# Role of Financial Players on Financialisation of Commodities

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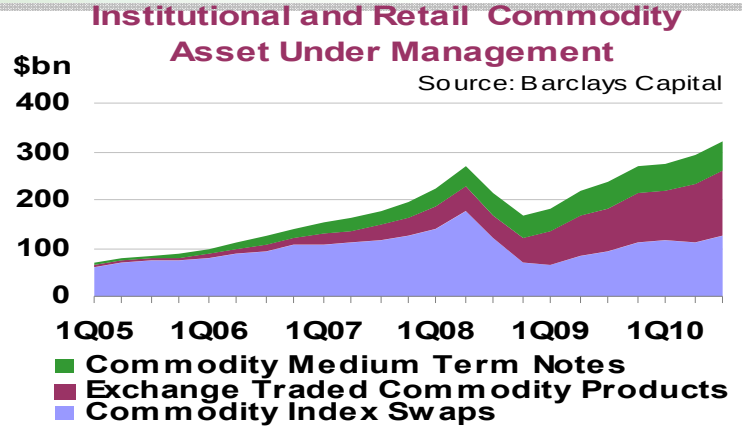
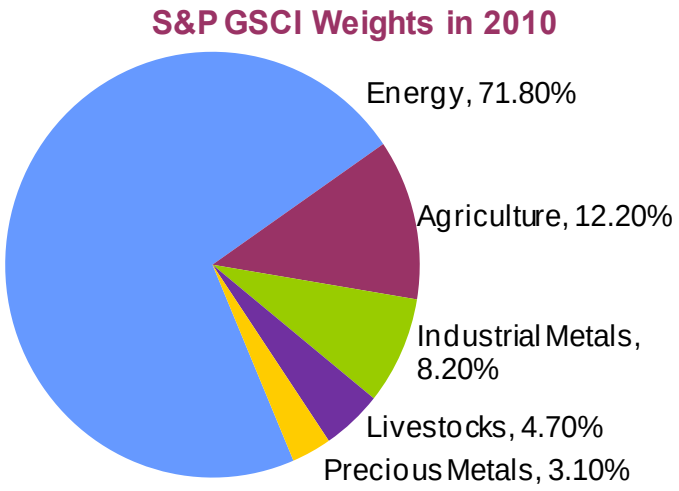
# Commodities: An Asset Class of Their Own




- ***Investor interest in commodities, including oil, has risen dramatically over the last decade and commodities have become a new asset class in institutional investors' portfolio***
- ***Investment in commodities* is due to**
  - **diversification benefits**
  - **hedge against inflation**
- **Main vehicle to gain exposure in commodities is via commodity indices**
- **Investors are exposed to three sources of returns in total-return commodity index investments:**
  - **Yield on underlying commodity**
  - **Roll Yield**
  - **Yield on Collateral**

# Commodities: An Asset Class of Their Own

- ***The oldest and most widely tracked commodity index in the market is S&P GCSI***
- ***It is heavily tilted toward energy because its weights reflect world production figures***
- ***Commodity index investment has increased from $55 billion in late 2004 to $354 billion in November 2010***
- ***Coincident rise in commodity prices and commodity index investment:***
  - **Some argue that index traders' strategic allocation changed the way in which commodity prices behave**
  - **Others argue that prices and investment are reacting to common factor, namely expectations of strong economic growth in Asia and other emerging countries**



