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for Quantitative Financial Research

ETF Short Interest and Failures-to-Deliver: Naked Short-Selling or Operational Shorting?

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Context…

- ETFs are Big…
  - Over \$4.7 trillion invested worldwide, \$3.5 trillion in the U.S.
- There's lots of shorting in ETFs…
  - ETFs account for 20% of the overall dollar value of short interest…but only…10% of market capitalization.
- …and lots of failing to deliver (FTD).
  - ETF FTDs account for over 78% of the dollar volume of all equity-related FTDs

…and high lending rates too…

- *Top 100 lending rates on two randomly selected dates…*

Rank	Date	Ticker	Name	Type	Loan Fee
1.00	3-Aug-11	SHZ	Sphere FTSE Emerging Markets Sustainable Yield Index	ETF	9767.322
30.00	3-Aug-11	GRNB	Vaneck Vectors/ Green BD ETF	ETF	4574.404

Rank	Date	Ticker	Name	Type	Loan Fee
1	15-Nov-11	SHZ	Sphere FTSE Emerging Markets Sustainable Yield Index	ETF	9780.328
84	15-Nov-11	GRNB	Vaneck Vectors/ Green BD ETF	ETF	1313.298

…2 top rates (including #1) on both days are ETFs…

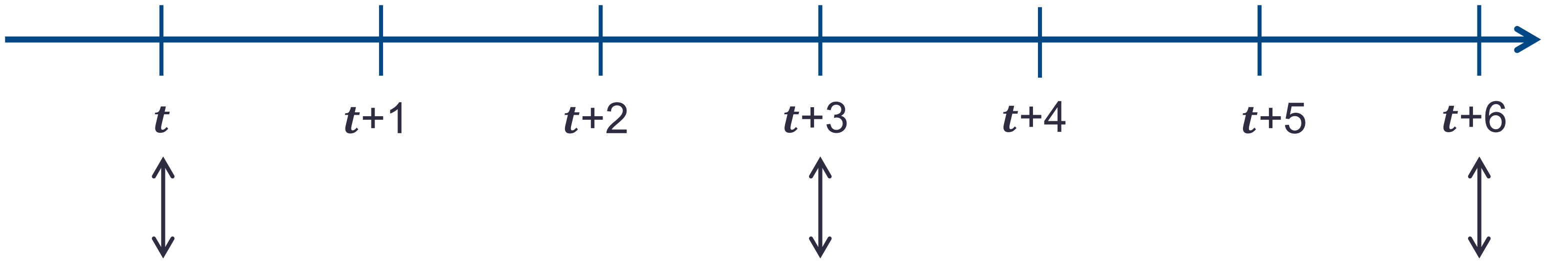
What does this paper do?

- Describes a Market Practice

- Traces Out Some Implications:

1. There is a disconnect between ETF activity and underlying activity.
    - Operational shorting is negatively related to intraday spreads and volatility, thus acting as a “release valve.”
2. Operational shorting is associated with increased FTDs.
    - Strong positive correlation between operational shorting and ETF FTDs.
3. There are two types of shorting: informationally motivated and operational shorting.
    - No relationship between operational shorting and the future return on underlyings.
4. There is a possible financial contagion through a commonality in APs and market makers.
    - Increases in operational shorting and FTDs for one ETF are related to the operational shorting/FTDs of other ETFs that are traded by the same lead market maker.

The market practice of waiting to deliver



When the buy/sell imbalance > 0, the AP sells ETF shares which it has not yet created in the primary market, thereby establishing an operational short (OS) position.

Between t and t+2, the AP has four available options (or a combination of these options):

1. Create ETF shares and close OS position
2. Borrow from another market maker and cover
3. Buy shares from open market and cover, or
4. Decide to wait, which results in a Fail to Deliver (FTD) at t+3.

At t+3, if AP opts to wait (option 4) an FTD position for the remaining OS shares is reported.

If the AP decided to fail at t+3, then t+6 is the last day to close-out the original FTD position. The ETF AP submits a creation order to NSCC. The ETF shares outstanding reflect this create/redeem activity.

…MM's can decide to wait to create

…which generates a FTD

…and, theoretically, this can be measured.

