# Innovation and Informed Trading: Evidence from Industry ETFs

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# The rise of ETFs…

- Few recent financial innovations have had the impact of ETFs
  - More than 5,000 exchange-traded products, assets now exceeding those of hedge funds, etc.
- This "disruptive innovation" has had far reaching effects
  - A more liquid, lower-cost alternative to mutual funds
  - A vehicle to access unavailable asset classes
- In this paper we investigate another role — the expanded ability to hedge

# Industry ETFs

- We focus on the role of industry ETFs and how this innovation affects informed trading and the efficiency of the market.
  - Innovations that facilitate risk-sharing can facilitate informed trading (Dow, 1998; Goldstein, Li, and Yang, 2014; et al)
  - While futures or index ETFs can be used to hedge market risk, industry ETFs can better hedge industry risk
    - Investors bet on firm-specific information: long stocks/short ETFs
  - We can use the time-series variation in inception dates to investigate their economic impact.

# Short interest on industry ETFs

**15 Most Shorted ETFs (excluding inverse/leveraged)**

| Ticker | Fund | Short Interest % |
|---|---|---|
| XRT | SPDR S&P Retail ETF | 507.99 |
| SMH | VanEck Vectors Semiconductor ETF | 176.58 |
| UNG | United States Natural Gas Fund LP | 106.57 |
| XOP | SPDR S&P Oil & Gas Exploration & Production ETF | 89.41 |
| VXX | iPath S&P 500 VIX Short-Term Futures ETN | 80.95 |
| FXE | CurrencyShares Euro Trust | 78.56 |
| XBI | SPDR S&P BIOTECH ETF | 59.43 |
| IMED | PureFunds ETFx HealthTech ETF | 58.63 |
| DWLV | PowerShares DWA Momentum & Low Volatility Rotation Portfolio | 57.34 |
| FXY | CurrencyShares Japanese Yen Trust | 55.53 |
| CTNN | iPath Pure Beta Cotton ETN | 50.00 |
| EWW | iShares MSCI Mexico Capped ETF | 48.07 |
| IYR | iShares U.S. Real Estate ETF | 47.92 |
| ERY | Direxion Daily Energy Bear 3X Shares | 46.39 |
| OIH | VanEck Vectors Oil Services ETF | 42.75 |

*Source: Bloomberg; data as of July 17, 2017*

- Industry ETFs have large short interest
- Short interest does not have to imply a bearish outlook
  - Bloomberg recently argued "…The funds' shorts don't necessarily indicate bearish sentiment, but rather are used to hedge out part of the market in order to isolate a long position…"

# "long the stock/short the ETF"

- We hypothesize that informed traders use industry ETFs to hedge their long positions on firms with positive firm-specific information
- Two implications
  - Short interest on the industry ETF should generate a temporary price impact leading to a price reversal on ETFs
    - Short interest could positively predict the return of the industry ETF
  - This hedging let informed traders trade more aggressively, which could make the market for underlying stocks more efficient

# Our empirical work

- We test for return predictability using a Fama-MacBeth approach.
  - We know positive short interest predicts negative performance at the stock level – is this also true for the industry ETF?

- We test for the informed trading effects using earnings announcements.
  - If more aggressive informed trading, then the market should react less to positive earnings surprises.

