Backing

The collateral backing is a way to alleviate credit risk and push bond yields down. Investors should analyze the collateral backing in the event bankruptcy.

Seniority Ranking **Secured bonds** are backed by assets and financial guarantees pledged to ensure debt repayments in the case of default. In contrast, **unsecured bonds** have no collateral and thus have only a limited general claim on the issuer's assets and cash flows. Thus, secured bonds are senior to unsecured bonds because they are paid first.
A bond's collateral backing might not specify a identifiable asset but instead have a general description such as general plant and infrastructure. In this case, investors rely on seniority ranking. What matters essentially for investors is how they are ranked in comparison to other creditors. **Seniority debt** has a priority claim over **subordinated debt** or **junior debt**.

Types of Collateral Backing **Collateral trust bonds** are secured by securities such as shares, other bonds and other financial assets. These securities are pledged by the issuer and held by the trustee.
Equipment trust certificates (ETC) are bonds secured by specific types of equipment or physical asset, such as aircraft, shipping containers, oil rigs. For example, an airline can finance the purchase of new aircrafts with equipment trust certificates. The legal title to the aircraft is held by the trustee, which issues equipment trust certificates to investors in the amount of the aircraft purchase price - the trustee finances the purchase of the aircraft by raising secured debt. The trustee then leases the aircraft to the airline, collects lease payments and pays interest to investors. When the certificate matures, the asset is transferred to the lessee. If the borrower defaults, the lender has the right to keep/repossess the asset.
Covered bond is a debt obligation backed by a segregated pool of assets called a *cover pool*. Covered bonds are similar to ABS but provide additional protection case the financial institution defaults. In the case of covered bonds, the pool of assets remains in the financial instution's balance sheet therefore giving the right to bondholders to recourse against both financial institutions and cover pool. In the case of ABS, bondholders only have claims at the SPV and its pool of assets.

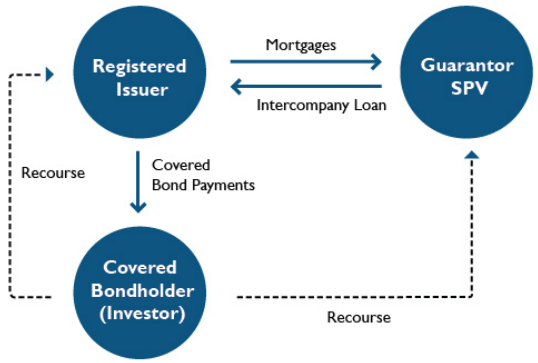

Figure 3

2.1.4 Credit Enhancements

Credit enhancements refer to provisions that can be used to reduce the credit risk. There are two main types of credit enhancements: **internal** - relies on structural features regarding the bond issue and **external**, which refers to guarantees received from third parties (similar to an insurance).

Internal Credit Enhancement The most common forms of internal credit enhancement are **subordination** (tranching), **overcollateralization** and **reserve accounts**.
Subordination or **credit tranching** is the practice of creating more than one bond class or tranche with different rights to cash flows and collateral. The cash flows generated by the assets are allocated with different priority to tranches of different seniority, from senior to subordinated or junior tranches.
Overcollaterization is the process of posting more collateral than needed to secure financing. It represents a form of internal enhancement because the collateral disposed by the issuer can absorb additional losses. One major problem is the valuation of the collateral - if it is overvalued, the overcollaterization may be ineffective at reducing risk.

Reserve funds Reserve accounts or reserve funds are another form of internal credit enhancements which come in two types: **cash reserve fund** and **excess spread fund**.
A cash reserve fund consists on a deposit of cash for the effect of absorbing losses - pretty much using cash as collateral.
An **excess spread** account involves the allocation into a specific account any amounts left over after paying out the interest to bondholders. The *excess spread* is also called *excess interest* and its the difference between the cash flow received from the assets less interest paid to bondholders.
In a process called *turboing*, the excess spread can be used to retire the principal, with the most senior tranche having first claim on these funds.

2.1.5 External Credit Enhancement

The most common forms of external credit enhancements are **bank guarantees and surety bonds**, **letters of credit** and **cash collateral accounts**. One important aspect is that bank guarantees, surety bonds and letters of credit expose the investors to a third party risk (*counterparty risk*) - the risk the guarantor cannot satisfy its obligations.

Bank guarantees and surety bonds Both ensure bondholders are reimbursed for losses incurred if the issuer defaults - the reimburse is limited to a maximum amount called the *penal sum*. The major difference is that bank guarantees are issued by banks and surety bonds are issued by insurance companies called *monoline insurers*.

Letter of credit Financial institution provides the issuer with a credit line to reimburse any cash shortfalls from the assets backing the issue.

Cash collateral account are deposits (usually highly rate highly liquid short-term commercial paper) with less risk because they aren't pledges like the above mentioned tools.