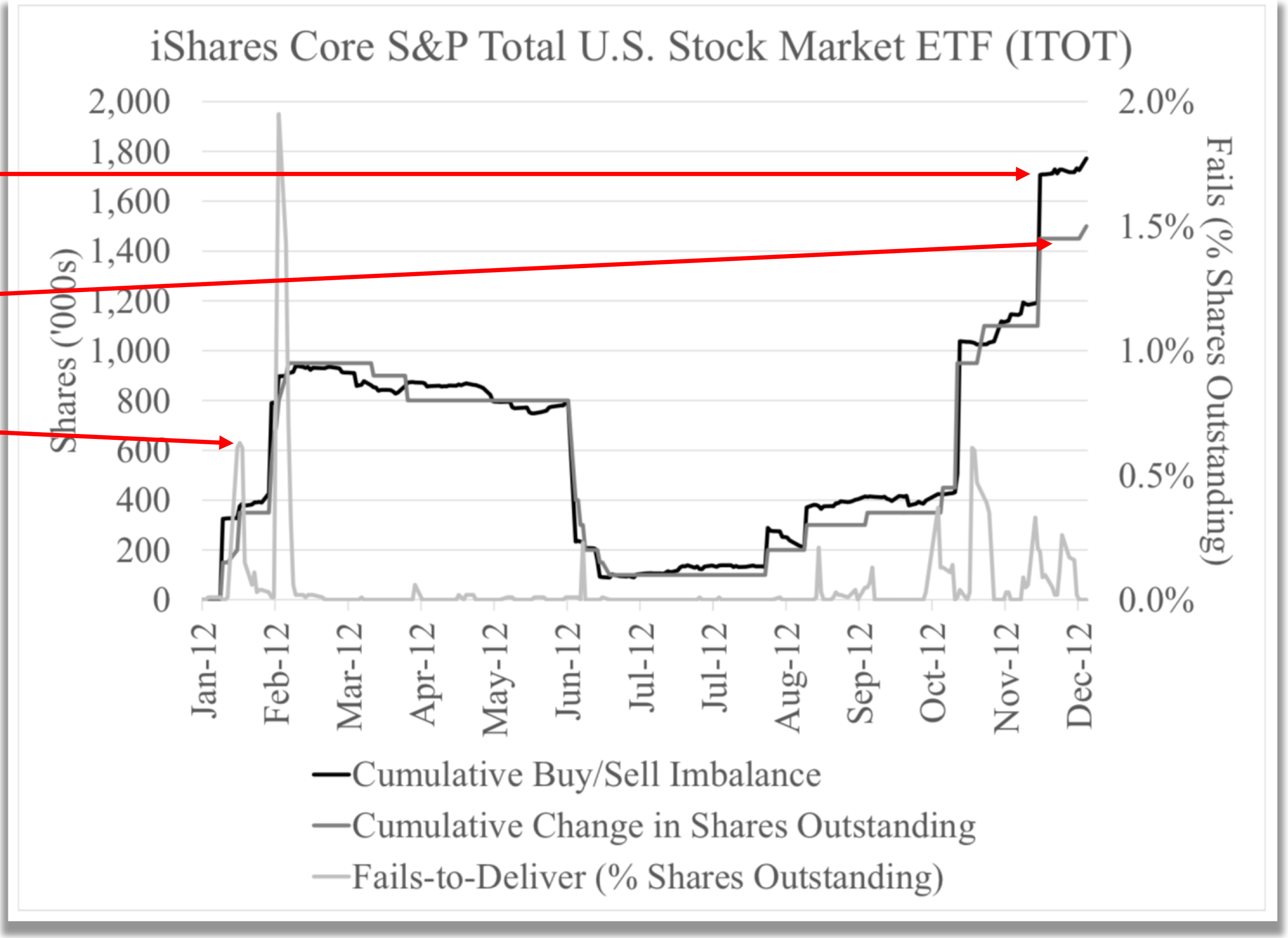
The Key Measure: Operational Shorting

- "The operational shorting measure…compares the cumulative buy-sell imbalance to the cumulative change in shares outstanding"
- …"an estimate of the potential short positions and failures-to-deliver that result due to the lagged response of APs/market makers to the excess demand."

$$\frac{\max[0, (0, \text{Cumulative Buy/Sell Imbalance}(t-3, t-1) - \Delta\text{Shares Outstanding}(t-1, t))]}{\text{Shares Outstanding}(t - 3)}$$