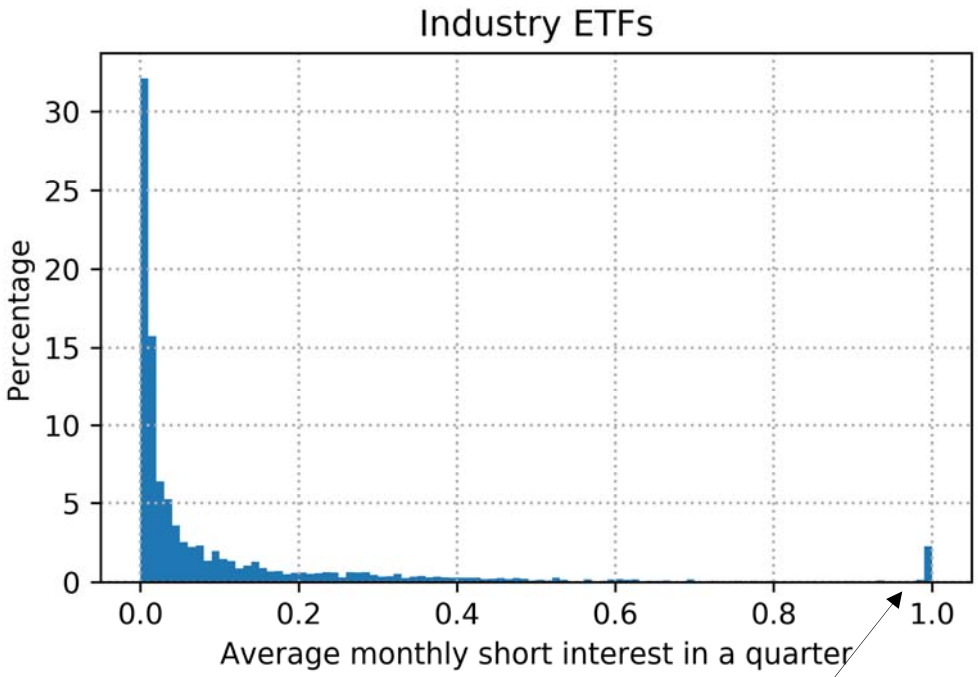
# A vast literature(s)

- Innovations facilitate risk-sharing or facilitate speculative trading — Allen and Gale(1994); Dow(1998); Simsek (2013)
- EFTs as financial innovations — Chen (1995); Cong and Xu (2016); Madhavan (2016); Bhattacharya and O'Hara (2017)
- Empirical ETFs — Ben-David et al (2014); Wermers and Xue (2015); Glosten et al (2017); Israel et al (2017)
- Short-selling — Diether et al (2009); Battalio and Shultz (2011); Grundy et al (2012); Comerton-Forde, et al (2016)

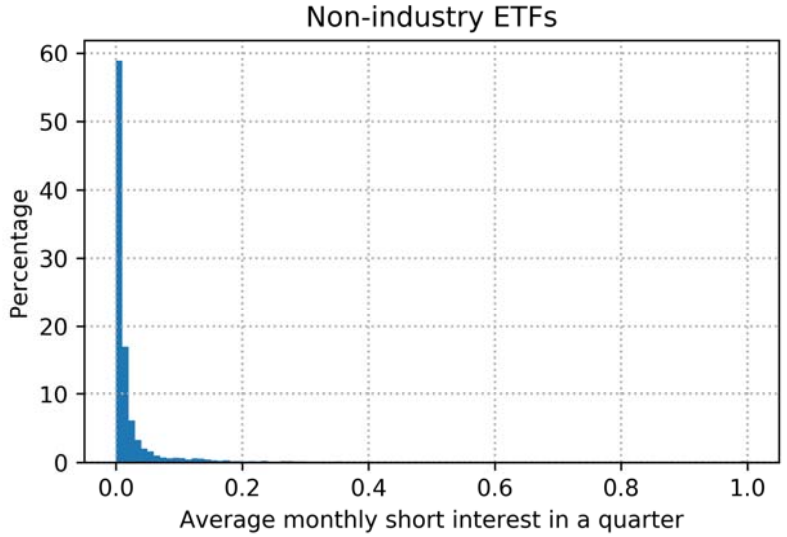
# Data and Sample

- **The ETF list**
  - CRSP Mutual Fund Database + ETFDB
  - Equity only, US only — 449 ETFs
- **Extract industry ETFs based on holdings**
  - Thompson Reuters 13F data + CRSP for holdings
  - We require the dominant industry holdings exceed one-third of ETFs holdings and the ETF must have at least 30 stocks
  - Data on price and volume are from CRSP, short interest is from COMPUSTAT
- Final sample — 116 industry ETFs (based on FF12 industry classification)
- **Earnings data** is constructed following Livnat and Mendenhall (2006), and $SUE_{i,t} = \frac{EPS_{i,t} - EPS_{i,t-4}}{\sigma_{i,t}}$
- **Funds data**
  - Hedge funds list is constructed following Griffen and Xu (2009)
  - Intuitional holdings based on Thompson Reuters 13F

