Short Selling

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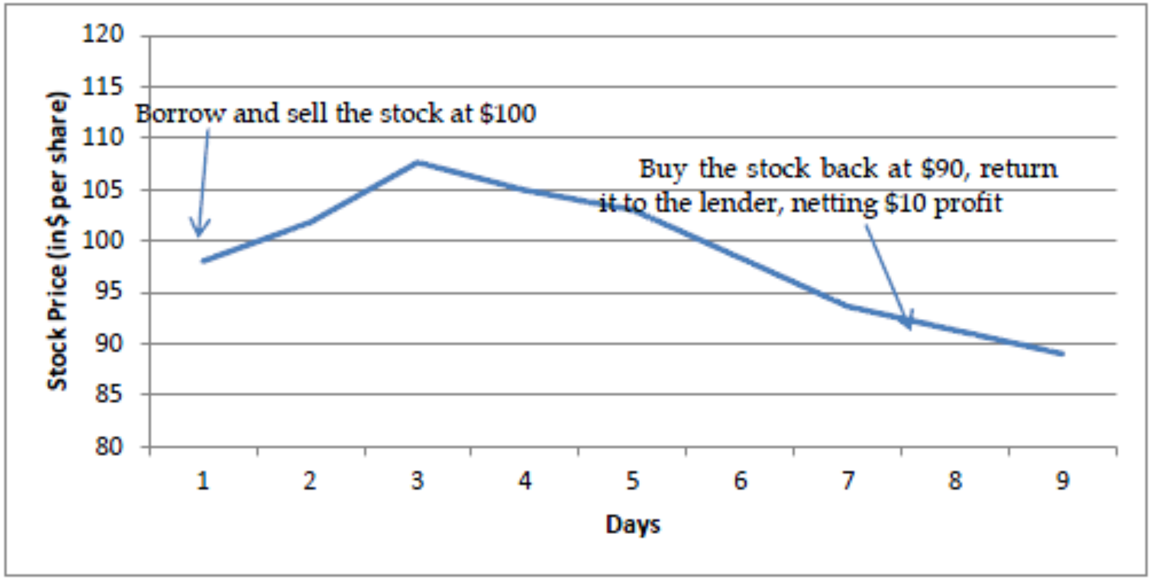
Outline

- Overview of Short Selling in the Real World
- Information in Short Selling Data
- Why Might Stock Prices Be Optimistic?
- Summary

Overview of Short Selling

What is Short Selling

Sell High and then Buy Low



What is the maximum you can make?

What is the maximum you can lose?

Thought Experiment

Through the wonders of time travel, a friend of yours is able to deliver you the following piece of information:

> The name and ticker of the stock that will have the most *negative* return from tomorrow morning until exactly 365 days in the future. In other words, which stock will be down the most (and how much) 365 days from now?

This is information you know with <u>100% certainty</u>!

How much of your wealth should you invest in shorting this stock tomorrow? Should you be taking out loans and leveraging every dollar you can take advantage of this information?

Thought Experiment

If you are short a stock what SCARES you the most?

The stock ripping upwards over a very small period of time and bankrupting you!

Why might this happen?

1. Good News
2. Short Squeezes
3. Liquidation Event (e.g. Archegos)
4. Corporate Action (e.g. M&A, stock splits, spinoff, etc.)
5. Short Bans
6. Irrational people (e.g. retail investors) doing misguided things -- GameStop

Where Do You Go To Borrow Shares?

Prior to 1926 there was a centralized market (pit) where you could go to borrow shares. The “loan crowd” met regularly through-out the day on the floor of the NYSE in order to facilitate borrowing and lending between members of the exchange.

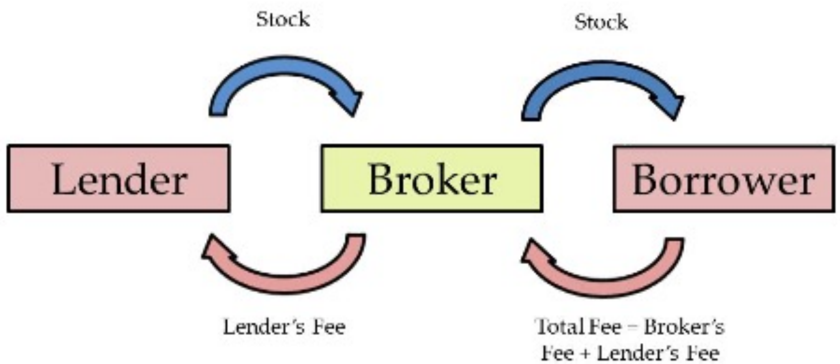
The market was most active just after 3:00 pm when the market closed and members needed to asses their net borrowing needs at the end of the day.

