The role of hedgers and speculators in commodity markets

Celso Brunetti

Thematic Semester on Commodity Derivatives Markets
Paris
November 6, 2015
The views expressed here are solely the responsibility of the author and should not be interpreted as reflecting the view of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.
Introduction

Commodity markets are evolving
Introduction

Commodity markets are evolving

- Historical low correlation with other asset classes
Introduction

Commodity markets are evolving

- Historical low correlation with other asset classes
- Commodities: a new asset class
Introduction

Commodity markets are evolving

- Historical low correlation with other asset classes
- Commodities: a new asset class
- Commodity Index Traders (CITs)
Introduction - cont’d

Three papers (and some preliminary results)
Introduction - cont’d

Three papers (and some preliminary results)

Introduction - cont’d

Three papers (and some preliminary results)

- Brunetti, Buyuksahin and Harris: Speculation, Prices and Volatility (JFQA, forthcoming)
Introduction - cont’d

Three papers (and some preliminary results)

- Brunetti, Buyuksahin and Harris: Speculation, Prices and Volatility (JFQA, forthcoming)
- Brunetti, Buyuksahin and Harris: Regime switching, hedgers and speculators (work in progress)
Introduction - cont’d

Three papers (and some preliminary results)

- Brunetti, Buyuksahin and Harris: Speculation, Prices and Volatility (JFQA, forthcoming)
- Brunetti, Buyuksahin and Harris: Regime switching, hedgers and speculators (work in progress)
- Brunetti and Reiffen: Are hedgers hedging? (Preliminary results, no paper yet)
Data

CFTC data: Large Trader Reporting System (and more)

- LTRS identifies daily positions of individual traders classified by line of business.
Data

CFTC data: Large Trader Reporting System (and more)

- LTRS identifies daily positions of individual traders classified by line of business.
- Reporting thresholds: e.g. 350 contracts for crude oil, 200 contracts for natural gas and 250 contracts for corn.
Data

CFTC data: Large Trader Reporting System (and more)

- LTRS identifies daily positions of individual traders classified by line of business.
- Reporting thresholds: e.g. 350 contracts for crude oil, 200 contracts for natural gas and 250 contracts for corn.
- LTRS data represents approximately 70 to 90 percent of total open interest in each market.
Data

CFTC data: Large Trader Reporting System (and more)

- LTRS identifies daily positions of individual traders classified by line of business.
- Reporting thresholds: e.g. 350 contracts for crude oil, 200 contracts for natural gas and 250 contracts for corn.
- LTRS data represents approximately 70 to 90 percent of total open interest in each market.
- The LTRS data identifies growth in speculative positions.
Brunetti and Reiffen: Commodity Index Trading and Hedging Costs (JFM, 2014)

How CITs affect the cost of hedging
Brunetti and Reiffen: Commodity Index Trading and Hedging Costs (JFM, 2014)

How CITs affect the cost of hedging

- Fundamental role of commodity markets
- Medium-term perspective
Brunetti and Reiffen: Commodity Index Trading and Hedging Costs (JFM, 2014)

How CITs affect the cost of hedging

- Fundamental role of commodity markets
- Medium-term perspective

Theoretical model of how different agents behave in these markets
Introduction

Brunetti and Reiffen: Commodity Index Trading and Hedging Costs (JFM, 2014)

- How CITs affect the cost of hedging
  - Fundamental role of commodity markets
  - Medium-term perspective

- Theoretical model of how different agents behave in these markets

- Test the model using LTRS data: Ags only
  - Sample: July 2003 – November 2012
Hedging Costs

Short hedge: a corn grower is able to reduce her exposure to price risk by taking a short position in the futures market.
Hedging Costs

- Short hedge: a corn grower is able to reduce her exposure to price risk by taking a short position in the futures market.