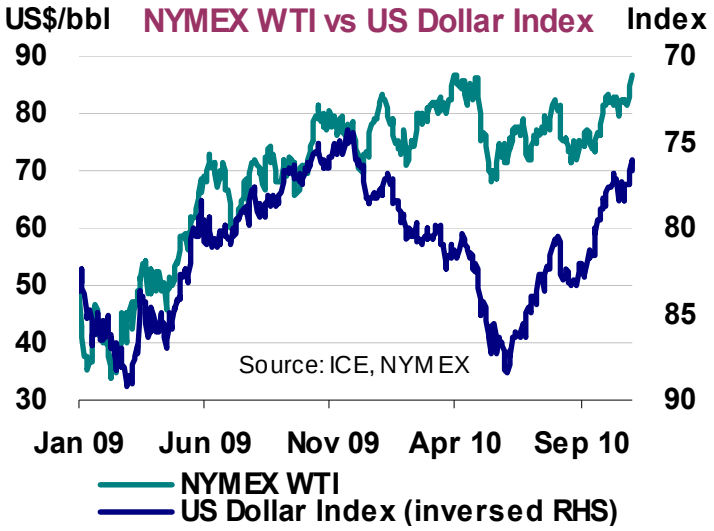
# Exchange Rates and Oil Prices

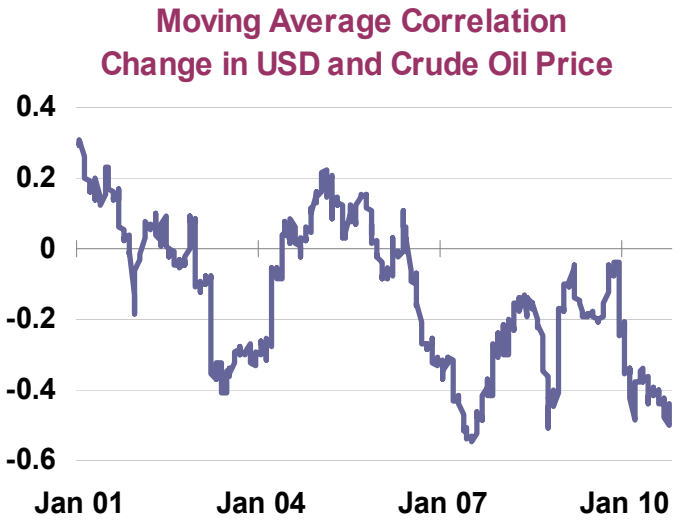
- *When the price of an import rises, if the demand for that import is very inelastic, ( i.e. quantities demanded hardly fall at all when the price is increased, as is the case for oil) this produces a deterioration in trade balance, which will decrease the value of your currency. This is referred to as a terms of trade effect.*

- *However, the relationship between the price of oil and the exchange rate is much more complex than the initial terms of trade impacts would suggest.*

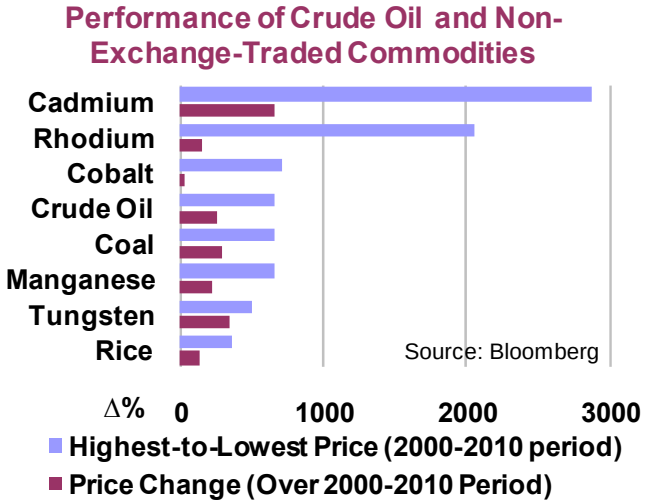
  - *Reverse causation is possible*

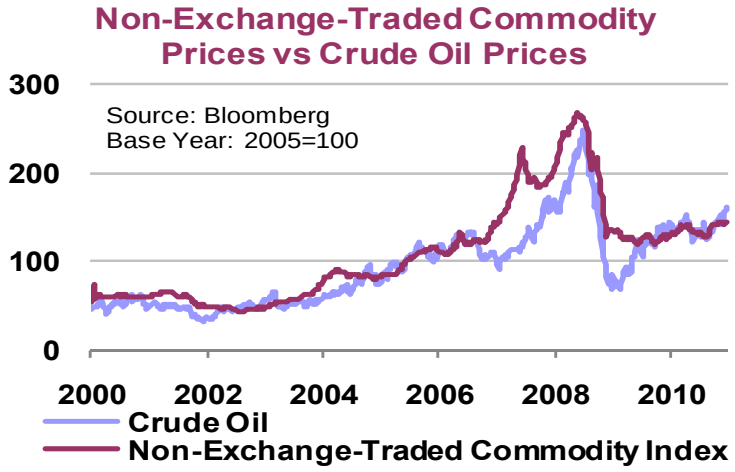
  - *Or, both exchange rate and oil prices might be reacting to some other common factor*



# Volatility: Not Unique to Exchange-Traded Commodities




- ***A comparision of non-exchange-traded commodity price index, as well as crude oil price series, supports the notion that, starting in 2003 and more strongly after 2004, a demand shock pushed upward the prices of most commodities.***
  - Prices for non-exchange-traded commodities rose faster than crude oil prices between 2006 and 2008
  - Commodity prices (of both crude oil and non-exchange-traded commodities) declined sharply amid the economic contraction of autumn 2008 and stabilised after 2009.
  - Fall in crude prices to below $40/bbl in early 2009 was something of an under-shoot, and that subsequent recovery has been more in line with the strengthening evident across commodities in light of the economic recovery

# Volatility in commodities rose sharply after 2006

- *Non-exchange-traded commodities' index volatility experienced a large spike in early 2007 while crude oil prices were still relatively stable*
- *Unusually high volatility in commodity markets post-2007 does not appear unique to crude oil traded on exchanges*
- *Other commodities that are not traded in exchanges experienced similar fluctuations and price surges in the second part of 2000s.*
- *Volatility declined for both crude and non exchange-traded commodities once again through 2010.*
- *This is not to say that the trading of futures and derivatives contracts on exchanges has no impact on price levels and volatility.*
- *However, it does suggest that a more holistic and refined set of policy responses than simply 'driving out the speculator' may be needed to achieve more stable and predictable markets.*

# Observations

- **More investment money in commodity futures markets**
  - *Thousands of hedge funds, commodity index funds, etc.*
  - *Assets under Management (AUM):*