2.1.6 Covenants

Bond covenants are legally enforceable rules that borrowers and lenders agree on at the date of bond issue. As result, an indenture frequently includes *affirmative* (or positive) and *negative covenants*. Affirmative covenants enumerate what issuers are required to do whereas negative covenants specify what issuers are prohibited from doing.

Affirmative covenants can be used in order to comply with law and contractual obligations, maintain certain lines of business or activities, maintain its assets, etc.

Negative covenants are frequently costly and constrain the issuer's potential business decisions. The purpose of negative covenants is to protect bondholders from dilution of their claims, assets withdrawals or sub-optimal investments.

- **Restrictions on debt covenants** are aimed to establish a maximum acceptable leverage ratio.
- **Negative pledges** prevent the issuance of debt that would be senior that existing bondholders debt
- **Restrictions on prior claims** protect unsecured bondholders by preventing the issuer from using assets that were not collateralized as collaterals.
- **Restrictions on distributions to shareholders** restrict dividends and other payments such as share buybacks.
- **Restriction on asset disposals** with the intent of preventing the break-up of the company
- **Restriction on investments** limited investment opportunities by blocking speculative investments
- **Restrictions on mergers and acquisitions**

2.2 Legal and Regulatory Considerations

The main markers where bonds are traded, generally speaking, are **domestic markets**, *national markets*, **foreign bonds**, **Eurobonds markets** and **global market**. The market where bonds are traded are important to investors because different markets imply different regulations and tax requirements. They can also be characterized by some other differences like the frequency of interest payments. Also, the currency denomination of bonds is also important because bond yields are highly dependent on interest rates.

Domestic and Foreign Markets Bonds issued in national markets can be domestic bonds when the issuer issues the securities in the domestic currency, or foreign market if the issuer issues in another currency. As an example, if Ford issues bonds denominated in US dollars, these bonds are classified as *domestic bonds*. If it issues bonds in Euro, those bonds are classified as *foreign bonds*.

Eurobond Markets Eurobonds were created to bypass the legal and regulatory constraints of national markets. Therefore, they are less regulated than national bonds because they are issued outside the jurisdiction of any single country.
There are several types of eurobonds such as Eurodollar, Euroyen and (euro-denominated) Eurobonds.

Global Markets Global bonds are bonds issued simultaneously in the Eurobond market and in at least one domestic bond market.

2.3 Tax Considerations

Generally, the income portion of bond investments is taxed at the ordinary income rate which is the same taxe rate on wages.
In addition to interest, bond investments can also generate capital gains. Capital gains are treated differently from taxable income. Capital gains that are recognized more than 12 months after the initial purchase are considered long-term capital gains and thus are subject to a different taxable rate. Short term capital gains, however, are subject to a generally higher tax rate.
Some jurisdictions have some provisions for bonds payed at discount/premium.

3. Structure of a Bond's Cash Flows

3.1 Principal Repayment Structures

3.1.1 Bullet, Fully Amortized and Partially Amortized Bonds

Bullet bonds are bonds which pay the principal at maturity. In contrast, **amortized bonds** have payment schedules that calls for periodic payments of interest and repayments of principal. A **partially amortized bond** makes periodic payments until maturity but only a portion of the principal is repaid, thus a **balloon payment** is required at maturity to offset the remaining debt.

Bullet Bond

Year	Investor Cash Flows	Interest Payment	Principal Repayment	Outstanding Principal at the End of the Year
0	–$1,000.00			$1,000.00
1	60.00	$60.00	$0.00	1,000.00
2	60.00	60.00	0.00	1,000.00
3	60.00	60.00	0.00	1,000.00
4	60.00	60.00	0.00	1,000.00
5	1,060.00	60.00	1,000.00	0.00

Fully Amortized Bond

Year	Investor Cash Flows	Interest Payment	Principal Repayment	Outstanding Principal at the End of the Year
0	–$1,000.00			
1	237.40	$60.00	$177.40	$822.60
2	237.40	49.36	188.04	634.56
3	237.40	38.07	199.32	435.24
4	237.40	26.11	211.28	223.96
5	237.40	13.44	223.96	0.00

Partially Amortized Bond

Year	Investor Cash Flows	Interest Payment	Principal Repayment	Outstanding Principal at the End of the Year
0	–$1,000.00			
1	201.92	$60.00	$141.92	$858.08
2	201.92	51.48	150.43	707.65
3	201.92	42.46	159.46	548.19
4	201.92	32.89	169.03	379.17
5	401.92	22.75	379.17	0.00

Figure 4. Payment schedules

3.1.2 Sinking Fund Arrangements

The **sinking fund arrangement** is another approaches that is used to achieve the goal of periodically retiring the bond's principal outstanding. The sinking fund is a cash reserve that is created for the sole purpose of repaying the principal overtime. Sinking fund arrangements compromise with settling a percentage of debt periodically (ex. 5% per year).
Typically, the issuer will forward payment proceeds to the bond's trustee and the trustee will redeem bonds to this value (doing a lottery).
For investors, structures which imply an anticipated redeem reduce the credit risk but create a risk of reinvesting cash flows at a lower interest rate, if bonds are redeemed earlier.

