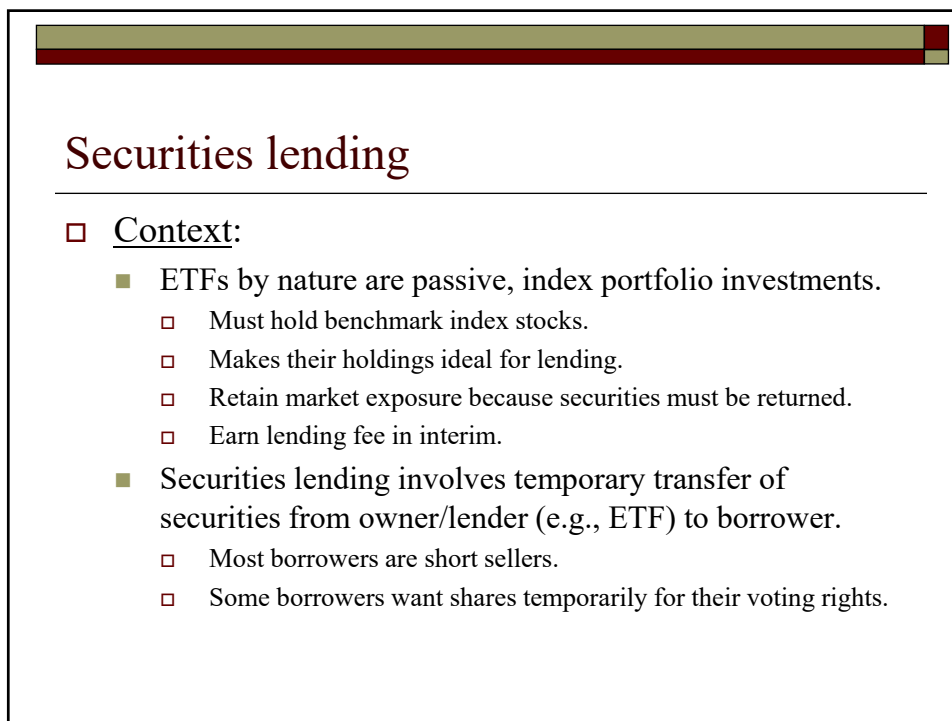


1



2

## Securities lending

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- Purpose:
  - Describe practice of securities lending.
    - Discuss short sales (why investors borrow shares).
    - Describe securities lending industry.

3

## Short sale - General

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- Short seller believes share price will fall in short run.
  - Borrows stock.
  - Deposits cash equal to market value of security plus haircut. (Loan is fully collateralized.)
    - Haircut is usually 2% to 5%.
- Lender invests cash risk-free interest rate.
  - T-bill rate or Fed Funds rate.
  - Lender then pays borrower rebate rate (i.e., risk-free interest rate less lending fee).

$$\text{rebate rate} = \text{risk-free interest rate} - \text{lending fee}$$

4

## Short sale - AAPL

- Illustration: Suppose hedge fund believes AAPL share price will drop over next day.
  - Wants to short \$1M in AAPL on 20230316.
    - Haircut is 2%.
    - Risk-free rate is 4.50%.
    - Borrow rate is 0.25%. (Called general collateral of “GC” rate.)
      - AAPL is not hard-to-borrow.
  - Consider cash flows at end of next day.
  - Support file: Short selling.xlsx
    - Sheet: AAPL short sale

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## Short sale - AAPL

AAPL short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	4.50%	Risk-free interest earned on collateral.
Borrowing rate/lending fee (%)	0.25%	Borrowing rate charged by lender.
Rebate rate (%)	4.25%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20230317	Next trading day is St. Patrick's Day (1 day later).
Share price	155.00	Last trade price.
Total share gain/loss	5,453.96	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Dollar value of shorted stock.

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## Short sale - AAPL

AAPL short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
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Borrowing rate/lending fee (%)	0.25%	Borrowing rate charged by lender.
Rebate rate (%)	4.25%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20230317	Next trading day is St. Patrick's Day (1 day later).
Share price	155.00	Last trade price.
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No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Haircut demanded by lender (depends on credit risk).

7

## Short sale - AAPL

AAPL short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	4.50%	Risk-free interest earned on collateral.
Borrowing rate/lending fee (%)	0.25%	Borrowing rate charged by lender.
Rebate rate (%)	4.25%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20230317	Next trading day is St. Patrick's Day (1 day later).
Share price	155.00	Last trade price.
Total share gain/loss	5,453.96	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Risk-free rate less borrowing rate (lending fee)  
equals rebate rate.