# Industry vs. Non-industry ETFs




Short interest > 100% shares outstanding



# Industry vs. Non-industry ETFs

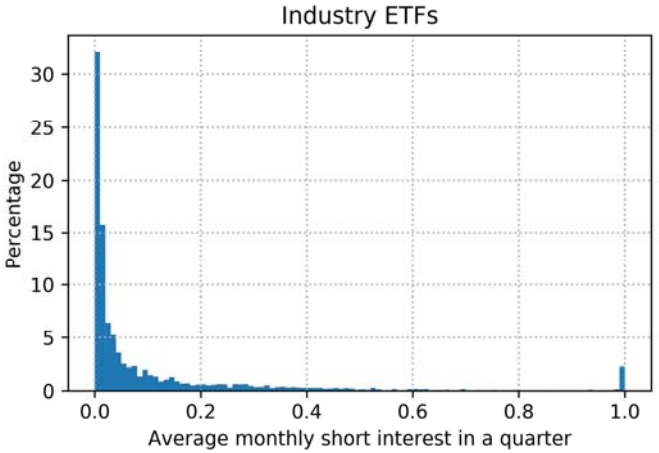
Panel A: Industry ETFs

| | **Mean** | **Std.** | **5%** | **25%** | **50%** | **75%** | **95%** |
|---|---|---|---|---|---|---|---|
| *SIR* | 0.118 | 0.211 | 0.001 | 0.007 | 0.026 | 0.117 | **0.607** |
| *Price* | 53.842 | 32.056 | 18.104 | 30.167 | 48.465 | 68.034 | 110.976 |
| *Volume (in shares)* | 422847.684 | 2111222.625 | 764.333 | 5382.917 | 19368.167 | 75731.833 | 1963009.083 |
| *TNA (in $ millions)* | 1051.615 | 2156.886 | 11.417 | 91.817 | 331.200 | 918.467 | 5295.167 |

Panel B: Non-industry ETFs

| | **Mean** | **Std.** | **5%** | **25%** | **50%** | **75%** | **95%** |
|---|---|---|---|---|---|---|---|
| *SIR* | 0.041 | 0.118 | 0.000 | 0.003 | 0.008 | 0.021 | **0.191** |
| *Price* | 56.290 | 35.659 | 15.884 | 28.185 | 48.853 | 75.056 | 123.672 |
| *Volume (in shares)* | 313927.645 | 2855881.357 | 538.017 | 2304.917 | 7388.500 | 32629.167 | 380683.450 |
| *TNA (in $ millions)* | 2309.432 | 9704.713 | 9.467 | 50.733 | 179.333 | 923.600 | 10578.307 |

# Why short?




- Speculation hypothesis
  - Investors are betting against a particular industry
    - Suggests bad news on the member stocks
- Hedging hypothesis
  - Informed investors short an industry to hedge their long position on a particular underlying stock
    - Suggests good news on the member stocks

# Positive earnings ratio

- We construct a measure that captures the earnings performance of the underlying firms in each ETF.
- Step 1: we define positive earnings if a firm's SUE is in the top 25% of the sample.
- Step 2: We compute the ratio of underlying firms in the ETF with positive earnings.