    *now exceed $350bn, inflows = $300bn in 10 years*

    *(Barclays, Nov. 2010)*

- **What could this development mean for…**
  - *Energy Price Levels?*
  - *Oil Market Volatility?*
  - *Cross-Market Linkages?*

# Role of Financial Players

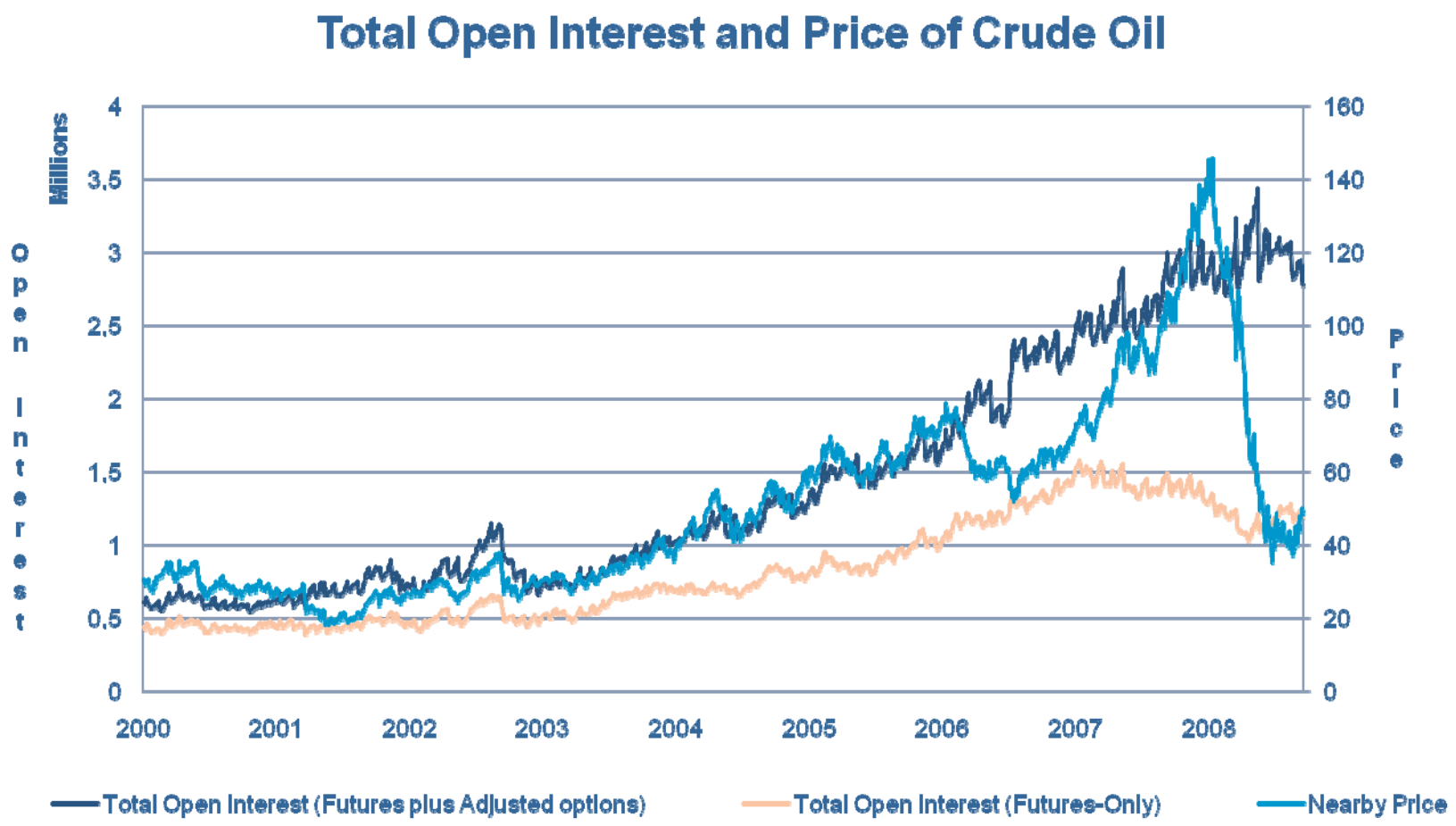
***" […] hedge funds are exploiting recently deregulated energy trading markets to manipulate energy prices. […] speculative purchases of oil futures contracts added as much as $20-$25 per barrel to the current price of oil." "***

***Tyson Slocum, Capital Hill Hearing Testimony, July 11, 2008***

***"These swap dealers […] convinced institutional investors that commodity futures were an asset class that would deliver 'equity like returns' […] as a result a new and more damaging form of speculator was born […] the result has been a titanic wave of speculative money that has flowed into the commodities futures markets and driven up prices dramatically."***

