Re-Thinking the Commodity Index

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Disclaimer

- Some of the research in this presentation is drawn from my commercial work.
- Some of the comments reflect my (educated, I hope) opinion and would be disputed by other academics *and vigorously disputed by my research partners at CISDM.*

Overview

- Some (unconventional) thoughts on commodities as an asset class
- Difference between a *strategy* and an *index*
- Focus on commodity indexes
- A new approach to commodity indexing
- Future research … the *convex index*

What is a Commodity Investment, anyway

- What are they
  - Financial assets that represent claims on real assets
    - *Actively managed* due to short average maturity of the average futures contract.
      - Even if the choice of investment is an *index.*
- A commodity investment *is a business*
  - A virtual warehouse that stores claims for future delivery of physical commodities.

Picture of an actual warehouse …

Commodities as a business

- Commodity Investment is a *Low-Margin Business*
  - Running a virtual warehouse is a highly competitive business
  - Low barriers to entry and exit
  - Loosely regulated
- Despite the low margins, it may be attractive.
  - Investors hold equity shares in many low margin businesses
  - Running a commodity warehouse may make sense as a portfolio investment *even if margins are zero or slightly negative.*

How do you want your warehouse to be run?

- There is no such thing as a *passive* commodity investment
  - You can have a *structured* investment
    - A pre-defined strategy with rules for how much to hold and when to roll.
  - You can also have an unstructured, or *discretionary* investment.
    - Allows for judgment on the part of the investment manager
- Passive investments *are* possible in equities
  - Because you have delegated management of the real assets to the CEOs of the companies.
  - Similarly, you *can* hold a passive investment in commodity funds.

Implications for Asset Allocation

- The strategy matters
  - Commodity funds and indexes have an average maturity *shorter than most money market funds.*
  - If you were running a warehouse, how much natural gas would you stock in the summer? Gasoline in the winter? Corn in July?
- Need to diversify *strategies*
  - Holding a diversified portfolio of commodities is not enough
  - Need to hold multiple strategies as well.

Difference between an *Index* and a *Strategy*

An *Index* or a *Strategy?*

- You come across the following equity index …
  - 25 large, global equities
  - Index weights are based on *capitalization* and *trading volume*
    - **Except** two equities are weighted only on *volume*
    - And **except** one stock is based on capitalization of shares owned in North America
    - And **except** *volume* is based only on certain exchanges even though some equities trade on multiple exchanges
    - **Also**, each year the weights of stocks that have become too big are reduced. Weights of some small stocks are increased.
- Is this an *index* or a *trading strategy*?

Not that there's anything wrong with that …

- Our equity indexes are simply too good!
  - Easy to identify the universe
  - Single share class usually sufficient for each equity. Limited restrictions on ownership
  - Shares do not expire or mature
  - Shares issued or retired by the corporate sector are a very small percentage of the total number of shares outstanding
- Equities are unique in this way.
  - Its not surprising that we have superb equity indexes!
    - For that matter, some equity indexes (e.g., Small Cap Growth) rely on a number of highly debatable assumptions
    - Is the equity market a good model for indexing other asset classes?