This centralized market for lending no longer exists. It was effectively “disbanded” post the 1929 crash when short-sellers were blamed for causing the crash.

Today there is no centralized market!

Individuals looking to borrow shares must go to individual broker dealers and find institutions that are willing to lend shares.

Mechanics of Short Selling



Within in the Broker-Dealer is a specific division called: Prime Services. This is where securities lending business takes place.

Prime Services works specifically with hedge funds or other funds whose business involves a whole range of services in a consolidated fashion. These services include:

- providing securities to short;
- facilitating the buying of securities on margin (cash lending or swaps);
- loaning securities for short sales;
- custody of securities;
- executing all trades with the prime broker's other divisions;
- providing back office technology and reporting;
- transferring cash between the prime broker and the custodian; and
- reconciliation of trades across brokers.

Prime brokers provide a tremendous service to hedge funds. They also are ***significant*** profit centers for Broker-Dealers. They also have tremendous insights into market dynamics.

Mechanics of Short Selling

- Often the "lender" of the securities is a custodian bank (e.g. State Street Bank, Bank of New York).

- But the lender can also be the Broker-Dealer itself (e.g. Prime Services Division) that is "lending" out the shares of another fund that it is a client of the Prime Services Division.

- When a fund wants to buy securities on margin (or sell-short securities) they must pledge collateral for the trade. Almost always, to do this, they sign a "**hypothecation agreement**" with the bank that allows them to use the shares they have in their Prime Services account as collateral.

- Thus, it grants "ownership" of those shares to the Prime Brokers and hence allows the PB lend them out.

- Consequently, if a bank has a large Prime Services Division, this greatly enhances the profitability of its securities lending business. Moreover, it becomes a virtuous cycle, as it means it has more securities to easily lend to those funds that want to short – preferential treatment on shorting capacity is given to the best customers of PB.

Costs of Short Selling

- Obviously, it is <u>not</u> costless to borrow shares. When you go to your PB to borrow shares, they will charge you for the opportunity:
  - Rebate Rate (Loan Rate):
    - When a short seller borrows shares, most of the proceeds goes *not* to the seller of the shares but to the lender of the shares. The lender of the shares must pay interest to the borrower (seller) on the money they are holding.
    - These are one-day contracts, though, the loan are quite frequently renewed. The rate is often subject to change – it is variable – but not always.
    - There other terms of the loan that are often negotiated (such as the amount of collateral) but the important variable is the interest rate. This is also called the Rebate Rate

Costs of Short Selling

- Rebate Rates
  - Rebate Rates are determined by supply and demand dynamics.
  - Stocks that are <u>easy</u> to borrow have <u>high</u> rebate rates (e.g. the interest rate is high). These are generally large cap stocks, that are in indices (e.g. lots of institutions hold them), and are easy to locate.
  - For these stocks the rebate rate generally tracks the Fed Funds rate. These are often referred to as “GC” stocks. (Generalized Collateral).
  - Stocks that are <u>hard</u> to borrow will have a <u>low</u> rebate rate and sometimes even a negative rebate rate. These are often referred to as being “on special”.
  - The vast majority of stocks are on GC. Typically 93%-96% of stocks are GC, though that fluctuates over time.

Costs of Short Selling

- Who Should Get Money From Negative Rebates?
  - For stocks that are on “special” who should receive the premium?
  - Individual investors:
    - Almost never receive the rebate. Your individual broker will keep the premium. Note: these are the stocks in your margin account that broker is lending out. You own the stocks.
  - Institutional Investors:
    - There is some split between the custodian / broker-dealer and the institutional investor. The larger the institutional investor and the more they stocks they hold and provide names that are on “special” and the lower the recall risk, the more of the premium the Institutional Investor is going to receive. Many of these large index funds, for example.
  - How much should go to the real investor in the fund versus the fund management company?

Costs of Short Selling

- Related Questions:
  - How is Fidelity / Vanguard / State Street / BlackRock able to charge 0% management fees on its Index Funds?
  - Who is creating economic value associated with the premiums being generated? Should they be getting the disproportionate share of economic benefits?
  - Who is taking the economic risk if something goes wrong? Should they be getting the one’s disproportionate share of economic benefits?
  - What exactly could go wrong?

