

“Energy markets, financial & monetary systems”

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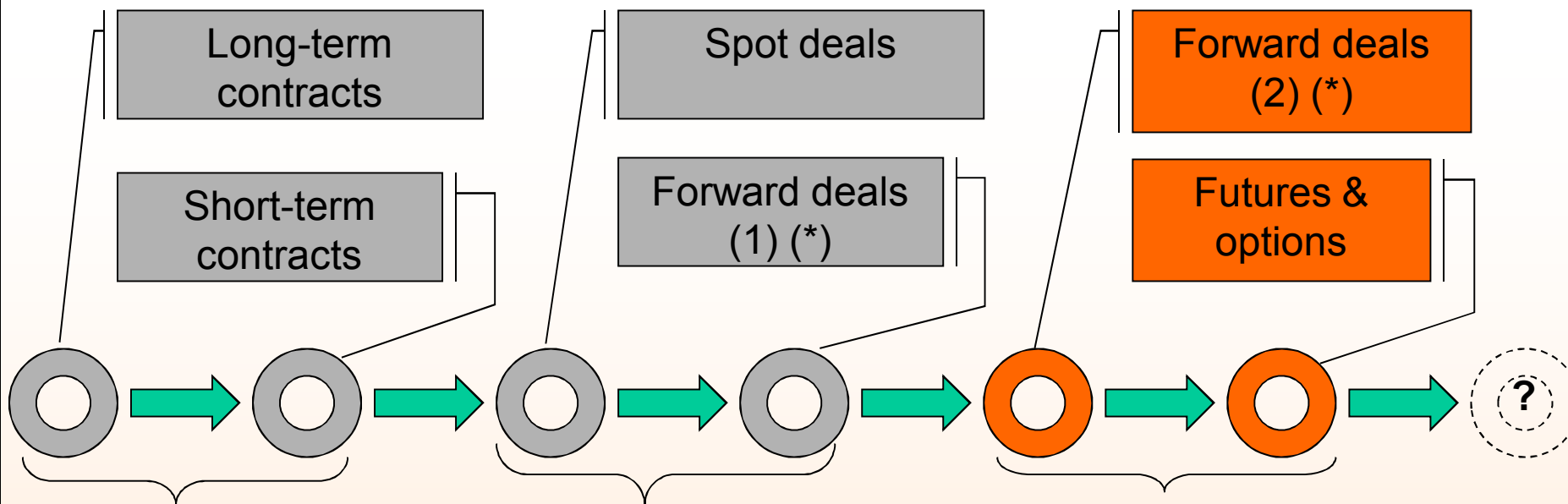
**Presentation at the workshop organized by Norwegian Centre for Strategic Studies
(SEFOSS), Norway, Narvik, 24 June 2011**

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1. Oil market: evolution of contractual structures (contract durations & market liquidity)

Evolution of oil market: volumes of trade vs. volumes of physical supplies



Volume of trade **corresponds** to volume of supplies

Volume of trade **exceeds** volume of supplies => OTC market (subsequent re-sales of non-unified commercial batches – “daisy chains”)

Volume of trade **multiply exceeds** volume of supplies => liquid marketplaces/exchanges (multidirectional re-sales of unified supply liabilities)

Increasing liquidity, **but also** growing market instability => good for traders/speculators, but is short-term & deprives project financing

- Markets of physical goods (of “physical” oil)
- Financial markets (of “paper” oil)

(*) (1) within the limits of coverage by accumulated volumes of stocks, (2) beyond such limits