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## Short sale - AAPL

AAPL short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
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<i>Cash flows at settlement on next trading day</i>		
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Share price	155.00	Last trade price.
Total share gain/loss	5,453.96	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Share price fell so marked-to-market price appreciation is positive.

$$-(155.00 - 155.85) \times 6,416.43 = 5,453.96$$

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## Short sale - AAPL

AAPL short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	4.50%	Risk-free interest earned on collateral.
Borrowing rate/lending fee (%)	0.25%	Borrowing rate charged by lender.
Rebate rate (%)	4.25%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20230317	Next trading day is St. Patrick's Day (1 day later).
Share price	155.00	Last trade price.
Total share gain/loss	5,453.96	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Rebate income for lender is

$$1,020,000 \times 0.0425 \times (1/360) = 120.42.$$

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## Short sale - AAPL

AAPL short selling illustration		
Cash flows at time 0		Explanation
Date stock shorted	20230316	
Share price	155.85	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	6,416.43	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	4.50%	Risk-free interest earned on collateral.
Borrowing rate/lending fee (%)	0.25%	Borrowing rate charged by lender.
Rebate rate (%)	4.25%	Rebate rate paid to borrower.
Cash flows at settlement on next trading day		
Market-to-market next trading day	20230317	Next trading day is St. Patrick's Day (1 day later).
Share price	155.00	Last trade price.
Total share gain/loss	5,453.96	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	1	
Rebate income	120.42	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	5,574.38	Amount gained by borrower.
Rate of return	0.55%	(Price appreciation plus rebate income) / collateral.

Marked-to-market payment is  $5,453.96 + 120.42 = 5,574.38$ .  
 Rate of return is 0.55%.

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## Short sale - GME

- Illustration: Suppose hedge fund believes GME share price will drop over next few days.
  - Wants to short \$1M in GME on 20210115.
    - Haircut is 2%.
    - Risk-free rate is 0.08%.
    - Borrow rate is 31.24%.
  - Consider cash flows over single trading day.
  - Support file: Short selling.xlsx
    - Sheet: GME short sale

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## Short sale - GME

GME short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	0.08%	Risk-free interest earned on collateral.
Borrowing rate (%)	31.24%	Borrowing rate charged by lender.
Rebate rate (%)	-31.16%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20210119	Next trading is 4 days afterward.
Share price	39.36	Last trade price.
Total share gain/loss	-108,732.39	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	4	
Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Dollar value of shorted stock.

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## Short sale - GME

GME short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	0.08%	Risk-free interest earned on collateral.
Borrowing rate (%)	31.24%	Borrowing rate charged by lender.
Rebate rate (%)	-31.16%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20210119	Next trading is 4 days afterward.
Share price	39.36	Last trade price.
Total share gain/loss	-108,732.39	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	4	
Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Haircut demanded by lender (depends on credit risk).

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## Short sale - GME

GME short selling illustration		
Cash flows at time 0		Explanation
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	0.08%	Risk-free interest earned on collateral.
Borrowing rate (%)	31.24%	Borrowing rate charged by lender.
Rebate rate (%)	-31.16%	Rebate rate paid to borrower.
Cash flows at settlement on next trading day		
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Share price	39.36	Last trade price.
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Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Risk-free rate less borrowing rate (lending fee) equals rebate rate. GameStop is *hard-to-borrow*.

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## Hard-to-borrow securities

