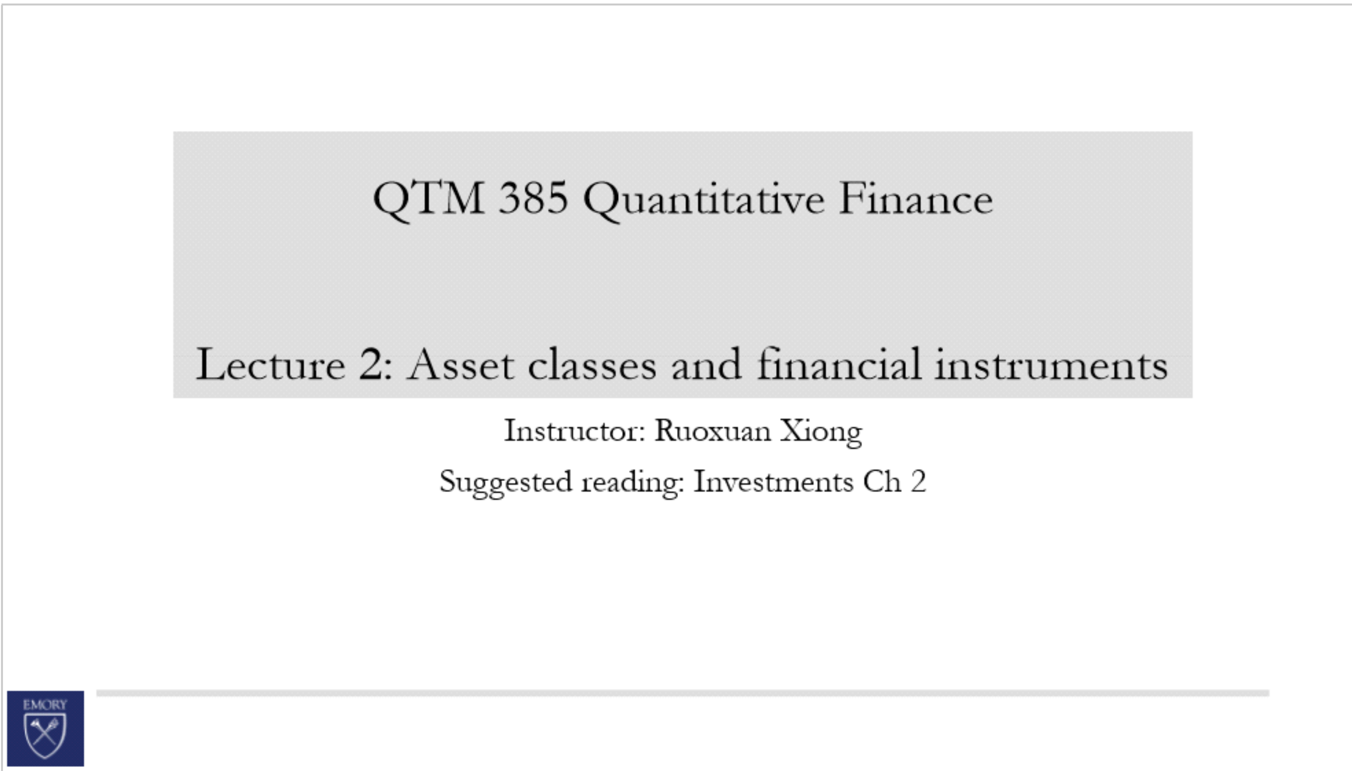
Lecture 2: Assets

Wednesday, January 25, 2023 09:05

2-asset



Question from Google form

- How much time do you expect us to spend on the homework per person?

- *Answer: 10 hours per homework, about 3-5 hours per week*

- Could you repeat why resource allocation in financial markets may not be the most efficient?