- Long Hedge: a flour mill, that plans to buy the crop after it matures, can reduce its exposure to price risk by buying the crop in advance using futures.
Hedging Costs

- Short hedge: a corn grower is able reduce her exposure to price risk by taking a short position in the futures market.
- Long Hedge: a flour mill, that plans to buy the crop after it matures, can reduce its exposure to price risk by buying the crop in advance using futures.
- Cost of hedging: it is the equilibrium discount price (from expected spot prices) hedgers accept in order to avoid price risk.
Two-step procedure

\[ Y_{t,i,j} = \frac{[E_t(P_T) - P_t]}{P_t} = b_{0,i,j} + b_{1,i,j} Y_{t-1,i,j} + b_{2,i,j} \Lambda_{t,i,j} + b_{3,i,j} Vol_{t,i,j} + b_{4,i,j} r_t + b_{5,i,j} ADS_t + b_{6,i,j} DS_t + \epsilon_{t,i,j} \]

\[ b_{0,i,j} = a_{0,j} + a_{1,j} l_{i,j} + a_{2,j} C_{i,j}^{agg} + \sum_{k=1}^{3} a_{2+k,j} FF_{i,j}^k + \nu_{i,j} \]

\[ \sigma_{0,i,j} = z_{0,j} + z_{1,j} l_{i,j} + z_{2,j} C_{i,j}^{agg} + \sum_{k=1}^{3} z_{2+k,j} FF_{i,j}^k + \xi_{i,j} \]
<table>
<thead>
<tr>
<th></th>
<th>Corn</th>
<th></th>
<th>Soy</th>
<th></th>
<th>Wheat</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hedging Cost</td>
<td>Volatility of hedging cost</td>
<td>Hedging Cost</td>
<td>Volatility of hedging cost</td>
<td>Hedging Cost</td>
<td>Volatility of hedging cost</td>
</tr>
<tr>
<td>$I_{t,j}$</td>
<td>-4.86e-07***</td>
<td>-2.51e-08**</td>
<td>-3.78e-06*</td>
<td>-5.41e-08**</td>
<td>-3.01e-07*</td>
<td>-2.55e-08*</td>
</tr>
<tr>
<td></td>
<td>(0.73e-07)</td>
<td>(1.19e-08)</td>
<td>(2.64e-06)</td>
<td>(2.61e-08)</td>
<td>(2.14e-07)</td>
<td>(1.94e-08)</td>
</tr>
<tr>
<td>$C_{t,j}^{agg}$</td>
<td>1.05e-07***</td>
<td>4.81e-08***</td>
<td>6.53e-07</td>
<td>2.51e-08***</td>
<td>9.80e-07</td>
<td>1.03e-09</td>
</tr>
<tr>
<td></td>
<td>(1.11e-08)</td>
<td>(2.27e-08)</td>
<td>(8.86e-7)</td>
<td>(8.80e-09)</td>
<td>(1.44e-06)</td>
<td>(1.35e-08)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.0994</td>
<td>0.2357</td>
<td>0.0785</td>
<td>0.1551</td>
<td>0.0429</td>
<td>0.1113</td>
</tr>
</tbody>
</table>

Note: Bootstrapped standard errors are in parentheses. Asterisks indicate significance at 20% (*), 5% (**), and 1% (***).
Hedgers (Distributors, Wheat)
CITs, (Soy)
The Model

- Two maturities

- Three agents
  - CITs: their positions are exogenous and contain no information.
  - Hedgers and Speculators have symmetric knowledge of market fundamentals but have different endowments. Hedgers have positions in both futures and cash markets while speculators only have positions in futures markets.
The Model - cont’d

\[ U(W) = A - \exp(-\alpha W_2) \]

\[ W_2 = W_0 + X_1^2(P_1^2 - P_0^2) + X_2^2(P_2^2 - P_1^2) + X_1^1(P_1^1 - P_0^1) + P_2^2 C_k \]

The agent consumes her entire period 2 wealth, which is equal to her initial wealth, plus the value of her position in the underlying, plus the gain/loss she makes on the futures.
As index traders roll their positions the spread rises. This is to be expected, since there is a selling pressure on the maturity $i$ contract and a buying pressure on the maturity $i+1$ contract. It is not trading per se that affects the spread, but rather the relative sizes of positions in the two maturities.