Commodity Indexing

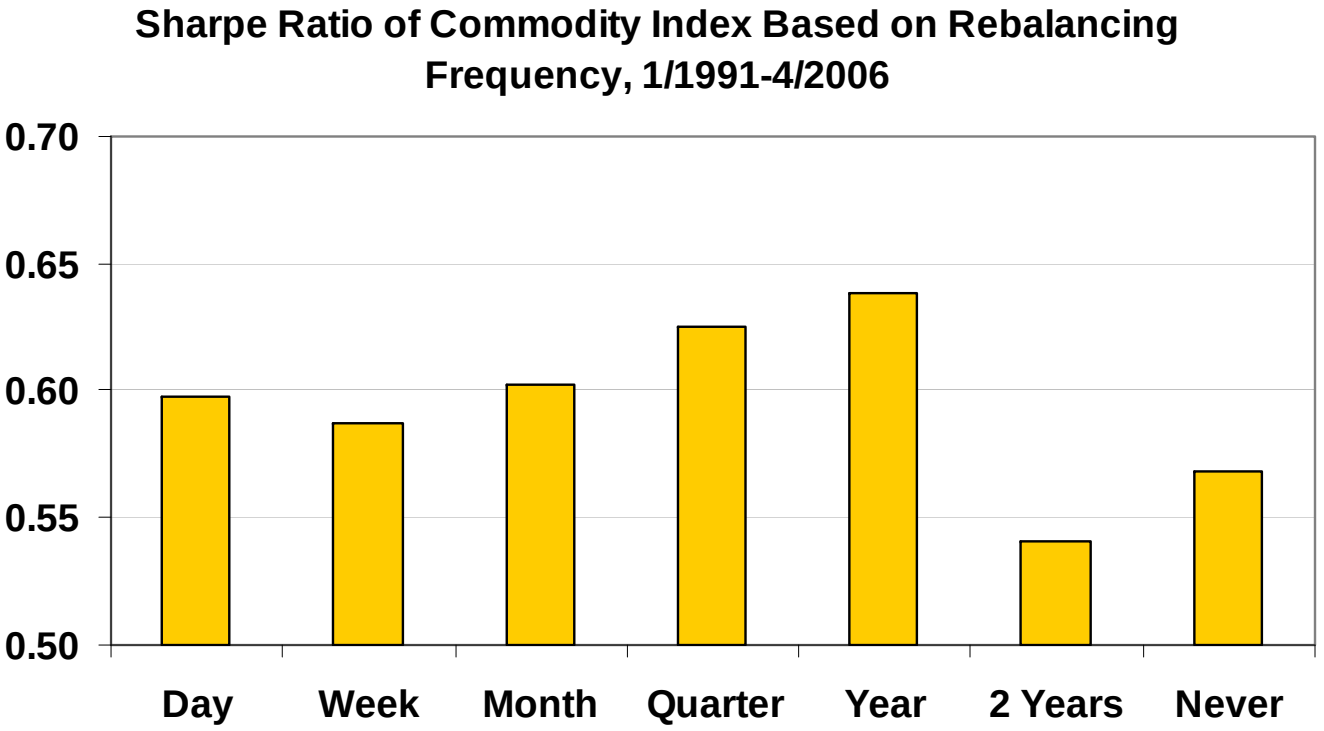
Stylized Facts

- The aggregate commercial position (longs minus shorts) in commodity futures is
  - Short-biased: On average, producers are more active hedgers than users of a commodity
  - Mean-reverting: Buy dips, sell rallys
  - Is not evenly spread across the forward curve for the commodity
- The aggregate speculative position
  - Is long-biased
  - Uses momentum: Buys rallys, sells dips
  - Employs tactical relative value: Uses spread trades to provide liquidity across the forward curve.

A Question …

- If a commodity index is, by definition, an active strategy, what should a it try to capture?
  - Commodity Beta:
    - Hold the same quantity and maturity of each commodity regardless of market dynamics.
  - Mimic the aggregate speculative position in commodity futures:
    - Vary the mix of commodity contracts to reflect the way that commodities are held in speculative portfolios?
    - *With an equity index, we can do both. With commodities, we can't*

Return to Rebalancing?



- Short-term momentum *implies* long run mean reversion.
- Rebalancing frequency is an implicit momentum strategy.
- If we get paid to do this, is there a ‘smarter’ way?

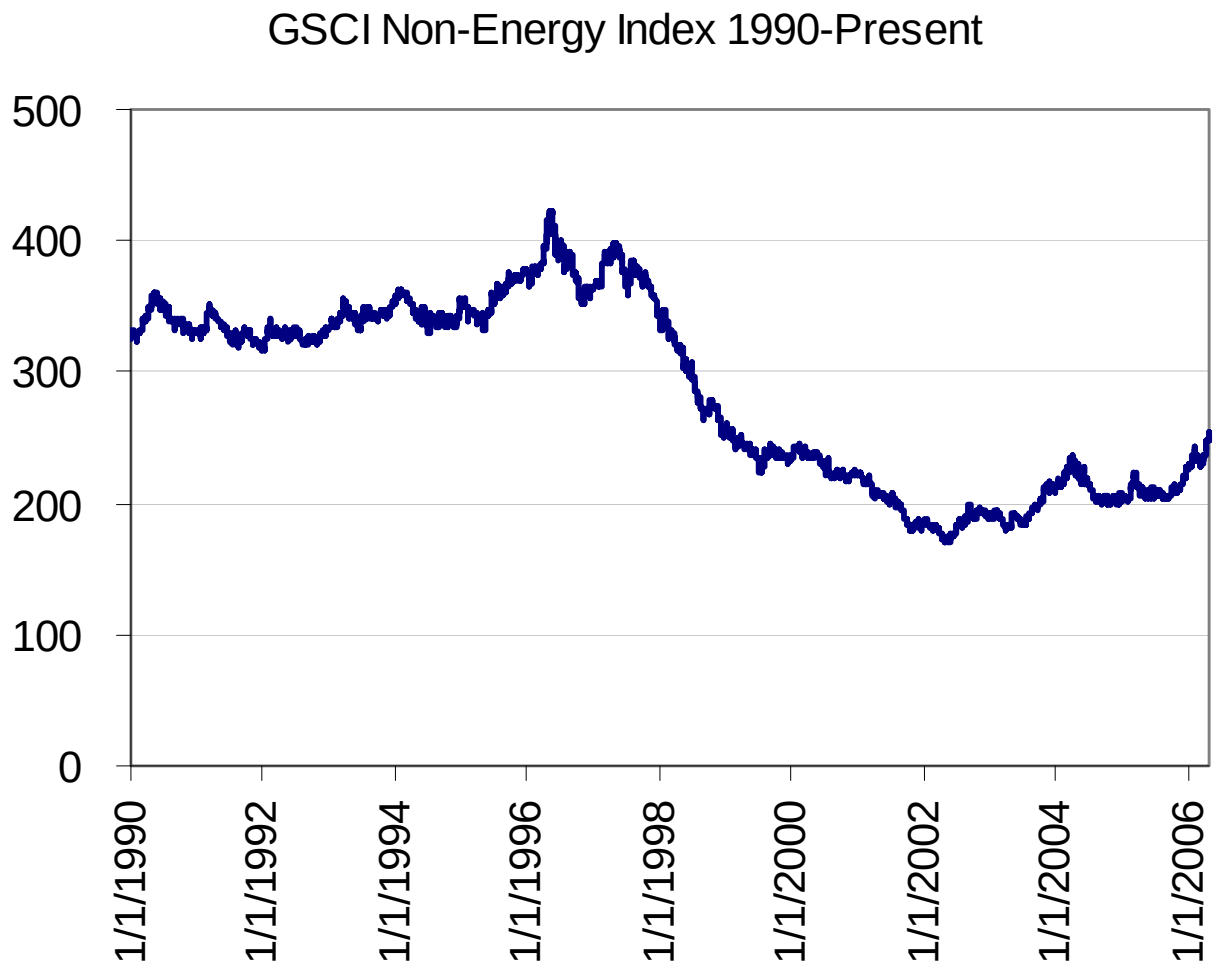
Should a Commodity Investor Rebalance?