- *Answer: Companies or whole industries may be "hot" for some time (dot-com bubble that peaked and then collapsed), attract a large flow of investor capital and then fail after a few years*

Question from Google form

- If arbitrage opportunities quickly disappear and that stock price will immediately return to fair market price, does it mean high frequency trading and short term investment tend to outperform long term holding of stocks? -Breaks down when investor assessment is wrong

- *Answer: Yes for intelligent investors when "arbitrage" opportunities they recognize are indeed arbitrage opportunities and can cover the trading cost*

- I think it would be helpful to have a list of vocabulary words and definitions for people who do not know any finance. For example, "bid," "ask," "order," "equity," "security," etc.

- *Answer: A glossary on canvas*

Fintech and financial innovation

- Applies technology to financial market

Lending to people w/o a bank

- **Peer-to-peer lending**: Link lenders and borrowers directly, without need of an intermediary like a commercial bank, e.g., LendingClub

pegcoin

- **Cryptocurrencies***:* payment systems that bypass traditional channels such as credit cards, debit cards, or checks, e.g, bitcoin

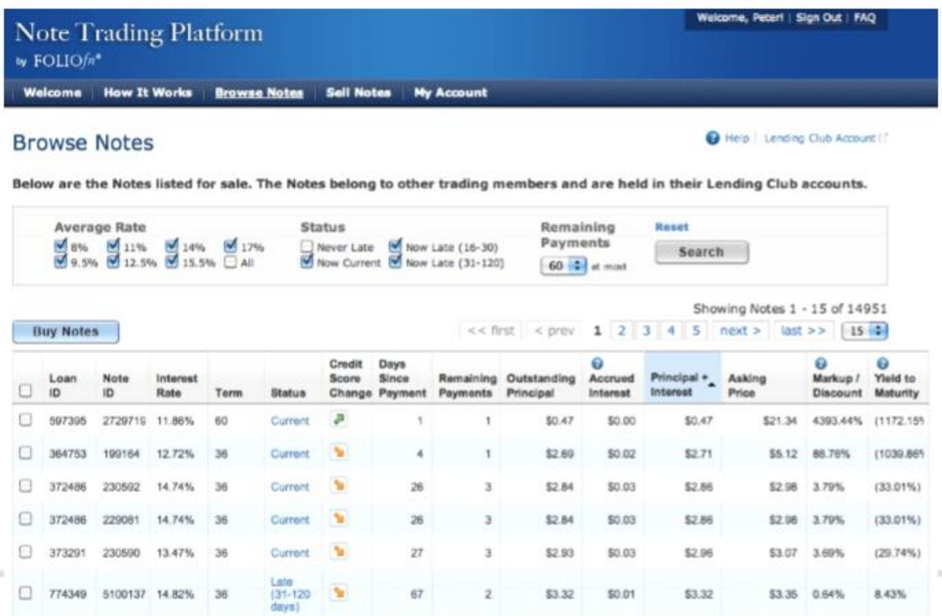
Input parameters ab yourself (income, risk tolerance, etc.) and generates a portfolio for you. Uses data to update its recommendations

- **Roboadvisors**: utilize algorithms to automate investment advice

As of now, algorithms are not that great but can remove the emotional factor of investing

LendingClub

P2P lending



Note Trading Platform
by FOLIOfn
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Welcome | How It Works | Browse Notes | Sell Notes | My Account

Browse Notes

Help | Lending Club Account

Below are the Notes listed for sale. The Notes belong to other trading members and are held in their Lending Club accounts.

Average Rate: 8% | 11% | 14% | 17% | 9.5% | 12.5% | 15.5% | All
Status: Never Late | Now Late (16-30) | Now Current | Now Late (31-120)
Remaining Payments: 60 at most
Reset
Search