2. Oil market: price dynamics & evolution of pricing mechanisms

Evolution of pricing systems in international oil trade

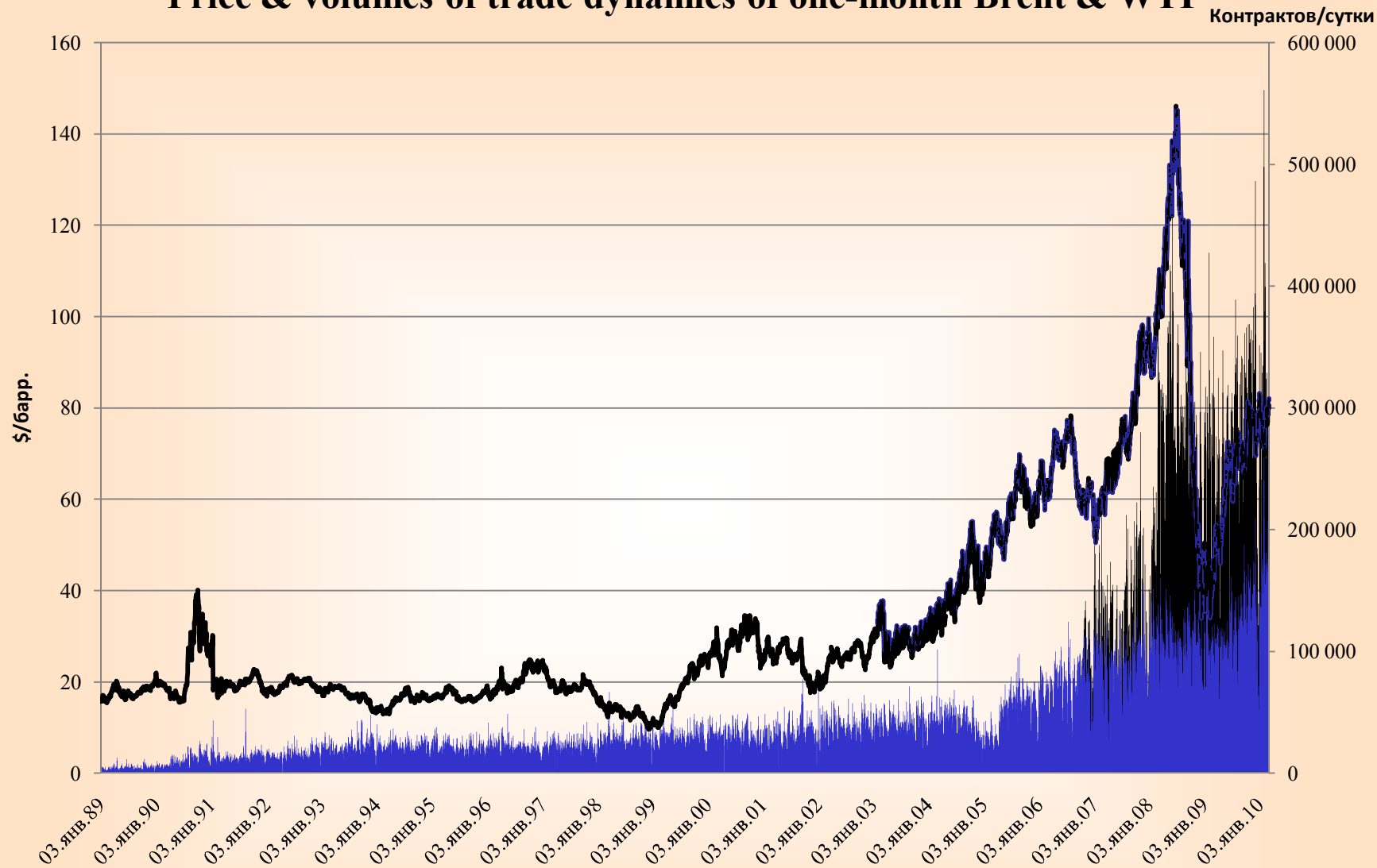


Futures prices dominate oil market, but NOT used by oil companies as benchmarks for project financing any more => 'oil price' is NOT a signal for long-term oil development

Compiled by M.Belova & E.Melnikova, State Academy of Management graduates, 2001

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Price & volumes of trade dynamics of one-month Brent & WTI



Compiled by A.Matveev, 2008-2010 Master programme, Russian State Oil & Gas University n.a.Gubkin

■ WTI Объем ■ Brent Объем — Brent Цена — WTI Цена

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Evolution of pricing mechanisms at international oil market

Periods, who establish the price

Pricing formula

(1) **1928-1947**, International Oil Cartel (one-base pricing)

$$P_{CIF} = P_{FOB} (\text{Mex.Gulf}) + \text{Freight fict. (Mex.Gulf)}$$

To the West of neutral point:

(2) **1947-1971**, International Oil Cartel (two-base pricing)

$$P_{CIF} = P_{FOB} (\text{Mex.Gulf}) + \text{Freight fict. (Mex.Gulf)}$$

To the East of neutral point:

$$P_{CIF} = P_{FOB} (\text{Mex.Gulf}) + \text{Freight real (Pers.Gulf)}$$

(3) **1971-1986**, OPEC

$$P_{CIF} = P_{FOB} (\text{OPEC OSP}) + \text{Freight real (OPEC)}$$

(4) **1986-mid-2000's**, oil exchange 1 (hedgers => oil speculators)

$$P_{FOB} (\text{netback}) = P_{CIF}/\text{exchange} - \text{Freight real}$$

$$P_{CIF} = \text{Exchange quotations (oil paper market)}$$

(5) **Mid-2000's & further on**, oil exchange 2 (**NON**-oil speculators)