#	Symbol	Last Trade	Change	% Change	Bid	Ask	Volume	Short Sell B	Short Sell Availability
1	AAPL	158.18	+0.78	+0.50	158.18	158.19	33,402,599	0.00%	Available
2	AMZN	99.49	+1.78	+1.82	99.49	99.50	28,668,868	0.00%	Available
3	INTC	28.17	-0.99	-3.40	28.17	28.18	30,327,701	0.00%	Available
4	LUV	30.95	+0.865	+2.88	30.94	30.95	2,772,635	0.00%	Available
5	TSLA	195.89	+12.64	+6.90	195.87	195.89	95,655,679	0.00%	Available
6	SPY	396.54	+2.80	+0.71	396.53	396.54	40,411,773	0.00%	Available
7	SPXL	66.93	+1.4219	+2.17	66.91	66.92	6,424,516	1.00%	Limited
8	SVIX	21.89	-2.26	-9.36	--	--	--	--	--
9	VIXY	9.9642	-0.7958	-7.40	9.96	9.97	4,728,662	4.00%	Limited
10	UVXY	5.395	-0.625	-10.38	5.39	5.40	39,415,226	7.75%	Limited
11	UVIX	19.65	-3.404	-14.77	19.60	19.64	3,369,589	16.75%	Not Available
12	SVXY	60.87	+2.095	+3.56	60.85	60.86	3,376,966	1.75%	Limited
13	SVIX	15.10	+1.01	+7.17	15.10	15.11	3,501,021	3.00%	Not Available
14	TLT	104.84	-1.07	-1.01	104.83	104.84	10,295,009	0.00%	Available

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## Short sale - GME

GME short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	0.08%	Risk-free interest earned on collateral.
Borrowing rate (%)	31.24%	Borrowing rate charged by lender.
Rebate rate (%)	-31.16%	Rebate rate paid to borrower.
<i>Cash flows at settlement on next trading day</i>		
Market-to-market next trading day	20210119	Next trading is 4 days afterward.
Share price	39.36	Last trade price.
Total share gain/loss	-108,732.39	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	4	
Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Share price rose so marked-to-market price appreciation is negative.  
 $(35.50 - 39.36) \times 28,169.01 = -108,732.39$

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## Short sale - GME

GME short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
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Market-to-market next trading day	20210119	Next trading is 4 days afterward.
Share price	39.36	Last trade price.
Total share gain/loss	-108,732.39	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	4	
Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Rebate income is negative because borrowing rate exceeds risk-free rate.  
 $1,020,000 \times (-0.3116) \times (4/360) = -3,531.16$

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## Short sale - GME

GME short selling illustration		
<i>Cash flows at time 0</i>		<i>Explanation</i>
Date stock shorted	20210115	
Share price	35.50	
Market value of borrowed stock	1,000,000	Dollar amount of shares borrowed.
No. of shares borrowed	28,169.01	Borrower agrees to repay this number of shares.
Lender demands haircut (%)	2.00%	
Cash collateral deposited with lender	1,020,000	Dollar collateral deposited with lender.
Fed funds rate (%)	0.08%	Risk-free interest earned on collateral.
Borrowing rate (%)	31.24%	Borrowing rate charged by lender.
Rebate rate (%)	-31.16%	Rebate rate paid to borrower.
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Market-to-market next trading day	20210119	Next trading is 4 days afterward.
Share price	39.36	Last trade price.
Total share gain/loss	-108,732.39	Marked-to-market. (Pay gain/loss daily.)
No. of calendar days in trading interval	4	
Rebate income	-3,531.16	Borrower pays lender (unusual).
Total mark-to-market (share gain plus rebate)	-112,263.56	Amount gained by borrower.
Rate of return	-11.01%	(Price appreciation plus rebate income) / collateral.

Marked-to-market payment is  $-108,732.39 - 3,531.16 = -112,263.56$ .  
 Rate of return is  $-112,263.56 / 1,020,000 = -11.01\%$ .

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## Short sale - General

- ❑ Cost to borrow for seller is lending fee for ETF.
  - Can exceed risk-free rate, in which case:
    - ❑ Rebate rate is negative, and
    - ❑ Borrower pays lender (does not receive).

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## Short sale - General

---

- Who wants to borrow shares?
  - Hedge fund are often short sellers with directional view that price will fall.
    - Will borrow to sell short sell.
  - Corporate raiders wanting voting rights.
    - Will borrow temporarily and cast vote.

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## Short sale - General

---

- Who is preferred lender?
  - Lender can recall (i.e., demand) return of stock any time.
  - Borrower faces recall risk.
    - If called, must be returned within 3 business days.
  - Short sellers (borrowers) prefer to borrow from passive investors (like ETFs) to minimize recall risk.
    - Little turnover, most stable sources of stock loans (e.g., index funds)

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## Securities lending - General

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- Securities lending market is OTC market.
  - Opaque by nature.
  - Broker/dealers share quote information with each other electronically through services such as Markit.
  - Difficult get access to comprehensive histories of rates of competing broker/dealers.

