Fixed Income

Fixed-Income Cash Flows and Types

Exam Focus

Detail

- Common cash flow structures
- Contingency provisions

Background content

- Laws, regulations, and tax

Cash Flow Structures

- Bullet structure
- Amortizing loans
- Variable interest
- Zero coupon
- Deferred coupon

Amortizing Loans

- Fully amortizing
- Partially amortizing
- Sinking fund provision
- Waterfall structure (ABSs and MBSs)

Principal: Example

The structure that requires the largest repayment of principal at maturity is that of a:

A. bullet bond.

B. fully amortized bond.

C. partially amortized bond.

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Fully Amortizing: Example

Mortgage **$400,000**; interest rate **3.5%**; term **360** months

Monthly payment: **$1,796.18**

Month	Total Monthly Payment	Monthly Interest Payment	Monthly Principal Repayment	Remaining Principal
1	$1,796.18	$1,166.67	$629.51	$399,370,49
2	$1,796.18	$1,164.83	$631.35	$398,739.14
3	$1,796.18	$1,162.99	$633.19	$398,105.95
359	$1,796.18	$10.43	$1,785.75	$1,790.96
360	$1,796.18	$5.22	$1,790.96	0

Variable Interest Debt

- MRR + credit spread
- Step-up bonds
- Leveraged loans
- Credit-linked notes
- Payment-in-kind (PIK) bonds
- Green bonds
- Index linked

Variable Interest: Example

- Floating-rate notes (FRNs): MRR + credit spread
- Antelas AG FRN cash flows: principal **€250m**; credit spread **2.50%**

Quarter	MRR	Coupon	Quarterly Interest Payment
13	–0.50%	2.00%	€1,250,000
14	0.15%	2.65%	€1,656,250
15	0.25%	2.75%	€1,718,750
16	0.50%	3.00%	€1,875,000

FRN: Example

The coupon rate of a floating-rate note that makes payments in June and December is expressed as six-month MRR + 25 bps. Assuming that the six-month MRR is 3.00% at the end of June 20XX and 3.50% at the end of December 20XX, the interest rate that applies to the payment due in December 20XX is:

A. 3.25%.

B. 3.50%.

C. 3.75%.

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Contingency Provisions

- Embedded options: callable/putable
- Convertible bonds
- Warrants
- Contingent convertible bonds

Callable Bonds: Example

Assume a hypothetical 30-year bond is issued on 15 August 2019 at a price of 98.195 (as a percentage of par). Each bond has a par value of $1,000. The bond is callable in whole or in part every 15 August from 2029 at the option of the issuer. The call prices are shown here.

Year	Call Price	Year	Call Price
2029	103.870	2035	101.548
2030	103.485	2036	101.161
2031	103.000	2037	100.774
2032	102.709	2038	100.387
2033	102.322	2039 and thereafter	100.000
2034	101.955		

Callable Bonds: **Example**

The call protection period is:

A. 10 years.

B. 11 years.

C. 20 years.

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Callable Bonds: **Example**

The call premium (per $1,000 in par value) in 2033 is *closest* to:

A. $2.32.

B. $23.22.

C. $45.14.

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Callable Bonds: **Example**

The call provision is *most likely:*

A. a Bermuda call.

B. a European call.

C. an American call.

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Embedded Options: **Example**

The type of bond with an embedded option that would *most likely* sell at a lower price than an otherwise similar bond without the embedded option is a:

A. putable bond.

B. callable bond.

C. convertible bond.

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Convertible Bonds: Example

1.25% annual coupon ZTG biotech five-year convertible note, principal: **€300m**

Maturity: **5 years** unless redeemed earlier in a conversion

Conversion price: **€42** per ZTGB common equity share (current price: **€28**)

Conversion ratio = convertible bond par value / conversion price

Example: if convert **€1,000** par value of ZTGB bond, will convert to (1,000 / 42) 23.81 common equity shares

Conversion value = conversion ratio × current share price
= 23.81 × €28 = €666.68

Laws, Regulation, and Tax

- Domestic bonds
- Foreign bonds
- Eurobonds
- Sukuk bonds
- Original issue discount (OID) bonds
- Tax: interest income vs. capital gains

Domestic/Foreign/Eurobonds: Example

An example of a domestic bond is a bond issued by:

A. LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom.

B. the UK Debt Management Office, denominated in British pounds, and sold in the United Kingdom.

C. Wal-Mart from the United States, denominated in US dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific.

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OID Bonds: Example

Assume that a company issues bonds in the hypothetical country of Zinland, where the local currency is the zini (Z). There is an original issue discount tax provision in Zinland's tax code. The company issues a 10-year zero-coupon bond with a par value of Z1,000 and sells it for Z800. An investor who buys the zero-coupon bond at issuance and holds it until maturity *most likely:*

A. has to include Z20 in his taxable income every tax year for 10 years and has to declare a capital gain of Z200 at maturity.

