International Finance

Session 3 — Securities Markets: Money Markets and Bonds

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KEDGE Business School

A small open economy, in two equations

Every market we open today sits inside one framework. A **small open economy** with **perfect capital mobility**, so the domestic rate is pinned to the world rate: $i = i^*$.

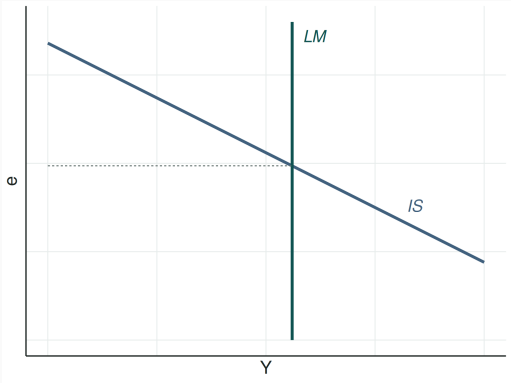
IS — the goods market, for a given i^*:

$$Y = C(Y - T) + I(i^*) + G + NX(e)$$

LM — the money market, for a given i^*:

$$M/P = L(i^*, Y)$$

The LM curve comes out **vertical** in (Y, e) space. **Why?**



e = foreign currency per unit of domestic currency.

What the model predicts

Fill it in. A **fiscal expansion**, a **monetary expansion**, an **import restriction** — what does each do to the exchange rate and to output, under **floating** and under **fixed** rates?

Policy	Floating: e	Floating: Y	Fixed: e	Fixed: Y
Fiscal expansion				
Monetary expansion				
Import restriction				

Press `C` and draw the IS and LM shift for each row before writing the sign.

The fixed-rate row, in one country

Thailand, 1997. The baht was **fixed at \$0.04** while the equilibrium rate had fallen to **\$0.02**.

- To hold the rate the central bank must **buy 300 million baht a month**, paying in dollars from its reserves.

Axes: millions of baht per month horizontal, dollars per baht vertical.

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- When the reserves run out the choice is to **float** or to **devalue**.

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Where we are

Sessions 1 and 2 established four prices and the balance-of-payments identity. We now disaggregate the financial system by **instrument**, and ask how each market transfers funds from surplus units to deficit units.

1. **Money markets** — short-term debt instruments
2. **Bond markets** — long-term debt instruments
3. **Stock markets** — ownership claims in firms
4. **Mortgage markets** — loans secured by real estate
5. **Foreign exchange markets** — trading of currencies
6. **Derivatives markets** — contracts whose value depends on an underlying asset

Each market is analysed through the same two questions: **what contractual claim does the instrument represent**, and **what determines its price**. These are the organising questions of the course, and of the examination.

9 August 2007: a funding market stops

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Why can a disruption in short-term funding threaten the stability of a financial institution?*

1 · Money markets

The corporate cash-timing problem

A firm receives EUR 40 million on the 25th of the month and disburses it on the 5th. For eleven days those funds must earn a return without being committed: the firm requires a **liquid**, short-dated, low-risk store of value.

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- Receipts and disbursements are **imperfectly synchronised** — for corporations, for banks, and for governments alike.
- The money market exists to price that mismatch. It is a market for **liquidity over short horizons**, not for long-run investment returns.

- **Short maturity** — under one year, and typically under 120 days. This limits both interest-rate risk and the horizon over which credit quality can deteriorate.

1 · What makes a money market instrument

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The four properties are not independent. Short maturity makes low default risk credible; low default risk and standardisation are what sustain a liquid secondary market. Both parties are managing a **liquidity-timing** problem rather than seeking a risk-adjusted return — which is why these instruments price close to the risk-free curve, and why small deviations from it are informative.