Operational Shorting in Pictures

- Buy/Sell Imbalance
- Shares Outstanding
- ETF FTDs



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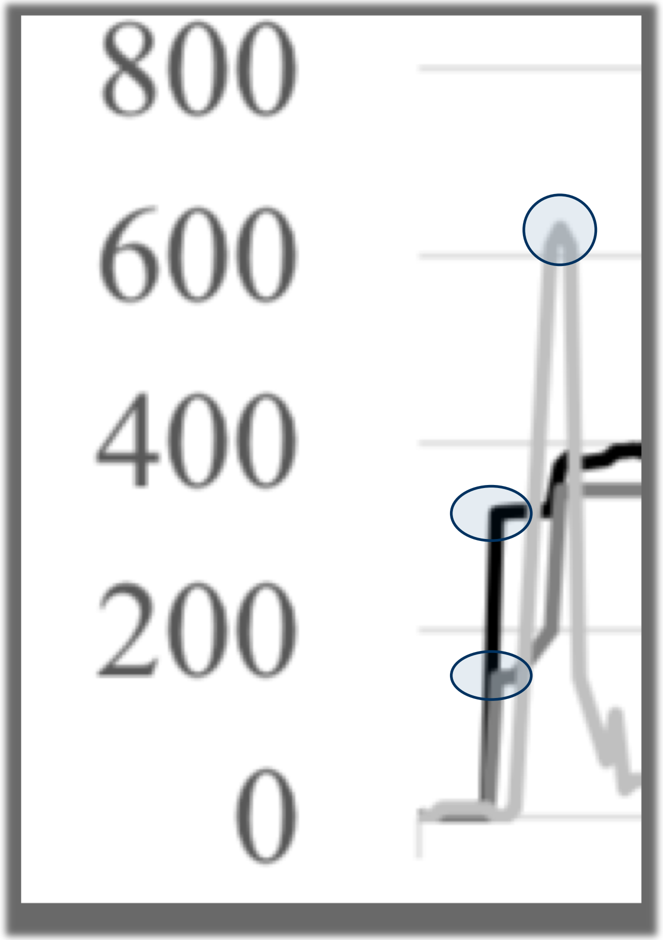
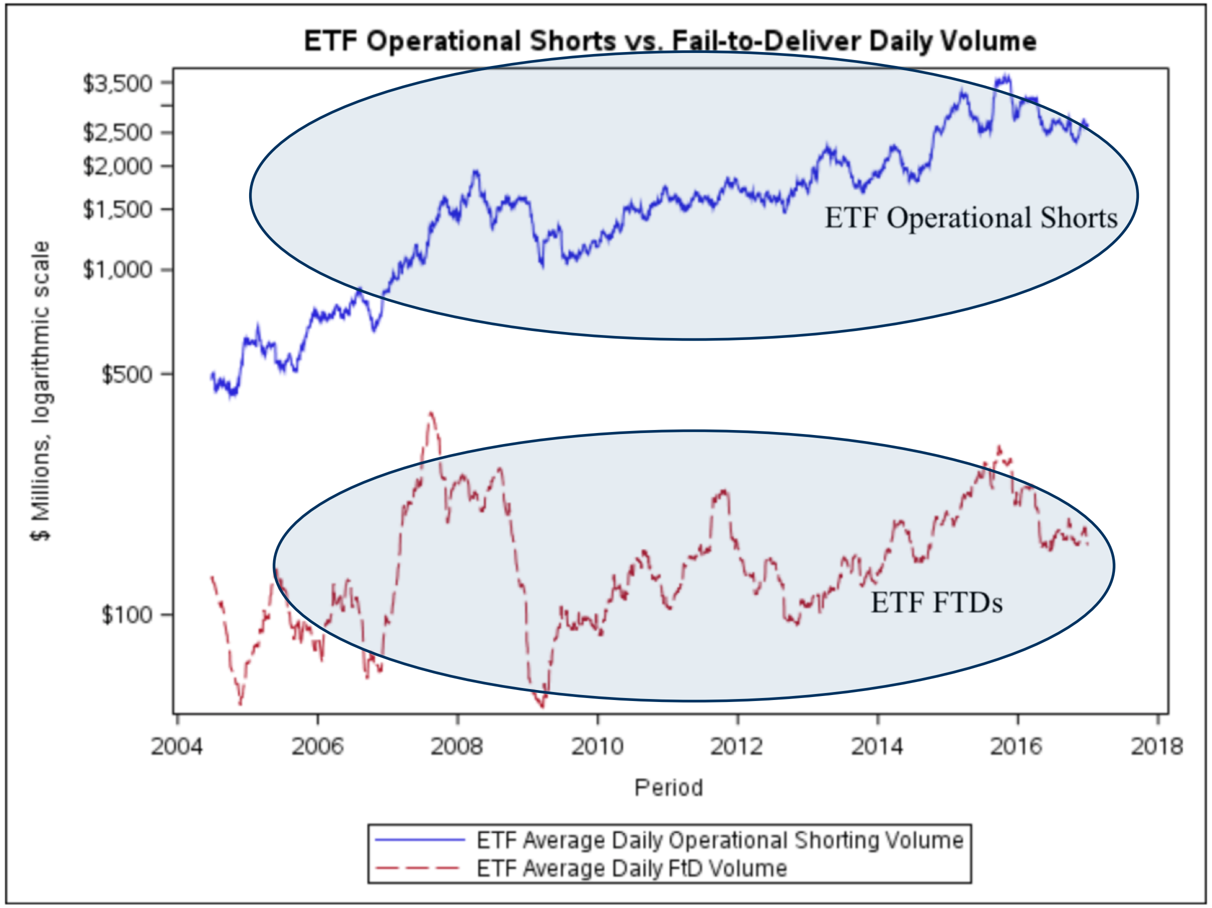


