

The Dynamics of Trading in Commodity Markets

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- 1. Motivation**
- 2. Research questions**
- 3. Data and sample**
- 4. Main tests and results**
- 5. Robustness tests**
- 6. Conclusions**
- 7. Future work**

1. Motivation

- **Commodity markets**
 - important sector of the real economy
 - large physical market and active derivatives market
 - market participants (hedgers, speculators)
 - increased participation
 - commodities are a popular asset class
 - recent spikes in activity and prices
- **Our paper:** analyzes the dynamic relation between trading and returns
 - focus on speculative trading
 - U.S. data, 26 commodities, 1986 – 2012
 - provide a broad and wide-ranging picture of trading behavior in the commodity markets, and its impact on prices

Market Participants

- **CFTC** (Commodity Futures Trading Commission)
- **Hedgers** (Commercial traders)
 - A trader “commercially engaged in business activities hedged by the use of futures or option markets”
- **Speculators** (Non-Commercial traders)
 - Large trader who does not meet criteria above.
 - No underlying cash business
 - “a trader who does not hedge, but who trades with the objective of achieving profits through the successful anticipation of price movements”

Sanders et al., 2004; Hong and Yogo, 2012; Han, 2008;

Recent Debate

- Spikes in prices and speculative trading
- Recent initiatives from the U.S. derivatives regulator to introduce a plan to curb commodity market speculation
- Position limits

2. Research Questions

1. What determines trading?

- Recent trends in trading activity (overall, trader type)
- Measure of trading activity is the change in net demand
- Study different participants (hedgers, speculators and small traders)

- Persistence in trading positions
- Risk –bearing capacity
 - large imbalances
 - volatility
- Feedback between market participants
- Effect of past performance (commodity / market returns)

Research Questions

2. Pricing effects of trading

- Order flow (imbalance = buys – sells) moves prices
 - Inventory
 - Information
 - Equity: Chordia, Roll and Subrahmanyam (2002, 2004)
 - Currency: Evans and Lyons (2002)
- Our measure of trading
 - Open interest, net demand = Long – Short
 - Change in net demand is our analog of futures order flow
- Commodities, Open Interest and Prices
 - Hong and Yogo (2012)

Research Questions

3. Volatility

- Influence of speculators subject of controversy
 - 1992 European Exchange Rate Mechanism in Obstfeld (1996) , the 1994 Mexican peso crisis in Fung and Hsieh (2000), the 1997 Asian financial crisis in Brown, Goetzmann and Park (2000), bailout of LTCM Edwards (1999).
- Evidence on whether speculators destabilize markets is mixed
- Examine relation between trading and subsequent price volatility

