The Role of Hedgers and Speculators in Liquidity Provision to Commodity Futures Markets

Wenjin Kang
Renmin University of China

K. Geert Rouwenhorst
Yale School of Management

Ke Tang
Renmin University of China

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Motivation

- Belief among many practitioners and academics that presence of speculative capital is important to the functioning of futures markets
  - Provision of insurance to short hedging by producers/merchants
  - Theory Normal Backwardation: speculators receive a risk premium

- Empirically:
  - Producers and merchants are indeed net short, and risk premium positive.
  - Speculators trade for other reasons besides to accommodate hedgers:
    - Capturing style premiums: trend following
    - Portfolio rebalancing

- Not clear who provides liquidity at the margin:
  - Examine rebalancing of positions of hedgers and speculators using public CFTC data and examine liquidity provision at the weekly horizon
  - We do not have data on who initiates position changes, but we use price predictability following position changes to infer who provides / consumes liquidity. (e.g. Kaniel, Saar, Titman (2008))

Main Findings

- Trading behavior:
  - Hedgers are contrarians, Speculators are momentum traders
  - Propensity to trade is higher for speculators than hedgers: specs are more "impatient"

- Prices predictably change following a trade:
  - Relative outperformance of commodities most heavily bought by hedgers
  - Relative underperformance of commodities most heavily bought by speculators

- The price effects are larger when:
  - Hedgers have recently suffered a large loss on their futures position ("collateral concern")
  - Hedgers are trading in the same direction in consecutive weeks ("order imbalance")
  - There are fewer speculators in the market (specs need to rely on hedgers to trade)
  - Positions are more unbalanced in the direction of the trade

- Speculators are short-term liquidity consumers, and hedgers are liquidity providers in commodity futures markets
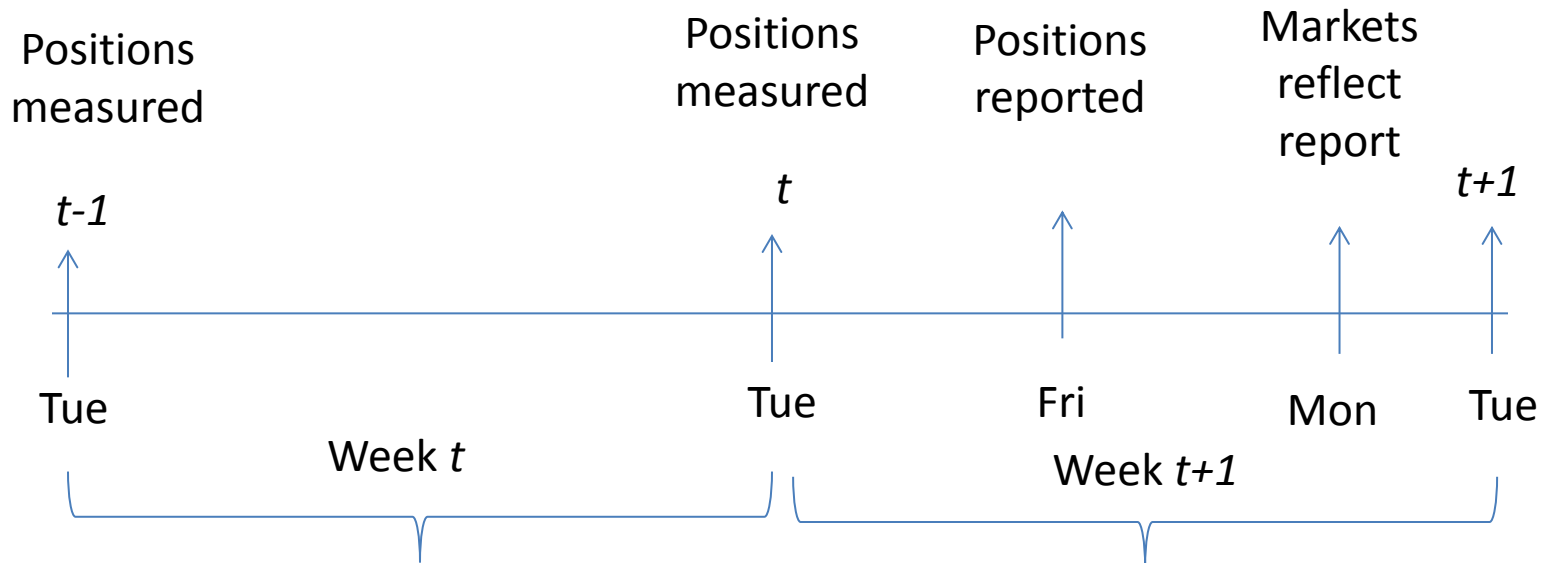
Our "trading" measure