Showing Notes 1 - 15 of 14951

Buy Notes

<< first | < prev | 1 | 2 | 3 | 4 | 5 | next > | last >> | 15

Loan ID	Note ID	Interest Rate	Term	Status	Credit Score Change	Days Since Payment	Remaining Payments	Outstanding Principal	Accrued Interest	Principal + Interest	Asking Price	Markup / Discount	Yield to Maturity
597395	2729715	11.86%	60	Current		1	1	$0.47	$0.00	$0.47	$21.34	4393.44%	(1172.15%
364753	199164	12.72%	36	Current		4	1	$2.69	$0.02	$2.71	$5.12	88.76%	(1039.86%
372486	230592	14.74%	36	Current		26	3	$2.84	$0.03	$2.86	$2.98	3.79%	(33.01%)
372486	229081	14.74%	36	Current		26	3	$2.84	$0.03	$2.86	$2.98	3.79%	(33.01%)
373291	230590	13.47%	36	Current		27	3	$2.93	$0.03	$2.96	$3.07	3.69%	(29.74%)
774349	5100137	14.82%	36	Late (31-120 days)		67	2	$3.32	$0.01	$3.32	$3.35	0.64%	8.43%

LendingClub

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Open Sell Orders

Reprice | Cancel Order

Note ID	Note Title	Investment	Status	Payments Received	Remaining Payments	Outstanding Principal	Accrued Interest	Principal + Interest	Asking Price	Order Expires On
2384130	consolidation	$25.00	In Grace Period	$7.67	47	$21.11	$0.41	$21.52	$19.50	12/02/11
4294790	Debt Loan	$25.00	In Grace Period	$3.66	54	$23.35	$0.42	$23.78	$21.95	12/02/11
3437743	pay off debt	$25.00	In Grace Period	$5.07	51	$22.19	$0.30	$22.49	$20.45	12/02/11
3634642	i would like to be debt free	$25.00	In Grace Period	$5.11	52	$22.67	$0.15	$22.82	$20.35	12/02/11
	Total: 4 Notes	$100.00		$21.51					$82.25	

Reprice | Cancel Order

LendingClub data

- Available at Kaggle: 2007 through current Lending Club accepted and rejected loan data
- Loan default/charge-off prediction

```
data = pd.read_csv("/kaggle/input/lending-club-dataset/lending_club_loan_two.csv")
data.head()
```

	loan_amnt	term	int_rate	installment	grade	sub_grade	emp_title	emp_length	home_ownership	annual_inc	v
0	10000.00	36 months	11.44	329.48	B	B4	Marketing	10+ years	RENT	117000.00	N
1	8000.00	36 months	11.99	265.68	B	B5	Credit analyst	4 years	MORTGAGE	65000.00	N
2	15600.00	36 months	10.49	506.97	B	B3	Statistician	< 1 year	RENT	43057.00	S
3	7200.00	36 months	6.49	220.65	A	A2	Client Advocate	6 years	RENT	54000.00	N
4	24375.00	60 months	17.27	609.33	C	C5	Destiny Management Inc.	9 years	MORTGAGE	55000.00	V

LendingClub

- Switched focus to institutional investors and shut down its retail investing platform

Side Note:
First successful use of Neural Networks in finance was mortgage default prediction

> As we move towards becoming a full-spectrum fintech marketplace bank, we have looked closely at our current and future product suite and have started development of new products to help our members keep more of what they earn and earn more on what they keep. Unfortunately, under a prospective banking framework, it is not economically practical for LendingClub to continue to offer Notes. So, we had to make the difficult decision to **retire the Notes platform effective December 31, 2020.**

No one wanted to use it because it was too risky for an individual to lend out money, which drove up interest rates (due to ass. risk), and ultimately killed the platform

Financial markets

- **Financial markets** are segmented into money markets and capital markets

Money market interchangeable w/ it's instruments

- **Money market**: short-term, marketable, liquid, low-risk debt securities
  - Money market instruments are also called cash equivalents

Assets in money market can be quickly converted to cash

- **Capital market**: longer term, riskier securities
  - Longer term bond markets
  - Equity markets ← Same as Stock market
  - Derivative markets for options and futures