3. Data

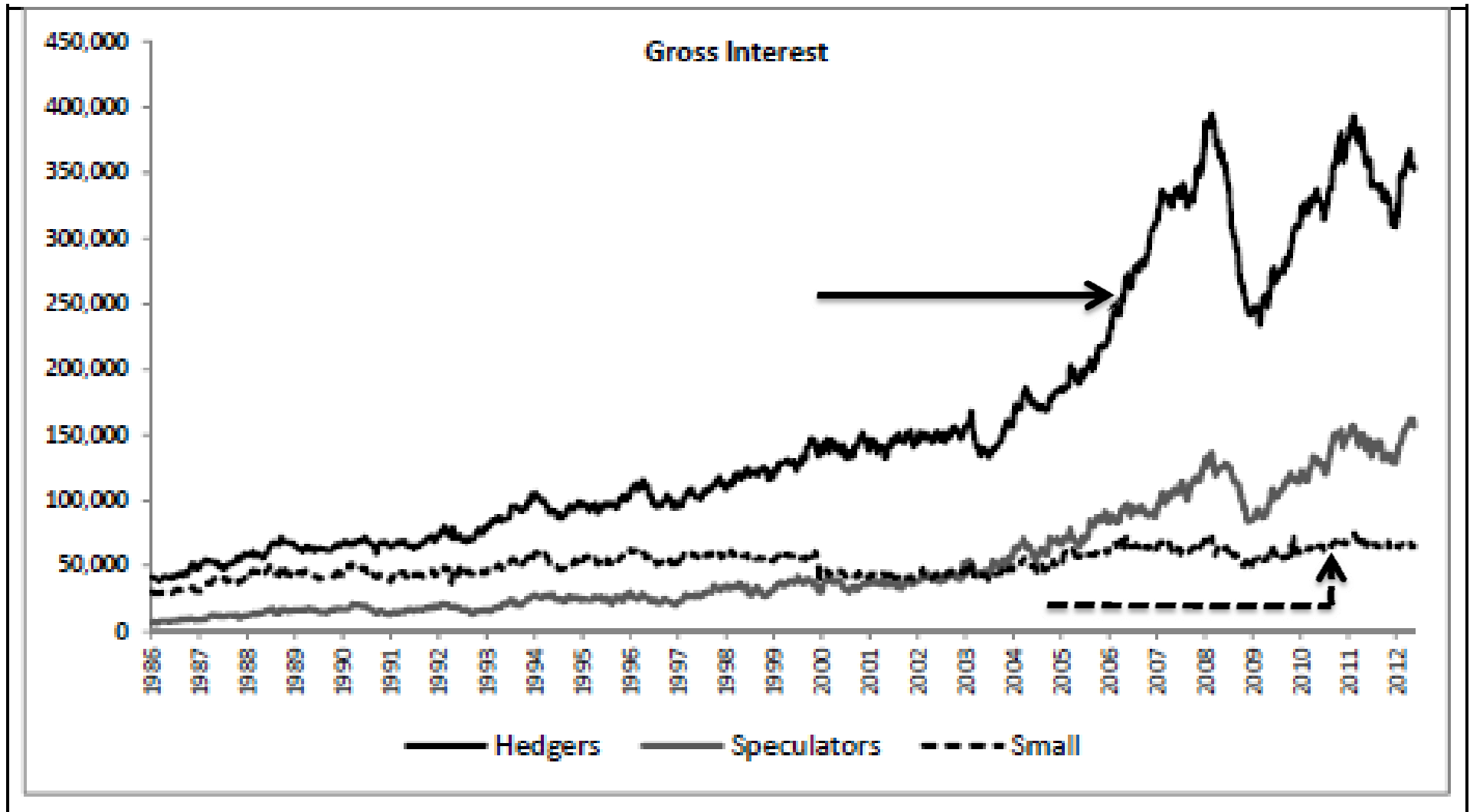
- **26 commodities, 1986 – 2012**
- **COT** (Commitments of traders) reports published *weekly* by the CFTC
 - Released every Friday and referring to positions established on Tuesday
 - Positions above reporting levels established by the CFTC

	Long	Short	Net Demand (Long – Short)	Order flow $\Delta(\text{Long} - \text{Short})$
Commercial (Hedgers)	Long _{COMM}	Short _{COMM}	X_{COMM}	$\Delta X_{\text{COMM}} = X_{T, \text{COMM}} - X_{T-1, \text{COMM}}$
Non-Commercial (Speculator)	Long _{SPEC}	Short _{SPEC}	X_{SPEC}	$\Delta X_{\text{SPEC}} = X_{T, \text{SPEC}} - X_{T-1, \text{SPEC}}$
Small trader	Long _{SMALL}	Short _{SMALL}	X_{SMALL}	$\Delta X_{\text{SMALL}} = X_{T, \text{SMALL}} - X_{T-1, \text{SMALL}}$
Open Interest	Long	Short	0	0