The spread depends also on hedgers’ cash positions. This effect depends on the production cycle.

The price of hedging should be correlated across commodities, at least for those commodities within the typical fund’s holdings.
Estimating the model

- The spread exhibits serial correlation and heteroskedasticity
- GARCH(1,1)
  - with variance targeting
  - GED
  - seasonality on both conditional mean and variance
Main findings

- CITs reduce the cost of hedging.
- CITs have an impact on futures prices: the spread increases when rolling.
- The spread depends on hedgers’ cash positions.
Speculators, Prices and Market Volatility (JFQA, forthcoming)

Is speculative activity destabilizing markets?

- Does speculative activity move prices?
- Does speculative activity increase volatility?
Speculators, Prices and Market Volatility (JFQA, forthcoming)

Is speculative activity destabilizing markets?

- Does speculative activity move prices?
- Does speculative activity increase volatility?

We use daily position-level participant data from the CFTC for three markets (2005 - 2009)
  - Crude oil
  - Natural gas
  - Corn

Instrumental variable approach
Crude oil
Brunetti, The role of hedgers and speculators in commodity markets - *Thematic Semester*

Brunetti, Buyuksahtin and Harris: Speculators, Prices and Market Volatility (JFQA, forthcoming)

Crude oil

*Crude oil*
Data

Three datasets

- High frequency data $\rightarrow$ realized volatility
- Daily settlement prices $\rightarrow$ returns
- Daily positions from LTRS $\rightarrow$ trading activity

Nearby contract

High frequency data: very liquid market, median inter-trade duration below a second
### Trader positions

#### Panel A: Crude Oil

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Merchant</td>
<td>Manufacturer</td>
<td>Floor Broker</td>
<td>Swap Dealer</td>
<td>Hedge Funds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long</td>
<td>0.07</td>
<td>0.01</td>
<td>0.02</td>
<td>0.42</td>
<td>0.23</td>
<td>0.75</td>
<td>0.88</td>
<td>0.52</td>
</tr>
<tr>
<td>Short</td>
<td>0.30</td>
<td>0.10</td>
<td>0.05</td>
<td>0.06</td>
<td>0.22</td>
<td>0.73</td>
<td>0.85</td>
<td>0.58</td>
</tr>
</tbody>
</table>

#### Sub-period 1: Stable prices, low volatility 01/03/2005 – 10/31/2007

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Long</td>
<td>0.09</td>
<td>0.01</td>
<td>0.02</td>
<td>0.42</td>
<td>0.23</td>
<td>0.77</td>
<td>0.88</td>
<td>0.61</td>
</tr>
<tr>
<td>Short</td>
<td>0.31</td>
<td>0.12</td>
<td>0.05</td>
<td>0.05</td>
<td>0.21</td>
<td>0.74</td>
<td>0.85</td>
<td>0.58</td>
</tr>
</tbody>
</table>

#### Sub-period 2: Rising prices, low volatility 11/01/2007 – 07/03/2008

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Long</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
<td>0.42</td>
<td>0.24</td>
<td>0.74</td>
<td>0.81</td>
<td>0.78</td>
</tr>
<tr>
<td>Short</td>
<td>0.26</td>
<td>0.07</td>
<td>0.04</td>
<td>0.08</td>
<td>0.25</td>
<td>0.70</td>
<td>0.75</td>
<td>0.67</td>
</tr>
</tbody>
</table>

#### Sub-period 3: Falling prices, high volatility 07/08/2008 – 03/19/2009

<p>| | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Long</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
<td>0.42</td>
<td>0.22</td>
<td>0.71</td>
<td>0.76</td>
<td>0.74</td>
</tr>
<tr>
<td>Short</td>
<td>0.26</td>
<td>0.06</td>
<td>0.05</td>
<td>0.10</td>
<td>0.25</td>
<td>0.73</td>
<td>0.68</td>
<td>0.65</td>
</tr>
</tbody>
</table>
## Correlations