What Can Go Wrong?

- If you are lending hypothecated shares, you need to make sure you have them when the client wants to sell them.
- This may mean that you need to go locate them in the market and this can be expensive.
- Sophisticated models exist on the risk of shares being "recalled".

- Lehman Brothers:
  - You were a Prime Services client with Lehman Brothers.
  - You signed a hypothecation agreement with Lehman.
  - Lehman goes bankrupt.
  - Who owns those shares? How do you get them back?
  - What if the "hypothecation agreement" wasn't with *Lehman Brothers USA* but *Lehman Brothers International Europe*? What set of laws apply?
  - What happens to the general cash and other securities sitting in your Prime Brokerage Account? Who has the right to trade them as the market is moving rapidly?

- Post the GFC the practice of "multi-Priming" has become much more common.
- Hypothecation agreements are much more heavily scrutinized.
- Excess cash and other "unnecessary securities" are routinely swept out of Prime Brokerage accounts

- Now many non-hedge funds refuse to allow the custodians to lend their securities. The rebate rate isn't worth the risk if another Lehman event happens

Biggest Mistakes You Can Make As A Quant Investor

You think that you can borrow as much of the stock as you want.

You think that it is costless to borrow a stock

You think that your “alpha” is unccorelated to the cost to borrow a stock (e.g. there is no endogenity)

You think that no one else is monitoring short-interest data and so your “short-interest alpha is unique”

You think that “path dependency” doesn’t matter

You think short-squeezes are “idiosyncratic” events and can’t impact your 1,000+ stock portfolio in any meaningful way

You don’t create a short-interest factor and closely monitor its performance

You aren’t constantly asking your Prime Brokers to give you as much information as they can about short positions

You don’t prevent your Prime Brokers from sharing your positions with anyone else

Why No Centralized Market For Short Selling

Why does no centralized market exist for selling short stocks?

One company, Quadriserve, tried to start a centralized electronic market for selling shares short. It failed miserably.

- If you were to start such a company what might the market opportunity be?
- Who would have an incentive for such a market to exist?
- Who would have a disincentive for such a market to exist?
- Whose assistance would you need for a market to exist? Would they be willing to give it to you? Under what circumstances?
- What other critical variables might be required to make a market happen?
- Would any of these be in conflict with the market opportunity?

Homework

Where Can You Get Information on Shorting?

- Why might investors want information on the amount of shorting going on the in the market?

- Who would have an incentive provide this information?
- Who would have an incentive to not provide this information?

  - Would securities regulators want this information publicized?

  - Would exchanges want this information publicized?

  - Would companies (issuers of securities) want this information publicized?

  - Do fund managers want this information publicized? Which fund managers?

  - Do Broker/Dealers want this information publicized?

Homework!

Information In & On Short Sold Stocks

Where Can You Get Information on Shorting?

- FINRA has mandated the exchanges provide bi-weekly data about the amount of net short interest out there. For example,
  http://www.nasdaq.com/quotes/short-interest.aspx
  http://www.nyxdata.com/Data-Products/NYSE-Group-Short-Interest
- There are many commercial sites that will provide this information to you as well.

- The SEC has mandated that SROs provide daily aggregate short-selling volume information for individual securities. The SROs are also providing tick-by-tick individual short-sale transactions in all exchange listed equity securities.
  https://www.sec.gov/answers/shortsalevolume.htm

- To get the rate level data and the amount of short-interest data outstanding, you have two choices to get this data:
  1. Commercial vendors such as DataExplorers (expensive!)
  2. Brokers Dealers themselves – need to be a good client.

What are the Returns to Selling Stocks That Are Heavily Shorted?

- How might you define whether a stock was "heavily" or "lightly" shorted?

    - Number of Shares of the Stock Sold Short
    - Dollar Value of Stock Sold Short
    - Amount of Stock Sold Short as a percentage of Shares Outstanding
    - Amount of $ Stock Sold Short as a percentage of total market cap
    - Amount of Stock Sold Short as a percentage of Shares Available to Short – this is known as the utilization rate
    - Rebate Rate (Fee)

- What are the advantages and disadvantages of each of these measures?
    - How correlated do you think they are?
    - What is the information contained in each of them that may be unique?
    - What do you think cross-sectional distribution of each signal looks like?

  Hint: Do you care about stocks that are on GC vs on Special?
  Hint: How much of the universe is on special?
    - Should you be looking at levels or changes? Or both? What is the information?