3.2 Coupon Payment Structures

3.2.1 Floating-Rate Notes

Floating-rate notes (FRN's) or **floaters** do not have a fixed coupon; instead their coupon rate is linked to an external reference rate such as Euribor. A FRN is composed of a varying reference rate and a fixed spread.
These characteristics make FRN to bear little interest rate risk and are usually favored by investors who expect that interest rates will rise.
FRN can have additional features such a floor which prevents the FRN rate to fall below a specified minimum rate or a cap, which prevents it from rising above a specified interest rate.

3.2.2 Inverse-FRN

Inverse FRN or **inverse floater** are bonds whose coupon rate has an inverse relationship with the reference rate.

3.2.3 Step-Up Coupon Bonds

Set-Up Coupon bonds involve a fixed or floating initial rate which is increased by specified margins at specified dates. These bonds offer protections against rising interest rates or deterioration in credit quality.

3.2.4 Credit-Linked Coupon Bonds

Credit-linked coupon bonds change their coupon rate when the bond's issuer credit rating changes. These bonds are attractive for investors who are concerned about the future creditworthiness of the issuer. However they have a big problem associated with the fact that these bonds increase the coupon payments and thus debt charges ultimately resulting in further deterioration of the credit rating or even contributing to the issuer's default.

3.2.5 Payment-in-Kind Coupon Bonds

A **payment-in-kind** (PIK) coupon bond allows the issuer to pay interest in the form of additional securities such as additional bonds or common shares. These bonds are favored by issuers who are concerned about iliquidity or potential cash shortfall in the future.
In consequence, investors demand higher yields for bearing the risks.

3.2.6 Deferred Coupon Bonds

A **deferred coupon bond** or **split coupon bond** pay no coupons in the first few years but then pay a higher coupon than it otherwise normally would for the remaining of its life. Issuers are generally concerned about conserving cash in the periods following the issuance.
One of the main advantages is that these securities are traded at a significant discount to par. Investors may also find the deferred coupon structure helpful in managing taxes.

Zero Coupon Bonds can be considered an extreme form of deferred coupon bond as interest payments are deferred till maturity.

3.2.7 Index-Linked Bonds

An **index-linked bond** has coupon payments or principal payments linked to a specified index. A popular example of ILB are **Inflation-linked bonds** or **linkers** which are bonds whose payments are linked to the CPI.

4. Bonds with Contingency Provisions

A **contingency provision** is a clause in the indenture that allows for some action if some event occurs. They are also called **embedded options** because provisions give issuers or bondholders the right but not the obligation to take some action. They are embedded because the are not independent of the bonds and cannot be traded separately.

4.1 Callable Bonds

A callable bond gives the issuer to redeem all or part of the bonds before the specified maturity date. The primary reason for callable bonds is that issuers can use the call option to protect themselves from declining interest rates or improving credit quality. Callable bonds allow refinancing and induce investors in reinvesting risk at lower interest rates.
Because call options have value to issuers and can potentially yield disutility for investors, they must bear a higher yield.
The details about the call provision are specified in the indenture. These details include *call price*, which represents the price paid to bondholders when the bond is called; the *call protection period* (if any), etc.
Exercise styles on callable bonds include:

- **American-style call** - the issuer has the right to call a bond at any time after the *call date* (first day after the call protection period)
- **European-style call** - for which the issuer has the right to call a bond only on the call date
- **Bermuda-style call** - for which the issuer has the right to call bonds on a specified dates following the call date.

4.2 Putable Bonds

A **putable bond** gives bondholders the option to sell the bond back to the issuer at a predetermined price on specified dates. Because put provisions have value to bondholders, yields should be lower.
Putable bonds have also the same scheduling as callable bonds, such as american, european and bermuda style.

4.3 Convertible Bonds

A convertible bond is a hybrid security with both debt and equity features. It gives the bondholders the right to exchange the bond for a specified number of common shares in the issuing company.
Convertible bonds are valuable to bondholders, so that must be traded at premium. From the issuer's perspective, convertible bonds offer two main advantages: (i) reduce interest expense since it allows bonds to traded at a lower yield and (ii) elimination of debt if the conversion option is exercised.

- Conversion price is the price per share at which the convertible bond can be converted into shares
- Conversion ratio is the number of shares that each bond can be converted into. The convertion ratio is equal to the par value divided by the conversion price.
- Conversion value is the current share price multiplied by the conversion ratio
- Conversion premium is the difference between the convertible bond's price and its conversion value

Warrant

Contingent Convertible Bonds (CoCo's)

References

[cfa, 2019] 2019. *CFA program curriculum*. CFA Institute.