Treasury bills

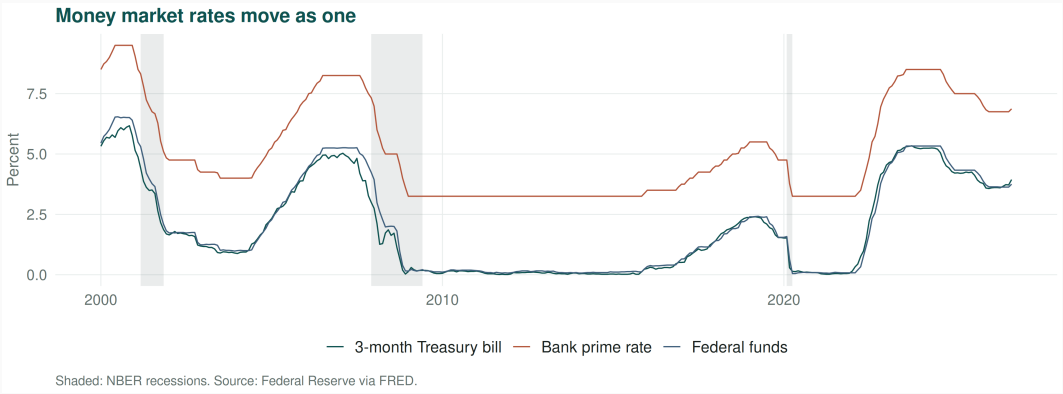
- Zero-coupon obligations of the U.S. Treasury, 28 days to 12 months.
- Issued by **auction**. *Competitive* bids specify a price and may be rationed; *noncompetitive* bids accept the clearing price and are filled in full.
- They constitute the **benchmark risk-free asset** of the domestic market: every other short rate in this session is quoted relative to them.

Fed funds

- Uncollateralised loans of **reserve balances** between depository institutions, predominantly **overnight**.
- Banks use them to satisfy reserve requirements at the close of the maintenance period.
- The **federal funds rate** is the operating target of U.S. monetary policy, which makes it the anchor of the short end of the yield curve.

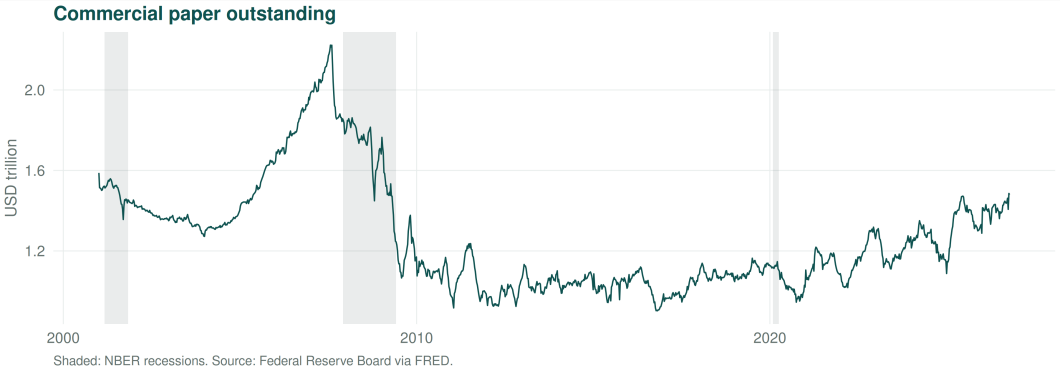
Instrument	Issuer	Buyer	Usual maturity	Secondary market
Treasury bills	U.S. government	Consumers and companies	4, 13, 26 weeks	Excellent
Federal funds	Banks	Banks	1 to 7 days	None
Repurchase agreements	Businesses and banks	Businesses and banks	1 to 15 days	Good
Negotiable CDs	Large money-centre banks	Businesses	14 to 120 days	Good
Commercial paper	Finance companies and businesses	Businesses	1 to 270 days	Poor
Banker's	Banks	Businesses	30 to 180 days	Good

1 · The rates move together



The series co-move closely because they share a common policy anchor. Under what conditions does the **spread** between the federal funds rate and the Treasury bill rate widen, and what is that spread measuring?

1 · Commercial paper outstanding



2007 marks a **structural break**, not a cyclical decline: the series steps down and does not recover its prior level. Which class of issuer exited the market, why could it not return, and what replaced that funding?

Money market instruments are **zero-coupon**: they are purchased below face value and redeemed at face value, so the entire return is the **discount**. Two conventions are used to express it, and they are not interchangeable.