# Hedging or Speculating?

- We ran the following regression:

$$PosSUE_{i,t} = \alpha_i + \alpha_t + \beta_1 SIR_{i,t-1} + controls + \epsilon_{i,t},$$

$$PosSUE_{i,t} = \alpha_i + \alpha_t + \beta_1 SIR_{i,t-1} + \beta_2 DummyIndetf_i \times SIR_{i,t-1} + controls + \epsilon_{i,t}.$$

- $DummyIndetf_i$ is 1 if the ETF is an industry ETF.
- We control for year, quarter, and ETF fixed effects.

# Industry ETFs are different

| **Dependent variable: PosSUE_(i,t)** | **Ind. ETFs** | **Non-ind. ETFs** | **All** |
|---|---|---|---|
| *SIR_(i,t-1)* | 0.0324* | -0.0235* | -0.0253* |
| | (1.6687) | (-1.6823) | (-1.7972) |
| *DummyIndetf x* | - | - | **0.0581**** |
| *SIR_(i,t-1)* | - | - | (2.481) |
| *log(TNA)* | 0.0067** | 0.0024** | 0.0037*** |
| | (2.416) | (2.2304) | (3.0643) |
| *Year F.E.* | Y | Y | Y |
| *Quarter F.E.* | Y | Y | Y |
| *ETF F.E.* | Y | Y | Y |
| Num.Obs. | 4079 | 9413 | 13492 |
| R-squared | 0.4868 | 0.6592 | 0.5855 |

# Sample excluding 2007-2008

| **Dependent variable: PosSUE_(i,t)** | **Ind. ETFs** | **Non-ind. ETFs** | **All** |
|---|---|---|---|
| *SIR_(i,t-1)* | 0.0436* | -0.0124 | -0.0174 |
| | (1.8814) | (-1.0757) | (-1.4781) |
| *DummyIndetf x* | - | - | **0.0625**** |
| *SIR_(i,t-1)* | - | - | (2.3364) |
| *log(TNA)* | 0.0099*** | 0.0043*** | 0.0058*** |
| | (2.7909) | (3.2452) | (3.8403) |
| *Year F.E.* | Y | Y | Y |
| *Quarter F.E.* | Y | Y | Y |
| *ETF F.E.* | Y | Y | Y |
| Num.Obs. | 3580 | 8244 | 11824 |
| R-squared | 0.5003 | 0.6817 | 0.6054 |

# Predicable returns and IETF short interest

- We have shown that:
  - Industry ETFs have greater extreme short interest than other ETFs
    - "long the stock/short the ETF" strategy

- One asset pricing implication:

  Extreme short interest should create a temporary price impact in the IETF — leading to predictable IETF returns

# Fama-MacBeth regression of returns on short interest ratios

| **Dependent variable: Ret_(t+1)** | **Industry ETFs** | | **Member firms (of IETFs)** | |
|---|---|---|---|---|
| *ΔSIR_t* | 0.019** | 0.024*** | -0.064** | -0.080*** |
| | (2.27) | (2.65) | (-2.32) | (-2.83) |
| *Intercept* | 0.013*** | 0.010*** | 0.009** | 0.007* |
| | (3.55) | (3.25) | (2.46) | (1.71) |
| Controls | N | Y | N | Y |
| Sample period | 2005.01 - 2006.12, 2009.01 - 2016.11 | | 1999.03 - 2016.11 | |

# Can you profit from this?

- We construct a long-short portfolio based on IETF monthly ΔSIR deciles
  - We long the ETF in highest decile and short the ETF in the lowest decile.
- Result?
  - It generates a statistically significant monthly alpha of approx. **30 basis points**
  - Applying a similar approach to stocks yields a **negative 33 basis points**.