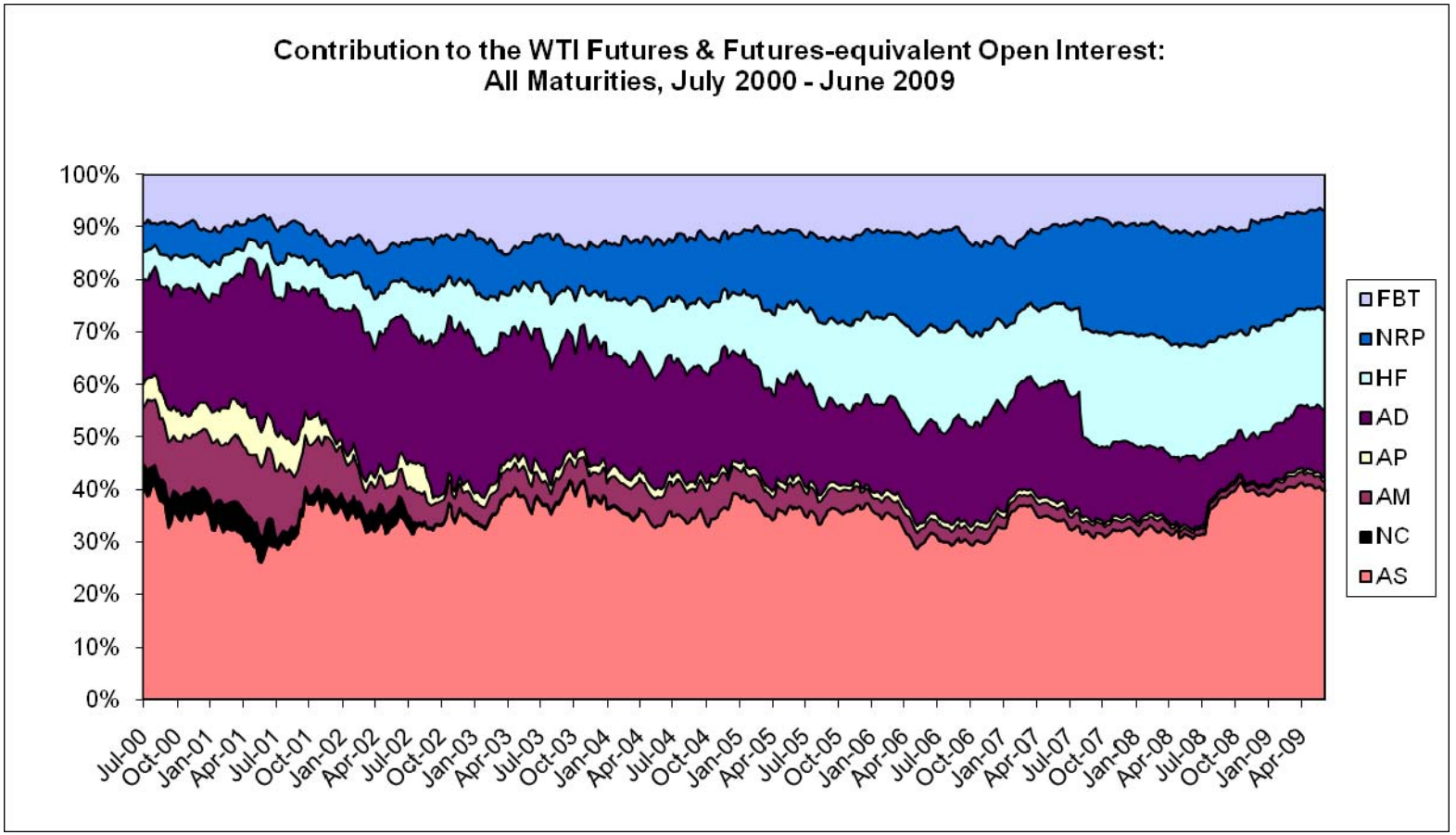
***Adam K. White, Capital Hill Hearing Testimony, July 10, 2008***