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## Securities lending data

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- Downloaded intraday quote data for US securities on 20210115 from IBKR.
  - $n = 1,155,133$
- Recorded last quote of each security.
  - $n = 12,175$
- Support file: Securities lending rates 20210115.xlsx
  - Sheet: USA.20210115

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## Securities lending data

**Last quote rebates rates for US securities on 20210115 (Source: IBKR)**

Ticker	Name	Rebate date	Lending fee	Amount	Risk-free rate
OGFGY	ORIGIN ENERGY LTD-UNSPON ADR	-0.1700	0.2500	6000	0.0800
FLWS	1-800-FLOWERS.COM INC-CL A	-0.2012	0.2812	450000	0.0800
VCVC	10X CAPITAL VENTURE ACQ-CL A	-0.1700	0.2500	400	0.0800
VCVCU	10X CAPITAL VENTURE ACQUISIT	-1.2266	1.3066	50000	0.0800
TXG	10X GENOMICS INC-CLASS A	-0.1700	0.2500	1400000	0.0800
RETC	12 RETECH CORP	-0.8709	0.9509	>10000000	0.0800
ONCP	141 CAPITAL INC	-0.1700	0.2500	>10000000	0.0800
YQ	17 EDUCATION & TECHNOLOGY GR	-69.5440	69.6240	2000000	0.0800
TURN	180 DEGREE CAPITAL CORP	-2.4859	2.5659	250000	0.0800
ATNF	180 LIFE SCIENCES CORP	-7.4003	7.4803	200000	0.0800

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## Securities lending rate analysis

### □ Explanations.

Ticker	Company name	Absolute Relative			Shares outst (K)	Market cap (\$K)	Shares traded	Relative volume	Return volatility	Rebate rate (%)	Lending fee (%)
		Midpoint	spread	spread							
FLWS	1 800 FLOWERS COM INC	29.510	0.0200	0.0007	36,657	1,081,748	679,231	0.0185	0.6094	-0.2012	0.2812
TXG	10X GENOMICS INC	179.635	0.0700	0.0004	85,804	15,413,402	545,384	0.0064	0.5258	-0.1700	0.2500
TURN	180 DEGREE CAPITAL CORP	6.395	0.0500	0.0078	7,937	50,757	12,233	0.0015	0.3819	-2.4859	2.5659
GOED	1847 GOEDEKER INC	9.450	0.2600	0.0275	6,111	57,749	146,572	0.0240	0.9487	-4.6073	4.6873
BCOW	1895 BANCORP OF WISCONSIN INC	10.285	0.4300	0.0418	4,834	49,718	923	0.0002	0.2914	-0.7201	0.8001

Midpoint = (bid + ask) / 2 at close of day

Absolute spread = (ask – bid)

Relative spread = Absolute spread / Midpoint

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## Securities lending rate analysis

- File contains all US securities IBKR will lend.
  - Select only stocks to illustrate.
  - Match tickers from IBKR to CRSP file (contains only stock data).
  - Downloaded daily data from 20201001 through 20210115 (74 trading days).
    - Eliminated stocks with missing trading days.
    - Sample size is  $n = 6,798$ .
  - Sheet: Stocks only

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## Securities lending rate analysis

- Explanations.

Ticker	Company name	Midpoint	Absolute spread	Relative spread	Shares outst (K)	Market cap (\$K)	Shares traded	Relative volume	Return volatility	Rebate rate (%)	Lending fee (%)
FLWS	1 800 FLOWERS COM INC	29.510	0.0200	0.0007	36,657	1,081,748	679,231	0.0185	0.6094	-0.2012	0.2812
TXG	10X GENOMICS INC	179.635	0.0700	0.0004	85,804	15,413,402	545,384	0.0064	0.5258	-0.1700	0.2500
TURN	180 DEGREE CAPITAL CORP	6.395	0.0500	0.0078	7,937	50,757	12,233	0.0015	0.3819	-2.4859	2.5659
GOED	1847 GOEDEKER INC	9.450	0.2600	0.0275	6,111	57,749	146,572	0.0240	0.9487	-4.6073	4.6873
BCOW	1895 BANCORP OF WISCONSIN INC	10.285	0.4300	0.0418	4,834	49,718	923	0.0002	0.2914	-0.7201	0.8001

Shares outstanding in thousands

Market cap = Shares outstanding x Midpoint

Shares traded = Number of shares traded on 20210115

Relative volume = Shares traded x Midpoint / Market cap

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## Securities lending rate analysis

□ Explanations.