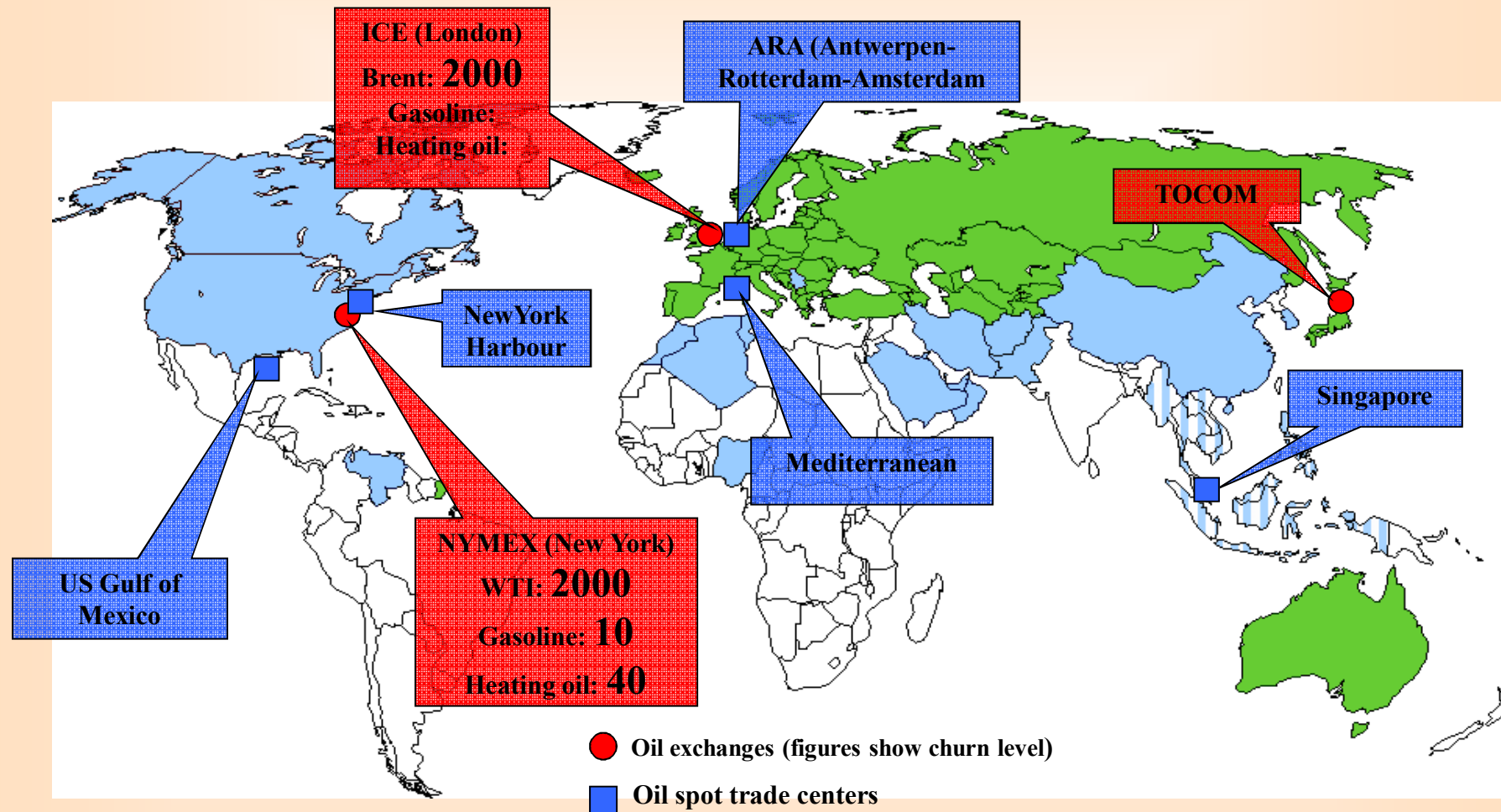
$$P_{FOB} (\text{netback}) = P_{CIF}/\text{exchange} - \text{Freight real}$$

$$P_{CIF} = \text{Exchange quotations (NON-oil non-commodities paper markets)}$$

- C_{CIF} - цена CIF (у потребителя);
- C_{FOB} (Мекс.Зал.) - цена FOB (у поставщика) в районе Мексиканского залива;
- Фр.фickt. (Мекс.Зал.) - фрахтовые ставки на фиктивную доставку нефти из района Мексиканского залива потребителям;
- Фр.реал.(Мекс.Зал.), Фр.реал.(Перс.Зал.) - фрахтовые ставки на реальную доставку нефти из районов Мексиканск. и Персидск. заливов;
- C_{FOB} (ОПЕК-ооц) - официальные отпускные цены FOB стран ОПЕК;
- Фр.реал. (ОПЕК) - фрахтовые ставки на реальную доставку нефти из государств ОПЕК потребителям;
- C_{FOB} (встр.) - цена FOB, рассчитанная по формуле «встречной» цены (цена CIF минус затраты, связанные с транспортировкой);
- C_{CIF} (бирж.) - устанавливаемая на бирже цена CIF (у потребителя);
- Фр.реал. - фрахтовые ставки на реальную доставку нефти потребителям из районов ее добычи.

3. Oil Market: role of exchanges/futures trading

Key international petroleum exchanges and spot trade centers



Paper oil market: key players

- **Hedgers** (since 1980's):
 - Usually producers/consumers of physical goods using futures (financial) markets to mitigate price risks
 - NYMEX: 1978 – LFO, 1983 – WTI
 - IPE: 1988 – Brent => today crude of reference of appr. 2/3 of internationally traded oil
- **Oil speculators** (since 1990's):
 - Players aimed at earning their profit from price fluctuations without physical deliveries/purchases – working mostly within paper oil market (no major horizontal capital flows to other non-oil financial markets)
- **Non-oil speculators** (since mid-2000's):
 - The same – players aimed at pure monetary results, but working within the whole spectrum of global financial markets => enter paper oil market from non-oil & non-commodities paper markets

Characteristics of spot, forward, futures, options deals

Contract	Spot	Forward	Futures	Options
Trading	OTC	OTC	exchange	OTC / exchange
Derivatives	no	yes	yes	yes
Delivery	yes	(yes)	(no)	(no)

Source: Putting a PRICE on Energy: International Pricing Mechanisms for Oil & Gas. – ECS, 2007, p. 81

Exchange vs. OTC

- (Regulated) oil futures markets:
 - CME (NYMEX), ICE (IPE)
 - Contracts are standardized in terms of quality, quantity, date & place of delivery
 - CFTC (US Commission overseeing futures markets) => detailed data available
 - (Non-regulated) OTC (over-the-counter) markets:
 - Non-standardized bilateral contracts => no CFTC rules
 - Not precisely measurable, OTC markets assumed to be much bigger than regulated oil trades markets
- ⇒ (1) No reliable quantitative evidence for non-regulated markets (e.g. bilateral trades outside regulated markets)
- ⇒ (2) Trades migrates to less regulated markets, when possible, to obtain undue advantage from the lack of restrictive regulation on traders (mean of protection from too risky operations)