# Stylized facts: I



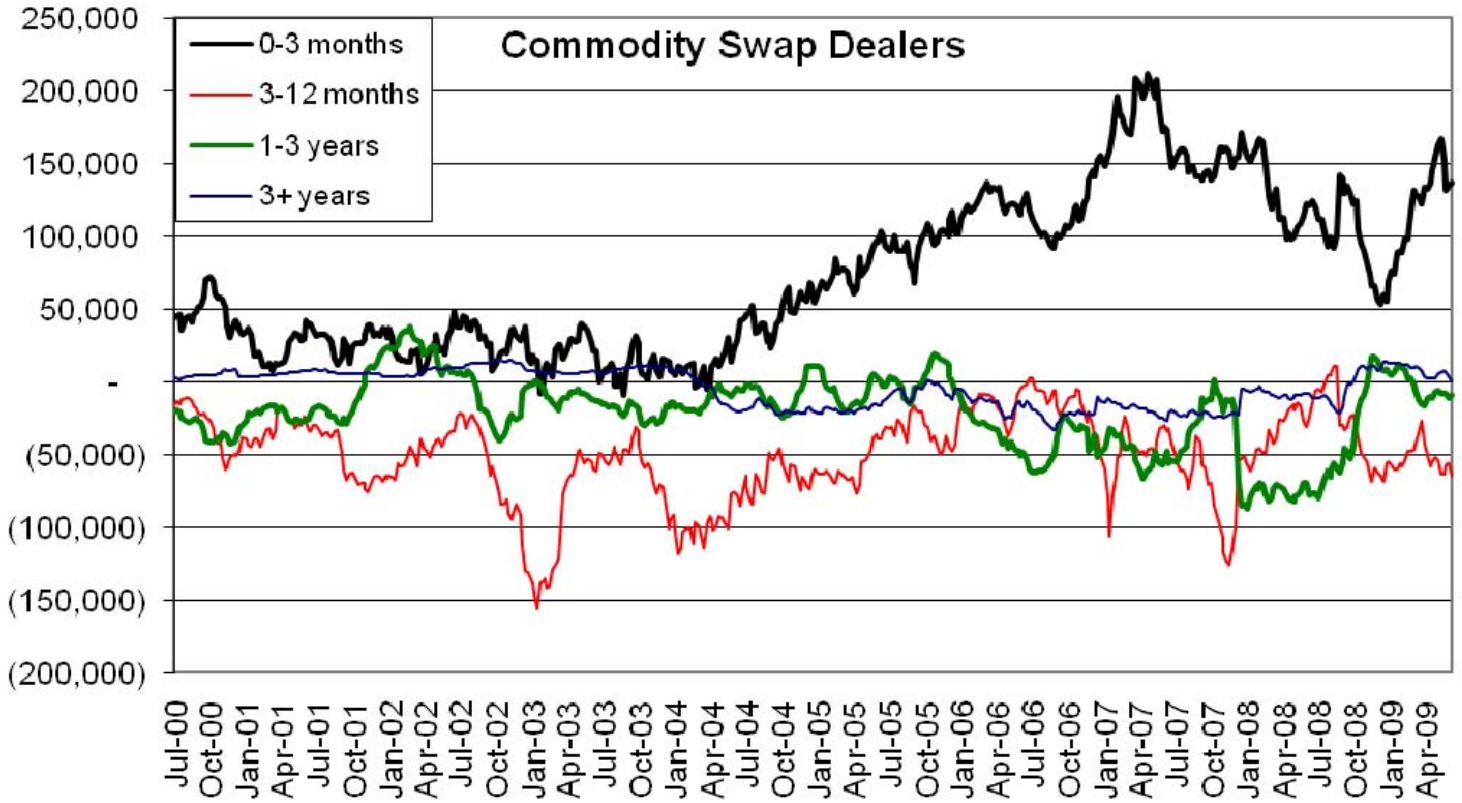
# Stylized facts: II

- Hedge Funds & Swap Dealers (*incl*. CITs) are up



# Stylized facts: III

- *E.g.*, Swap Dealers: net long nearby / net short backdated



# Data

- Non-commercials
  - **Hedge Funds (MMT)** includes Commodity Pool Operators (CPOs), Commodity Trading Advisors (CTAs), Associated Persons who control customer accounts, and other Managed Money traders
  - **Floor Brokers & Traders (FBT)**
  - **Non-Registered Participants (NRP)** Traders not registered under the Commodity Exchange Act (CEA) – mostly non MMT financial traders
- Commercials
  - **"Traditional"**
    - **Producers (AP)**
    - **Manufacturers (AM)** (refiners, fabricators, etc.)
    - **Dealers AD** (wholesalers, exporter/importers, marketers, shippers, etc.)
    - **Others AO**
  - **Commodity Swap Dealers (AS)** (includes arbitrageurs)

# A simple question

- **Is speculative activity destabilizing markets?**
  - **Is speculative activity moving prices?**
  - Theory:
    - **Profitable speculation must involve buying when the price is low and selling when the price is high (Friedman, 1953)**
    - **Speculators fill hedgers' demand-supply imbalances and provide liquidity to the market (Keynes, 1923)**
    - **Speculative activity reduces cost of hedging (Hirshleifer, 1990 and 1991)**

# Data and Findings

- For each category we consider:
  - **Level of Net Futures Position**
  - **Change in Net Futures Position**
  - **Level of Net Total Position (Futures plus futures equivalent options)**
  - **Change in Net Total Position**
- Trading Activity is measured at
  - **Daily and multiple day intervals**
- What we found:
  - **Speculative activity does not Granger-cause prices**
  - **In general, on the other hand, we find the reverse causality to hold, i.e. position change is Granger caused by price change.**

# Granger Causality: Crude Oil Managed Money Traders

Full Sample

| | Managed Money Traders (Futures Only) | | | | Managed Money Traders (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | **0.000** | **(0.000)** | 0.991 | (0.234) | **0.000** | **(0.000)** | 0.813 | (0.229) |
| 2 | **0.001** | (0.116) | 0.245 | (0.113) | **0.000** | (0.051) | 0.170 | (0.113) |
| 3 | 0.039 | (0.348) | 0.956 | (0.235) | 0.012 | (0.153) | 0.990 | (0.242) |
| 4 | 0.867 | (0.284) | 0.656 | (0.288) | 0.388 | (0.793) | 0.624 | (0.298) |
| 5 | 0.717 | (0.731) | 0.223 | (0.405) | 0.299 | (0.670) | 0.215 | (0.396) |