Ticker	Company name	Midpoint	Absolute spread	Relative spread	Shares outst (K)	Market cap (\$K)	Shares traded	Relative volume	Return volatility	Rebate rate (%)	Lending fee (%)
FLWS	1 800 FLOWERS COM INC	29.510	0.0200	0.0007	36,657	1,081,748	679,231	0.0185	0.6094	-0.2012	0.2812
TXG	10X GENOMICS INC	179.635	0.0700	0.0004	85,804	15,413,402	545,384	0.0064	0.5258	-0.1700	0.2500
TURN	180 DEGREE CAPITAL CORP	6.395	0.0500	0.0078	7,937	50,757	12,233	0.0015	0.3819	-2.4859	2.5659
GOED	1847 GOEDEKER INC	9.450	0.2600	0.0275	6,111	57,749	146,572	0.0240	0.9487	-4.6073	4.6873
BCOW	1895 BANCORP OF WISCONSIN INC	10.285	0.4300	0.0418	4,834	49,718	923	0.0002	0.2914	-0.7201	0.8001

Return volatility = 74-day historical volatility

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## Securities lending rate analysis

□ Explanations.

Ticker	Company name	Midpoint	Absolute spread	Relative spread	Shares outst (K)	Market cap (\$K)	Shares traded	Relative volume	Return volatility	Rebate rate (%)	Lending fee (%)
FLWS	1 800 FLOWERS COM INC	29.510	0.0200	0.0007	36,657	1,081,748	679,231	0.0185	0.6094	-0.2012	0.2812
TXG	10X GENOMICS INC	179.635	0.0700	0.0004	85,804	15,413,402	545,384	0.0064	0.5258	-0.1700	0.2500
TURN	180 DEGREE CAPITAL CORP	6.395	0.0500	0.0078	7,937	50,757	12,233	0.0015	0.3819	-2.4859	2.5659
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Rebate rate and lending fee from IBKR file.

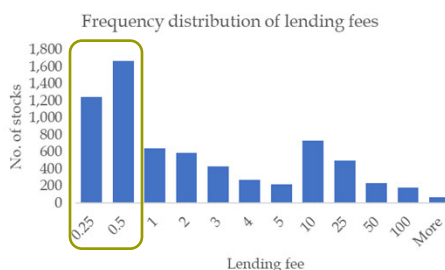
Overnight interest rate on 20210115 is 0.08%.

Rebate rates are negative.  
– Borrower pays lender.

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## Securities lending rate analysis

- Lending rates are highly skewed to right.



1st bar: Minimum lending fee is 0.25.

- Called general collateral or GC rate.
- Stocks are “easy-to-borrow.”
- 1,248 stocks

2<sup>nd</sup> bar: Lending fee is >0.25 and <=0.50.

- 1,671 stocks

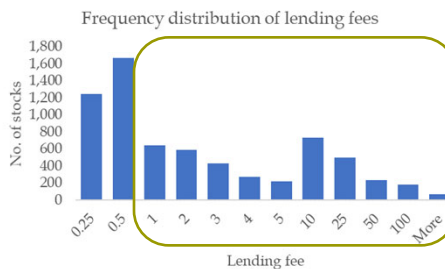
Together: Lending fee is >=0.25 and <=0.50.

- 2,929 of 6,798

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## Securities lending rate analysis

- Lending rates are highly skewed to right.



Stocks are said to be hard-to-borrow or in short supply.

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## Securities lending rate analysis

- What are characteristics of hard-to-borrow stocks?
  - Eliminated all stocks with lending fees less than or equal to 0.50.
    - With little or no variation in the lending fee, have nothing to explain.
    - $n = 3,879$
  - Computed average parameters for each decile.

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## Securities lending rate analysis

- What are characteristics of hard-to-borrow stocks?