$$Q_{i,t} = \frac{netlong\ position_{i,t} - netlong\ position_{i,t-1}}{OI_{i,t-1}}$$

- Trading measure =   weekly change in the net long position, scaled by beginning of week open interest.

- We calculate this measure separately for
  - Commercials: "Hedgers"
  - Non-Commercials: "Speculators"
  - Non-Reportables

  using the weekly COT Reports of the CFTC between 1994-2012

- Matched sample of weekly price data for 26 commodity futures

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Weekly positions data and return measurement

Positions measured

Positions measured

Positions reported

Markets reflect report

$t-1$

t

$t+1$

Tue

Tue

Fri

Mon

Tue

Week t

Week $t+1$

$$Q_{i,t} = \frac{netlong\ position_{i,t} - netlong\ position_{i,t-1}}{OI_{i,t-1}}$$

Trading behavior

$\boldsymbol{R}_{i,t+t}$

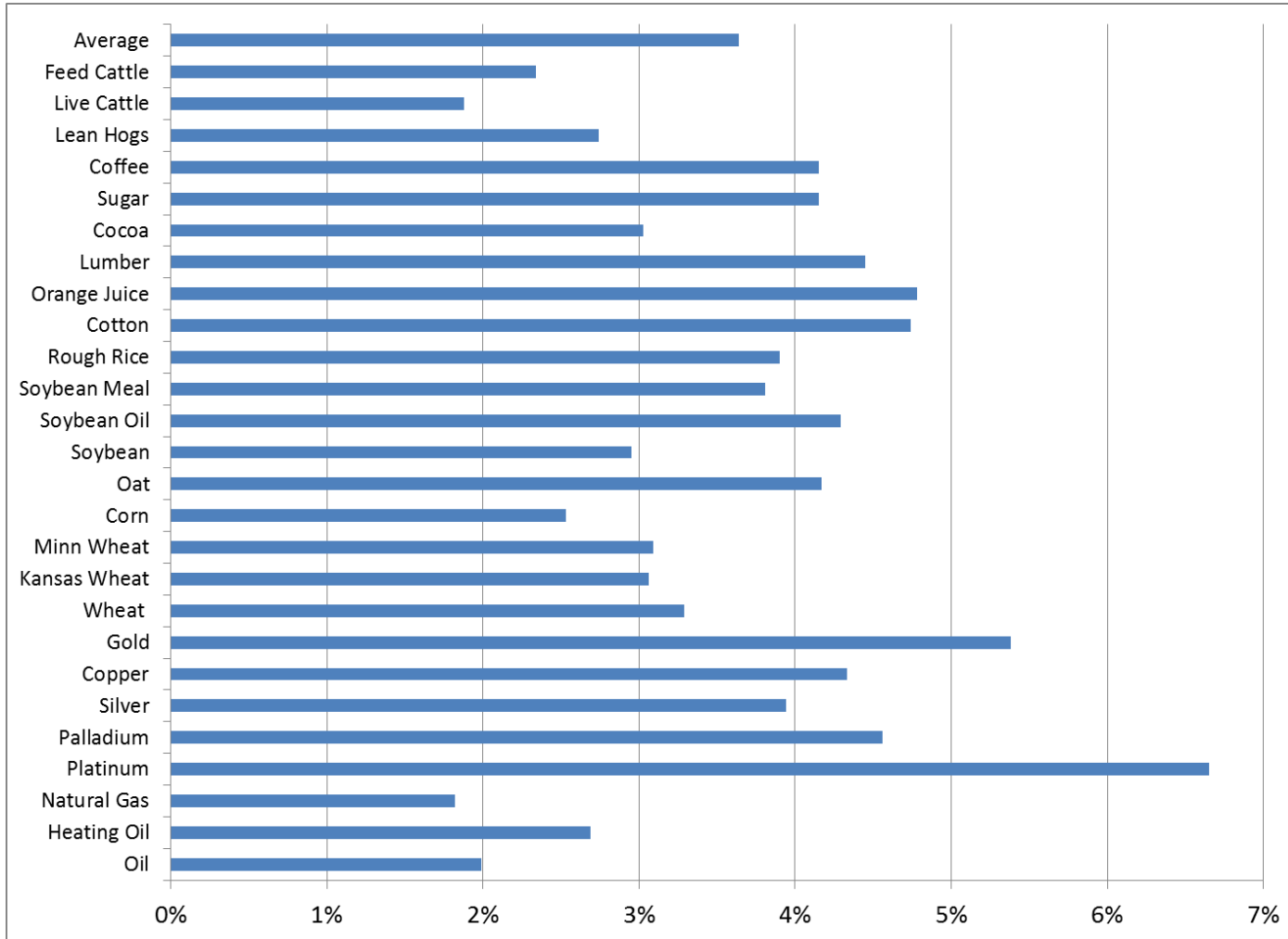$$R_{i,t} = \frac{F_i(t,T) - F_i(t-1,T)}{F_i(t-1,T)}$$

