

# Fixed Income Instruments and Debt Markets

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# Course overview

- Introduction: debt securities, markets, institutions (Topics 1, 7, 8, 9).
- Analytics of fixed income markets (Topics 2, 3, 5).
- Fixed income derivatives (Topics 4, 5, 8).
- Term structure models (Topics 5, 6).
- Central banking and monetary policy (Topics 1, 6, 9, 10).
- Crises and debt markets (Topics 1, 8, 10).

# Schedule

- $9 \times 2$  hours **in-person lecture**.
- $8 \times 1$  hour **in-person seminar**.
- Lecture: Tuesdays, 11am-1pm, Room 1.005/6
- Seminars: Tuesdays, 2pm-3pm, Room 1.005/6

# Assessment and additional information

- **Group project (25% of the final mark, 5% are allocated based on peer assessment):** Empirical analysis of data submitted in the form of a written report.
- **Final Exam (75% of the final mark):** Two-hour long written examination.
- Calculators allowed for the exams.
- Lecture notes and additional course material will be posted on `my.wbs`.

# Recommended readings

Main textbook:

- **Pietro Veronesi:** *Fixed Income Securities: Valuation, Risk, and Risk Management*, John Wiley & Sons, 2010

Additional textbooks:

- Suresh M. Sundaresan: *Fixed Income Markets and Their Derivatives*, Academic Press, 3rd edition, 2009
- Frank Fabozzi: *Bond Markets, Analysis and Strategies*, Prentice Hall, 7th edition, 2010
- Zvi Bodie, Alex Kane and Alan Marcus, *Investments*, McGraw Hill, 10th edition, 2014  
Can be helpful for basic material

# Course topics

- Topic 1: Overview of debt markets
- Topic 2: Basics of fixed income securities
- Topic 3: Interest rate risk management
- Topic 4: Interest rate derivatives
- Topic 5: Binomial trees and derivatives pricing
- Topic 6: No-arbitrage and equilibrium interest rate models
- Topic 7: Government securities and their derivatives
- Topic 8: Securitization and mortgage-backed securities
- Topic 9: Monetary policy, inflation, and interest rates
- Topic 10: Crises and monetary policy reactions

# Topic 1: Overview of debt markets

- Overview of debt contracts and classification of debt securities
- Players and their objectives
- The complexity of debt markets
- Government debt markets
- The money market
- The repo market
- MBS and ABS markets
- Fixed income derivatives markets
- No-arbitrage and the law of one price
- Risks of debt securities

## *Supplementary readings:*

- Veronesi, Chapter 1.
- Sundaresan, Chapters 1, 4, 5.

## Topic 2: Basics of fixed income securities

- Discount factors and interest rates
- Compounding
- Term structure of interest rates
- Zero coupon and coupon bonds
- Bootstrapping
- Yield to maturity
- Floating rate bonds
- Quoting conventions

*Supplementary readings:*

- Veronesi, Chapter 2.
- Sundaresan, Chapter 2, 8, 9.



## Topic 3: Interest rate risk management

- Variation in interest rates and bond price volatility
- Duration
- Portfolio immunization
- Convexity
- Non-parallel shifts of the yield curve

### *Supplementary readings:*

- Veronesi, Chapters 3, 4.
- Sundaresan, Chapters 7, 8, 9.
- Fabozzi, Chapters 4, 5.

## Topic 4: Interest rate derivatives

- Forward rates and forward discount factors
- Forward rate agreements and forwards
- Swaps
- Interest rate futures
- Interest rate options

### *Supplementary readings:*

- Veronesi, Chapters 5, 6.
- Sundaresan, Chapters 14, 15, 16, 17.

## Topic 5: Binomial trees and derivatives pricing

- One-step binomial trees
- Multi-step binomial trees
- Risk neutral trees and derivative pricing
- American options

*Supplementary readings:*

- Veronesi, Chapters 9, 10, 11, 12.

## Topic 6: No-arbitrage and equilibrium models

- Equilibrium interest rate models
- Vasicek model
- Cox, Ingersoll and Ross (CIR) model
- No-arbitrage models
- Multi-factor models

*Supplementary readings:*

- Veronesi, Chapters 14, 15, 19, 22.

## Topic 7: Government securities and their derivatives

- US Treasury debt securities
- UK Treasury debt securities
- US Treasury futures
- Options on interest rate futures

### *Supplementary readings:*

- Veronesi, Chapters 6, 7.
- Sundaresan, Chapters 6, 11, 13.

## Topic 8: Securitization and MBS

- Securitization
- Mortgages and the prepayment option
- Mortgage-backed securities (MBS)
- Collateralized mortgage obligations (CMO)
- Hedging of MBS portfolios

### *Supplementary readings:*

- Veronesi, Chapter 8.
- Sundaresan, Chapter 12.
- Fabozzi, Chapters 10, 11, 12, 15.

# Topic 9: Monetary policy, inflation, and interest rates

- Roles of central banks
- Tools of monetary policy
- The Fed funds rate
- Inflation risk and economic activity

## *Supplementary readings:*

- Veronesi, Chapter 7.
- Sundareshan, Chapters 3, 5.
- Federal Reserve System (2021).

## Topic 10: Crises and monetary policy reactions

- Securitization and the housing bubble
- The credit crisis of 2007–2009
- Amplification mechanisms and monetary policy reactions
- COVID-19 and debt markets

### *Supplementary readings:*

- Brunnermeier (2009).
- Gorton (1998).



# References

- BODIE, Z., A. KANE, AND A. MARCUS (2014): *Investments*. McGraw Hill, 10th edn.
- BRUNNERMEIER, M. (2009): “Deciphering the 2007-08 Liquidity and Credit Crunch,” *Journal of Economic Perspectives*, 23, 77–100.
- FABOZZI, F. (2010): *Bond Markets, Analysis and Strategies*. Prentice Hall, 7th edn.
- FEDERAL RESERVE BOARD (2021): “The Fed Explained: What the Central Bank Does,” Federal Reserve System Publication.
- GORTON, G. (1998): “The Panic of 2007,” in *Maintaining Stability in a Changing Financial System, Proceedings of the 2008 Jackson Hole Conference*. Federal Reserve Bank of Kansas City.
- SUNDARESAN, S. M. (2009): *Fixed Income Markets and Their Derivatives*. Academic Press, 3rd edn.
- VERONESI, P. (2010): *Fixed Income Securities: Valuation, Risk, and Risk Management*. John Wiley & Sons, 1st edn.