2000-2004

| | Managed Money Traders (Futures Only) | | | | Managed Money Traders (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | **0.004** | (0.447) | 0.118 | (0.193) | **0.004** | (0.405) | 0.155 | (0.186) |
| 2 | 0.134 | (0.470) | 0.123 | (0.351) | 0.105 | (0.540) | 0.165 | (0.352) |
| 3 | 0.408 | **(0.007)** | 0.047 | (0.226) | 0.508 | **(0.010)** | 0.068 | (0.222) |
| 4 | 0.074 | **(0.000)** | 0.056 | (0.150) | 0.116 | **(0.000)** | 0.076 | (0.152) |
| 5 | 0.029 | **(0.000)** | 0.023 | (0.113) | 0.043 | **(0.000)** | 0.035 | (0.188) |

2004-2009

| | Managed Money Traders (Futures Only) | | | | Managed Money Traders (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | **0.000** | **(0.000)** | 0.921 | (0.134) | **0.000** | **(0.000)** | 0.767 | (0.128) |
| 2 | **0.002** | (0.063) | 0.148 | (0.061) | **0.000** | (0.024) | 0.099 | (0.060) |
| 3 | 0.023 | (0.089) | 0.798 | (0.142) | **0.005** | (0.026) | 0.780 | (0.143) |
| 4 | 0.538 | (0.990) | 0.964 | (0.149) | 0.180 | (0.381) | 0.981 | (0.150) |
| 5 | 0.379 | (0.395) | 0.500 | (0.235) | 0.111 | (0.095) | 0.459 | (0.223) |

# Granger Causality: Crude Oil Commodity Swaps/Derivative Dealers

Full Sample

| | Commodity Swaps/Derivative Dealers (Futures Only) | | | | Commodity Swaps/Derivative Dealers (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | 0.186 | (0.427) | 0.456 | (0.533) | **0.000** | (0.218) | 0.437 | (0.972) |
| 2 | 0.076 | (0.585) | 0.507 | (0.696) | **0.000** | (0.072) | 0.763 | (0.856) |
| 3 | 0.146 | (0.542) | 0.333 | (0.595) | **0.001** | (0.132) | 0.463 | (0.994) |
| 4 | 0.117 | (0.637) | 0.767 | (0.576) | **0.003** | (0.250) | 0.972 | (0.970) |
| 5 | 0.055 | (0.786) | 0.749 | (0.732) | **0.002** | (0.131) | 0.965 | (0.834) |

2000-2004

| | Commodity Swaps/Derivative Dealers (Futures Only) | | | | Commodity Swaps/Derivative Dealers (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | **0.000** | (0.053) | 0.279 | (0.393) | 0.011 | (0.074) | 0.211 | (0.162) |
| 2 | **0.000** | (0.085) | 0.128 | (0.228) | 0.052 | (0.157) | 0.135 | (0.121) |
| 3 | **0.002** | (0.156) | 0.288 | (0.228) | 0.257 | (0.196) | 0.296 | (0.136) |
| 4 | 0.031 | (0.215) | 0.449 | (0.247) | 0.615 | (0.258) | 0.435 | (0.137) |
| 5 | 0.211 | (0.377) | 0.440 | (0.265) | 0.966 | (0.469) | 0.437 | (0.188) |