HOMEWORK

What are the Returns to Selling Stocks That Are Heavily Shorted?

- What other signals do you think Short Interest might be correlated with?
  - Idiosyncratic volatility?
  - Momentum?
  - Value?
  - Liquidity?
  - Quality?
  - Size?
  - Market Returns? Industry Returns?
  - The short-term returns of groups of investors (e.g. long/short discretionary money managers)?
  - Balance Sheet conditions of Prime Brokers?

Hint: Remember August 2007. What do you think a Short Interest Factor would have returned that week?
Hint: Remember the concept of contagion
Hint: Remember "What Scares a Short Seller the Most"?

HOMEWORK

Should You Be A Short Seller?
Or Is All Bad News Incorporated in Prices?

Why Might Stock Prices Be Optimistic?

- Miller (1977):

  Assumption 1: There are differences of opinion among investors on the price of the stock
  Assumption 2: Some investors have binding short-sale constraints

  Any pessimists who might be constrained from selling short will not be able to sell the stock short. Hence, they will simply not own the stock.

  On the other hand, optimists will continue to buy and buy the stock (until they become pessimists and sit out).

  Hence the stock's price will reflect the valuation that the optimists assign to it but not reflect the valuation of the pessimists.

  Thus, short sale constraints can exert a significant influence on equilibrium prices and expected returns.

  Note: the great the divergence in valuation of the optimists and pessimists, the higher will be the price of a stock in equilibrium and hence the lower the subsequent returns!

What Are The Major Constraints to Shorting?

- Certain classes of investors are legally prevented from going short: mutual funds
- No centralized market.
  - Hard to locate
  - Favored clients will get the locate
  - Hard to know “appropriate price”
- It is illegal to go short in certain markets…. Or it can suddenly become illegal.
- Recall risk
- Asymmetric Payoff
  - Leads to some institutional investors not allowing managers to short (long-only funds)
- Shareholders may refuse to allow shares to be lent out
  - Why help short-sellers drive the price down?
  - Recall risk for owner
- “Hot Stocks”, small stocks, low institutional ownership stocks and high demand stocks are hard to borrow.
- General behavioral reasons: “Short sellers are odd people”.

What Are The Major Constraints to Shorting?

- General harassment:
  - People have been killed or threatened with severe bodily harm for selling stocks short.
  - Short-sellers are often sued, harassed and bullied. See Overstock.com !

  - Companies often fight with their shorts in public and unpleasant ways
    - Read Lamont (2012) "Going Down Fighting".

Distribution of events

Description	Comment	Number Events	Number Firms
Claims conspiracy	Conspiracy/bear raid/manipulation/illegal	29	29
Alleges lies	Lies/rumors/planting stories/inaccurate statements	125	125
Considering options	Consider options or conducting investigation using outside counsel or private investigator	21	21
All belligerent		175	159
Requests investigation	Requests investigation by authorities (usually SEC or exchange), or claims one is underway, or media reports that authorities are investigating shorters	66	66
Lawsuit	Announcement of lawsuit or of retraction based on litigation	35	35
All legal	All legal	101	98
Exchange switch	Exchange switch/seeking exchange switch	6	6
Urge not lend	Urges (or "suggests") that shareholders not lend shares to shorters	29	29
Friendly owners	CEO sets up system to buy own stock, or firm announces repurchase explicitly in response to shorters, Friendly owners withdraw shares from lending market, lending by firm to share-holders, or employee stock ownership plan buying shares	7	7
Other technical	Split/distribution/halt	9	9
All technical		51	43
All events		327	266

The sample is firms which have at least one monthly return in the 12 months following the event.

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What Are The Major Constraints to Shorting?

- So how do firms that fight with their shorts perform?