Liquidity Provision

Net position changes (Q) by Hedgers
Average Absolute Value from Using Weekly Data (Table 1 C)

Propensity to change positions (Table 1D)

$$PY_{i,t}^{Hedger} = \frac{abs(HL_{i,t} - HL_{i,t-1}) + abs(HS_{i,t} - HS_{i,t-1})}{HL_{i,t-1} + HS_{i,t-1}}$$
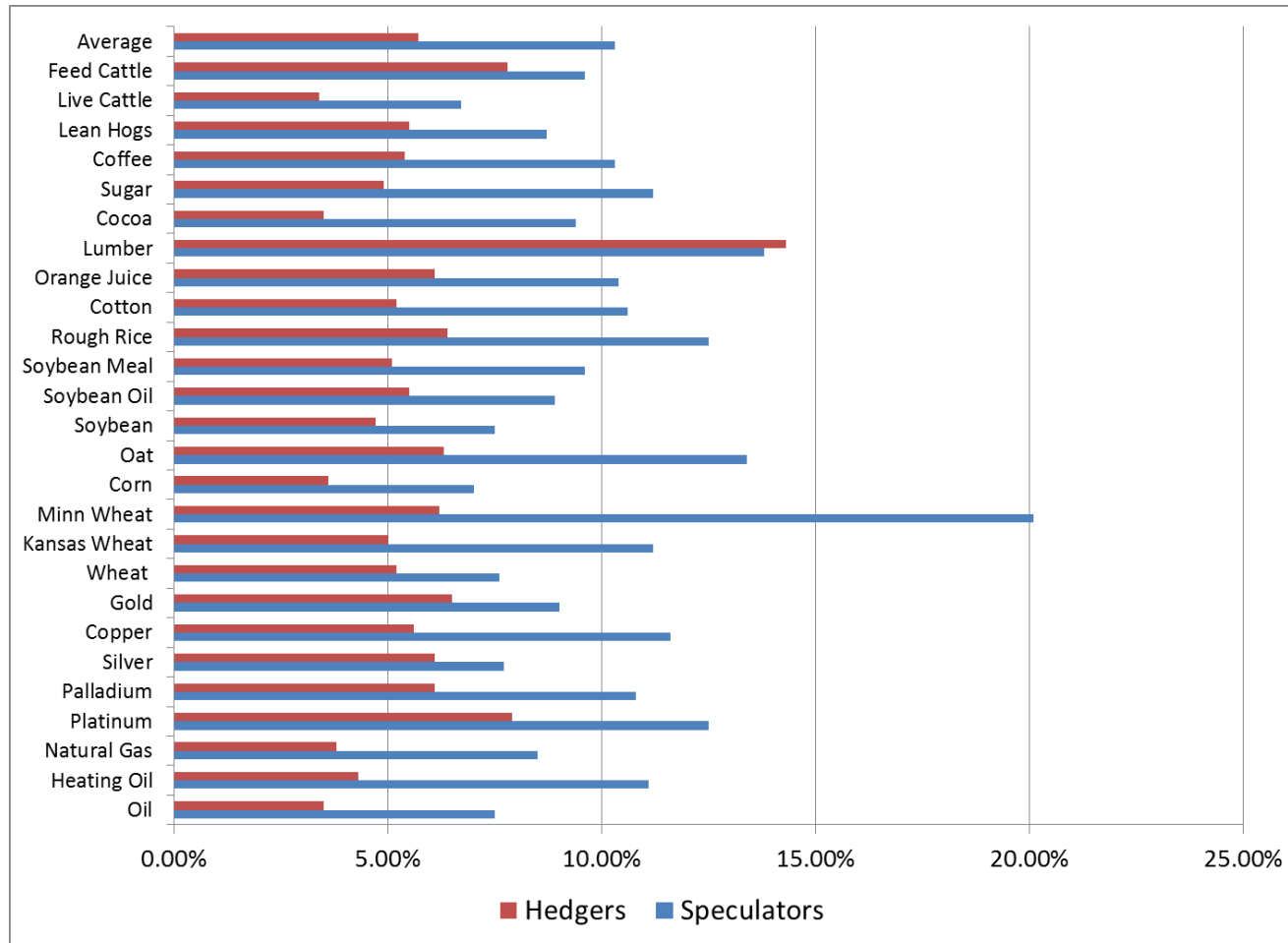
Table 2: Returns and contemporaneous position changes