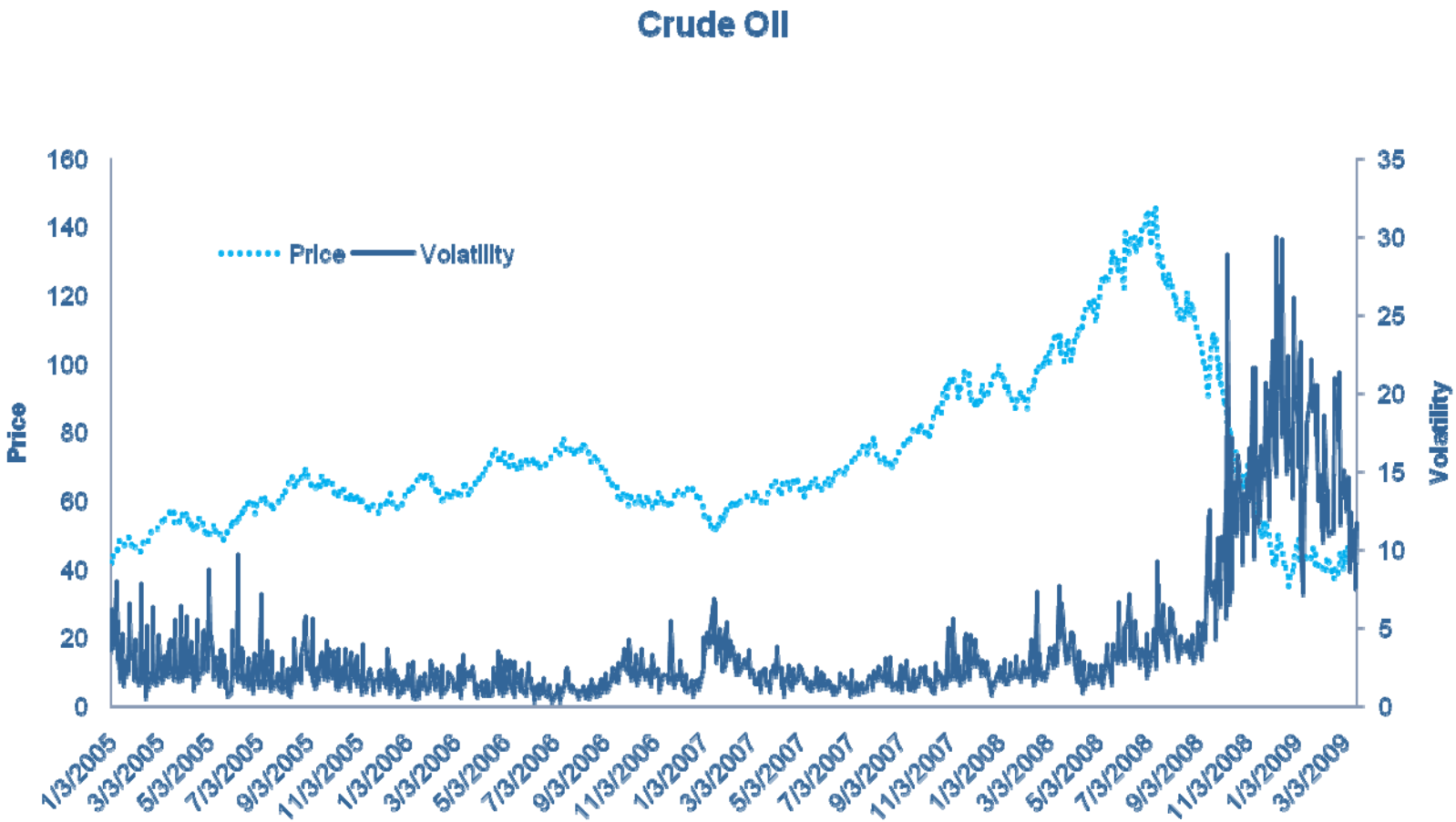
2004-2009

| | Commodity Swaps/Derivative Dealers (Futures Only) | | | | Commodity Swaps/Derivative Dealers (Futures and Options) | | | |
|---|---|---|---|---|---|---|---|---|
| Day Change | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | | ΔPrice→ΔPosition | | ΔPosition→ΔPrice | |
| 1 | **0.004** | (0.123) | 0.632 | (0.934) | **0.000** | (0.150) | 0.620 | (0.284) |
| 2 | **0.006** | (0.015) | 0.741 | (0.707) | **0.000** | (0.057) | 0.985 | (0.204) |
| 3 | 0.040 | (0.073) | 0.485 | (0.922) | **0.000** | (0.151) | 0.637 | (0.360) |
| 4 | 0.043 | (0.070) | 0.930 | (0.982) | **0.002** | (0.256) | 0.848 | (0.437) |
| 5 | 0.024 | (0.035) | 0.914 | (0.810) | **0.002** | (0.153) | 0.857 | (0.295) |