### Panel A: Crude Oil

<table>
<thead>
<tr>
<th></th>
<th>Merchant</th>
<th>Manufacturer</th>
<th>Floor Broker</th>
<th>Swap Dealer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.27**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.18**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor Broker</td>
<td>0.05</td>
<td>-0.05</td>
<td>-0.04</td>
<td>-0.22**</td>
</tr>
<tr>
<td></td>
<td>-0.05</td>
<td></td>
<td>-0.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.01</td>
<td></td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Swap Dealer</td>
<td>-0.66**</td>
<td>-0.42**</td>
<td>-0.22**</td>
<td>-0.00</td>
</tr>
<tr>
<td></td>
<td>-0.62**</td>
<td>-0.44**</td>
<td></td>
<td>-0.13*</td>
</tr>
<tr>
<td></td>
<td>-0.62**</td>
<td>-0.31**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hedge Fund</td>
<td>-0.25**</td>
<td>-0.25**</td>
<td>-0.15**</td>
<td>-0.20**</td>
</tr>
<tr>
<td></td>
<td>-0.13*</td>
<td>-0.11</td>
<td>-0.11</td>
<td>-0.38**</td>
</tr>
<tr>
<td></td>
<td>-0.27**</td>
<td>-0.32**</td>
<td>-0.08</td>
<td>-0.27**</td>
</tr>
</tbody>
</table>
The instrument
The instrument

The change in the number of reporting accounts

- Traders with large positions are required to report to the CFTC each day.
- The cost of reporting positions to the CFTC is high.
- Traders near the reporting threshold continue reporting daily.
- Over longer horizons, however, traders falling below reporting thresholds stop reporting.
- Position reporting thresholds are set as a number of contracts so that market prices do not play a direct role in whether an account is required to report.
The model

Heterogeneous Autoregressive model of Realized Volatility (HAR-RV) developed by Corsi (2008)

\[
[RV_{i,t}^d]^{1/2} = \alpha_i + \gamma_d [RV_{i,t-1}^d]^{1/2} + \gamma_w [RV_{i,t-1}^w]^{1/2} + \gamma_m [RV_{i,t-1}^m]^{1/2} + \beta_i |\Delta TP_{i,t}^j| + \epsilon_{i,t}
\]

We estimate the model with the two-stage weak instrumental variable approach of Stock and Yogo (2005).
Estimation results

<table>
<thead>
<tr>
<th>Panel A: Crude Oil</th>
<th>Merchant</th>
<th>Manuf.</th>
<th>Floor Br.</th>
<th>Swap Dl</th>
<th>Hedge Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>0.86**</td>
<td>-0.36</td>
<td>0.17**</td>
<td>-0.48*</td>
<td>-0.60**</td>
</tr>
<tr>
<td></td>
<td>(0.29)</td>
<td>(0.61)</td>
<td>(0.08)</td>
<td>(0.26)</td>
<td>(0.28)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>81.5</td>
<td>81.3</td>
<td>81.5</td>
<td>81.4</td>
<td>81.5</td>
</tr>
<tr>
<td>F-Stat</td>
<td>27.9†</td>
<td>12.2†</td>
<td>23.6†</td>
<td>46.5†</td>
<td>13.1†</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub-period 1: Stable prices, low volatility 01/03/2005 – 10/31/2007</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>0.78**</td>
<td>0.28</td>
<td>0.18**</td>
<td>-0.53*</td>
<td>-0.60*</td>
</tr>
<tr>
<td></td>
<td>(0.36)</td>
<td>(0.69)</td>
<td>(0.09)</td>
<td>(0.32)</td>
<td>(0.35)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>31.5</td>
<td>31.1</td>
<td>31.5</td>
<td>31.4</td>
<td>31.4</td>
</tr>
<tr>
<td>F-Stat</td>
<td>19.3†</td>
<td>43.0†</td>
<td>14.5†</td>
<td>27.5†</td>
<td>12.7†</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub-period 2: Rising prices, low volatility 11/01/2007 – 07/03/2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>0.49*</td>
<td>0.65</td>
<td>0.05</td>
<td>-0.21</td>
<td>-1.08*</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td>(1.23)</td>
<td>(0.19)</td>
<td>(0.53)</td>
<td>(0.63)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>22.5</td>
<td>22.4</td>
<td>22.3</td>
<td>22.3</td>
<td>23.6</td>
</tr>
<tr>
<td>F-Stat</td>
<td>22.5†</td>
<td>11.0†</td>
<td>5.03</td>
<td>10.1†</td>
<td>10.6†</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sub-period 3: Falling prices, high volatility 07/08/2008 – 03/19/2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>1.14*</td>
<td>-2.56</td>
<td>0.47*</td>
<td>-0.61</td>
<td>-0.11*</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(2.17)</td>
<td>(0.25)</td>
<td>(0.78)</td>
<td>(0.06)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>74.9</td>
<td>74.8</td>
<td>74.8</td>
<td>74.7</td>
<td>74.7</td>
</tr>
<tr>
<td>F-Stat</td>
<td>15.5†</td>
<td>12.1†</td>
<td>15.3†</td>
<td>10.3†</td>
<td>10.0†</td>
</tr>
</tbody>
</table>
Same instrument

