

An Econometric Evaluation of A Geopolitical Theory of Oil Price Behavior

Ahmad Slaibi
Duane Chapman
Hazem Daouk



25th USAEE/IAEE Conference
Denver, Sep. 20, 2005

Slide 1

PC1

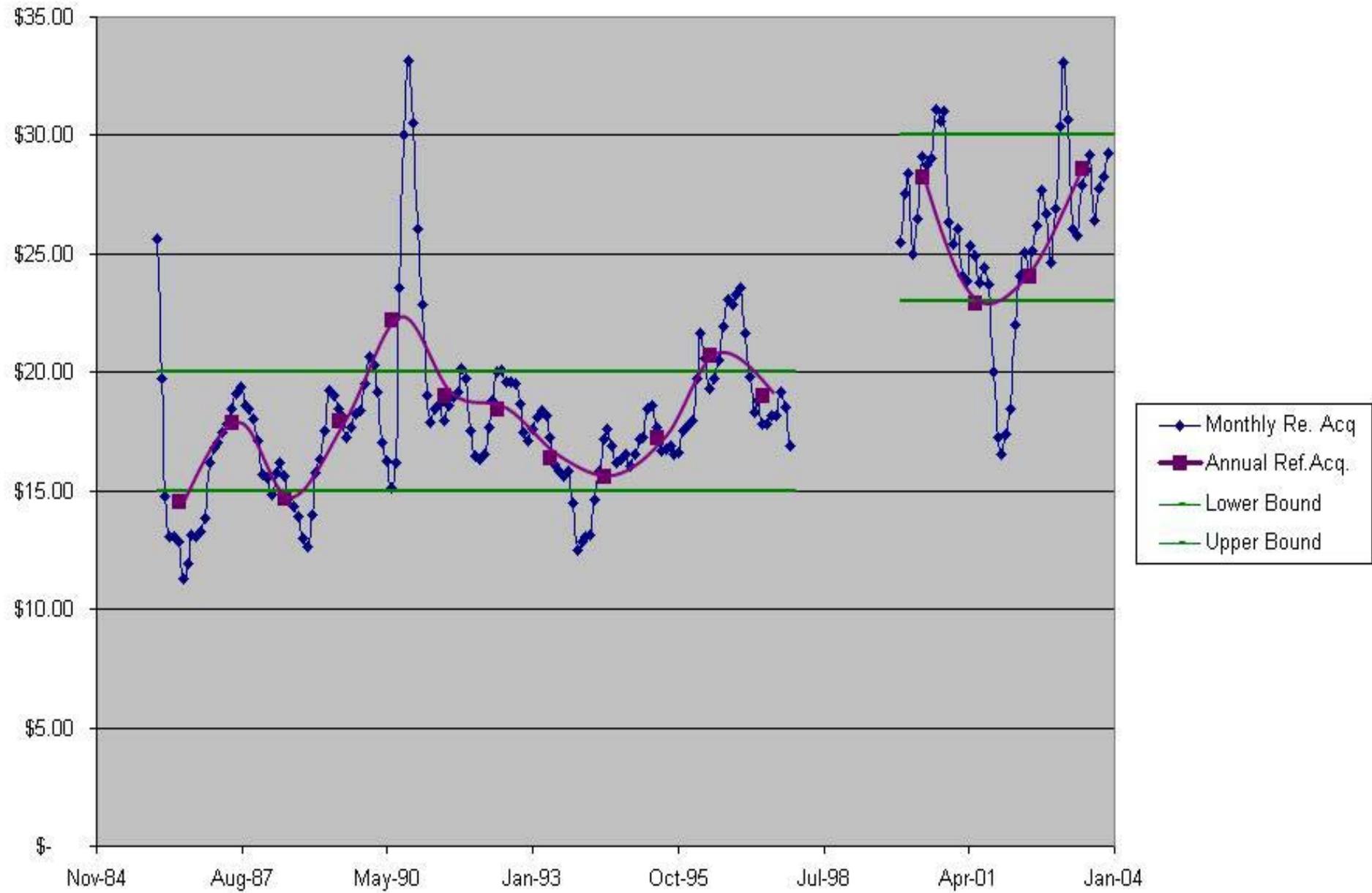
Ahmad Slaibi
September 5, 05
September 14,05
Preferred Customer, 9/13/2005

Introduction

- Have oil prices been stable in the past?
- Are they today?