Fama-MacBeth: $$Q_{i,t} = a_{0,t} + a_{1,t} R_{i,t} + \varepsilon_{i,t}$$

Trader	Full Sample Period		
	Hedgers	Speculators	Others
$R_{i,t}$	-0.0066	0.0052	0.0014
	(-46.95)	(43.77)	(22.99)
R^2	20.9%	17.4%	6.1%

- Speculators: shift positions towards commodities with increasing prices that exhibit relative strength (price momentum)

- Hedgers: shift away from commodities that experience relative price strength: contrarians

- Non-reportables: behave like small speculators

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Table 3: Returns and past position changes

Fama-MacBeth: $$R_{i,t+1} = b_0 + b_1 Q_{i,t} + b_2 B_{i,t} + b_3 S_{i,t}\hat{v}_{i,t} + b_4 R_{i,t} + \varepsilon_{i,t+1}$$

Controls for x-sectional differences in expected returns

	Full Sample Period		
Trader	Hedgers	Speculators	Others
$Q_{i,t}$	4.58	-5.36	-2.09
	(5.93)	(-6.68)	(-1.28)
R^2	11.7%	11.6%	11.4%

- Speculators: Commodities that are most heavily bought by speculators earn lower return in the subsequent week

  Return Impact for typical position change (3.1%)
  = 5.36% × 3.1% = 0.17bp / week or 8.6% annualized

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Table 4 A: Portfolios sorted on net position changes of hedgers

- t=0 date of CFTC position measurement), sort commodities based on hedger Q into halves or quintiles
- Track return for 20 days after portfolio formation
- Days 1-4: pre-release of the report

Top / Bottom 50% sorts	day -10 to -1	day 1-20	day 1-4	day 5-20
Portfolio 1 (smallest Q)	0.929%	0.182%	0.010%	0.171%
Portfolio 2 (largest Q)	-0.575%	0.612%	0.212%	0.400%
Portfolio 2- Portfolio 1	-1.503%	0.431%	0.202%	0.229%
(*t*-statistics)	(-20.08)	(4.16)	(4.20)	(2.42)

Notes:
- Hedgers buy commodities that rank low on relative price strength

- About 1/2 of the 20-day excess return occurs prior to the release of the report

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Alternative Explanation: Private information?