B. has to include Z20 in his taxable income every tax year for 10 years and does not have to declare a capital gain at maturity.

C. does not have to include anything in his taxable income every tax year for 10 years but has to declare a capital gain of Z200 at maturity.

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Solutions

Principal: **Example**

The structure that requires the largest repayment of principal at maturity is that of a:

A. bullet bond.

B. fully amortized bond.

C. partially amortized bond.

The entire repayment of principal occurs at maturity for a bullet (or plain vanilla) bond, whereas it occurs over time for fully and partially amortized bonds. Thus, the largest repayment of principal at maturity is that of a bullet bond.

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FRN: **Example**

The coupon rate of a floating-rate note that makes payments in June and December is expressed as six-month MRR + 25 bps. Assuming that the six-month MRR is 3.00% at the end of June 20XX and 3.50% at the end of December 20XX, the interest rate that applies to the payment due in December 20XX is:

A. 3.25%.

B. 3.50%.

C. 3.75%.

The interest rate that applies to the payment due in December 20XX is the six-month MRR at the end of June 20XX plus 25 bps: 3.25% (3.00% + 0.25%).

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Callable Bonds: **Example**

The call protection period is:

A. 10 years.

B. 11 years.

C. 20 years.

The bonds were issued in 2019 and are first callable in 2029. The call protection period is 2029 – 2019 = 10 years.

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Callable Bonds: Example

The call premium (per $1,000 in par value) in 2033 is *closest* to:

A. $2.32.

B. $23.22.

C. $45.14.

The call prices are stated as a percentage of par. The call price in 2033 is $1,023.22 (102.322% × $1,000). The call premium is the amount paid above par by the issuer. The call premium in 2033 is $23.22 ($1,023.22 – $1,000).

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Callable Bonds: Example

The call provision is *most likely:*

A. a Bermuda call.

B. a European call.

C. an American call.

The bond is callable every 15 August from 2029—that is, on specified dates following the call protection period. Thus, the embedded option is a Bermuda call.

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Embedded Options: **Example**

The type of bond with an embedded option that would *most likely* sell at a lower price than an otherwise similar bond without the embedded option is a:

A. putable bond.

B. callable bond.

C. convertible bond.

The call provision is an option that benefits the issuer. Because of this, callable bonds sell at lower prices and higher yields relative to otherwise similar noncallable bonds.

A and C are incorrect because the put provision and the conversion provision are options that benefit the investor. Thus, putable bonds and convertible bonds sell at higher prices and lower yields relative to otherwise similar bonds that lack those provisions.

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Domestic/Foreign/Eurobonds: **Example**

An example of a domestic bond is a bond issued by:

A. LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom. *Overseas issuer = foreign bond*

B. the UK Debt Management Office, denominated in British pounds, and sold in the United Kingdom. *Domestic issuer and currency = domestic bond*

C. Wal-Mart from the United States, denominated in US dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific. *Domestic issuer and overseas issuer = global bond*

Domestic bond in the U.S., Eurobond elsewhere

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OID Bonds: **Example**

Assume that a company issues bonds in the hypothetical country of Zinland, where the local currency is the zini (Z). There is an original issue discount tax provision in Zinland's tax code. The company issues a 10-year zero-coupon bond with a par value of Z1,000 and sells it for Z800. An investor who buys the zero-coupon bond at issuance and holds it until maturity *most likely:*

A. has to include Z20 in his taxable income every tax year for 10 years and has to declare a capital gain of Z200 at maturity.

B. has to include Z20 in his taxable income every tax year for 10 years and does not have to declare a capital gain at maturity.

C. does not have to include anything in his taxable income every tax year for 10 years but has to declare a capital gain of Z200 at maturity.

Discount amortized and treated as interest + added to cost basis

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