- Argument for infrequent rebalancing
  - Stock indexes such as S&P 500 do not rebalance (hold relatively fixed number of shares in each component)
  - Allows investor to capture the 'return to rebalancing' (if it exists)
  - Reduced turnover costs
- Argument for frequent rebalancing
  - Treats commodity sectors as separate asset classes rather than a single asset class
  - Prevents the index from becoming dominated by a few commodities which reduces the diversification benefit

A Problem: Investors Like to Rebalance

- First came the GSCI
  - which was followed by GSCI Reduced Energy
  - which was followed by GSCI Light Energy
  - and then GSCI Ultra-Light
    - Each successive version simply reduces the energy component of the index
- Shifting assets away from energy reduces volatility and improves diversification
  - But, the GSCI non-Energy index has **negative returns since inception**.

Returns are OK if you ignore 1996-2002



A Technical Issue: "Bunching"

Bunching, *n*. The tendency of commodity indexes to roll commodity contracts on the same days, possibly leading to market distortions for investors tracking the index

Bunching, continued

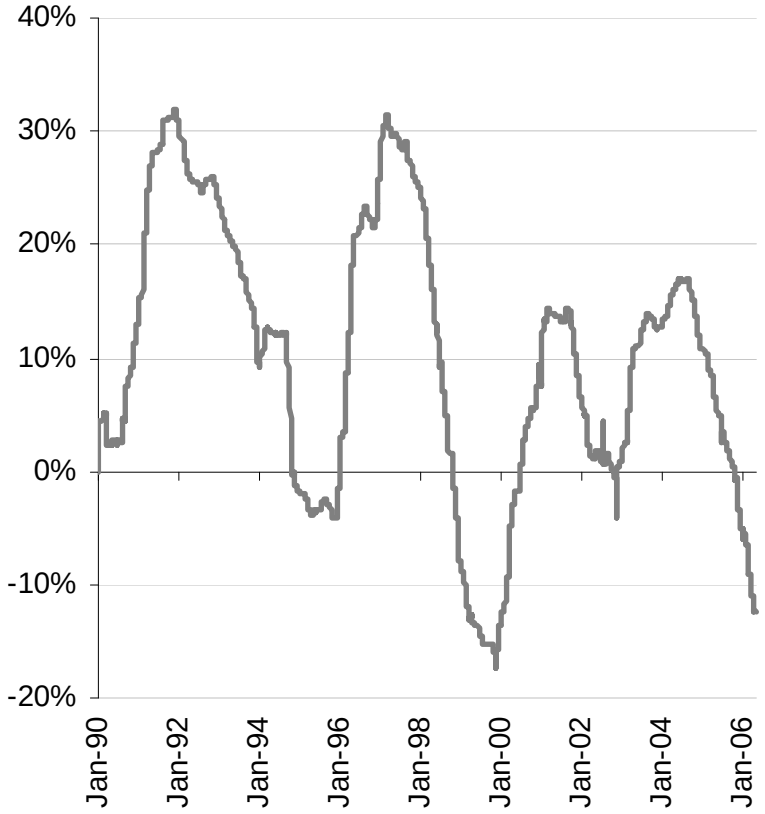
- The obvious solution is to hold longer maturity contracts to minimize market impact
  - Would require re-thinking part of the economic rationale for commodity indexes!
  - Much less liquidity in deferred commodity contracts
  - Difficult to execute market-on-close orders in deferred contracts, making index replication problematic
- Newer commodity indexes address this issue
  - The Deutsche Bank commodity index holds deferred “new crop” grain contracts but bunches the others.
  - The Merrill Lynch commodity index uses a longer ‘roll period’ to avoid bunching with the other indexes.