The money market

- **Money market**: Very short-term, highly marketable debt securities
- Many securities trade in large denominations, not accessible to individual investors i.e. I want da money
- Money market funds are accessible to individual investors
  - Mutual funds that invest in money market instruments
  - Average maturity of less than 3 months
    Time it takes for principal investment to be paid back

1969 $100,000 Treasury Bill

Treasury bills

- **Treasury bills** ← Most common type of money market asset

  Basically buying bills for cheap, just gotta wait for shipping xD
  - The government raises money by selling bills to the public
  - Investors buy the bills at a discount from the stated maturity (or face) value
  - At maturity, the government pays the investor the face value of the bill
  - Investor's earnings: Difference between purchase price and maturity value
  - Most marketable of all money market instruments
  - Issued with initial maturities of 4, 13, 26, or 52 weeks

*Typo on this slide

Ask and bid price

- **Ask price**: Price to pay to ~~buy~~ sell a T-bill from a dealer
- **Bid price**: Price to get to ~~sell~~ buy a bill to a dealer

When someone does not wanna hold a T-bill to maturity, they can sell on open market

- **Bid–ask spread**: The difference in these prices, which is the dealer's source of profit
- Bid yield is higher than asked yield ← The buyer needs to see a higher return the price

= rate of return

Bid yield Asked yield

TREASURY BILLS					
MATURITY	DAYS TO MATUR	BID	ASKED	CHANGE	ASKED YIELD
15-Jan-2019	12	2.270	2.260	−0.018	2.293
19-Feb-2019	47	2.368	2.358	0.020	2.398
9-May-2019	126	2.388	2.378	−0.012	2.431
18-Jul-2019	196	2.370	2.360	−0.043	2.424
5-Dec-2019	336	2.415	2.405	−0.105	2.494

EMORY

Bill yield and price

- The first yields in the table are reported using *bank-discount method*
  - Bill's discount from its face value is "annualized" based on a 360-day year

How to calc. bid price

- A T-bill of $10,000 denomination ← face value of the bill
- Bid yield of 2.388%
- Bill discount from face value:

$$.02388 \times \frac{126}{360} = .8358\%$$

1 year: guess

- Bid price:

$$\$10,000 \times (1 - .8358\%) = \$9,916.42$$

→ The bill would

using this one

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An exercise

- What is the ask price for the T-bills maturing on May 9, 2019 with face value $10,000?

$0.2378 \times \frac{126}{360} = 0.8323\%$

$\$10{,}000 \times (1 - 0.8323\%)\ \$9916.77$

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Treasury bills

- Two issues of *bank-discount method*
  - Assumes that a year has only 360 days
  - Computes the yield as a fraction of par value, but not the price the investor paid
- For a T-bill of $10,000 denomination with asked price $9,916.77
- Treasury-bill's *bond-equivalent ask yield*:

$$(\$10{,}000/\$9{,}916.77 - 1) \times 365/126 = 2.431\%$$

The amount to be made if bought at asking price

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Treasury-bill's bond-equivalent yield

Bank is asking for this price

Jeff is bidding this price

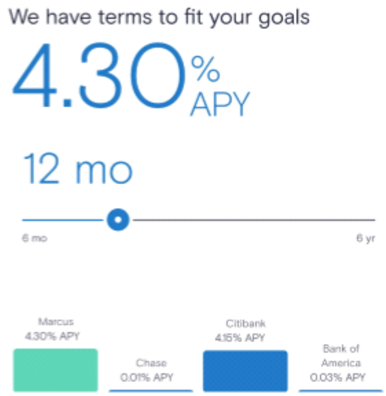
The lower the yield, the more exp.

Figure 2.1 Treasury bill yields

Source: The *Wall Street Journal Online*, January 3, 2019.