4. Oil market: particularities of the current stage (2008 crisis)

Evolution of pricing mechanisms at international oil market: from four to five stages



Periods	1928-1947	1947-1971	1971-1985/1986	1986-today (see Chapter 3)
Pricing principle and main players	CIF selling prices set by an oligopoly (Seven Sisters) established by the Achnacarry agreement; FOB buying prices set de facto unilaterally by the Seven Sisters as posted prices within their concession agreements with host states		FOB selling prices set by an oligopoly (13 OPEC countries) established by OPEC agreement used in the long-term deals and at the spot market for spot transactions (spot quotations were later used by OPEC as a reference point for establishing its official selling prices)	Prices set by competition on market exchanges (mainly by oil traders)
Points of competition	Only in the end-user market		In the end-user market and for crude deliveries	At all parts of the chain
Trends in demand	Stable growth		Growth / short temporary decline	Slowed growth
Trends in production costs (major factor of their dynamics)	Decline (natural: moving to larger fields)		Growth (natural: moving to smaller fields and more challenging areas) / decline (technical progress)	Decline (technical progress) increase as of early 2000's (e.g., costs of steel)
Prices: trends and levels (\$/bbl, current prices)	Around 2 \$/bbl		From 2 to 40 \$/bbl (1981), then to 30 \$/bbl (1985), then to 10 \$/bbl (1986)	Within 15-20 \$/bbl (prior to 1997), within 10-30 \$/bbl (prior to 2004), up to 60-70 \$/bbl (2005-2006), then to 50+ \$/bbl (2006)
CIF price calculation at the delivery points worldwide	CIF = FOB Mexican Gulf plus factual or virtual freight from Mexican Gulf ('One-base pricing' based on Achnacarry agreement)	CIF = FOB Mexican Gulf plus factual or virtual freight: (a) either from Mexican Gulf (to the west of the 'neutral point'), or (b) from Persian Gulf (to the east from the 'neutral point') ('Two-base pricing' based on modified Achnacarry agreement)	Until end-85: CIF = Light Arabian FOB Persian Gulf plus freight; End-85- 86: Light Arabian FOB Ras Tanura = spot prices of petroleum products netted-back to Ras Tanura (net-back pricing)	CIF & FOB futures quotations
Marker crudes	West Texas	West Texas, Light Arabian	Light Arabian, West Texas	West Texas Intermediate (NYMEX), Brent (IPE), Dubai (SIMEX, until 1999)
Dominant trade contracts	Long term (volume & price)		Long term (volume) + spot (price)	Spot (volume) + long term (volume) + exchange (price)
Dominant types of prices	Posted (used as transfer price)		Official selling, market, posted	Market
Type of the market	'Physical oil' market (physical deliveries dominate in international pricing)			'Paper oil' market (oil financial derivatives dominate in international pricing)

1986 – mid-2000's

Paper oil market is subordinate & linked to physical deliveries, hedgers dominate (not speculators), financial instruments – for hedging price risks at physical oil market; oil price is formed at paper oil market (oil contracts)

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Mid-2000's & further on

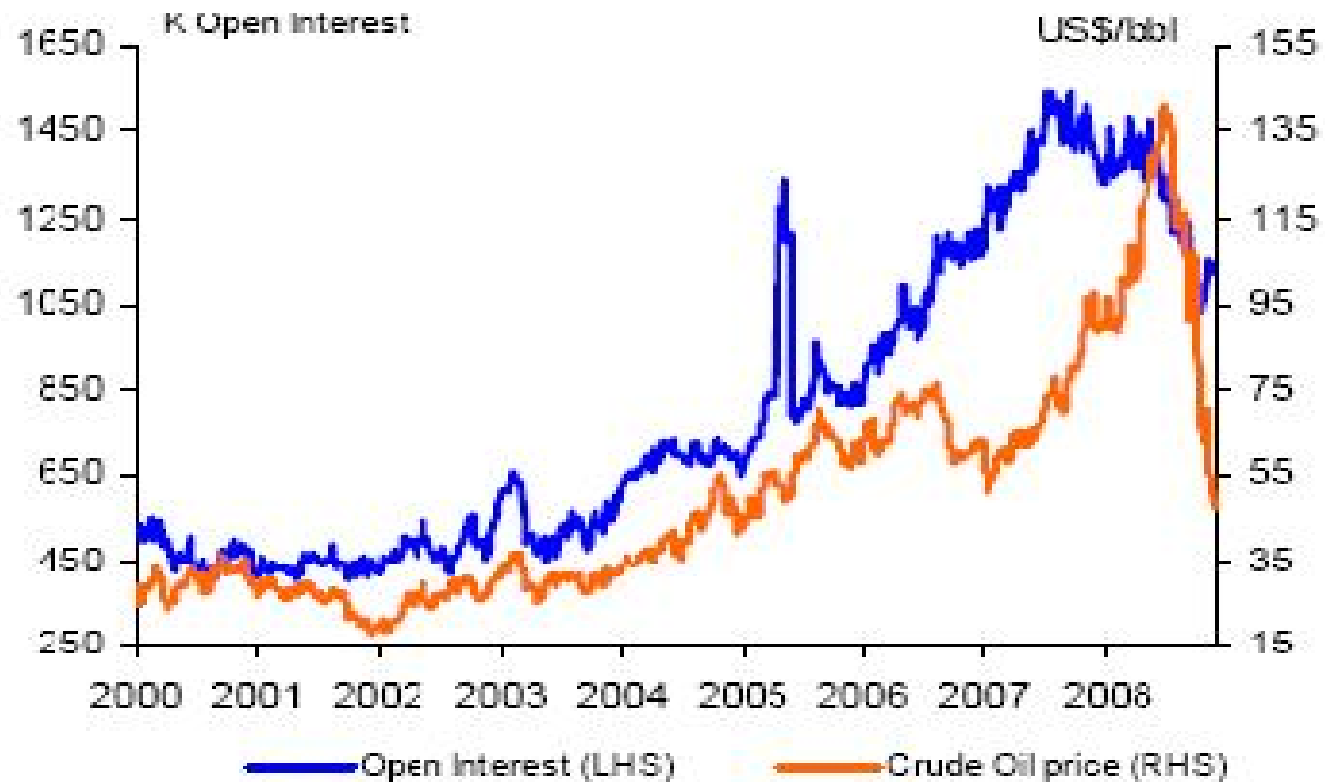
Paper oil market is dominant & de-linked from physical deliveries, speculators dominate, incl. from non-oil sectors of global financial market; oil price is formed by financial instruments at non-oil paper markets (oil derivatives)