Winners and Losers from Bunching

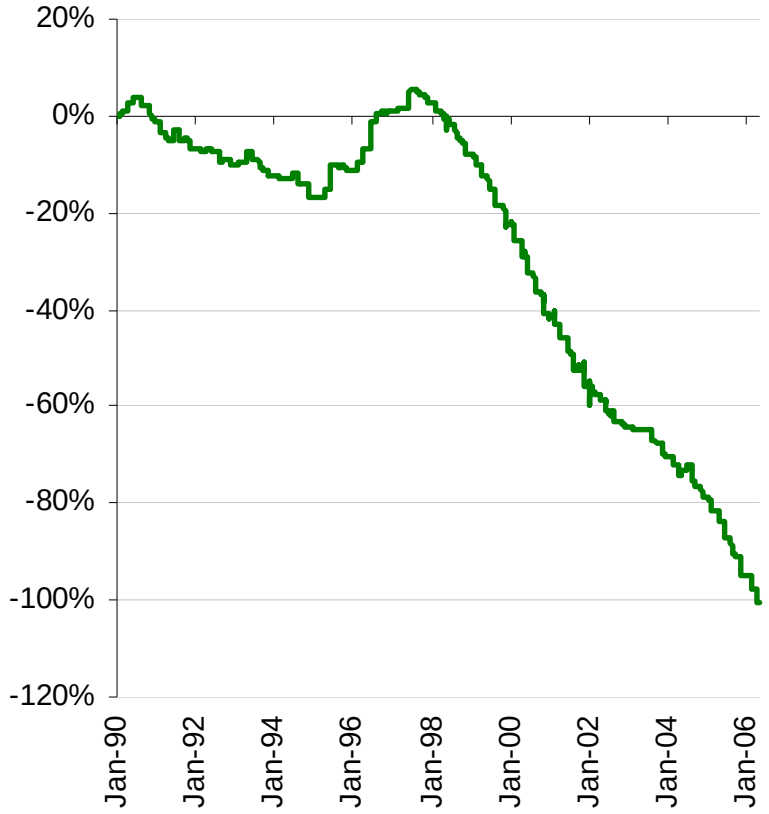
- Winners
  - The major index providers are also traders. They make money by trading the forward curve.
  - Active commodity investment programs have an easier time beating passive benchmarks by timing their trades to avoid the index roll periods
  - Exchanges and market-makers benefit from increased volume. The amount of spread trading has increased dramatically in many markets
  - Commercial short hedgers, who benefit from better pricing
- Losers
  - Investors in commodity index-linked products
  - Commercial long hedgers who buy at higher prices (or are crowded out of opportunities to manage risk)

Measuring the Impact of Bunching

Cumulative Roll Return for GSCI Energy
1990 to present



Cumulative Roll Return for GSCI ex-Energy
1990 to present



Another Measure: Correlation between Commercial and Speculative Open Interest, NYMEX Crude Oil.

Correlation Between Open Interest Changes for Selected CFTC Classification, NYMEX Crude Oil

Period	Correlation From/To	Spec Long	Spec Short	Comcl Short
1992-1999	Comcl Long	-46%	42%	29%
2000-2005	Comcl Long	-2%	33%	70%