Certificate of deposit

- A **certificate of deposit,** or CD, is a time deposit with a bank. Time deposits may not be withdrawn on demand
- CDs are treated as bank deposits by the Federal Deposit Insurance Corporation
- They are insured for up to $250,000 in the event of a bank insolvency



Commercial paper

- **Commercial paper**: Large, well-known companies issue their own short-term unsecured debt notes
- Commercial paper is often backed by a bank line of credit, which gives the borrower access to cash that can be used to pay off the paper at maturity
- Maturities range up to 270 days, most often less than 1 or 2 months, usually in multiples of $100,000.

Use case: Construction company sources cash via commercial paper to build houses and then sell the homes to pay back commercial paper.

Money market funds

- **Money market funds**: mutual funds invest in money market instruments
  - Government money market fund: invest in Treasury securities
  - Prime money market fund: invest in floating-rate commercial paper
  - Municipal money market fund: invests in municipal bonds (free from federal and state tax)

Allows retail investors (e.g. Jeff) to invest in institutional money markets

Government and U.S. Treasury Money Market[3]
Fidelity® Government Money Market Fund (SPAXX)
Fidelity® Government Money Market Fund - Premium Class (FZCXX)
Fidelity® Government Cash Reserves (FDRXX)
Fidelity® Investments Money Market Government Portfolio - Class I (FIGXX)
Fidelity® Investments Money Market Government Portfolio - Institutional Class (FRGXX)
Fidelity® Investments Money Market Treasury Only- Class I (FSIXX)
Fidelity® Investments Money Market Treasury Only- Institutional Class (FRSXX)
Fidelity® Investments Money Market Treasury- Class I (FISXX)
Fidelity® Investments Money Market Treasury- Institutional Class (FRBXX)
Fidelity® Treasury Money Market Fund (FZFXX)
Fidelity® Treasury Only Money Market Fund (FDLXX)

State Municipal Money Market[4]
Retail Municipal
Fidelity® California Municipal Money Market Fund (FABXX)
Fidelity® California Municipal Money Market Fund - Premium Class (FSPXX)
Fidelity® California Municipal Money Market Fund - Institutional Class (FSBXX)
Fidelity® Massachusetts Municipal Money Market Fund (FAUXX)
Fidelity® Massachusetts Municipal Money Market Fund - Premium Class (FMSXX)
Fidelity® Massachusetts Municipal Money Market Fund - Institutional Class (FMAXX)
Fidelity® New Jersey Municipal Money Market Fund (FAYXX)
Fidelity® New Jersey Municipal Money Market Fund - Premium Class (FSJXX)
Fidelity® New Jersey Municipal Money Market Fund - Institutional Class (FSKXX)
Fidelity® New York Municipal Money Market Fund (FAWXX)

National Municipal Money Market[4]
Retail Municipal
Fidelity® Investments Money Market Tax Exempt - Class I (FTCXX)
Fidelity® Municipal Money Market Fund (FTEXX)
Fidelity® Tax-Exempt Money Market (FMOXX)
Fidelity® Tax-Exempt Money Market Fund - Premium Class (FZEXX)

Prime Money Market
Retail Prime[4]
Fidelity® Investments Money Market - Money Market Portfolio - Class I (FMPXX)
Fidelity® Investments Money Market - Money Market Portfolio - Institutional Class (FNSXX)
Fidelity® Money Market Fund (SPRXX)
Fidelity® Money Market Fund - Premium Class (FZDXX)

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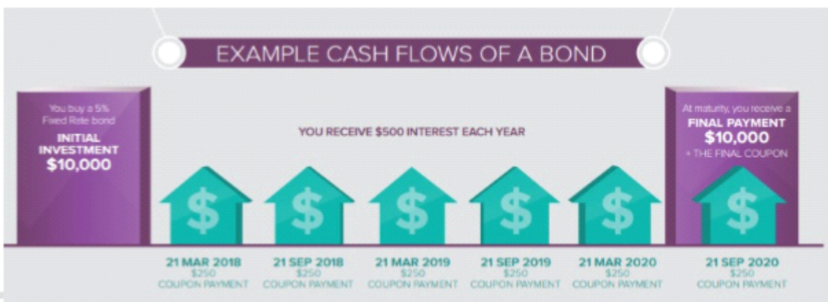
The bond market

maturity is longer than money market

- **Bond market**: Longer term borrowing or debt instruments than those trade in the money market
- Also known as *fixed-income capital market*: Most of them promise either a fixed stream of income or a stream of income determined by a specific formula
  - *Coupon payments*: Interest payments before maturity, commonly made semiannually



