A Dissection of Crude Oil Prices: A Layered Approach

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By

William H. Brown III

President

WHB Energy Research LLC

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- Independent Research On The International Oil and Gas Industry
- Equity Research
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- Investment/Trading And Hedging Recommendations: Energy Stocks, Oil And Gas Prices, And Spread Relationships
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The Thesis: Current Crude Oil Prices Are Composed Of Heterogeneous Layers

• Base Layer:	2000-2003 Price/Inventory Relationships
• Layer 2:	2000-2005 Shift In Atlantic Basin Fundamentals
• Layer 3:	2003-2005 Impact From CFTC-Reporting Funds
• Layer 4:	2003-2005 Impact From “Passive Length”
• Caveat:	Layers Are Not Mutually Exclusive, And A Multitude Of Factors Influence Decisions

Base Layer Analysis:
Correlation Between U.S. Days Supply Of Crude Oil And Prompt NYMEX CL

2000	-0.55
2001	-0.52
2002	-0.67
2003	+0.35
2004	+0.04
2005	+0.44

Base Layer Analysis:
U.S. Inventory Vs. Prompt NYMEX CL

	Days Supply	Prompt CL
2000	19.4	$30.26
2001	20.3	$26.04
2002	20.6	$26.16
2003	18.4	$31.12
2004	18.8	$41.43
2005	20.9	$56.71

Base Layer Analysis:
Where Prices "Should Be" Or Rather, "Would Have Been"

1. Observing 2000-2003 Price/Inventory Relationships
2. Taking Today's Days Supply Of Crude Oil
3. Derives A Price Of $26.60 Per Barrel

- Assumes Same Mix of Crude Qualities Available On The Market And In Inventory Today As In 2000-2003

- Assumes Same Refiner Behavior Pattern Re "Desired Inventory"

- Were 2000-2003 Prices "Too Low"?

- Were 2000-2003 Prices "Correct"?

Layer 2 Analysis: The Dynamics of The Atlantic Basin Low-Sulphur Crude Oil Balance, 2000-2005

- Progressive Decline In North Sea Crude Oil Production
- Progressive Decline in U.S. Sweet Crude Oil Production
- U.S. And European Declines Not Offset By Rising African OPEC And Non-OPEC West African Production
- Rising Light Product Demand In The Atlantic Basin
- Rising Light Product Demand In China

  Required Incremental Low-Sulphur Crude Oil Supplies

  Leading To "China Pull" Of Cargoes Out Of Atlantic Basin, Exacerbating The Rising Local Sweet Crude "Deficit"

Layer 2 Analysis:
Year-To-Year Change In The Atlantic Basin Low-Sulphur Crude Oil Balance, 2001-2005
(MB/D)

2001	-375
2002	-65
2003	-400
2004	-1,090
2005	-410

Cumulative:	-2,340

Layer 2 Analysis:
Quantifying The Rising Atlantic Basin Low-Sulphur Crude Oil "Deficit"

1. Take U.S. Share Of Cumulative "Deficit"
2. This Amounts To 23 Million Barrels Of "Decremental Inventory" Assuming 16 Days Supply Of Desired Atlantic Basin Low-Sulphur Inventory, Three Days Lower Than For All Crudes Due To Shorter Transit Time
3. This In Turn Implies A Roughly Six-Day "Decremental Days Supply" For The Proportion Of East Of Rockies Refining Capacity That Required Low-Sulphur Crudes
4. Plugging Numbers Into The 2000-2003 Price/Inventory Equation Yields A Value Of $10.65 Per Barrel
5. This Represents The Fundamental Price Impact Of Secular Shifts In The Low-Sulphur Atlantic Basin Crude Oil Balance

Therefore, Base Layer + Layer 2: $26.60 + $10.65 = $37.25

Layer 3 Analysis:
The Impact Of CFTC-Reporting Funds

- Our Previous Analyses Have Yielded An Average $.80 Per Barrel Price Change For Each 10,000 Contract Shift In Net Fund Positions

- However, This Relationship Held During Discrete Periods Of Large Movement <u>Within</u> Any Given Year

- Our Layer 3 Analysis Requires Looking At The Data Over An Extended Period Of Time And In A Different Way

Layer 3 Analysis:
CFTC-Reporting Non-Commercial Profile

	Non-Comm. Traders: Long	Non-Comm. Traders: Short
2003	44	45
2004	60	65
2005	63	87
2006	70	93