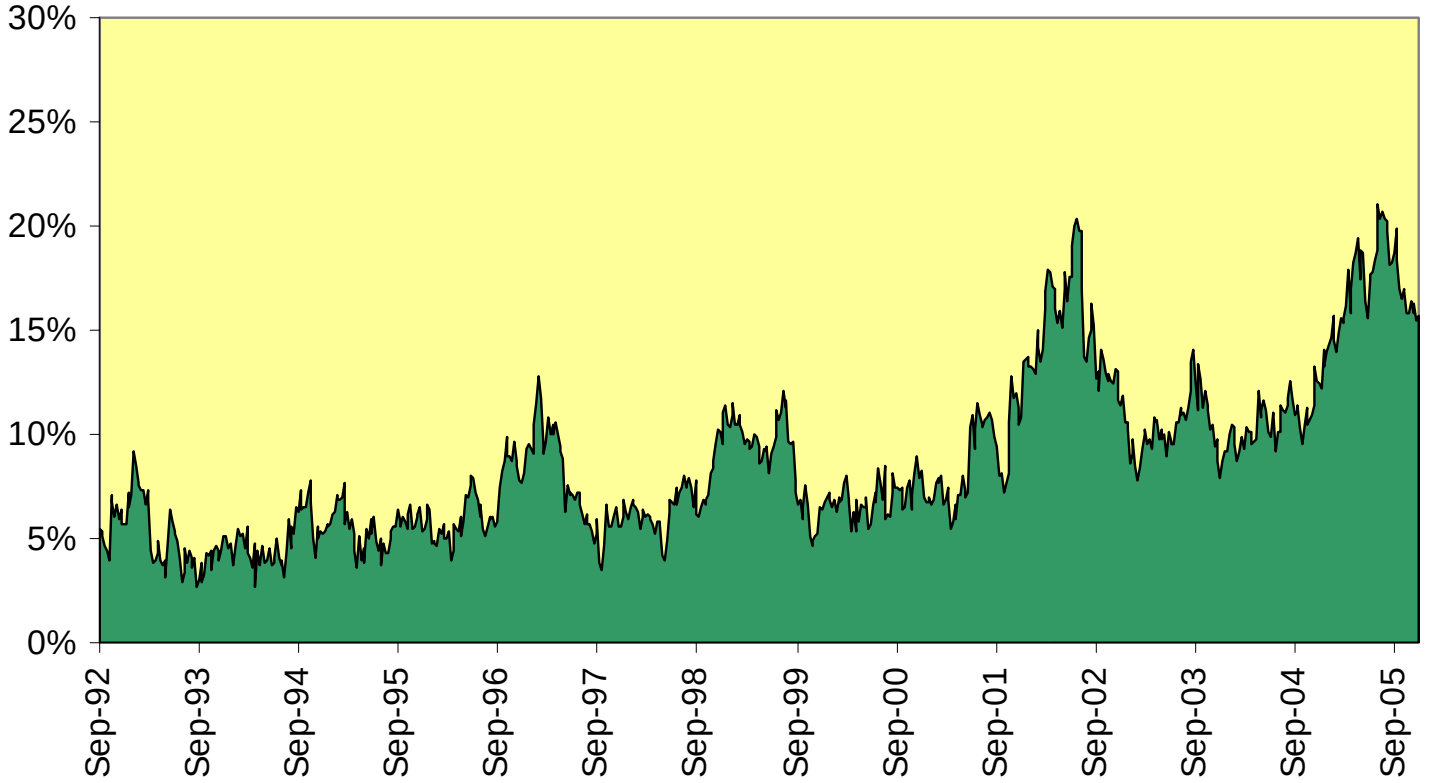
		Spec Short	Spec Long	Comcl Long
1992-1999	Comcl Short	-44%	49%	29%
2000-2005	Comcl Short	-10%	54%	70%

Source: CISDM. Data from CFTC Commitments of Traders Reports

- Before 2000, the typical *commercial* trade had a high correlation with the corresponding *spec* position.
- Since 2000, the typical *commercial* position was matched with another *commercial*.

Yet Another: Growth in Crude Oil Spread Trades

Percent of Reportable Positions Classified as SPREAD, NYMEX Crude Oil Futures 9/1992 to 12/2005



Source: CFTC Commitments of Traders Reports

Where is this going?

