Commodity Price Insurance: A Keynesian Idea Revisited

OIES Seminar
25 February 2003

John Bower  Nawal Kamel
Commodity price stabilisation mechanisms

At Bretton Woods conference Keynes’ proposal lead to creation of IMF and World Bank…

JOHN MAYNARD KEYNES (June 5, 1883 - April 21, 1946)
Commodity price stabilisation mechanisms

… but his Commod Control idea was vetoed by the US and UK Treasury

COMMOD CONTROL

1. Prevent macroeconomic dislocations that had created Great Depression and WWII
   - Create physical buffer stocks of key commodities to be held in London
   - Finance their purchase with gold released from the Bank of England
   - Sell / Buy stocks when prices rise 10% above / below true long run equilibrium level

2. Objections to scheme that were raised
   - Buffer stock may run if prices rise is strong or finance may run out if prices fall
   - May cause under consumption if central stabilisation price is set above true equilibrium price
Commodity price stabilisation mechanisms

Keynes’ recognised other measures may be required too such as import-export controls…

ALTERNATIVE MECHANISMS TO SUPPORT SPOT COMMODITY PRICES

- **Free Market**
  - Price: $10
  - Quantity: Q

- **Export Control**
  - Price: $20
  - Quantity: Q

- **Buy Stockpile**
  - Price: $20
  - Quantity: Q

- **Price Control**
  - Price: $20
  - Quantity: Q
Commodity price stabilisation mechanisms

... but now global capital markets may offer an alternative to commodity buffer stocks...

### DERIVATIVE CONTRACT OPEN INTEREST

<table>
<thead>
<tr>
<th></th>
<th>OTC</th>
<th>Exchange Traded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign exchange contracts</td>
<td>$18011</td>
<td>$16748</td>
</tr>
<tr>
<td>Forwards, forex swaps, futures</td>
<td>$12063</td>
<td>$10336</td>
</tr>
<tr>
<td>Currency swaps</td>
<td>$2253</td>
<td>$3942</td>
</tr>
<tr>
<td>Options</td>
<td>$3695</td>
<td>$2470</td>
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<tr>
<td>Interest rate contracts</td>
<td>$50015</td>
<td>$77513</td>
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<tr>
<td>Forward rate agreements, futures</td>
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<td>$7737</td>
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<tr>
<td>Interest rate swaps</td>
<td>$36262</td>
<td>$58897</td>
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<tr>
<td>Options</td>
<td>$7997</td>
<td>$10879</td>
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<tr>
<td>Equity-linked contracts</td>
<td>$1488</td>
<td>$1881</td>
</tr>
<tr>
<td>Forwards, swaps, futures</td>
<td>$146</td>
<td>$320</td>
</tr>
<tr>
<td>Options</td>
<td>$1342</td>
<td>$1561</td>
</tr>
<tr>
<td>Commodity contracts</td>
<td>$415</td>
<td>$598</td>
</tr>
<tr>
<td>Other Contracts</td>
<td>$10389</td>
<td>$14375</td>
</tr>
</tbody>
</table>

Source: Bank for International Settlements

Note: Exchange Traded Commodity contract data is calculated from contract open interest not notional value
Exchange Traded Other Contracts includes Single Equity option contracts only
Commodity price stabilisation mechanisms

... by insuring economies against severe commodity price shocks – up or down!

COMMODITY PRICE INSURANCE (CPI)

1. Global Commodity Insurer (GCI) established as the new Commod Control

2. GCI sells CPI-Max and CPI-Min contracts on 49 commodities in IMF Commodity Index

3. Governments buy insurance contracts on net national export or import exposure

4. Duration of cover is maintained to at least the 5 year horizon

5. CPI-Max pays out if mean annual spot price is >10% above LR equilibrium price

6. CPI-Min pays out if mean annual spot price is >10% below LR equilibrium price
An increasing need

Almost all global commodity price stabilisation mechanisms established since WWII failed

INTERNATIONAL COMMODITY PRICE STABILISATION SCHEMES


6. OPEC (1961-today) and IEA (1974-today)
An increasing need

Energy now dominates the world commodity export trade with…

NEW IMF TRADE WEIGHTED (1995-1997) COMMODITY PRICE INDEX
An increasing need

... Developed and Developing economies having similar long term debt liabilities ...

DEVELOPED AND DEVELOPING WORLD ECONOMIC INDICATORS

<table>
<thead>
<tr>
<th>Economic Groups</th>
<th>GDP Consumption</th>
<th>GDP Investment</th>
<th>Public Debt/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public</td>
<td>Private</td>
<td>25%</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>16%</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Developing Countries</td>
<td>13%</td>
<td>61%</td>
<td>25%</td>
</tr>
<tr>
<td>OPEC Members</td>
<td>15%</td>
<td>58%</td>
<td>20%</td>
</tr>
<tr>
<td>Other Developing Countries</td>
<td>13%</td>
<td>61%</td>
<td>25%</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>16%</td>
<td>58%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: UNCTAD Handbook of Statistics 2002 (GDP) and Bank For International Settlements (Public Debt)

Note: GDP Consumption + GDP Investment = Exports - Imports
   Public Debt = Internationally Issued Public Debt Securities
                + Domestically Issued Public Debt Securities
                + Consolidated Bank Claims on Public Sector
An increasing need

... with Developed and Developing world now reciprocally exposed to an oil price shock...