Based on: Putting a PRICE on Energy: International pricing mechanisms for oil and gas. – ECS, 2007, p.56

2000-ies: new stage in oil pricing

- Underinvestment of the 1990-ies => cost increase since early 2000-ies + decrease in spare production capacities
- China, India, etc. – accelerated demand growth (since 2003) + accumulation of strategic petroleum reserves in developed countries (USA), China
- US Commodity Futures Modernization Act (CFMA) (Dec. 2000)
- Evolution of commodities (exchange, futures) trade:
 - Internet + IT technologies => electronic marketplaces/trading floors (IPE=>ICE=> end of voice floor trading) => robotization of electronic trading => increase in amount of traders + ease of market entry
 - Decrease of USD exchange rate (increase of oil import => increase in trade & budget deficit) => appearance of index oil funds => expansion of possibilities for financial investments in oil-related instruments + hedging against fall of USD rate
 - Globalization of financial operations => ease of horizontal financial flows from/to financial (non-oil) sectors into/from paper oil market
 - Ease of financial investments into oil market (derivatives on derivatives) => “Belgian dentist” as key private (non-institutional) financial investor at the paper oil market
- Oil-linked derivatives of index funds become the new class of financial assets aimed at compensating, inter alia, from fall of USD exchange rate
- Switch of oil pricing from physical market (supply/demand of physical oil) – to paper market (supply/demand of oil-related financial derivatives)

Nymex Crude Oil prices vs open interest

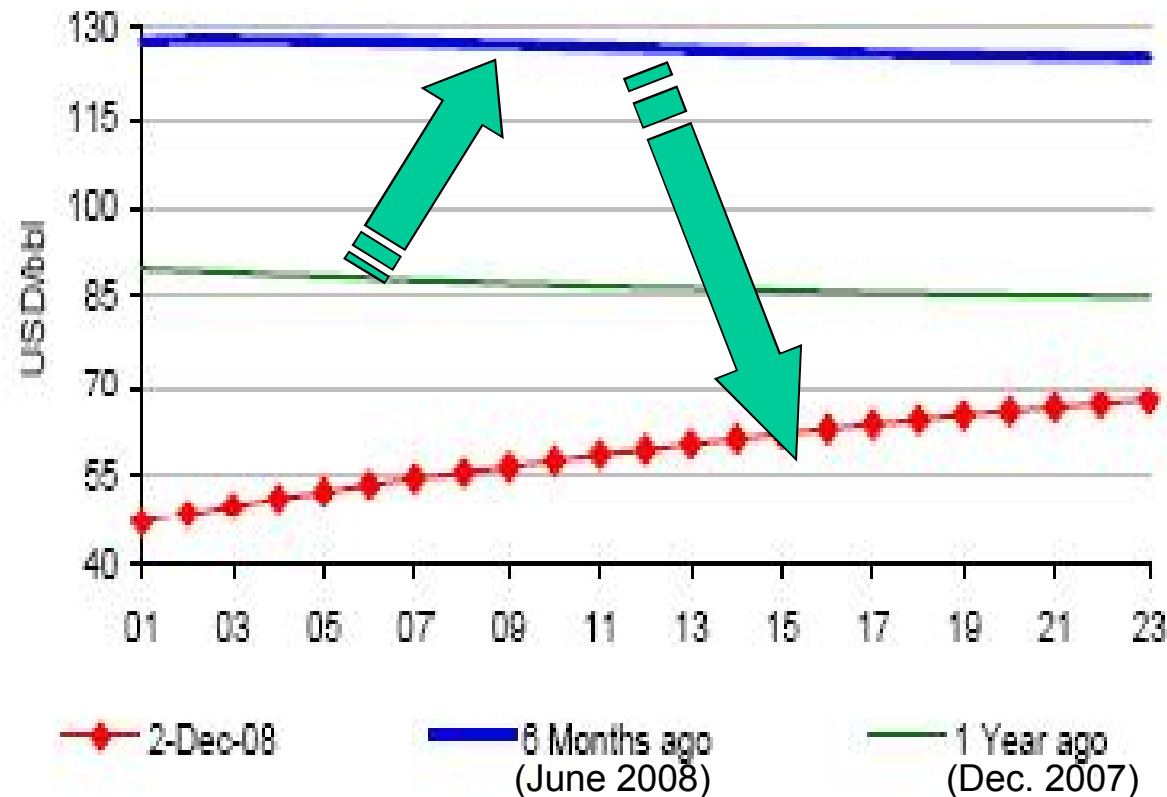


Source: Deutsche Bank, CFTC Commissions of Traders report for w/e 02-Dec-08, p.1 (based on CFTC, NYMEX data)