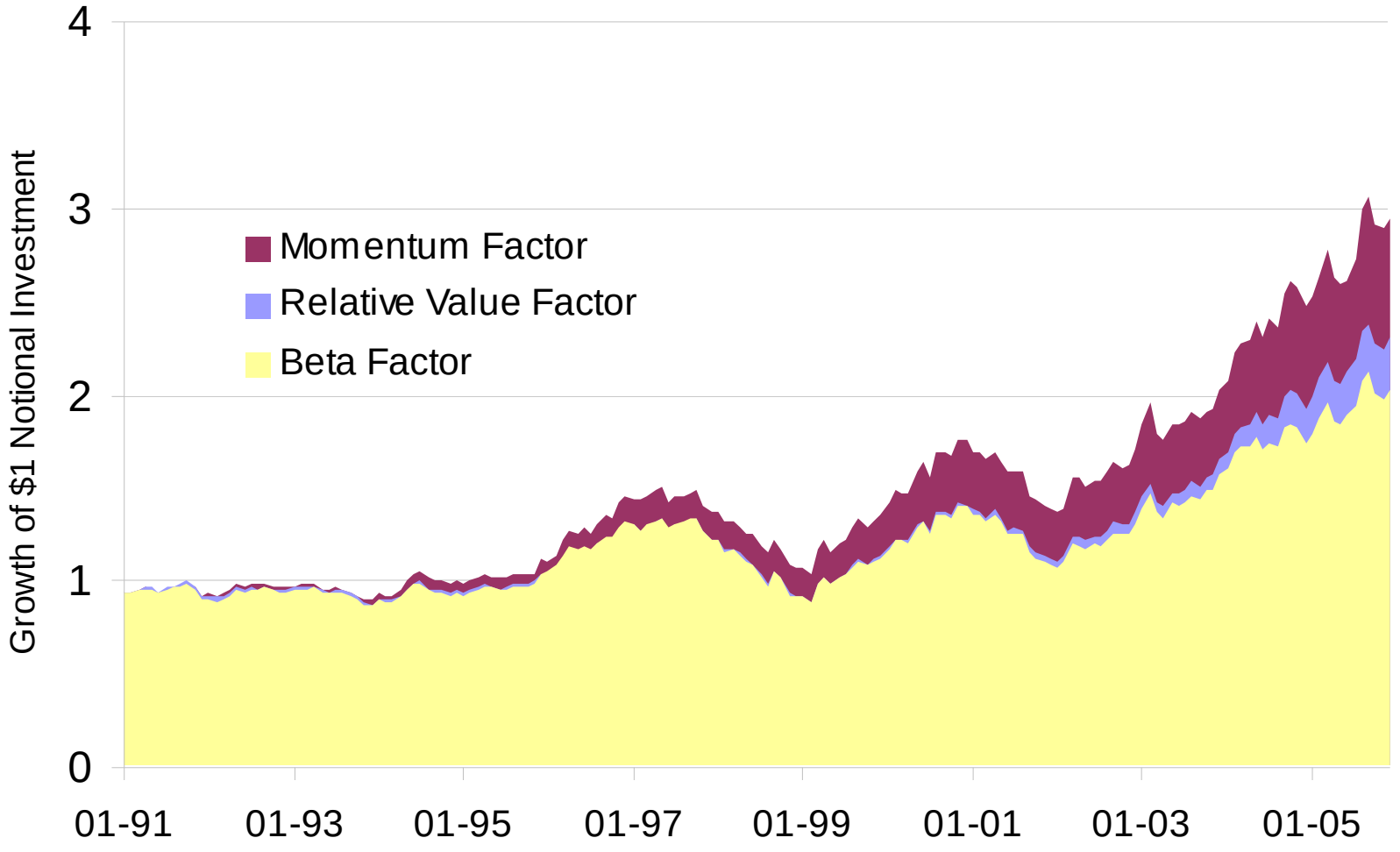
- Eventually, the market will stabilize
  - But academics tend to think that speculative capital in commodity markets provides a **service** to *commercial hedgers*
  - It will take a while to get used to the idea that tens of billions of dollars of speculative capital are needed to provide a service to ***other speculators***.

Incorporating Multiple Sources of Return in a Commodity Index

Another Solution to Commodity Indexing

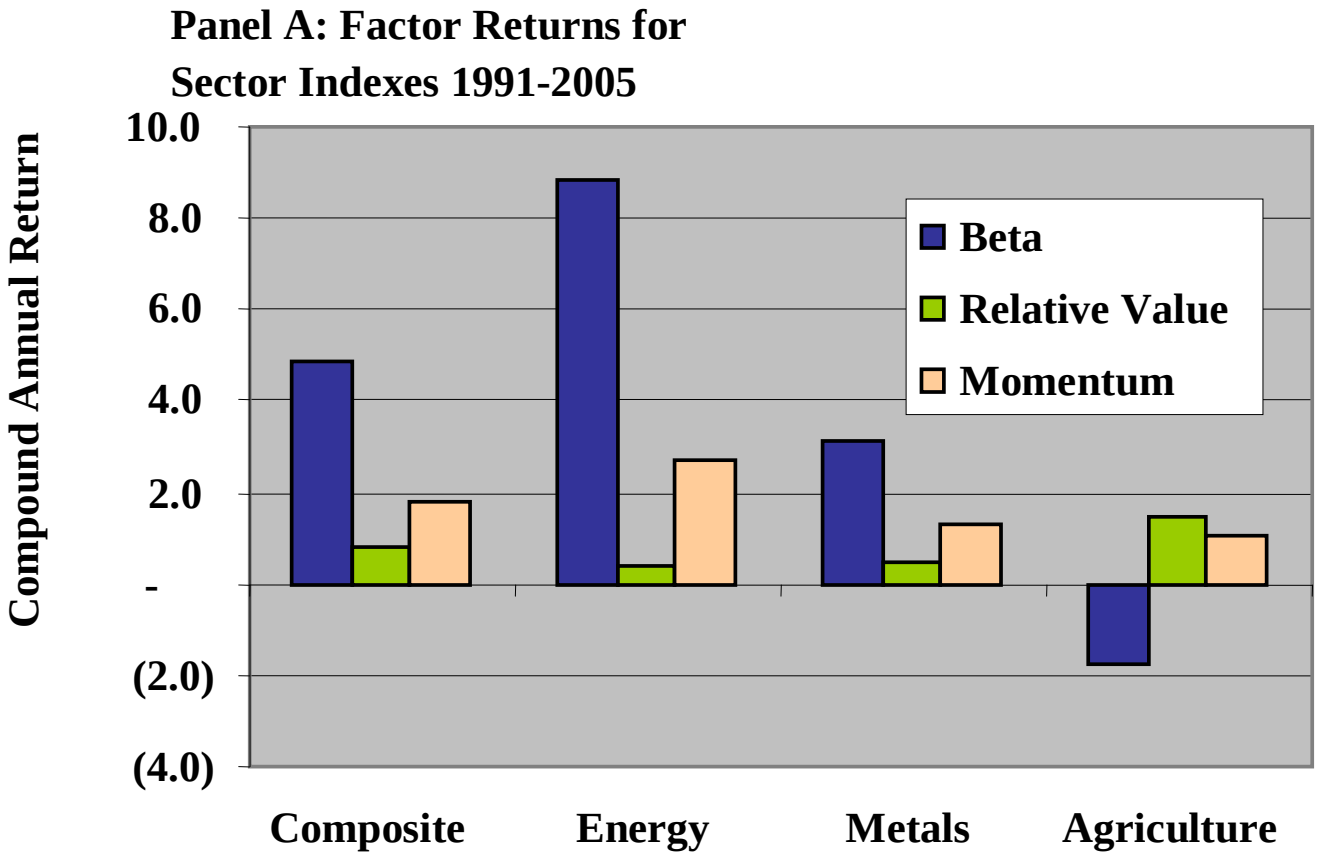
- A structured approach to commodity investment that focuses on the sources of return to commodity investment
  - Commodity Beta: Long biased
  - Momentum: Captures the return to providing liquidity to commercial hedgers who prefer a mean reverting strategy
  - Tactical Relative Value: Holds multiple maturities to avoid bunching
- Problems
  - Momentum can result in high transactions costs
  - May have undesirable tracking error
  - Any publicly available strategy is subject to bunching if sufficiently large assets are employed.
  - *Is this an index?*