\[ R_{i,t} = \vartheta_{i} + \sum_{k=1}^{5} \zeta_{i,k} R_{i,t-k} + \kappa_{i}^{j} \Delta TP_{i,t}^{j} + \nu_{i,t} \]

We estimate the model with the two-stage weak instrumental variable approach of Stock and Yogo (2005).
### Estimation results

#### Panel A: Crude Oil

<table>
<thead>
<tr>
<th></th>
<th>Merchant</th>
<th>Manuf</th>
<th>Floor Br</th>
<th>Swap Dl</th>
<th>Hedge Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full sample</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>-1.45</td>
<td>-1.22**</td>
<td>-7.76**</td>
<td>0.70</td>
<td>1.21**</td>
</tr>
<tr>
<td></td>
<td>(1.32)</td>
<td>(0.22)</td>
<td>(3.43)</td>
<td>(1.03)</td>
<td>(0.15)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>1.59</td>
<td>3.69</td>
<td>1.93</td>
<td>1.50</td>
<td>11.3</td>
</tr>
<tr>
<td>F-Stat</td>
<td>113†</td>
<td>46.1†</td>
<td>9.95†</td>
<td>322†</td>
<td>15.4†</td>
</tr>
<tr>
<td><strong>Sub-period 1: Stable prices, low volatility 01/03/2005 – 10/31/2007</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>-2.93**</td>
<td>-1.17**</td>
<td>-15.0**</td>
<td>-0.32</td>
<td>1.21**</td>
</tr>
<tr>
<td></td>
<td>(1.29)</td>
<td>(0.20)</td>
<td>(3.44)</td>
<td>(1.14)</td>
<td>(0.12)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>1.81</td>
<td>4.88</td>
<td>4.51</td>
<td>0.92</td>
<td>17.2</td>
</tr>
<tr>
<td>F-Stat</td>
<td>81.3†</td>
<td>36.2†</td>
<td>9.92†</td>
<td>233†</td>
<td>16.0†</td>
</tr>
<tr>
<td><strong>Sub-period 2: Rising prices, low volatility 11/01/2007 – 07/03/2008</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>-7.55</td>
<td>-1.54**</td>
<td>11.0</td>
<td>-0.27</td>
<td>1.27**</td>
</tr>
<tr>
<td></td>
<td>(2.40)</td>
<td>(0.49)</td>
<td>(7.38)</td>
<td>(1.80)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>9.97</td>
<td>10.8</td>
<td>6.03</td>
<td>4.69</td>
<td>19.2</td>
</tr>
<tr>
<td>F-Stat</td>
<td>22.6†</td>
<td>9.57†</td>
<td>8.87</td>
<td>75.8†</td>
<td>14.5†</td>
</tr>
<tr>
<td><strong>Sub-period 3: Falling prices, high volatility 07/08/2008 – 03/19/2009</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coeff.</td>
<td>-6.37**</td>
<td>-1.95*</td>
<td>-10.9</td>
<td>6.35*</td>
<td>1.08**</td>
</tr>
<tr>
<td></td>
<td>(3.01)</td>
<td>(1.05)</td>
<td>(20.4)</td>
<td>(3.70)</td>
<td>(0.45)</td>
</tr>
<tr>
<td>R² (%)</td>
<td>7.49</td>
<td>7.68</td>
<td>6.22</td>
<td>7.45</td>
<td>10.1</td>
</tr>
<tr>
<td>F-Stat</td>
<td>17.7†</td>
<td>10.6†</td>
<td>10.7†</td>
<td>32.6†</td>
<td>9.16†</td>
</tr>
</tbody>
</table>
Results, so far