# Industry ETFs and market efficiency

- If informed traders use industry ETFs to hedge, then this may allow more aggressive trading
  - Suggests that information is impounded faster so this should reduce the market reaction to positive earnings surprises
- We calculated the cumulative abnormal daily return from days -1 to1 around the earning announcement based on the Fama-French 3 factor model.
- We ran

$$CAR_{i,t} = \alpha_i + \alpha_t + \theta_1 SUE_{i,t} + \theta_2 DummyIndetfown + \theta_3 DummyIndetfown \times SUE_{i,t} + controls + \epsilon_{i,t}.$$

# Market reaction to positive SUE is reduced

| Dependent variable: CAR_(i,t) | All | Negative SUE | Positive SUE |
|---|---|---|---|
| *SUE_(i,t)* | 0.2002*** | 0.0944*** | 0.0043 |
| | (30.8998) | (9.6612) | (0.3632) |
| *DummyIndetfown* | 0.007*** | 0.0045*** | 0.0153*** |
| | (9.6669) | (3.0769) | (9.765) |
| *DummyIndetfown x SUE_(i,t)* | **-0.0551*** ** | -0.014 | **-0.0464** ** |
| | (-5.0421) | (-0.8049) | (-2.4792) |
| *log(MktCap)* | -0.0014*** | 0.0011*** | -0.0072*** |
| | (-7.3373) | (2.9473) | (-16.2583) |
| *BM* | 0.0032*** | 0.0036*** | 0.0039*** |
| | (7.3859) | (4.8421) | (4.9137) |
| *TR* | -0.566*** | -0.5242*** | -0.8457*** |
| | (-10.0016) | (-5.4694) | (-8.2553) |
| *MOM* | -0.0012 | -0.0071*** | -0.0021 |
| | (-1.3935) | (-4.9633) | (-1.5745) |
| *EarnPerst* | 0.0 | -0.0016 | 0.0018 |
| | (0.0429) | (-1.3259) | (1.3534) |
| *NumEst* | 0.0004*** | 0.0007*** | 0.0007*** |
| | (7.5835) | (5.7893) | (6.0641) |
| *Industry F.E.* | Y | Y | Y |
| *Month F.E.* | Y | Y | Y |
| *Year F.E.* | Y | Y | Y |
| Num.Obs. | 291599 | 72715 | 72922 |
| R-squared | 0.0163 | 0.0116 | 0.0155 |

# The channel …

- Hedge funds could be a channel for this effect if they are using IETFs to hedge.
- To investigate this, we calculated aggregate abnormal hedge fund holdings on firm $i$ in the quarter before the earnings announcement.
- We ran:

$$HfAhdngRatio_{i,t} = \alpha_i + \alpha_t + \theta_1 SUE_{i,t} + \theta_2 DummyIndetfown + \theta_3 DummyIndetfown \times SUE_{i,t} + controls + \epsilon_{i,t}.$$

| **Dependent variable: HfAhdngRatio_(i,t)** | **All** | **Negative SUE** | **Positive SUE** |
|---|---|---|---|
| *SUE_(i,t)* | 0.1345 | 0.0428 | 0.2352 |
| | (1.5702) | (0.3039) | (1.3629) |
| *DummyIndetfown* | -0.0363* | 0.0164 | -0.1041*** |
| | (-1.9484) | (0.4293) | (-2.8134) |
| *DummyIndetfown* x *SUE_(i,t)* | 0.0735 | -0.0181 | **0.931**** |
| | (0.3437) | (-0.0554) | (2.1608) |
| *log(MktCap)* | -0.0122*** | 0.0108 | 0.0226*** |
| | (-3.1918) | (1.3304) | (2.9731) |
| *BM* | 0.0197* | -0.0169 | -0.007 |
| | (1.8528) | (-0.9672) | (-0.4304) |
| *TR* | 32.3415*** | 23.336*** | 31.3782*** |
| | (23.6757) | (9.7707) | (13.2446) |
| *MOM* | 0.034* | 0.1052*** | 0.0972*** |
| | (1.9494) | (3.5782) | (4.0837) |
| *EarnPerst* | -0.0672*** | 0.0074 | -0.0444 |
| | (-4.7204) | (0.2544) | (-1.5082) |
| *NumEst* | -0.007*** | -0.0035 | -0.0124*** |
| | (-5.2105) | (-1.1806) | (-4.0509) |
| *Industry F.E.* | Y | Y | Y |
| *Month F.E.* | Y | Y | Y |
| *Year F.E.* | Y | Y | Y |
| Num.Obs. | 291620 | 72722 | 72932 |
| R-squared | 0.035 | 0.0397 | 0.0342 |