Put in $10k receive 6 payments of $250 over 2 years. Get back initial $10k investment

EMORY

The bond market: Treasury notes and bonds

- **Treasury notes** and **Treasury bonds**: issued by the U.S. government
- **Treasury notes**: maturities ranging up to 10 years
- **Treasury bonds**: maturities ranging from 10 to 30 years
- Most commonly traded in denominations of $1,000

Price and yield of Treasury notes and bonds

- Prices are quoted as a percentage of par
- For the $1,000 par value bond maturing on August 15, 2029
- Bid price: $132.7266\% \times \$1{,}000 = \$1{,}327.266$
- Asked price: $132.7891\% \times \$1{,}000 = \$1{,}327.891$
- Semiannual payments: $\frac{6.125\%}{2} \times \$1{,}000 = \$30.625$

Bid price Asked price

LISTING OF TREASURY ISSUES

MATURITY	COUPON	BID	ASKED	CHANGE	ASKED YIELD TO MATURITY
15-Feb-2019	2.750	100.0391	100.0547	0.0078	2.256
30-Apr-2021	2.250	99.7500	99.7656	0.2344	2.354
15-May-2023	1.750	97.4531	97.4688	0.4766	2.364
15-Aug-2029	6.125	132.7266	132.7891	1.1406	2.575
15-Feb-2036	4.500	125.4688	125.5313	1.5391	2.637
15-Aug-2048	3.000	101.8984	101.9297	1.5391	2.902

Municipal bonds

- **Municipal bonds**: issued by state and local governments
  - Their interest income is exempt from federal income taxation
  - Also exempt from state and local taxation in the issuing state
- Choose between taxable and tax-exempt (municipal) bonds: Compare after-tax returns on each bond

  Equivalent taxable yield of tax-exempt bond

$$r_{taxable}(1-t) = r_{muni} \text{ or } r_{taxable} = r_{muni}/(1-t)$$

where t is combined federal plus local marginal tax bracket

Marginal Tax Rate	Tax-Exempt Yield 1%	2%	3%	4%	5%
20%	1.25%	2.50%	3.75%	5.00%	6.25%
30	1.43	2.86	4.29	5.71	7.14
40	1.67	3.33	5.00	6.67	8.33
50	2.00	4.00	6.00	8.00	10.00

Table 2.1 Equivalent taxable yields corresponding to various tax-exempt yields

Tax-exempt of municipal bonds

- Cutoff tax bracket

$$1 - \frac{r_{muni}}{r_{taxable}}$$

- If an investor's tax bracket is higher than the cutoff bracket, municipal bond is more appealing
- Municipal bonds is attractive to high-tax-bracket investors

Exercise

- Suppose your combined federal plus state tax bracket is 30%.
- Would you prefer to earn a 6% taxable return or a 4% tax-free return?
- What is the equivalent taxable yield of the 4% tax-free yield?

Corporate bonds

- **Corporate bonds**: Private firms borrow money from the public
  - Semiannual coupons over their lives and return the face value at maturity
  - Riskier than Treasury bonds
- **Secured bonds**: Secured by a specific asset owned by the issuer
- **Unsecured bonds**, called *debentures:* Backed by general credit rather than by specified assets

Callable corporate bonds

- **Callable bonds**: The firm has the option to repurchase the bond from the holder at a defined call price before maturity
  - Call price is usually higher than the par value
  - Usually called when interest rate is low as the firm can refinance at a lower rate

- Example: A 20-year maturity 9% coupon bond with par value $1,000paying coupons semiannually is callable in five years at a call price of $1,050