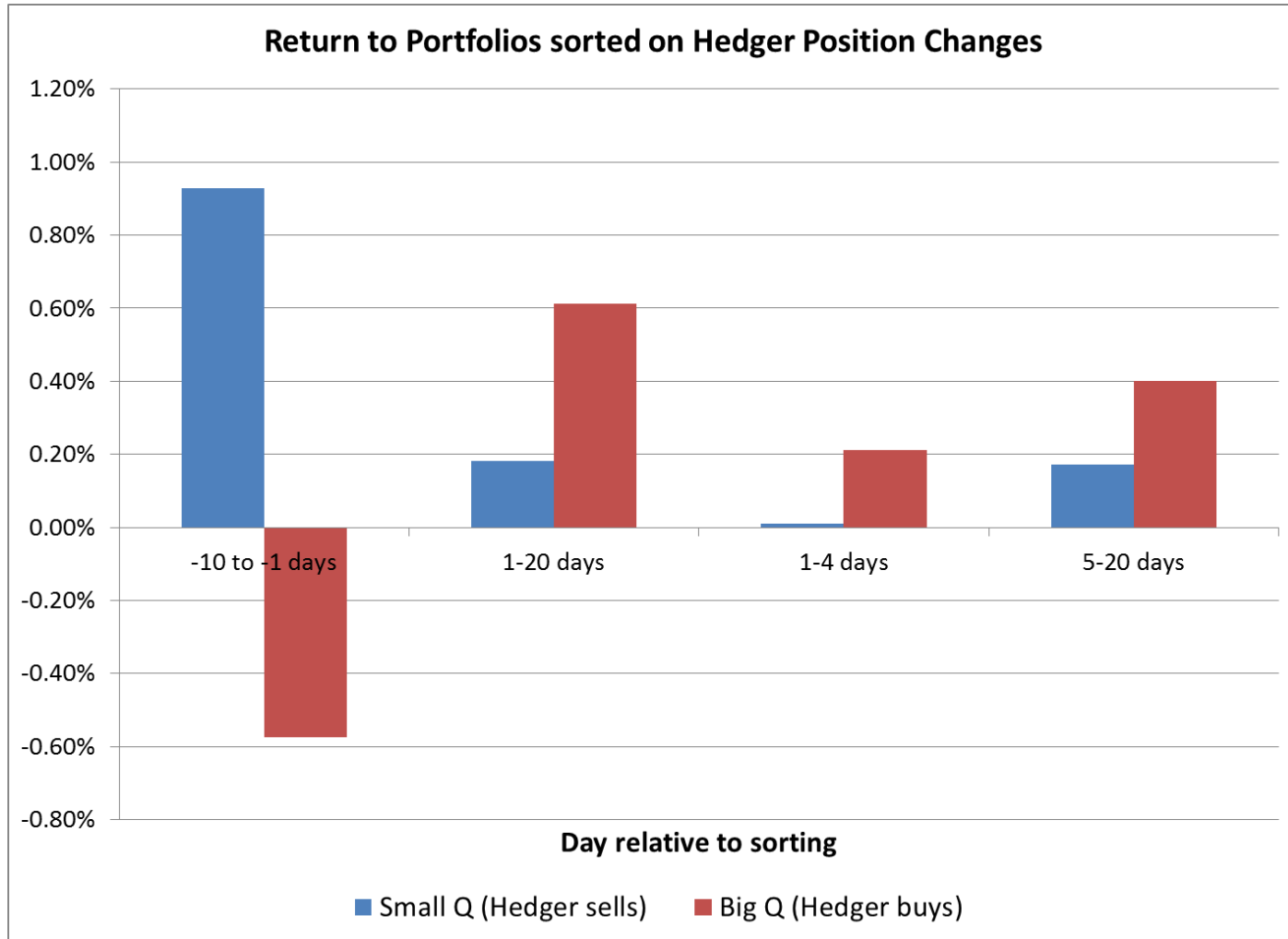Return to Portfolios sorted on Hedger Position Changes

Table 4 A: Portfolios sorted on net position changes of hedgers

- Quintile sorts:

Quintile sorts	-10 to -1 days	1-20 days	1-4 days	5-20 days
Portfolio 1 (smallest Q)	1.554%	0.092%	-0.019%	0.111%
Portfolio 2	0.759%	0.220%	0.023%	0.198%
Portfolio 3	0.084%	0.430%	0.112%	0.318%
Portfolio 4	-0.461%	0.477%	0.225%	0.252%
Portfolio 5 (largest Q)	-1.032%	0.759%	0.215%	0.544%
Portfolio 5 - Portfolio 1	-2.587%	0.667%	0.234%	0.433%
(t-statistics)	(-22.89)	(4.02)	(3.12)	(2.92)

Notes:

- 0.67% excess return between quintile portfolios

- About 1/3 of the 20-day excess return occurs prior to the release of the report

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Commodity portfolios sorted on Hedger Buying

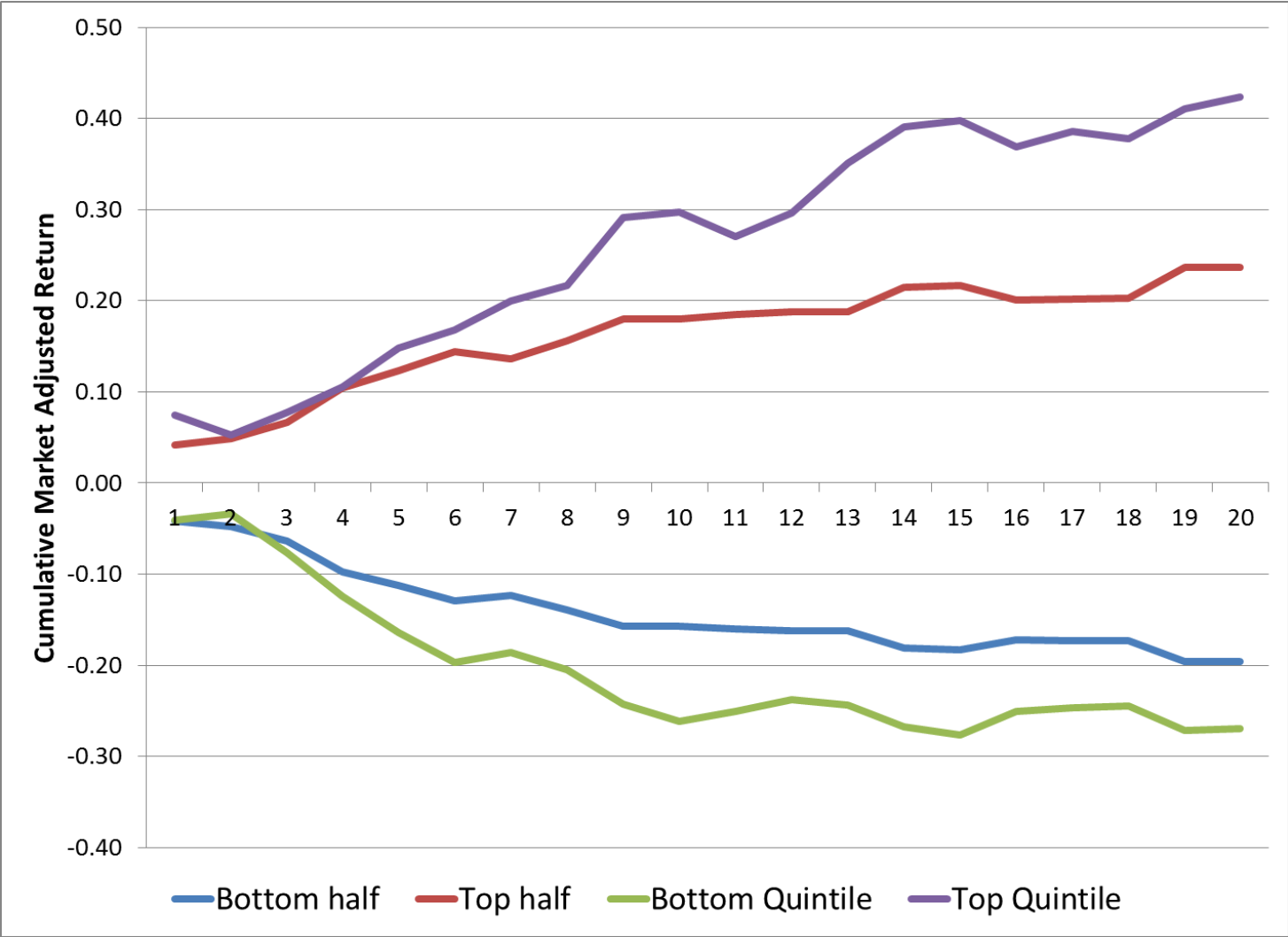Market-adjusted cumulative returns in 20 days following a trade