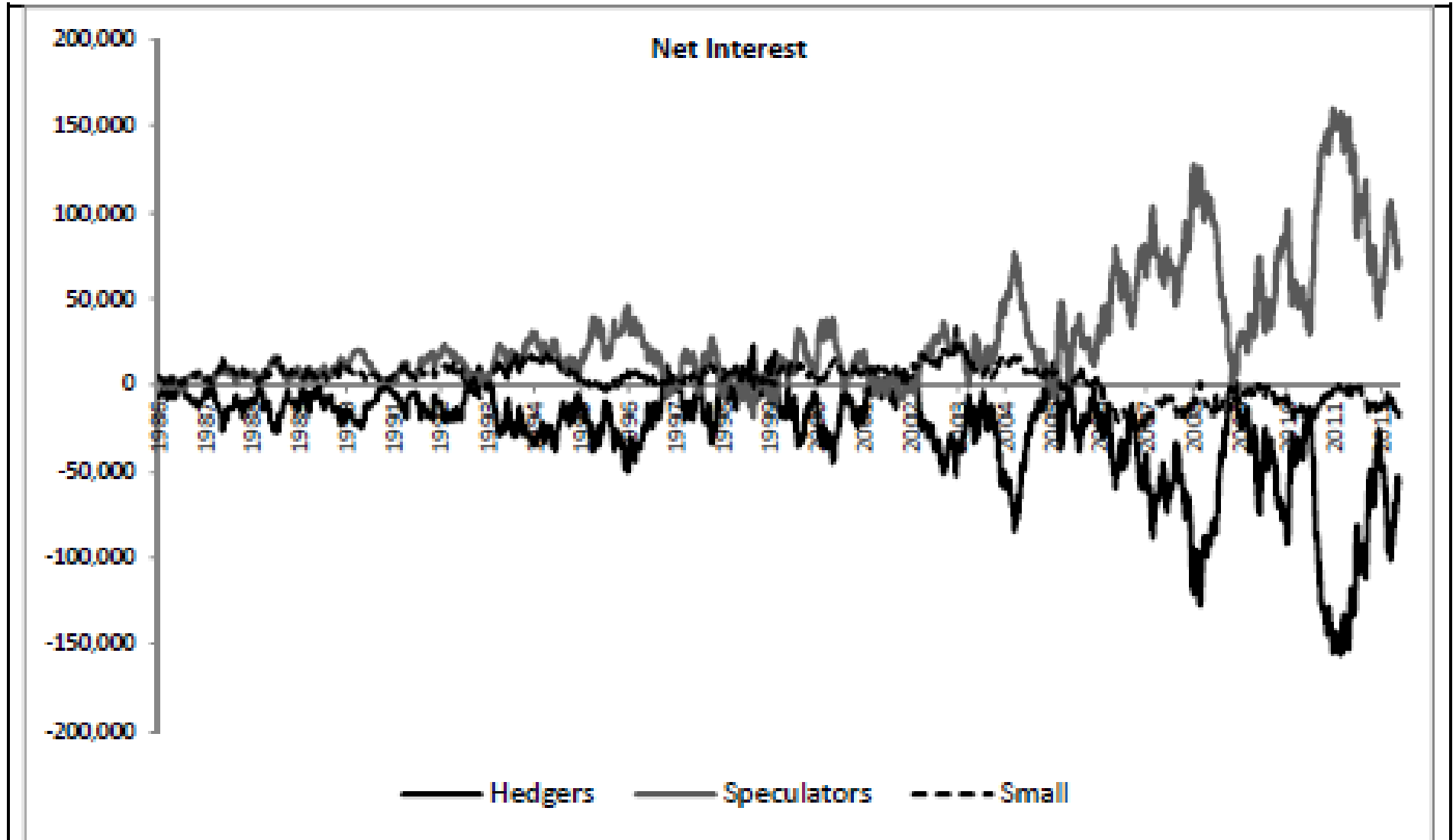
- The measure of **net demand** is our analog of futures order flow or order imbalance
 - $X = \text{Long} - \text{Short} \rightarrow \Delta X = X_T - X_{T-1} = \mathbf{OIB}$ (*order imbalance*)
 - Reflects whether the net long position has increased or declined
- **Returns** measured Tuesday-Tuesday to match the open interest

Group	Commodity	Open Interest	Volume	Open Interest			Net Position		
				Hedgers	Speculators	Small	Hedgers	Speculators	Small
Energy	Crude Oil	527,033	219,189	368,041	88,489	70,502	-23,092	22,384	707
	Natural Gas	348,776	103,425	241,728	52,426	54,622	13,876	-37,728	23,852
	Gasoline	168,465	44,021	31,425	82,013	55,026	-51,819	69,937	40,519
	Heating Oil	144,942	47,083	89,648	18,147	37,147	-16,146	6,398	9,749
Food and fiber	Sugar	268,389	40,506	151,533	65,438	51,418	-56,608	38,171	18,437
	Cocoa	86,190	9,112	55,763	19,459	10,968	-10,857	6,118	4,740
	Cotton	82,145	11,836	48,506	19,509	14,130	-6,994	3,149	3,844
	Coffee	60,651	11,606	33,302	16,790	10,558	-10,811	6,534	4,277
	Frozen Orange Juice	21,563	2,491	9,785	7,015	4,764	-5,534	3,344	2,189
	Lumber	4,778	1,008	1,262	1,478	2,037	-498	285	213
Grains	Corn	493,590	60,935	264,554	127,267	101,770	-29,852	70,191	-40,339
	Soybeans	204,825	46,741	97,763	55,666	51,396	-27,700	30,373	-2,674
	Wheat	146,399	20,302	82,292	35,129	28,979	1,740	130	-1,870
	Soybean Oil	128,172	21,566	70,147	28,211	29,813	-20,118	11,692	8,425
	Soybean Meal	109,409	22,051	54,685	22,547	32,177	-21,892	11,553	10,339
	Wheat KC	62,985	9,245	32,996	15,366	14,623	-7,988	9,232	-1,244
	Wheat Minn	23,894	4,031	12,799	3,856	7,238	-2,622	2,544	77
	Oats	11,340	1,338	4,246	2,243	4,852	-4,125	1,471	2,654
Livestock	Live Cattle	121,317	19,571	54,878	35,838	30,601	-7,356	15,404	-8,047
	Live Hogs	64,360	11,823	30,345	18,572	15,443	-92	4,484	-4,391
	Feeder Cattle	17,923	2,717	5,990	6,000	5,933	1,528	2,749	-4,277
Metals	Gold	208,078	62,252	88,945	75,343	43,791	-59,789	42,912	16,877
	Silver	88,782	23,165	25,229	31,393	32,160	-41,454	21,525	19,929
	Copper	70,142	15,126	36,326	18,122	15,695	-7,030	3,738	3,291
	Platinum	17,136	3,140	4,952	7,556	4,629	-8,091	5,538	2,553
	Palladium	8,503	1,040	2,504	4,195	1,804	-4,282	3,130	1,152
Groups	Energy	375,766	140,602	243,371	71,374	61,021	-19,654	17,091	14,218
	Food and Fiber	178,489	26,423	102,601	44,109	31,778	-35,213	23,509	11,704
	Grains	292,913	41,063	154,993	75,468	62,453	-23,687	39,403	-15,715
	Livestock	96,000	15,893	43,611	27,971	24,418	-4,568	10,896	-6,327
	Metals	149,817	42,932	60,460	54,575	34,782	-47,785	32,265	15,520