Result: Co-movement between Operational Shorting and ETF FTDs.

A Key Result: Correlation

- ETF Operational Shorts
- ETF FTDs



Result: Co-movement between Operational Shorting and ETF FTDs.

A Key Result: Release Valve

- Underlying Volatility
- On ETF Ownership
- On Operational Shorting

	Average Intraday Second-by-Second Return Volatility			
	(1)	(2)	(3)	(4)
Average ETF Ownership in Underlying Stocks in ETF Basket (t-1)	0.00018230***	0.00006649***		
	(2.79)	(2.78)		
Operational Shorting, as % of Shares Outstanding at (t-1)			-0.00002750**	-0.00001036**
			(-2.56)	(-2.51)

ETF ownership is <u>positively</u> associated with higher volatility of the ETF's underlying…
…consistent with Ben-David et. al.

However, operational shorting is <u>negatively</u> related to volatility…
...acting as a "release valve".

A Key Result: Connection to Future Returns

Literature shows short-selling predictive of future returns…consistent with a "directional" motive for informed short sellers.

- Returns
- On Operational Shorting

	ETF Ret (t) (1)	ETF Ret (t+1) (2)	ETF FF4 α (t+1) (3)	NAV Ret (t+1) (4)	NAV FF4 α (t+1) (5)
Operational Shorting - Weekly % (t)	2.368***	-0.252	-0.0370***	-0.107	-0.00255
	(8.93)	(-1.46)	(-2.93)	(-0.63)	(-0.20)

…new result: operational shorting has no relationship with future returns.

Questions About the Measure

$$\frac{\max[0, \left(0,\text{Cumulative Buy/Sell Imbalance}(t-3, t-1) - \Delta\text{Shares Outstanding}(t-1, t)\right)]}{\text{Shares Outstanding(t - 3)}}$$

- Is the trading imbalance prone to error? What if NBBO trade signing is off? Order imbalance is natural…
- How can you tell it's not coming from market maker inventory (at least initially)?

At a higher level…

- Q: Why are market makers willing to take economic exposure? In other words, why doesn’t the price adjust more?

- A1: They’re below minimum creation size…need to wait.

- A2: They can hedge…sometimes.

- A3: They’re taking bets…

“they've discovered that they can make a predictable return” - *Jim McTague, Barron’s*

Are market makers quants now too?

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MARKETS

Wall Street Erases the Line Between Its Jocks and Nerds

There used to be a strict hierarchy: Traders made money and won glory while programmers wrote code and stayed out of sight. Those days are over.

"…At Citigroup Inc., traders work alongside coders from the bank's quantitative analysis group…"

This paper: Market makers are the same as the AP's, and they aren't going home net zero anymore. They're taking directional bets…Nice Contribution.

Can the paper do more?

- Exploit differences in creation units:
  - *"70% of ETFs traded in the U.S. have creation units with blocks of 50,000 ETF shares, but creation unit sizes can range from 25,000 to 200,000 shares." -Ben-David et. al. (2017)*

- Exploit differences in creation/redemption fees:
  - *"The fees can decrease with size for some ETFs…and it is also not uncommon for them to have negative fees…" –etf.com*