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NYMEX WTI forward curves: December 2007, June and December 2008

Nymex WTI forward curves



+/- 50% price fluctuations within a year => example of quick radical multidimensional changes of price expectations for the upcoming 2-year period => non-appropriate for taking long-term capital-intensive investment decisions in oil industry

Source: Deutsche Bank, Global Commodities Daily, 4 December 2008, p.1

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Correlation of scales of oil, commodities and financial & monetary markets (order of figures)

Prior to 2008 = 1%,

2008 = 2%

(R.Jones, IEA, at Global
Commodities Forum,
UNCTAD, Geneva,
31.01.2011)

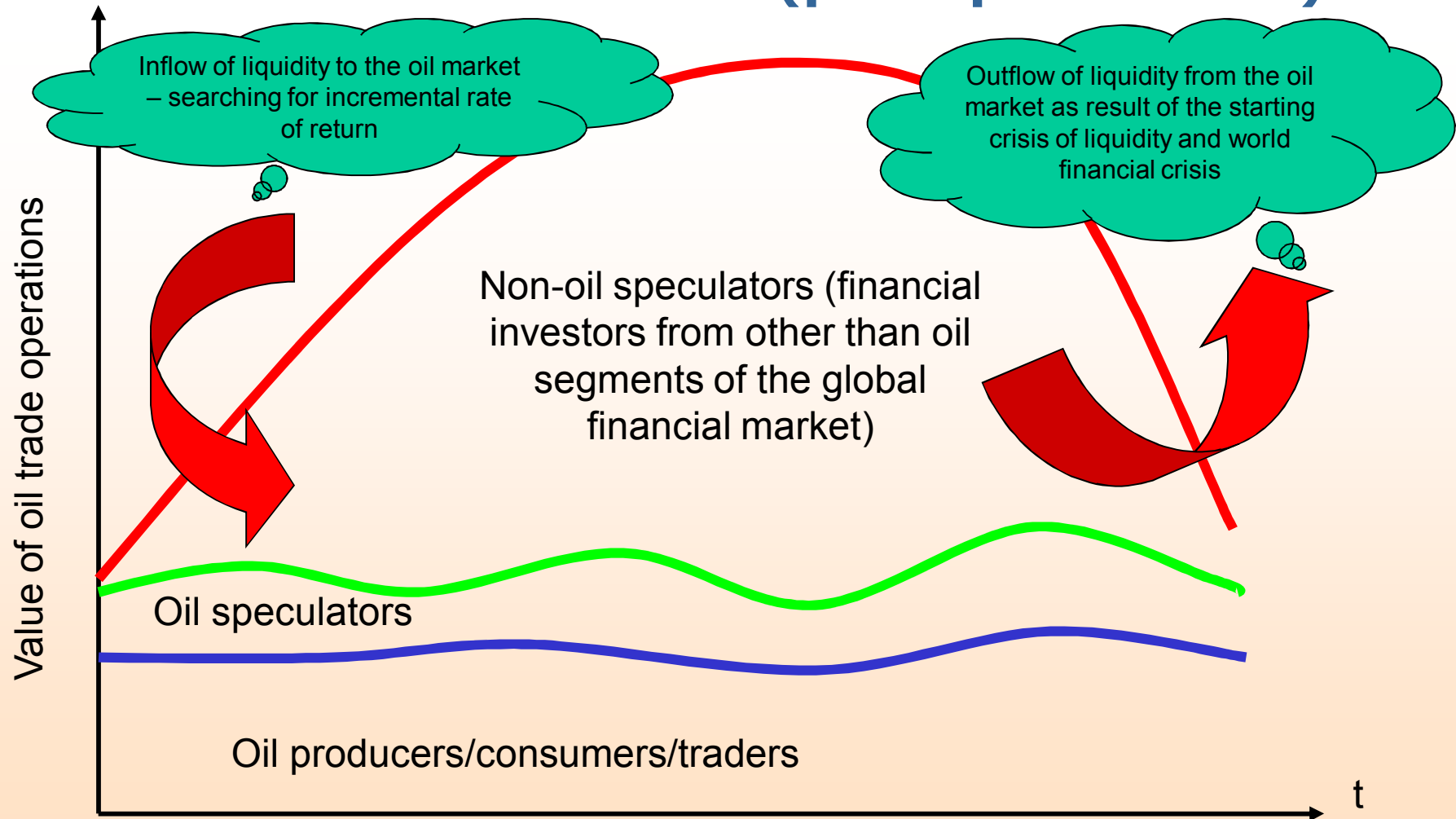
Financial & monetary markets = 100+

Commodities market = 10+

“Paper” oil market = 3+

“Physical” oil
market = 1

Role of non-oil speculators (global “financial investors”) in forming “price bubble” at the global oil market in 2007-2008 (principal scheme)