The **discount rate** — how far below face value you paid:

$$i_{discount} = \frac{F - P}{F} \times \frac{360}{n}$$

The **annualised yield** — what you actually earned:

$$i_{yt} = \frac{F - P}{P} \times \frac{365}{n}$$

1 · Price and rate

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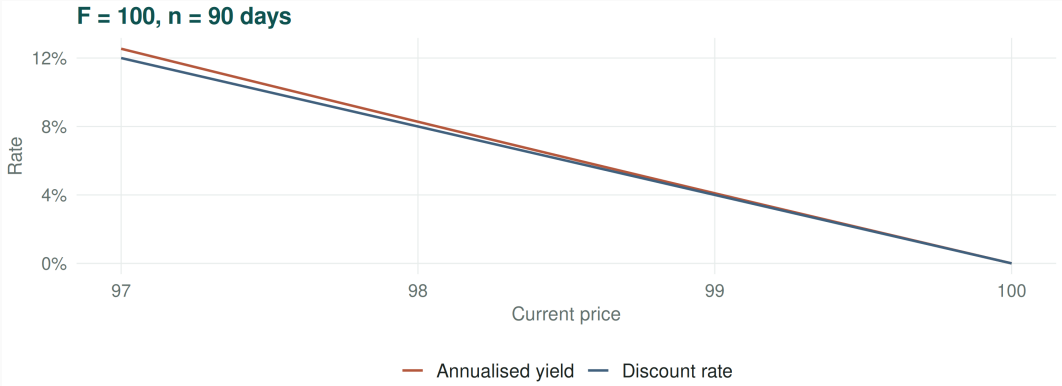
One instrument, two measures. The **bank discount basis** deflates by face value F on a 360-day year — a convention inherited from pre-computational market practice. The **annualised yield** deflates by the price actually paid, P, on a 365-day year, and is therefore the true holding-period return expressed annually. Since $P < F$, the yield always exceeds the discount rate. Only the yield is comparable across instruments.

1 · The two rates, drawn



The gap between the two is the 360 / 365 convention plus the choice of denominator.

1 · Problem 2.1

A 28-day T-bill costs **$996.73** and is worth **$1,000** at maturity.

1. What is the **discount rate**?
2. What is the **annualised yield**?

1 · Problem 2.2

The Treasury auctions **$2.5 billion** of 91-day bills. Competitive bids:

Bidder	Bid amount	Bid price
1	$500 million	$0.9940
2	$750 million	$0.9901
3	$1.5 billion	$0.9925
4	$1 billion	$0.9936
5	$600 million	$0.9939

It also received **$750 million** of noncompetitive bids.

Who receives bills, how many, and at what price?

2 · The bond market

Athens, March 2012

In March 2012, Greece restructured around **€200 billion of government debt**. Private investors accepted losses of roughly **53% of face value**. Only a few years earlier, Greek government bonds had been rated investment grade.

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- But promised payments are **not guaranteed**. The issuer may be unable or unwilling to pay.
- This possibility is **credit risk** — and investors require compensation for bearing it.
- Sovereign bonds have an additional complication: enforcing claims against a **government** can be particularly difficult.

Term	What it means
Coupon interest rate	The annual interest rate, usually fixed for the whole life
Current yield	Coupon payment divided by the current price
Face amount / par value	The maturity value
Indenture	The contract that specifies the terms of the loan agreement
Market rate	The rate currently in effect on securities of like risk and maturity
Maturity	Number of periods until the security matures
Yield to maturity	The yield if you buy at the current price and hold to maturity

Treasuries

- **Treasury notes**: 1 to 10 years. **Treasury bonds**: 10 to 30 years.
- Nominal default risk is negligible because the obligation is denominated in a currency the issuer creates. That is a statement about **nominal** default only.
- Two risks remain and are examinable: **inflation risk**, which erodes the real value of fixed payments, and **interest-rate risk**, the capital loss on an existing bond when market rates rise. The latter increases with maturity.

Municipals

- Issued by local, county and state governments to fund public projects.
- **Tax free**, which is the whole point. Compare like with like:

$$\text{after-tax rate} = \text{taxable rate} \times (1 - \text{marginal tax rate})$$

Moody's	S&P	Fitch	Meaning
Aaa	AAA	AAA	Best quality, least credit risk
Aa1-Aa3	AA+/AA/AA-	AA+/AA/AA-	High quality, very strong capacity
A1-A3	A+/A/A-	A+/A/A-	Upper-medium

Moody's	S&P	Fitch
Ba1-Ba3	BB+/BB/BB-	BB+/BB/BB-
B1-B3	B+/B/B-	B+/B/B-
Caa-C	CCC/CC/C	CCC/CC/C
—	D	DDD/DD/D