Monthly and Annual US Composite Refiner Acquisition Crude Oil Prices



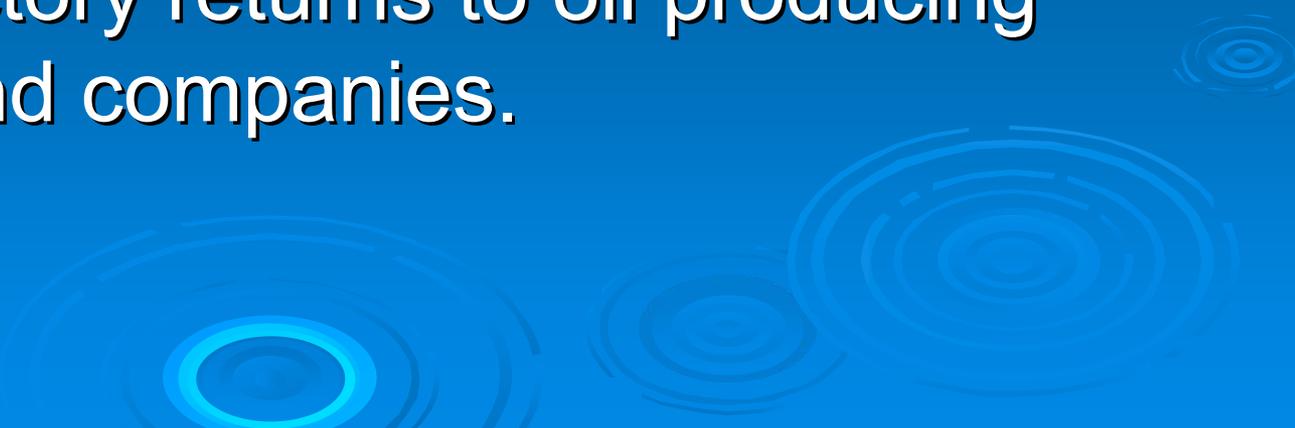
Why would such a system exist?

- This target price zone is the result of a Pure Strategy Nash equilibrium game theory:

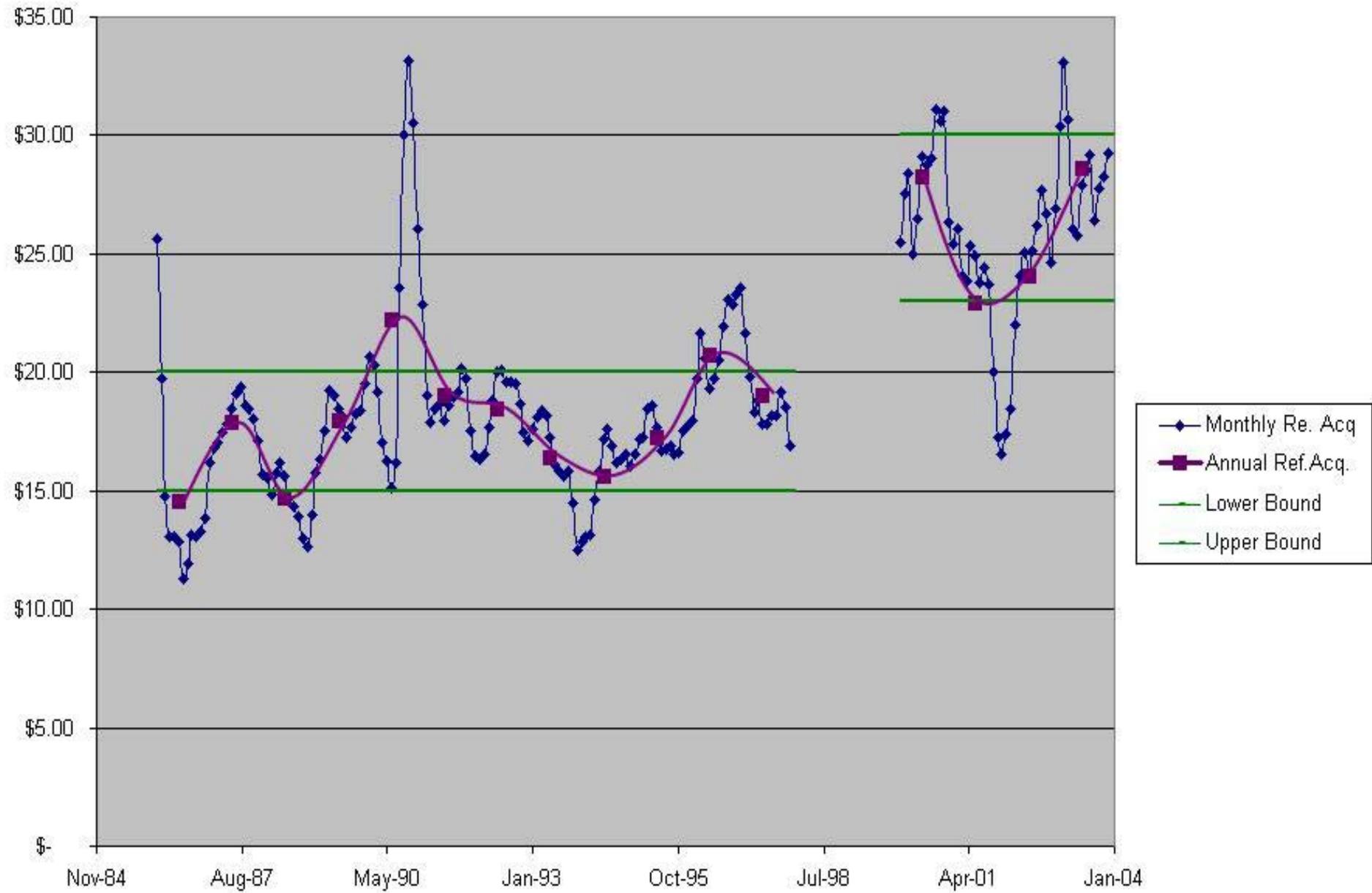
One side, oil importers led by the United States, offer military security in the Persian Gulf.