5. 2008 oil market crisis & US past & future role

Evolution of oil futures markets

- For 2 decades (mid-80-ies/mid-00-ies) oil futures markets were playground for physical market players:
 - Energy companies, major users of petroleum products (airline & maritime transport, utilities)
 - They wanted to hedge price risk in their own business (physical deliveries/purchases)
- Since mid-00-ies these markets started to attract growing number of financial market traders:
 - Banks, investment/hedge/pension funds,
 - They are completely foreign to physical oil market
- CFTC: commercial (hedgers) vs. non-commercial (speculators): 2000 - 75/15, 2007 – 55/40

Damages and repairs of global oil futures/commodities markets: US role

- US past damaging role:
 - Commodities Futures Modernization Act (CFMA) (Dec. 2000)
 - CFMA left commodity transactions largely outside the reach of CFTC => left companies with minimal regulatory obligations from too risky operations
- US expected future repairing role:
 - Wall Street Transparency and Accountability Act (Dodd-Frank Act) (enacted by US Congress on July 21, 2010; to come into effect on July 14, 2011 =>?)
 - Dodd-Frank effectively replaces CFMA & makes it illegal for producers to execute trades outside forthcoming & more restrictive CFTC rules

Consequences of adoption of US Commodity Futures Modernization Act (CFMA, 15/21.12.2000)

- Downgraded level of “excessive” speculative activity & price manipulation in by-pass of CFTC =>
 - Increase of amount of speculators in oil market (20% => 50-80%) compared to hedgers,
 - Increase in amount of contracts non-covered by anti-speculative limitations of CFTC => derogation from CEA & CFTC jurisdiction:
 - US contracts at foreign exchanges/marketplaces (so-called “London loophole”),
 - Swaps (so-called “swap loophole” – contracts on price differentials)
- Increase in OTC trade in oil derivatives (outside of the reach/control of US CFTC)
- Downgrading barriers for key holders of long relatively cheap money (e.g. pensions & insurance funds, etc.) on investing into risky financial instruments,
- Increase in speculative activities (“amount of speculators” multiplied by “amount of available instruments”) moved them from “price-takers” category into category of “price-makers”

CFTC = Commodity Futures Trading Commission, **CEA** = Commodity Exchange Act

For more details, see, f.i.: K.B.Medlock III, A.M.Jaffe. Who Is In the Oil Futures Market and How Has It Changed? – James A.Baker III Institute for Public Policy, Rice University, August 26, 2009 , etc.. 24

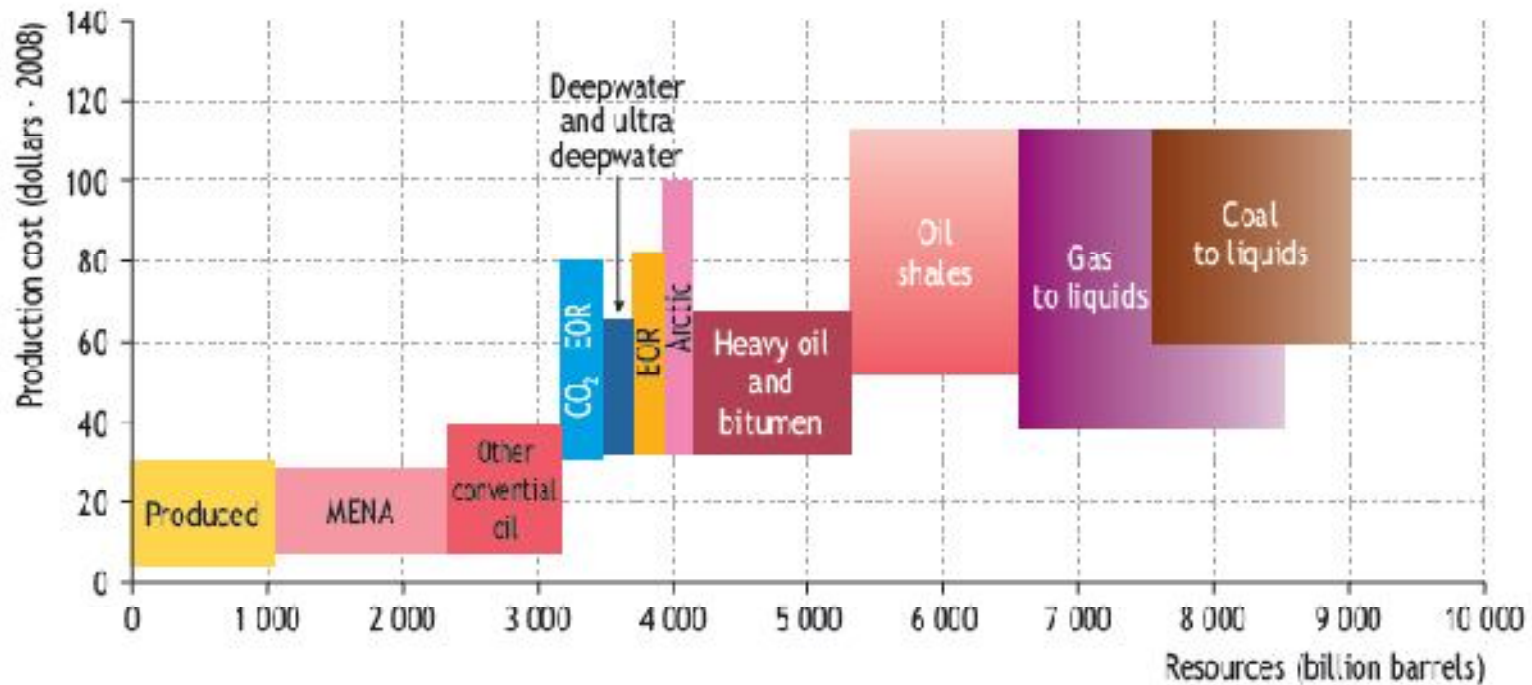
Expected consequences of adoption of Dodd-Frank Act