- CITs reduce the cost of hedging.
- CITs have an impact on the spread between the futures of different maturities.
- Hedge funds and swap dealers seem to reduce volatility and, perhaps, provide liquidity.
- Hedgers seem to increase volatility.
- Swap dealer activity is not linked to returns.
Regime switching, hedgers and speculators (work in progress)

Our data cover the period in which commodity prices went up and down → regime switching approach.

Same CFTC positions data as previous paper.

Crude oil only.

Consider the effect of economic activity.
Trader positions and economic activity

To isolate trading behavior not linked to fundamentals, we filter traders positions:

- ADS (economic condition)
- TED spread
- Expected inflation and CPI
- Inventory and Inventory surprise
- Seasonality (Fourier transform) plus other controls

Strong link between economic activity and fundamentals.
Regime switching model

\[ y_t = \mu_s + \sum_{j=1}^{k} \theta_j X_{j,t} + \epsilon_t \]

\[ \epsilon_t = \sigma_t u_t \text{ and } u_t \sim iidN(0, 1) \]

\[ \sigma_t^2(S_t, S_{t-1}, \ldots, S_0) = \omega(S_t) + \sum_{j}^{p} \alpha_j(S_{t-j}) \epsilon_{t-j}^2 + \sum_{j}^{q} \beta_j(S_{t-j}) \sigma_t^2(S_{t-1}, \ldots, S_0) \]

\[ Pr(S_t = 0 | S_{t-1} = 0, Z_{t-1}) = p_{00,t} = \Phi(Z'_{t-1} \zeta) \]

\[ Pr(S_t = 1 | S_{t-1} = 1, Z_{t-1}) = p_{11,t} = \Phi(Z'_{t-1} \tau) \]
Regime switching model - Main findings

- The model identifies 2 regimes: Bull and bear markets.
- Volatility in bear market is about 10 times larger than in bull markets.
- Hedgers have a significant and positive coefficient in the time-varying probabilities.
- Swap dealers (CITs) never significant.
- Hedge funds not significant in bull market but significant and negative in bear market.
Results, so far

Our evidence suggests that

- Hedgers do have an impact on commodity markets, and rightly so.
- Hedge funds seem to stabilize prices and volatility.
- Swap dealers do not seem to be connected to regime shifts.
Are hedgers hedging?

Hedgers play an important role in commodity markets.
Hedgers play an important role in commodity markets.
Are hedgers hedging?
Are hedgers hedging?

Data on hedgers cash positions.
Are hedgers hedging?

- Data on hedgers cash positions.
- Combined with LTRS.
Are hedgers hedging?

- Data on hedgers cash positions.
- Combined with LTRS.
- Compute hedge ratios.
Are hedgers hedging?

Data on hedgers cash positions.
Combined with LTRS.
Compute hedge ratios.
Hedge ratios vary considerable and are both positive and negative.
Concluding remarks

Commodities: very interesting markets.
Commodities: very interesting markets.

Yet new players.
Concluding remarks

- Commodities: very interesting markets.
- Yet new players.
- Why crude oil price is so low?
Concluding remarks

- Commodities: very interesting markets.
- Yet new players.
- Why crude oil price is so low?
- Linkages between large investment banks and commodity markets.
Commodities: very interesting markets.
Yet new players.
Why crude oil price is so low?
Linkages between large investment banks and commodity markets.
Liquidity commodity markets.
THANK YOU