Other side, Persian Gulf producers, have offered reliable production growth and reasonably stable prices

Why the \$15-20 Zone?

- Prices were not so high as to deter economic growth for oil-consuming countries and businesses.
 - Prices were not too low to guarantee stable and satisfactory returns to oil producing countries and companies.
- 

Monthly and Annual US Composite Refiner Acquisition Crude Oil Prices



Why the \$23-30 zone between 2000 and 2003?

- The price zone in the 2000 – 2003 period is equivalent to the old price range adjusted for inflation from 1986 to 2000.
- Thus, the new range is equivalent to the old range multiplied by 1.5

Why Nominal US Composite Refiner Acquisition Cost?

- For all the different crude price series we examined nominal terms exhibited less variance.
- The US composite refiner acquisition cost is the weighted average of prices paid for oil booked into US refineries.
- It covers about 25% of total global crude oil consumption and it represents domestic crude and imported crude from all international sources.
- Composite refiner acquisition averages have the highest correlation to other crude price series

Why 1986 to 1997 and 2000 to 2003?

1. The Chow test supports the theory that oil prices 1974 – 1997 has undergone a structural change in 1986, and thus should be considered as two separate periods.
2. The Chow test does not support the idea that the oil prices between 1986 – 1997 are structurally different from those between 2000 – 2003.

Was the system reliable?

- We ran a Monte Carlo simulation to predict the probability of obtaining monthly average oil prices beyond the proposed range.
- The probability of obtaining a price beyond the proposed range (i.e. at least 1 cent above or below the range) was found to be less than 40%.
- However, this probability decreased to around 20% when 1986 (transition year) and the Middle East wars affected months were ignored.
- This probability decreased even more, to around 10% when the range was increased by \$1 from each side.