# A placebo test — mutual fund holdings

| Dependent variable: MfAhdngRatio_(i,t) | All | Negative SUE | Positive SUE |
|---|---|---|---|
| *SUE_(i,t)* | 2.5139*** | 4.0446*** | -4.2241*** |
| | (10.6551) | (10.0637) | (-10.0624) |
| *DummyIndetfown* | -0.9834*** | -0.5686*** | -1.1736*** |
| | (-14.9465) | (-5.2105) | (-11.6335) |
| *DummyIndetfown x SUE_(i,t)* | -0.6845 | 0.6863 | 0.8297 |
| | (-1.1713) | (0.7723) | (0.815) |
| *log(MktCap)* | 0.3333*** | 0.3589*** | 0.4869*** |
| | (19.7558) | (13.521) | (19.4775) |
| *BM* | -0.5808*** | -0.3701*** | -0.381*** |
| | (-16.2149) | (-7.523) | (-8.6381) |
| *TR* | 71.5907*** | -15.8043** | 82.3471*** |
| | (16.9328) | (-2.442) | (12.9173) |
| *MOM* | 2.4397*** | 2.38*** | 1.5836*** |
| | (34.256) | (25.9914) | (20.9999) |
| *EarnPerst* | 0.1002** | -0.0479 | 0.1877** |
| | (2.1033) | (-0.5969) | (2.2023) |
| *NumEst* | -0.0776*** | -0.0396*** | -0.0844*** |
| | (-16.9889) | (-4.6167) | (-9.7255) |
| *Industry F.E.* | Y | Y | Y |
| *Month F.E.* | Y | Y | Y |
| *Year F.E.* | Y | Y | Y |
| Num.Obs. | 291620 | 72722 | 72932 |
| R-squared | 0.0896 | 0.0694 | 0.0898 |

# Extensions

- Are hedge funds really hedging?
  - Hedge funds often act as arbitrageurs in the ETF creation/redemption process. Could this be the reason we find a correlation between SIR and hedge fund holdings
    - One implication of the ETF arbitrage is that this would suggest a hedge fund increases holdings on all constituents of the ETF.
    - The correlation should be universal among all constituents: $\beta_1 > 0$.
- We ran:

$$HfAhdngRatio_{i,j,t} = \alpha_i + \alpha_t + \beta_1 SIR_{j,t-1} + \beta_2 DummyPosSUE_{i,t} \times SIR_{j,t-1} + controls + \epsilon_{i,j,t}$$

# Are hedge funds hedging?

| Dependent variable: HfAhdngRatio_(i,j,t) | Coef. |
|---|---|
| *SIR_(j,t-1)* | 0.1048 |
| | (0.9544) |
| *DummyPosSUE_(i,t)* x *SIR_(j,t-1)* | 0.282** |
| | (2.0229) |
| *log(MktCap)* | -0.0548*** |
| | (-8.6449) |
| *Industry F.E.* | Y |
| *Year F.E.* | Y |
| *Quarter F.E.* | Y |
| *ETF F.E.* | Y |
| Num.Obs. | 343613 |
| R-squared | 0.0167 |

Not significant

Positive correlation between the SIR and hedge fund holdings on firms with positive earnings surprises

# Conclusion

- Industry ETFs appear to be a valuable innovation by facilitating the hedging of industry risk
  - Our paper provides strong evidence of industry ETFs enabling the "long the stock/short the industry ETF" strategy
    - Short interest in industry ETFs is a different animal than short interest in stocks and even other ETFs
    - It makes the market more informationally efficient
    - It appears to be implemented by hedge funds
    - It results in return predictability
    - It is asymmetric – reflecting that while shorting costs of ETFS are low, shorting costs of stocks are not.

Thank you!