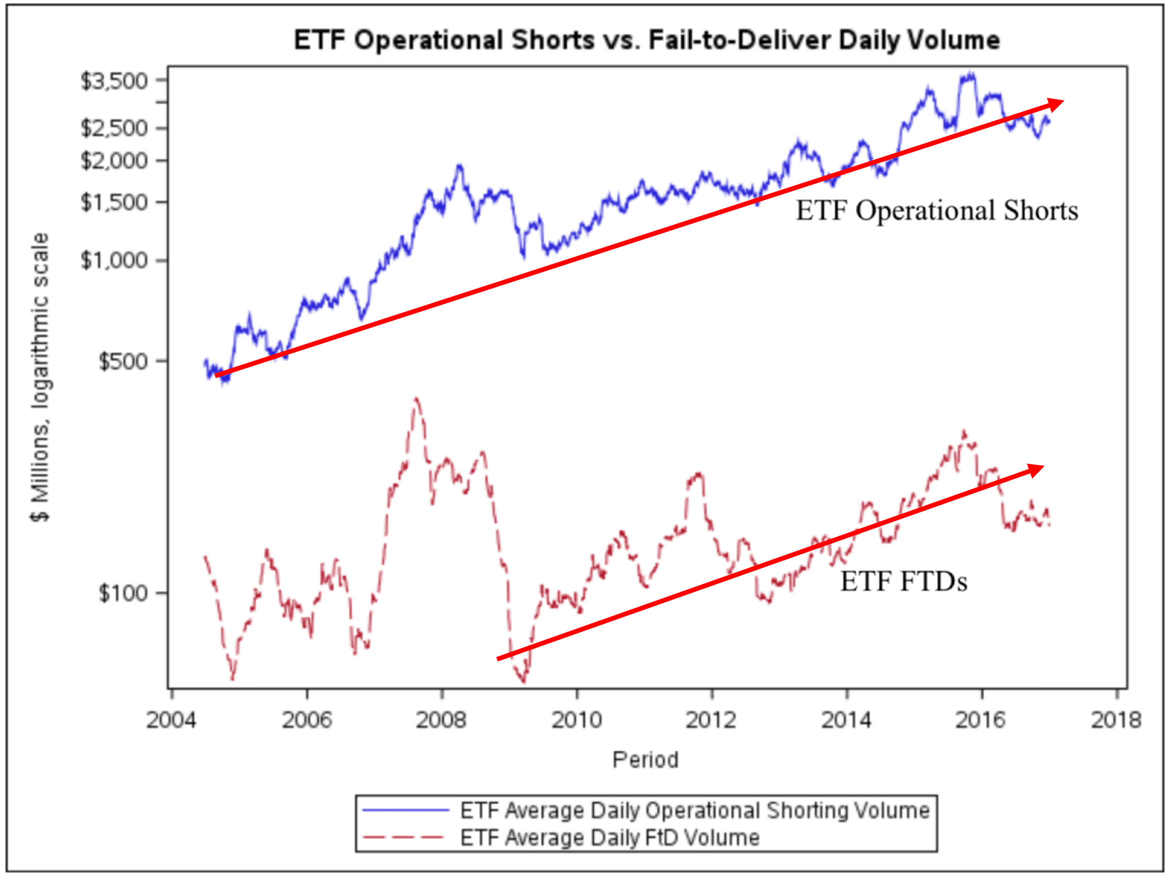
Can the paper do more?

- What about operational buying?

- Asymmetry between buying and selling could be interesting because lending fees (and shorting costs more generally) can be employed on one side to test the effects of liquidity & trading costs.

What about the trend?

- ETF Operational Shorts
- ETF FTDs



Is there any piece of the story that could explain the upward trend?

Can we get an even sharper test?
Recent Amendment: Settlement Cycle – Rule15c6-1(a)

- On March 22, 2017, the Commission amended Rule 15c6-1(a)

- …fails to deliver resulting from long sales or sales from bona fide market making activity, the existing close-out requirement will be reduced from T+6 to T+5.

- In addition, shortening the standard settlement cycle to T+2…

- …reduce the number of days (from 13 business days to 12 business days)…before being required to close out a customer transaction…

- **Compliance Date:** September 5, 2017

What about risks?
Rule 204 – Close-out Requirement

- Rule 204 requires brokers to take action to close out failure to deliver positions.

- If a participant has a failure to deliver…that is attributable to bona fide market making activities, the participant must close out the failure to deliver by T+6.

...but then…consequences of failing longer…

- If the position is not closed out, the broker or dealer and any broker or dealer…may not effect further short sales in that security without borrowing or "pre-borrowing"

- …must immediately purchase shares to close out failures to deliver in securities with large and persistent failures to deliver, referred to as "threshold securities," if the failures to deliver persist for 13 consecutive settlement days.

Other Suggestions

- More can be done with the motivations for operations shorting.

- Why not try to measure the profitability of waiting?

- Predicting returns results could be sharpened.

- Narrative can be honed further…focus on one or two key takeaways other than the market practice.

Overall

- A very nice paper.
- Descriptive treatment of market practice is nice.
- Opens up a new way of thinking about market making and shorting in the ETF world.
  - *…possibly shifting how we think about short interest overall.*
- Tremendous institutional background…paper likely to be a heavily cited reference work.