	Non-Comm. Contracts/Trader: Long	Non-Comm. Contracts/Trader: Short
2003	1,603	1,535
2004	2,012	1,296
2005	1,900	1,240
2006	2,037	1,586

Layer 3 Analysis:
Quantifying The CFTC-Reporting Fund Impact

1. Taking The Aggregate Impact Of Traders + Contracts Per Trader, From 2003 To 2004 The Average Net Length Rose From 1,268 Contracts To 35,453 Contracts

2. Net Length Declined In 2005 From 2004, But Stood Well Above 2003

3. On Average For The Multi-Year Time Period, Applying Our \$.80 Per 10,000 Contract Shift Rule Yields About \$2.00 Per Barrel

This Value Appears Reasonable:

CFTC Reporting Profile Includes A Number Of Long-Established Funds Who Have No Problem Swinging From Long To Short

Add Incremental Layer Of New CTAs Having A Long Bias

Base Layer + Layer 2 + Layer 3: \$26.60 + \$10.65 + \$2.00 = \$39.25

Layer 4 Analysis: The Impact Of "Passive Length"

- Explosion In Capital Allocated To Commodities From 2000-2005
- Estimates Are A Rise From $6 Billion In 2000 To $65 Billion In 2005
- Dominant Bias Is Passive Length
- Attractive Historical Returns Relative To Equity And Fixed Income Returns Led To Commodities As An Integrated Portfolio Asset Class
- Pension Funds Desired To Diversify Source Of Returns Given Low Yields On Fixed Income Investments And Requirement For A Pension Plan That Appreciates With Wage Inflation
- Many Pension Fund Mangers Felt That Continued Heavy Reliance On Low-Yield Fixed Income Investments Would Have Required Unacceptably High Contributions From Plan Sponsors
- Crude Was Deemed Attractive Due To Correlation With World Economic Activity And "Excess Returns" That Could Be Realized Through Supply Bottlenecks And Disruptions

Layer 4 Analysis:
Quantifying The Impact Of "Passive Length"

1. Assume An Incremental $59 Billion Was Allocated To Commodities 2000-2005
2. Assume Of This, Some $33 Billion Was Allocated To Passive Length In Crude Oil 2000-2005, Primarily In 2004-2005
3. This Proportion Mirrors The Weightings Of The Goldman Sachs Commodity Index (GSCI), Preferred By Many Managers
4. Taking Incremental Passive-Length Crude Oil Capital Vs. Annual Crude Oil Prices From 2003 Through 2005 Yields An Increase In Passive Length Of 290,000 NYMEX Crude Oil Contract Equivalents
5. Taking Our $.80/10,000 Contract Rule Yields Price Impact Of $23.20 Per Barrel

Base Layer + Layer 2 + Layer 3 + Layer 4:

$26.60 + $10.65 + $2.00 + $23.20 = $62.45

Summary And Caveats

Base Layer, 2000-2003 Price/Inventory:	$26.60
Layer 2, Fundamental Impact, 2000-2005:	$10.65
Layer 3, CFTC-Reporting Fund Impact:	$2.00
Layer 4, Passive Length Impact:	$23.20
Total Implied Price:	$62.45

- Do Not Wish To Overplay The Quantification; However,
- General Proportions Of Respective Layers "Make Sense"
- Implied In Our Layers Are Such Factors Including:
  - "Security Premium"
  - OPEC Capacity Utilization
  - Hedge Funds (CFTC Reporting And/Or Passive Length)

Thoughts For 2006

- Base Layer + Layer 2 Will Remain Intact Under Our Forecast Global Oil Balances, With Layer 2 Expanding Modestly. Therefore, A Complete Elimination Of Layer 4 Still Implies A Floor Of About $40.00 Per Barrel
- Layer 4 Will Remain Intact, However, And Likely Increase, But Perhaps More Modestly Compared To 2004-2005
- Layer 3 (CFTC-Reporting Funds) Will Be A Primary Driver Of Prices At The Margin
- Hypothetically Assuming A Potential Swing Reaching The 2005 Peaks In Both Net Shorts And Net Length Implies A Trading Range Of $62.00-$73.00 Per Barrel In The First Half Of 2006
- Second Half Of 2006 Will Witness The Beginning Of Longer-Term Fundamental Impacts, Including A Secular Moderation In U.S. Gasoline Demand Growth