Table 4 B: Portfolios sorted on net position changes of speculators

- t=0 date of CFTC position measurement), sort commodities based on speculator Q into halves or quintiles
- Track return for 20 days after portfolio formation
- Days 1-4: pre-release of the report

Top / Bottom 50% sorts	day -10 to -1	day 1-20	day 1-4	day 5-20
Portfolio 1 (smallest Q)	-0.643%	0.542%	0.207%	0.336%
Portfolio 2 (largest Q)	0.997%	0.252%	0.016%	0.236%
Portfolio 2- Portfolio 1	1.640%	-0.290%	-0.191%	-0.099%
(*t*-statistics)	(23.45)	(-2.72)	(-4.05)	(-1.05)

Notes:
- Speculators buy commodities that exhibit relative price strength

- 2/3rd of the 20-day excess return occurs prior to the release of the report

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Table 4 B: Portfolios sorted on net position changes of speculators

- Quintile sorts:

Quintile sorts	-10 to -1 days	1-20 days	1-4 days	5-20 days
Portfolio 1 (smallest Q)	-1.133%	0.752%	0.273%	0.479%
Portfolio 2	-0.385%	0.362%	0.130%	0.232%
Portfolio 3	0.002%	0.382%	0.134%	0.248%
Portfolio 4	0.837%	0.393%	0.049%	0.343%
Portfolio 5 (largest Q)	1.599%	0.098%	-0.036%	0.134%
Portfolio 5 - Portfolio 1	2.732%	-0.654%	-0.309%	-0.345%
(t-statistics)	(25.00)	(-4.15)	(-4.25)	(-2.40)

Notes:
- 0.66% excess return between quintile portfolios

- About 1/2 of the 20-day excess return occurs prior to the release of the report

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Table 5: Drivers of liquidity provision by hedgers

Panel:
$$R_{i,t+1} = b_1 Q_{i,t}^{hedger} + b_2 Dm(\cdot) Q_{i,t}^{hedger} + controls + u_i + \varepsilon_{i,t+1}$$

	Capital Constraint	Order Imbalance
$Q_{i,t}^{hedger}$	2.68	1.40
	(5.18)	(1.76)
$Q_{i,t}^{hedger} \times$ Dummy	3.47	2.40
	(2.01)	(2.66)
	(1.57)	(1.23)
R^2	0.33%	0.33%

Capital Constraint Dummy:
- Calculate the capital loss for hedgers in commodity *i* in week t
- Set D = 1 for the decile of largest capital losses

Order Imbalance Dummy:
- D = 1 if hedgers trade in the same direction for 2 consecutive weeks

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Table 6: Drivers of liquidity consumption by speculators

$$R_{i,t+1} = b_0 + b_1 Q_{i,t}^{Spec} + b_2 Dm(\cdot)_{i,t} \cdot Q_{i,t}^{Spec} + controls + \varepsilon_{i,t+1}$$

	Speculative Ratio	Speculative Imbalance
$Q_{i,t}^{spec}$	-2.846	-2.998
	(-4.74)	(-5.13)
$Q_{i,t}^{spec} \times Dm(FRatio1)_{i,t}$	-2.981	
	(-2.44)	
$Q_{i,t}^{spec} \times Dm(SpecPosition)_{i,t}$		-4.636
		(-2.67)
R^2	0.3%	0.3%

Speculative ratio:
○ Define speculative ratio $F_{i,t-1}^1 = (SL_{i,t-1} + SS_{i,t-1})/(HL_{i,t-1} + HS_{i,t-1})$
○ Set $Dm(FRatio1)_{i,t} = 1$ when $F_{i,t-1}^1$ is below the median for commodity i

Speculative Imbalance:
○ $Q_{i,t}^{spec} > 0$, and $(SL_{i,t-1} - SS_{i,t-1})/OI_{i,t-1}$ in top quintile
○ $Q_{i,t}^{spec} < 0$, and $(SL_{i,t-1} - SS_{i,t-1})/OI_{i,t-1}$ in bottom quintile

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Conclusions

- We characterize the trading behavior of hedgers and speculators around net position changes.
    - Hedgers are contrarians, Speculators are momentum traders
    - Propensity to trade is higher for speculators than hedgers: specs are more "impatient"

- Prices predictably change following position adjustments, in a manner that is consistent with hedgers providing liquidity to speculators.

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