Market-adjusted returns subsequent to events

	One month		Three month		One year		Three years		2 to 3 Years	
	t to $t+1$		t to $t+3$		t to $t+12$		t to $t+36$		$t+12$ to $t+36$	
Claims conspiracy	−2.64	(0.33)	−2.28	(0.68)	−4.37	(2.73)	−2.77	(2.54)	−1.63	(1.22)
Alleges lies	−1.62	(0.67)	−2.08	(1.61)	−1.71	(1.96)	−1.31	(2.03)	−1.06	(1.55)
Considering options	−5.10	(0.63)	−8.19	(2.48)	−5.79	(3.44)	−2.76	(2.53)	−0.82	(0.62)
All belligerent	−2.63	(1.00)	−2.70	(2.08)	−2.28	(2.86)	−1.62	(2.73)	−1.19	(1.93)
Requests investigation	−4.59	(1.52)	−1.30	(0.66)	−1.99	(2.17)	−1.19	(1.73)	−0.72	(0.81)
Lawsuit	−3.48	(1.15)	−3.30	(1.03)	−2.65	(1.72)	−1.44	(1.48)	−0.59	(0.48)
All legal	−4.22	(1.87)	−1.89	(1.09)	−2.24	(2.59)	−1.31	(2.04)	−0.73	(0.92)
Exchange switch	3.54	(0.47)	−1.69	(0.38)	0.12	(0.06)	−2.84	(2.37)	−4.26	(2.95)
Urge not lend	−4.55	(1.00)	−4.66	(1.82)	−3.17	(1.65)	−2.66	(2.29)	−2.14	(1.54)
Friendly owners	−11.46	(0.87)	−10.07	(1.66)	−4.96	(1.90)	0.23	(0.07)	3.01	(0.60)
Other technical	−8.17	(1.35)	−12.39	(2.93)	−8.54	(2.61)	−5.60	(2.23)	−1.52	(0.40)
All technical	−3.86	(1.08)	−5.19	(2.62)	−2.66	(1.95)	−2.04	(2.13)	−1.50	(1.14)
All events	−3.09	(1.85)	−2.58	(2.63)	−2.34	(3.69)	−1.48	(2.80)	−0.89	(1.51)

Average monthly market-adjusted returns in percents. Market-adjusted returns are returns minus the return on the CRSP value-weighted index. The t-statistics, in parentheses, use standard errors adjusted for the clustering of dates in calendar time.

- On average, in the twelve months subsequent to any event, firm have returns that are a whopping 2.34% lower than then the market.

- Over 36 months after any event, the market adjusted returns are -1.48% per month, so the cumulative fall is 42%

What Are The Major Constraints to Shorting?

- So how do firms that fight with their shorts perform?

Calendar time portfolio returns for one-year horizon returns

Description	*N* months	Market adjusted		Characteristic adjusted		Four-factor α	
Claims conspiracy	166	−3.33	(2.22)	−2.77	(2.05)	−2.06	(1.32)
Alleges lies	229	−2.06	(2.22)	−1.09	(1.32)	−1.76	(1.79)
Considering options	125	−5.46	(3.37)	−4.66	(3.05)	−4.90	(2.91)
All belligerent	251	−2.26	(2.66)	−1.36	(1.85)	−1.94	(2.31)
Requests investigation	220	−2.67	(2.94)	−2.04	(2.47)	−2.11	(2.17)
Lawsuit	179	−3.07	(2.06)	−1.95	(1.39)	−2.93	(1.88)
All legal	241	−2.82	(3.32)	−1.91	(2.48)	−2.55	(2.89)
Exchange switch	53	0.58	(0.27)	1.32	(0.70)	−0.83	(0.33)
Urge not lend	132	−4.52	(3.07)	−4.55	(3.18)	−4.00	(2.48)
Friendly owners	51	−4.69	(1.82)	−3.15	(1.25)	−6.95	(2.19)
Other technical	58	−8.81	(2.45)	−7.26	(1.99)	−9.93	(2.42)
All technical	180	−2.79	(2.36)	−1.97	(1.87)	−2.90	(2.33)
All events	257	−2.85	(4.32)	−1.88	(3.41)	−2.40	(3.81)
All events, value weighted	257	−1.31	(1.81)	−1.23	(1.72)	−1.95	(3.22)

Monthly returns in percents for the 12 months following an event, calculated using calendar time portfolios. Portfolios are equally weighted except for the last row, which is value weighted. Market-adjusted returns are returns minus the return on the CRSP value-weighted index. Characteristic adjusted are returns minus the returns on a value-weighted portfolio of all CRSP firms in the same size, market-to-book, and one-year momentum quintile. Four-factor alpha is the intercept from a regression of returns in excess of T-bills on the three factors of Fama and French (1993), size, value, and market, plus a fourth price, momentum factor, similar to Carhart (1997). "*N* months" is the number of calendar months available for market-adjusted returns (the number may be lower for the other columns). *T*-statistics are in parentheses.

- Even after controlling for momentum and other common characteristics that predict returns, these firms dramatically underperform, though, the effect is slightly bigger for small firms than large firms, which is consistent with short-sale constraints.

Impact of Shorting Bans: Do They Work?

Many countries have at times imposed shorting bans.