Overview of Factor Performance 1991-2005



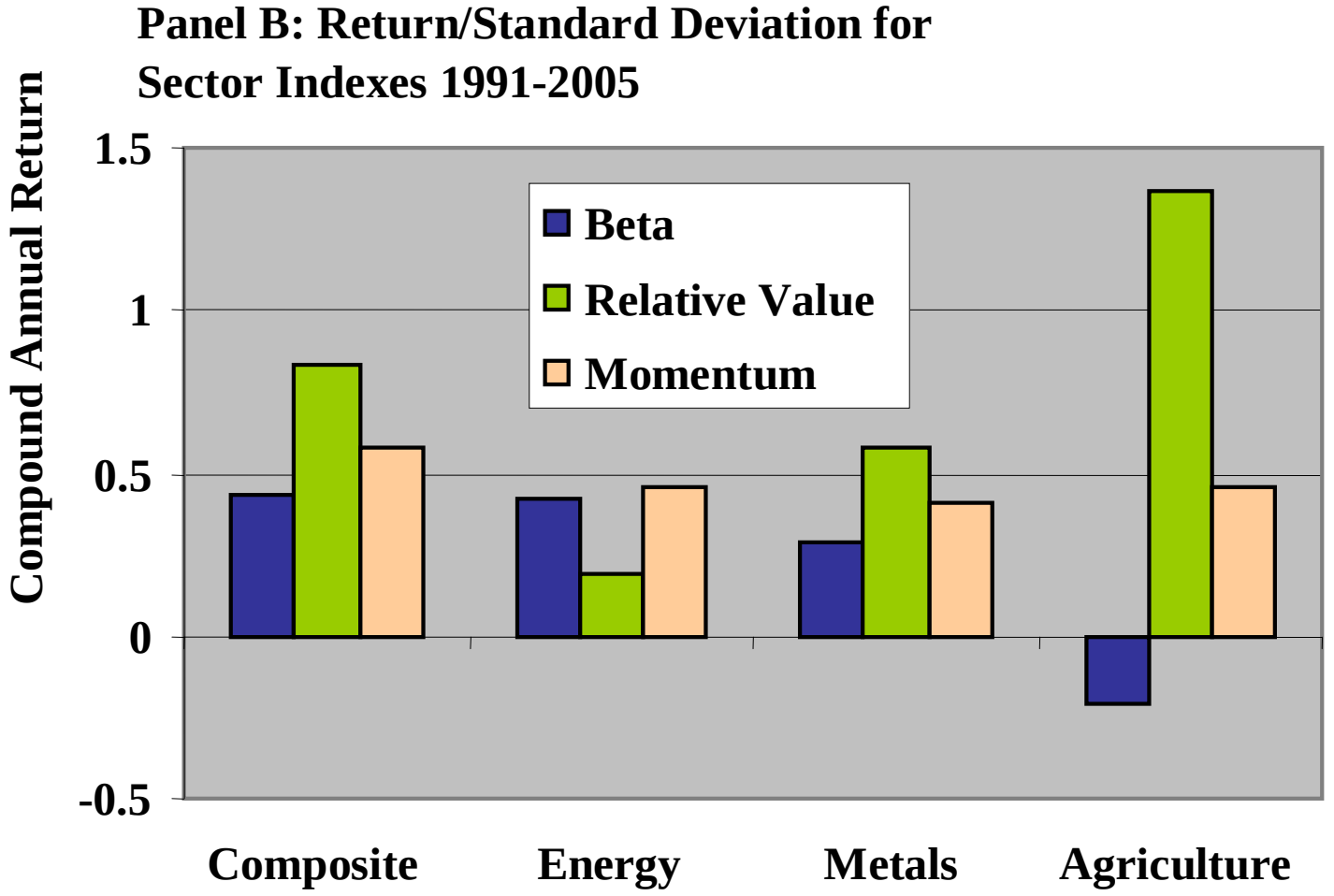
Weights are 50% energy, 35% agriculture, 15% metals. Daily rebalancing