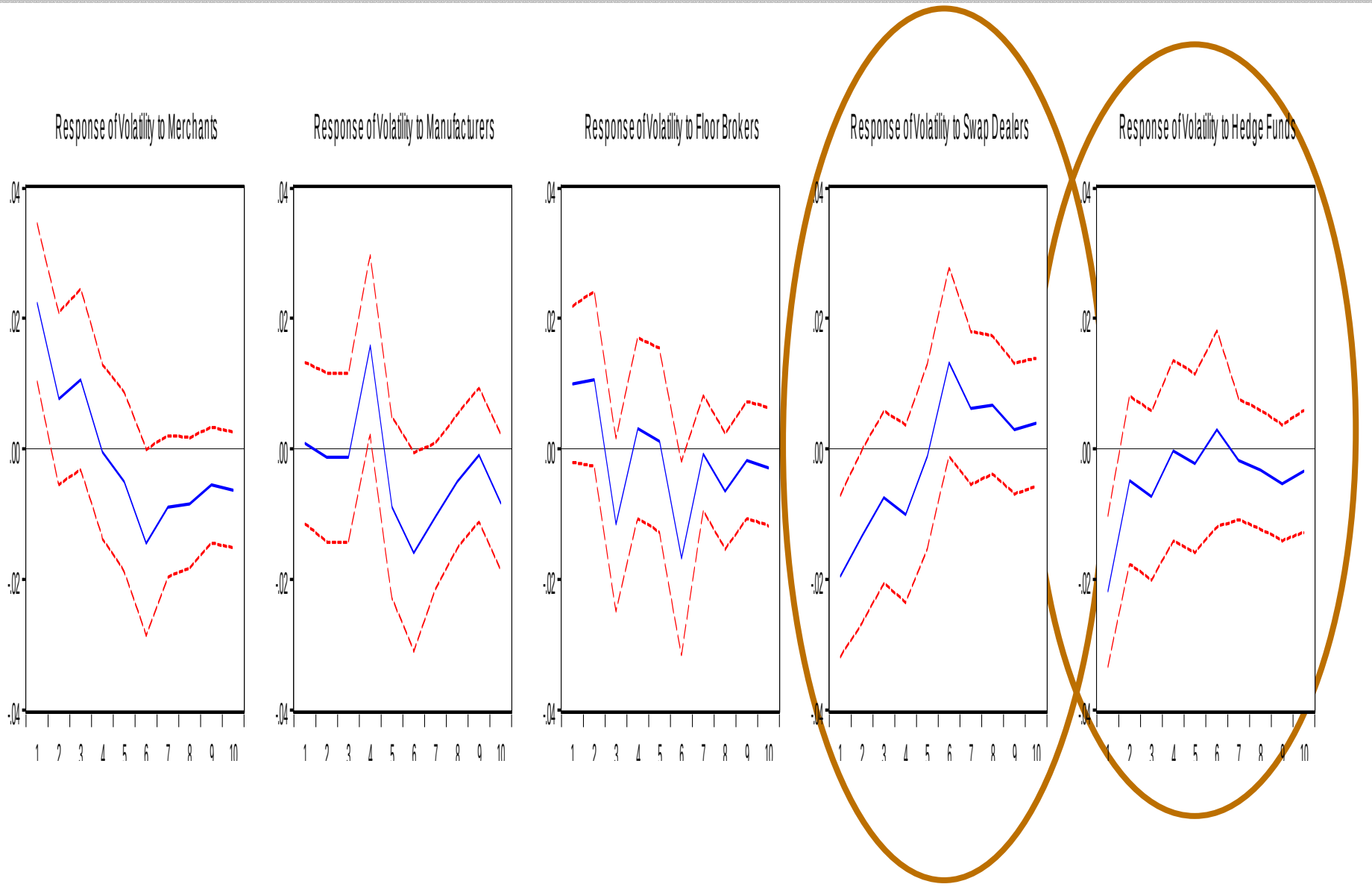
# Main Findings: Returns

- ***Change in price is not Granger-caused by positions (including those of swap dealers and hedge funds)***
- ***Change in positions of different traders preceded by change in prices***
- ***Hedge funds are reacting to market conditions and providing liquidity to the market; i.e. there is a uni-directional causation from change in price to change in MMT's position***
- ***Interestingly, Swap dealers change in position is preceded by change in prices***

# Prices and Realized Volatility



# Impulse Responses: Crude Oil



# Multivariate Granger Causality Findings

- **Returns are not Granger-caused by positions (including those of swap dealers and hedge funds)**

- **Hedge fund activity**
  - does not cause any variable in the system
  - is caused by all the variables in the system
  - reacts to market conditions and provides liquidity
  - Reduces volatility

- **Swap dealer activity**
  - Generally reduces volatility

# Contemporaneous Effects

$$RV_{i,t} = \alpha_i + \beta_{i,j} TP_{i,j,t} + \sum_{s=1}^{N} \varsigma_{i,s} RV_{i,t-s} + \varepsilon_{i,t}$$

- **Endogeneity → IV → change in number of reporting traders in each market each day**
- **Stock and Yogo (2005):**
  - Limited information Maximum Likelihood better than two-stage least squares
  - The validity of the instruments is tested via an F-test using their critical values

# IV Estimation Position Changes and Volatility

| | | Merchant | Producer/Manu-facturer | Broker | Swap Dealer | Hedge Fund |
|---|---|---|---|---|---|---|
| Crude Oil | Coeff. | 2.71e-4** (1.01e-4) | 6.18e-5 (2.05e-4) | 5.41e-4** (2.73e-4) | -1.20e-4 (9.17e-5) | -2.88e-4** (8.31e-5) |
| | F-Stat | 113.1 | 46.08 | 9.948 | 321.5 | 16.38 |
| Natural Gas | Coeff. | 1.76e-3* (9.73e-4) | -1.26e-4 (2.54e-3) | -2.94e-4 (7.63e-4) | -6.43e-4 (5.19e-4) | -8.29e-06** (3.60e-5) |
| | F-Stat | 34.40 | 17.72 | 8.67 | 117.67 | 43.11 |
| Corn | Coeff. | 1.37e-5 (1.66e-4) | -5.11e-4 (7.55e-4) | 2.95e-4 (2.84e-4) | -1.45e-4 (1.72e-4) | -3.57e-5 (1.53e-4) |
| | F-Stat | 33.38 | 12.276 | 14.08 | 70.70 | 10.09 |

# Conclusions

- Starting in 2003 and more strongly after 2004, a demand shock pushed upward the prices of most commodities, including non-exchange traded commodities.
- High volatility in commodity markets post-2007 does not appear unique to crude oil traded on exchanges.
- Hedge funds are reacting to market conditions and providing liquidity to the market; i.e. there is a uni-directional causation from change in price to change in MMT's position
- Interestingly, Swap dealers change in position is preceded by change in prices
- More transparent information on composition of open interest is needed to have better understanding of role of different market participants on prices and observed high volatility in commodity derivatives markets