Decile	Midpoint	Relative spread	Market cap (\$K)	Shares traded	Relative volume	Return volatility	Lending fee (%)
1	31.93	0.0057	2,221,014	1,169,906	0.0160	0.5102	0.594
2	32.73	0.0077	2,011,310	1,511,123	0.0217	0.4825	0.924
3	33.34	0.0065	1,237,622	1,316,582	0.0229	0.4357	1.478
4	38.48	0.0050	1,046,605	1,023,714	0.0279	0.3643	2.275
5	34.61	0.0040	729,452	1,032,315	0.0260	0.3600	3.303
6	37.47	0.0044	1,056,080	888,751	0.0286	0.3500	4.942
7	40.32	0.0043	668,516	931,626	0.0190	0.3226	6.929
8	26.42	0.0047	417,314	2,895,565	0.0396	0.4379	10.562
9	19.99	0.0055	365,229	2,539,523	0.0594	0.5541	20.824
10	11.34	0.0097	324,938	3,518,057	0.1625	0.9350	70.470

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## Securities lending rate analysis

- What are characteristics of hard-to-borrow stocks?

Correlation matrix						
	Midpoint	Relative Spread	Market cap (\$K)	Relative volume	Return volatility	Lending fee (%)
Midpoint	1	-0.683	0.427	-0.871	-0.914	-0.858
Rel sprd	-0.683	1	0.097	0.723	0.870	0.701
Mkt cap	0.427	0	1	-0.523	-0.215	-0.539
RelVol	-0.871	0.723	-0.523	1	0.922	0.994
Volatility	-0.914	0.870	-0.215	0.922	1	0.913
Lending fee	-0.858	0.701	-0.539	0.994	0.913	1

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## Securities loan details

- What do terms of loan imply?
  - Will take GME on 20210115 as example.
  - Pulled from IBKR data.
  - Support file: Securities lending illustration (GME).xlsx

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## Security loan details

Information from IBKR.

GME securities lending illustration	
<i>Description of security lending opportunity</i>	
Date	1/15/2021
Ticker	GME
Name	GAMESTOP CORP-CLASS A
Rebate rate (%)	-31.16
Lending fee (%)	31.24
Amount available	1,000,000
Risk-free interest rate (%)	0.08
<i>Loan</i>	
Loan value	1,000,000
Haircut (2% - 5%)	2.00%
Cash collateral	1,020,000
<i>Cash flows over next trading day (360 calendar days)</i>	
Next trading day	1/19/2021
No. of calendar days in trading interval	4
Income from T-bills earned by lender	9.07
Lending fee	3,540.23
Rebate payment to borrower	-3,531.16

Pulled directly from IBKR file.

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## Security loan details

Information from IBKR.

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Borrow \$1M in GME shares.

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## Security loan details

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Borrow \$1M in GME shares.

Loan	
Loan value	1,000,000
Haircut (2% - 5%)	2.00%
Cash collateral	1,020,000

Lender demands haircut of 2%.

<i>Cash flows over next trading day (360 calendar days)</i>	
Next trading day	1/19/2021
No. of calendar days in trading interval	4
Income from T-bills earned by lender	9.07
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Rebate payment to borrower	-3,531.16

Borrowing provides \$1.02M in cash collateral.

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## Security loan details

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Lending fee (%)	31.24
Amount available	1,000,000
Risk-free interest rate (%)	0.08

Interest is paid daily.

Loan	
Loan value	1,000,000
Haircut (2% - 5%)	2.00%
Cash collateral	1,020,000

4-day weekend.

Risk-free interest income is

<i>Cash flows over next trading day (360 calendar days)</i>	
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$1,020,000 \times 0.0008 \left( \frac{4}{360} \right) = 9.07$

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## Security loan details

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Lending fee (%)	31.24
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Risk-free interest rate (%)	0.08
	Interest is paid daily.
<i>Loan</i>	
Loan value	1,000,000
Haircut (2% - 5%)	2.00%
Cash collateral	1,020,000
	4-day weekend.
	Lending fee is
<i>Cash flows over next trading day (360 calendar days)</i>	
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Rebate payment to borrower	-3,531.16

$$1,020,000 \times 0.3124 \left( \frac{4}{360} \right) = 3,540.23$$

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## Security loan details

Information from IBKR.