GLOBAL COMMODITY EXPORT TRADE BY ECONOMIC GROUP

<table>
<thead>
<tr>
<th>Economic Groups</th>
<th>SITC</th>
<th>1955</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Developed</td>
<td>Developing</td>
<td>Socialist</td>
</tr>
<tr>
<td>All Food Items</td>
<td>0+1+2+2+4</td>
<td>16.5%</td>
<td>36.5%</td>
</tr>
<tr>
<td>Agricultural Raw Materials</td>
<td>2-22-27-28</td>
<td>9.8%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Ores and Metals</td>
<td>27+28+68</td>
<td>6.5%</td>
<td>9.9%</td>
</tr>
<tr>
<td>Fuels</td>
<td>3</td>
<td>5.5%</td>
<td>25.2%</td>
</tr>
<tr>
<td>Total Primary Commodities</td>
<td>0+1+2+3+4-68</td>
<td>38.3%</td>
<td>92.1%</td>
</tr>
<tr>
<td>Total Manufactured Goods</td>
<td>5+6+7+8+9-68</td>
<td>61.7%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Total Exports</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
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An increasing need … and interdependence increasing as Developed country oil (coal + gas) reserves decline

GLOBAL COMMODITY EXPORT TRADE BY ECONOMIC GROUP

<table>
<thead>
<tr>
<th>Economic Groups</th>
<th>Commodity Trade v Total Trade</th>
<th>GDP By Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exports</td>
<td>Imports</td>
</tr>
<tr>
<td>World</td>
<td>24%</td>
<td>24%</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>19%</td>
<td>22%</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>31%</td>
<td>22%</td>
</tr>
<tr>
<td>OPEC Members</td>
<td>77%</td>
<td>25%</td>
</tr>
<tr>
<td>Other Developing Countries</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>41%</td>
<td>28%</td>
</tr>
</tbody>
</table>

* Major Petroleum Exporting Countries include 11 OPEC countries for Export-Import data columns but top 20 oil exporting countries for GDP by Activity columns

An increasing need

Not surprisingly the OPEC and IEA oil buffer stocks are the only schemes to endure

OPEC STATUTE

Article 2.

B. The organization shall devise ways and means of ensuring the stabilization of prices in international oil markets with a view to eliminating harmful and unnecessary fluctuations

Source: www.opec.org/Publications/OS/OS.pdf

THE ONLY PRESIDENTIALLY -ORDERED EMERGENCY USE OF SPR

The rapid decision to release crude oil from government-controlled stocks in the United States and other OECD countries helped calm the global oil market, and prices began to moderate. On January 30, 1991, the Energy Department accepted bids from 13 companies offering the best prices for 17.3 million barrels of Strategic Reserve oil.

Source: www.fossil.energy.gov/spr/spr_oilreleases.shtml
How oil CPI would work

LR equilibrium price and mean reversion parameter has been estimated for oil and…

10 YEAR EQUILIBRIUM OIL PRICE

<table>
<thead>
<tr>
<th>Index Constituents</th>
<th>Index Weight %</th>
<th>Equilibrium Prices</th>
<th>Strike Prices</th>
<th>CPI Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CPI-Max</td>
<td>CPI-Min</td>
<td>CPI-Max</td>
</tr>
<tr>
<td>Oil; Average of U.K. Brent, Dubai, and West Texas Intermediate</td>
<td>39.9</td>
<td>20.32</td>
<td>22.35</td>
<td>18.28</td>
</tr>
</tbody>
</table>
How oil CPI would work

... and even under current system stress LR forward price is close to LR equilibrium

NYMEX FORWARD CURVE (23 FEB 2003) AND EQUILIBRIUM PRICE
How oil CPI would work

GCI hedges CPI-Max and CPI-Min contract sales with cheap Asian Call and Put options…

HISTORIC CPI INTERVENTIONS WITH 10% MAX MIN STRIKE PRICES
How oil CPI would work

... because of log price mean reversion process and pay off against annual mean price

HISTORIC CPI INTERVENTIONS WITH 10% MAX MIN STRIKE PRICES

John Bower
Commodity Price Insurance
Issues to be resolved

GCI initially could be CPI contract market maker but then gradually withdraw …

GCI STRUCTURE

CLIENT ORGANISATIONS (CPI BUYERS)
Governments, NGOs, World Bank, IMF, Multinationals

BROKER
Core Functions

EXCHANGE
Core Functions

INSURER
Core Functions

CAPITAL MARKET (SUPPLIERS)
Investment Banks, Commodity Traders, Hedge Funds, Portfolio Investors
Issues to be resolved

... its role determines the type of risk and amount of risk capital required

GCI STRUCTURE

CLIENT ORGANISATIONS (CPI BUYERS)
Governments, NGOs, World Bank, IMF, Multinational

BROKER
Core Functions
No Risk

EXCHANGE
Core Functions
No Risk
Credit Risk

INSURER
Core Functions
Credit Risk
Market Risk

CAPITAL MARKET (SUPPLIERS)
Investment Banks, Commodity Traders, Hedge Funds, Portfolio Investors
Speaker

**John Bower** is Senior Research Fellow at the Oxford Institute for Energy Studies. His research interest is in the emergence and evolution of cross-border electricity and gas markets. Specifically; the development of efficient pricing and investment mechanisms for transmission capacity, integration of energy markets, and energy price / credit risk management.

John’s previous career was in the commodity industry and his experience ranges from energy trading, at Marc Rich & Co, to risk management consultancy, with Coopers & Lybrand, advising commodity traders, producers and processors in base metal, precious metal, ‘softs’ and energy markets. Before joining the PhD programme he was Global Controller Metals/Commodities at Deutsche Morgan Grenfell.

John completed his PhD at London Business School in 2000. He also has an MBA from London Business School and an MA in Biochemistry from Oxford University.

Oxford Institute for Energy Studies
57 Woodstock Road
Oxford OX2 6FA
United Kingdom

Telephone: +44 (0)1865 311 377
Facsimile: +44 (0)1865 310 527
Email: john.bower@oxfordenergy.org
URL: http://www.oxfordenergy.org