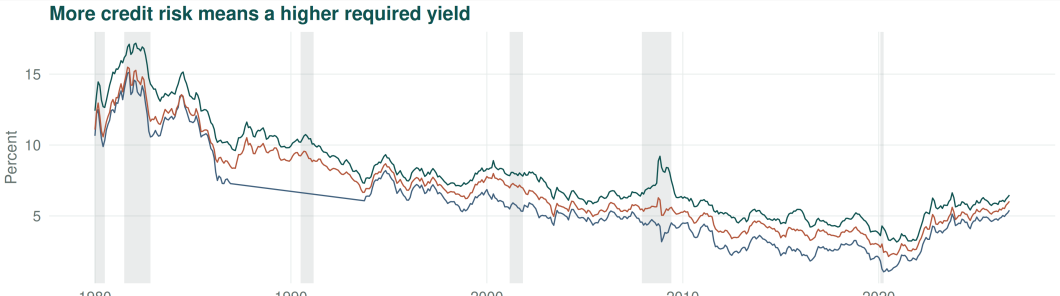
2 · Rates by credit quality

Credit ratings summarize differences in **credit risk**.

If investors think a bond is more likely to default, they will only hold it if it offers a **higher yield**.

[Higher credit risk Lower bond price Higher yield]

So how large is this difference in practice?



2 · The price of a bond

A bond is worth today the **present value of the payments it promises in the future**.

For a bond paying coupon C each year and face value F at maturity:

$$P = \frac{C}{1+r} + \frac{C}{(1+r)^2} + \cdots + \frac{C+F}{(1+r)^n}$$

where r is the return investors currently require for a bond with similar **risk and maturity**.

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When the required yield rises, the bond price falls:

$$r \uparrow \implies P \downarrow$$

The bond's promised payments have not changed. What changes is the **price investors**

The **yield to maturity** is the internal rate of return r that equates the present value of the contractual payments to the observed market price:

$$0 = -P + \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{F}{(1+r)^n}$$

2 · Two ways of quoting the return

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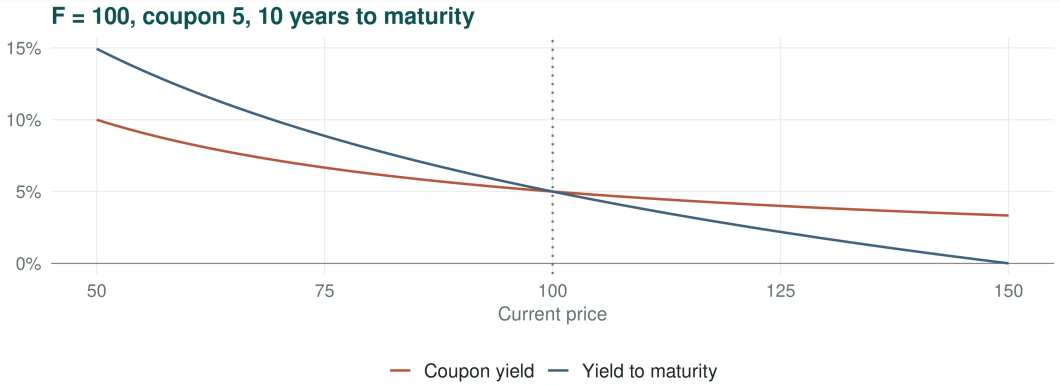
The **current (coupon) yield** ignores any capital gain or loss at redemption:

$$r_c = \frac{C}{P}$$

Two assumptions are embedded in the yield to maturity: that the bond is **held to maturity**, and that every coupon is **reinvested at** r. Neither holds in general, which is why realised returns differ from quoted yields.

2 · Coupon yield is only an approximation



The two agree only at par. Away from par the coupon yield misleads.

2 · Problem 2.3

1. A corporate bond yields **9%**, a municipal bond **6.75%**. Which do you buy?
2. A corporate bond yields **5%**, a municipal **3.5%**, and your marginal tax rate is **28%**. Which now?

2 · Problem 2.4

1. What is the **coupon yield** on a bond with face value \$1,000, current price \$921.01 and a coupon rate of **10.95%**?
2. What is the **price** of a two-year, 10% coupon bond paying **semi-annually**, face value \$1,000, if the required return is **12%**?

Next session

Session 4 finishes securities markets: **stocks**, **mortgages**, **foreign exchange** and **derivatives**, then the green bonds discussion.

Bring **Sartzetakis (2021)** on green bonds, read — and the security your group wants to analyse. Not "a stock". A specific one, with a ticker.

Press `O` for the slide overview · `C` to draw · `S` for speaker notes · `F` for fullscreen · `E` then print for a PDF of the slides.