Return Decomposition by Sector



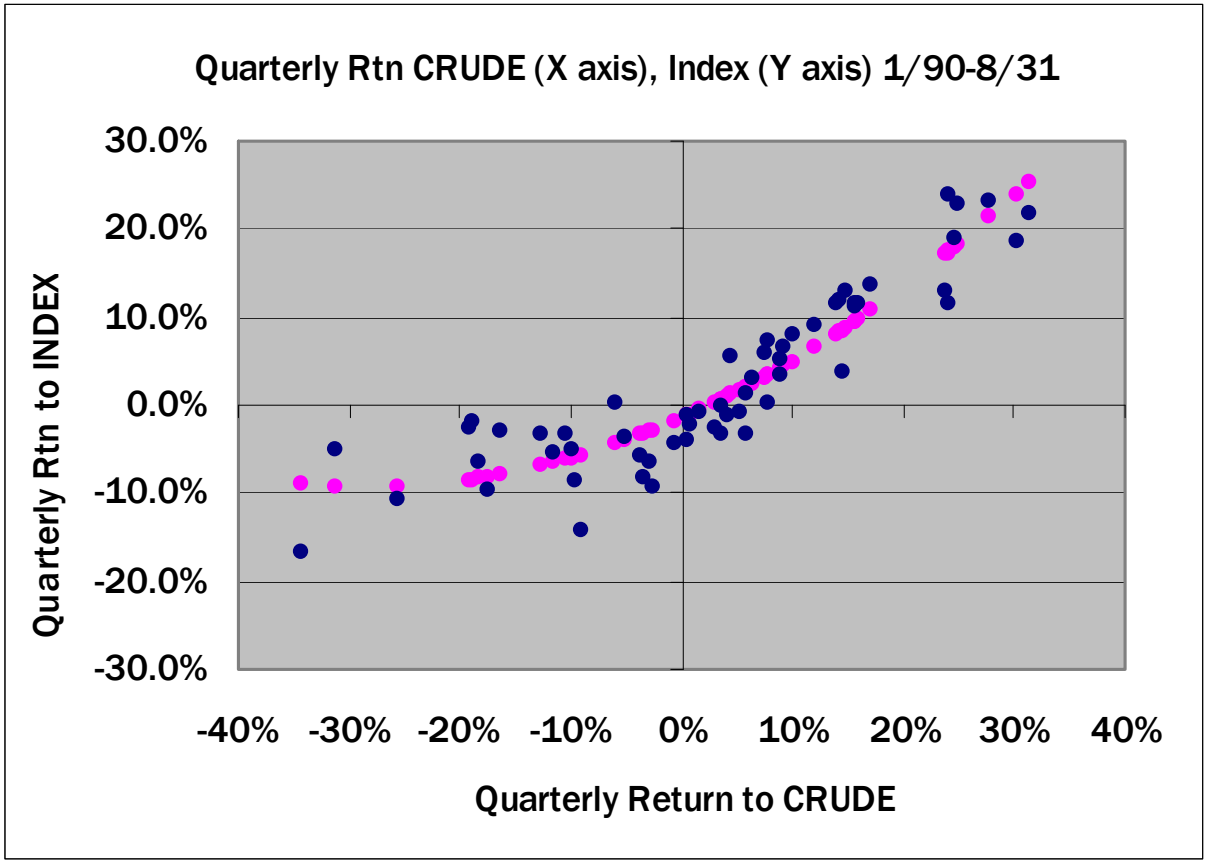
Beta is the dominant source of return, mostly in energy.

Risk-Adjusted Return Decomposition



On a risk-adjusted basis, *relative value* and *momentum* add more value than *beta*

Another Benefit: Momentum Factor Induces Convexity



- Momentum factor significantly alters shape of the returns. Convexity term increases regression r-square for crude oil from 0.77 to 0.85.

Conclusions and Future Research

- Indexing
  - Are dynamic indexes appropriate tools for benchmarks and/or investment vehicles?
  - Is a dynamic index more representative of the typical actively managed commodity portfolio than a passive index?
  - Is convexity a desirable property for an index to exhibit
- Commodity Investment
  - Are the additional sources of return incorporated in our methodology likely to persist? Likely to be persistently negative?