Examples

- United States during the GFC
- Australia, Canada and Europe during the GFC
- In total 30 countries had a shorting ban in place during 2008-2009Should they be getting the disproportionate share of economic benefits?
- Malaysia during 1998 Asian Financial Crisis
- After the market crash of 1929
- China in the summer of 2015
- China before the Olympics
- Many Emerging Markets do not allow shorting of their shares

Thought Questions on Shorting ….

Is short selling *more likely* to incentivize "collusion" between market participants than going long?

- Does it encourage rumor mongering?
- Does it encourage nefarious behavior? Can you think of an example? Hint: if you were a L/S manager and wanted to crash the stock of a Broker-Dealer what might you do?
- Does it encourage market manipulation?
- Is it more prone to occur in certain types of stocks? Or assets? Why Nickel?
- Is it more likely to impact certain types of investors?
- Should certain types of stocks be subject to shorting restrictions? How would you "delineate" these types of stocks? How do you balance all information being incorporated into prices vs manipulation?
- Should certain types of investors be restricted from shorting? How would you "delineate" these types of investors?

Cultural Costs of Shorting

Can you be a short-seller and still be a patriot?

"It seems certain that effort to reduce the price of stocks has had masterful direction, beginning with the selling of U.S. securities by the French Government and other European investors weeks ago."

John D. Rockefeller

November 4, 1929

Cultural Costs of Shorting

Can you be a short-seller and not be a terrorist?

"I can tell you that during this crisis — every day was a crisis, and the day before the markets opened a lot of us couldn't sleep. We were really concerned about what would happen. I truly believe that buying stocks is a patriotic act.

We had Liberty Bonds in World War I, War Bonds in World War II. And I think in the terrorist war we have stocks. And many, many Americans went out and did just the opposite of what the terrorists wanted, they invested in the American economy and I believe they are great patriots."

U.S. Representative Caroline Maloney
September 26, 2001
Committee on Financial Services

Cultural Costs of Shorting

Can you be a short-seller and be a good Christian?

"Do not rejoice when your enemy falls and do not let your heart be glad when he stumbles."

Proverbs 24:17

Cultural Costs of Shorting

Can you be a short-seller and be a human being?

“Why is the world so unwilling to identify the culprits? The world financial system in itself would not destabilize Asia so much as the currency trader…. They were short-selling, so they could make a profit at an enormous cost to others.

Those currency traders do not look at people but at the screen of their computers….Millions of people have been thrown on the streets. Their lives have been affected, schools have closed, governments have been overthrown, but what does it mean to the currency traders?

Nothing, they just were in front of their screen, using probably some software to tell them when to sell. They are not human…. When you destroy so much wealth just to make that amount of money, what are you? An animal! Vermin!”

Dr. Mohmamad Mahathir
Prime Minister of Malaysia
Asian Affairs, September 2000

Summary

Summary

- What are the mechanics of short selling? What is a hypothecation agreement? How does they impact the practices of short-selling both in normal times and turbulent times and how short-interest data is reported?
- Why is the level of short-interest not a good indicator of how over-priced a stock is?
- What does Lamont mean by “The stock lending market works very well, except when you want to use it, in which case it works terribly.” Be specific.
- Describe 3-4 different type of constraints that short-sellers face. (Read Lamont).
- Describe specifically, in detail, how these shorting constraints can keep markets from being efficiently priced. Provide specific examples of constraints.
- What are some (at least 2) examples that short-sellers are informed investors?
- What are some of the specific issues one needs to consider in portfolio construction with shorting? How does Jim Chanos (see Pederson) handle these issues? Are they similar or dissimilar to the way Arup Datta at AJO handles them?
- What do Pederson and Chanos mean by the “behavioral impediments to short-selling”?
- How does Chanos get (and not get) information on which securities to short?
- How do firms make short-sellers lives difficult? Is this appropriate?
- Should short selling be banned generally? How about in any specific cases?

Circuit Breakers as a Type of Shorting Ban

Many exchanges have "Circuit Breakers" in place.

- If stock is down more than X% over the course of the day, all trading is halted until the next session.
- If the index is down more than Y% over the course of the day, all trading is halted until the next session.
- If the stock is down more than Z% all trading is halted for XX minutes.

Do you believe circuit breakers should be implemented?

1. Why might you as regulator want a circuit breaker?
2. As an investor do you want a circuit breaker?
3. Where could they be helpful?
4. What unintended consequences might result?
5. Should all trading be halted? Buying? Selling? Shorting?