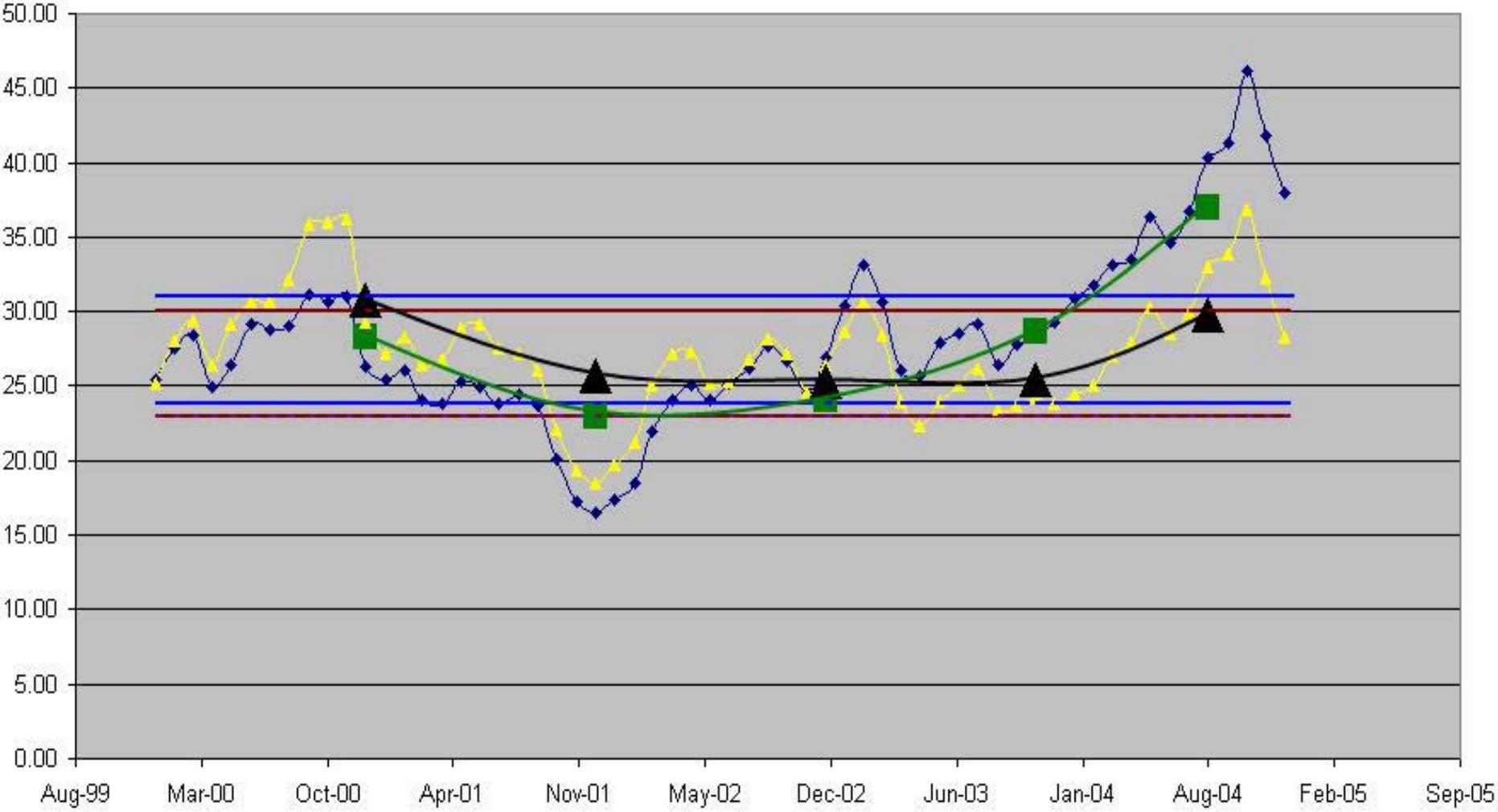
Summary

1. The TPZ theory is not rejected, and seems to have good predictive power.
2. Our time periods for the TPZ (1986 – 1997, 2000 – 2003) seem appropriate.

Examining the Impact of the Introduction of the Euro

- The world's largest oil consumers are the United States and China (which surpassed Japan in 2003).
- The Chinese currency is pegged to the US dollar. Thus, OPEC had in 2003 and 2004 its largest customers paying in the weakening dollar.
- While most OPEC members import mainly from Europe and Japan and the Euro and the Yen were becoming more costly.

Monthly and Annual Averages of Ref. Acq. Prices in US\$ and Euro



- ◆ Monthly Refiner Acquisition Cost of Crude Oil, Composite US \$
- ▲ Monthly Refiner Acquisition Cost of Crude Oil, Composite in Euro
- Annual Refiner Acquisition Cost of Crude Oil, Composite US \$
- ▲ Annual Refiner Acquisition Cost of Crude Oil, Composite in Euro
- Lower Bound US\$
- Lower Bound Euro Corrected
- Upper Bound US\$
- Upper Bound Euro Corrected

Conclusion

- The introduction of the Euro has apparently impacted global oil prices. Euro based oil prices have been more stable than US dollar based ones.
- All evidence seems to support the notion that our proposed TPZ was a credible representation of oil prices most of the 18 year period 1986 - 2003.

Conclusion

- In the last few months, monthly average oil prices have risen well beyond our TPZ.
- This is due to an increase in world oil consumption (led by an increase in demand by China and India) coupled with a sharp reduction in excess supply capacity in oil producing countries.
- Other factors such as the weakening US dollar, limited refining capacity, and turmoil in the Persian Gulf also contributed to the problem.
- We believe that oil prices will eventually fall again in a calmer framework creating a new TPZ that will guarantee oil producers ample returns without damaging the global economy.