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$$1,020,000 \times (-0.3116) \left( \frac{4}{360} \right) = -3,531.16$$

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## Securities lending by ETFs

**BUZZ** VanEck  
Social Sentiment ETF



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**Fund Details**

Fund Ticker	BUZZ
Intraday NAV (IIV)	BUZZIV
Index Ticker	BUZZTR
Total Net Assets (\$M)	116.80
Options	Available
Exchange	NYSE Arca
Inception Date	03/02/21

**Fund Data**

Number of Holdings	75
Currency	USD
Price/Earnings Ratio*	24.06
Price/Book Ratio*	4.74
Weighted Avg. Market Cap (\$M)	\$362,651

**Fund Description** As of January 31, 2022

VanEck Social Sentiment ETF (BUZZ) seeks to track, as closely as possible, before fees and expenses, the price and yield performance of the BUZZ NextGen AI US Sentiment Leaders Index (BUZZTR), which is intended to track the performance of the 75 large cap U.S. stocks which exhibit the highest degree of positive investor sentiment and bullish perception based on content aggregated from online sources including social media, news articles, blog posts and other alternative datasets.


**Top 10 Holdings**

Holding Name	Ticker	% of Net Assets
APPLE INC	AAPL US	3.39
PFIZER INC	PFE US	3.17
AMAZON.COM INC	AMZN US	3.09
SOFI TECHNOLOGIES INC	SOFI US	3.07
BLACKBERRY LTD	BBRY US	3.05
NVIDIA CORP	NVDA US	2.98
GAMESTOP CORP	GME US	2.90
TESLA INC	TSLA US	2.89

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## Securities lending by ETFs

**BUZZ** VanEck  
Social Sentiment ETF



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SOFI TECHNOLOGIES INC	SOFI US	3.07
BLACKBERRY LTD	BBRY US	3.05
NVIDIA CORP	NVDA US	2.98
GAMESTOP CORP	GME US	2.90
TESLA INC	TSLA US	2.89

BUZZ holds \$116.80M x .0290 = \$3.39M in GME shares.

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## Securities lending by ETFs

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- VanEck can lend all its GME shares in BUZZ.
  - But conceivably, they have GME shares in other ETFs.
- VanEck wants to lend all its GME shares.
  - Decision made at issuer level not ETF level.
  - GME shares are aggregated by issuer's securities lending desk and are available to lend.
  - Any profit from GME share lending is allocated across VanEck ETFs on pro rata basis.

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## GME lending rates

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- Lending fees vary on daily basis depending on available supply.
  - IBKR is one broker/dealer.
    - Others with different fees and supplies.
    - Unlike exchange-trader markets, OTC market is not transparent.
  - Consider IBKR's lending rates during period 20191202 through 20221218.

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## GME lending rates



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## Prophecy fulfilled

- *Financial Times* (April 2013) “Vanguard raises the possibility of free ETFs”
  - “...revenues from securities lending alone are sufficient to make ETFs profitable.”
  - “...cost of investing [in ETFs] could come down to zero.”
  - “Exchange traded fund providers have room to reduce charges to zero and could even pay clients to invest in their products, ...”

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## Inferring securities lending income

- Can deduce revenue from securities lending using ETFs on S&P 500.
  - Recall:

S&P 500 ETFs					
Symbol	Name	Assets	Inception	ER	Days
SPY	SPDR S&P 500 ETF Trust	455,031	19930122	0.09%	13
IVV	iShares Core S&P 500 ETF	335,954	20000515	0.03%	141
VOO	Vanguard S&P 500 ETF	281,038	20100907	0.03%	121

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## Inferring securities lending income

- SPY and IVV are both benchmarked to S&P 500.
  - SPY: AUM \$455.0B and ER 0.0945% (from fact sheet)
  - IVV: AUM \$336.0B and ER 0.03%
- SPY and IVV cost structures are similar.
- But SPY is unit investment (UIT) trust and cannot lend securities by statute. IVV can. Hence, IVV has lower expense ratio.
- IVV's estimated revenue from securities lending is

$$(.000945 - .0003) \times \$336.0B = \$216.7M$$

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## Inferring securities lending income

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- Why is SPY an UIT?
  - First ETF launched and was only structure SEC would approve.
    - DIA and QQQ are also UITs.
  - Once track record of stability was established, SEC allowed securities lending.
    - IVV and VOO “40 Act” structure.

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## Inferring securities lending income

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- Why doesn't SPY change to “40 Act” structure?
  - UIT SPY would have to “sell” its assets to new 40 Act SPY Trust.
  - Creates taxable event.
  - Involves trading costs, potential slippage, and tracking error.

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## Lesson summary

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- Securities lending income is important source of ETF revenue.
  - Subsidize costs reducing expense ratios.
    - Particularly true for thematic indexes with less liquid securities.
- Short sellers prefer to borrow from passive investors like ETFs.
  - Minimizes recall risk.

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