# Course Summary

Lecture 13.2

# Interest and the Time Value of Money

In the first two lectures, we considered interest compounding and the time value of money.

- Because interest compounds on interest, your savings can grow a lot over a long investment period. **It's best to start saving early.**
- And the higher the interest rate, the faster your savings will grow. **If you keep your savings in a low-yielding savings account at your bank, your savings will barely grow.**
- Because money today can earn interest, **a dollar today is more valuable than a dollar in the future**. This is the **time value of money**.
- By considering the interest rate in the market (and any risk premium), you can calculate the **present value** of any future cash flows.

# Consumer Borrowing

In Lecture 3, we looked at consumer borrowing.

- The power of interest rate compounding applies to borrowing as well. **Debt at a high rate of interest is very expensive over the long-run.**
- **High-cost borrowing methods** – such as payday loans, auto title loans, and rent-to-own – **charge an especially high (implicit) interest rate**.
- If a borrower makes only the minimum payment, they will never pay off their credit card. But, by using a financial calculator, you can **calculate the monthly payment needed to pay down a credit card balance after a certain number of years**.

# Mortgages

Lecture 4 focused on mortgages.

- Because of loan amortization, **the initial payments on a 30-year mortgage go almost entirely to interest**. But towards the end of the mortgage, most of the payment goes toward principal.
- Many mortgage borrowing decisions depend largely on how long a borrower plans to stay in a home. **The longer a borrower plans to stay in a home, the better it is to buy instead of renting, the better it is to take mortgage points, and (if interest rates have fallen) the better it is to refinance.**
- Fixed-rate mortgages require fixed payments over time. And while **adjustable-rate mortgages require lower initial payments, the monthly payment may become much larger if interest rates increase over time.**

# Investment Products and their Risks

In Lecture 5, we introduced a number of different products and later, in lecture 11, we considered the tradeoff between the risks and returns of these products.

- Bank deposits and Treasury bills are **risk-free investments** but yield **low returns**.
- Corporate bonds are loans to corporations. Because of their **default risk, corporate bonds pay a higher return than Treasury bonds**.
- Stocks are among the **riskiest investments** and have had some of the **highest long-run returns** because of this.
- **Fees matter** when it comes to investment funds. Low cost index funds may outperform actively managed mutual funds in the long-run just because of their lower fees. (And the **efficient market hypothesis** is a reason to believe mutual funds can't consistently outperform the market).

# Risk Diversification and Leverage

In Lecture 12, we considered how investors can modify their risk through diversification and leverage.

- Investors can **reduce their risk by diversifying their investments over multiple assets**.
- But the effects of diversification are limited by correlation between assets. **Further benefits can be realized by investing across multiple asset classes**, such as small stocks, foreign stocks, bonds, and commodities.
- Investors may also increase their returns by **leveraging their investments**, but doing so also may drastically **increase risk**.

# Retirement Planning

In Lecture 6, we considered some basic retirement plans. In Lectures 7 and 9, we introduced inflation and taxes.

- Using a financial calculator and working backwards, you can **calculate how much you should set aside today to enjoy a certain income in retirement**.
- And if you **save enough of your income each year, you may be able to retire early!**
- Inflation, can easily be incorporated into your retirement plans. **Just make all plans using real interest rates and dollar amounts.**
- Taxes can make a big difference in your retirement wealth. **Invest for the long term, and your capital gains will be taxed at a lower rate and deferred.**
- And you can get further tax benefits if you **invest in tax advantaged retirement accounts**.

# Risk and Retirement Planning

In Lecture 12, we showed how investors can manage the risks they face while saving for retirement.

- The **financial risk** from stock investments may be too much near or during retirement. For this reason, **life-cycle investing requires that retirees phase out of stocks and into less risky investments.**
- Retirees may worry that interest rates will fall as they near retirement, lowering the yield they may earn on their invested principal. But **interest rate risk can be hedged by investing in long-term bonds.**
- **Longevity risk** can be countered with annuities. **Life annuities make payments for as long as the retiree lives, making it impossible to outlive savings.**
- And **Social Security is the ultimate hedge against retirement risks!** It protects against financial risk, longevity risk, and inflation risk all at once!

# Fintech

In Lecture 8, we look at fintech and how technology can facilitate decision making.

- Technology has the potential to change the field of personal finance
- There are advantages but also costs of fintech
- Basic financial literacy becomes even more important when it comes to fintech
- Beware of “low cost” of financial apps.

# Some general advice

**Here is advice for everyone.**

- Start to save early and use the magic of interest compounding to work for you
- If interest rates fall, consider refinancing your mortgage
- Invest for your retirement using tax advantaged assets
- Take advantage of employers’ matches
- There is a trade-off between risk and returns: you cannot get higher returns without taking on more risk
- Protect your wealth by diversifying your portfolio
- Take into consideration inflation in your retirement planning
- Consider whether to invest more in education and training

# Final remarks

**It is also important**

- To keep it simple
- Do the calculations
- Understand the risks involved
- Do comparisons