Gross Interest (Long + Short) by Investor Type



Net Interest (Long - Short) by Investor Type



Methodology

- All specifications as pooled OLS regressions, across commodities and time
- Dependent and independent variables are demeaned and standardized.
 - subtract the time-series mean of the variable, and scale the result by its time-series standard deviation
- Robust standard errors clustered at the group level

4. Determinants of Order Imbalances

$$\begin{aligned}
 OIB_{i,t}^{type} = & a_0 + a_1 OIB_{i,t-1}^{spec} + a_2 OIB_{i,t-1}^{small} + a_3 NETPOS_{i,t-1}^{spec} + a_4 NETPOS_{i,t-1}^{small} + a_5 NETPOS_{i,t-1}^{spec} \times \sigma_{i,t-1}^{ST} \\
 & + a_6 NETPOS_{i,t-1}^{small} \times \sigma_{i,t-1}^{ST} + a_7 NETPOS_{i,t-1}^{spec} \times \sigma_{i,t-1}^{LT} + a_8 NETPOS_{i,t-1}^{small} \times \sigma_{i,t-1}^{LT} + a_9 R_{i,t-1}^{ST} \\
 & + a_{10} R_{i,t-1}^{LT} + a_{11} \sigma_{i,t-1}^{ST} + a_{12} \sigma_{i,t-1}^{LT} + a_{13} R_{t-1}^M + a_{14} Dummy_i + u_{i,t}
 \end{aligned}$$

- OIB = order imbalance; TYPE = SPEC or SMALL
- $NETPOS$ = net position measured as LONG – SHORT
- R^{ST} and R^{LT} are the short term and long term returns for commodity i
- R^M is the commodity market return
- σ^{ST} and σ^{LT} are the short term and long term volatilities for commodity i
- σ is measured as average of daily $\log(P_{high}/P_{low})$
- $Dummy$ is an indicator equal to 1 for the weeks in which contracts are rolled over

- Persistence in trading positions $\rightarrow a_1$
- Risk –bearing capacity
 - Net position $\rightarrow a_3, a_4$
 - Net position x volatility $\rightarrow a_5 - a_8$
- Feedback between traders $\rightarrow a_2$
- Returns $\rightarrow a_9, a_{10}, a_{13}$

	Panel A: SPEC		Panel B: SMALL	
	(1)	(2)	(3)	(4)
<i>Intercept</i>	0.002	0.002	0.000	0.000
	[0.715]	[0.725]	[0.971]	[0.982]
$OIB_{i,t-1}^{spec}$	0.118	0.119	0.050	0.050
	[0.004]	[0.004]	[0.041]	[0.044]
$OIB_{i,t-1}^{small}$	0.055	0.055	-0.039	-0.039
	[0.011]	[0.011]	[0.265]	[0.266]
$NETPOS_{i,t-1}^{spec}$	-0.084	-0.066	-0.021	0.008
	[0.005]	[0.039]	[0.464]	[0.592]
$NETPOS_{i,t-1}^{small}$	-0.000	-0.000	-0.000	-0.000