- Every trade is now likely to fall under jurisdiction of CFTC & should be evaluated to determine if it has Dodd-Frank regulatory obligations
- All swap transactions must be cleared with only a few exceptions, while definition of “swaps” under Dodd-Frank is expansive.
 - Generally, “swaps” – financial product that exchanges fixed for floating prices, and floating for fixed prices, but
 - CFTC takes a much wider view of swaps to include just about any transaction that has a price or event contingency
 - Under Dodd-Frank, if producer cannot actually deliver product, it is considered a swap and must be cleared
- Any trade market players enter into may have Dodd-Frank implications:
 - More detailed CFTC classification, producers become part of a regulated category
 - everyone under Dodd-Frank act will pay out more in margin, incl. producers
- Dodd:
 - “Transparency is needed in OTC derivatives market... If we tried to pass this bill today, it wouldn't happen. It literally took the events of 2007 & 2008 to get it done. In the absence of such a crisis, the bill wouldn't have passed”.

6. Oil Market: marginal costs (where is floor for oil price falls)

Long-term oil-supply cost curve from conventional & unconventional resources (IEA assessment based on 580 major fields)

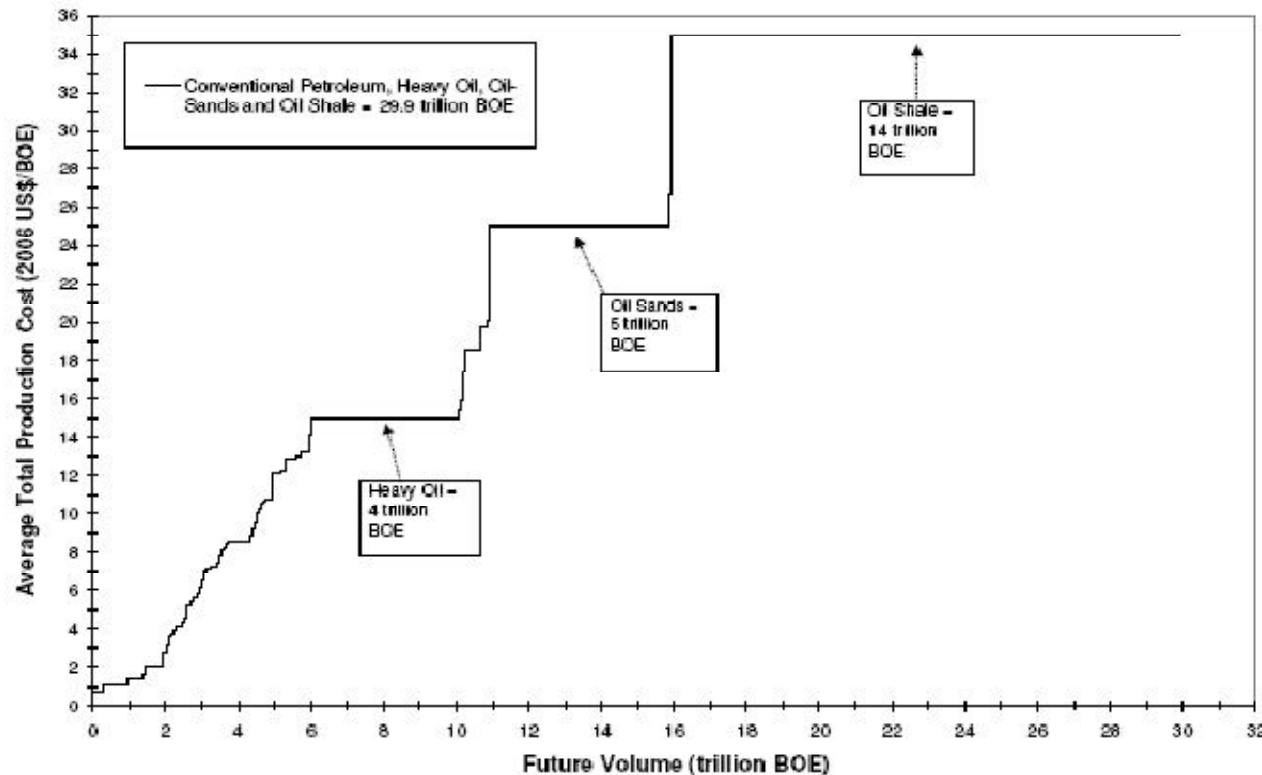
Figure 9.10 • Long-term oil-supply cost curve



Source: International Energy Agency. World Energy Outlook 2008, p.218

Global cumulative long-run availability curve for conventional petroleum and unconventional sources of liquids including heavy oil, oil sands and oil shale (CSM/PUCC/IIASA assessment based on 937 petroleum provinces)

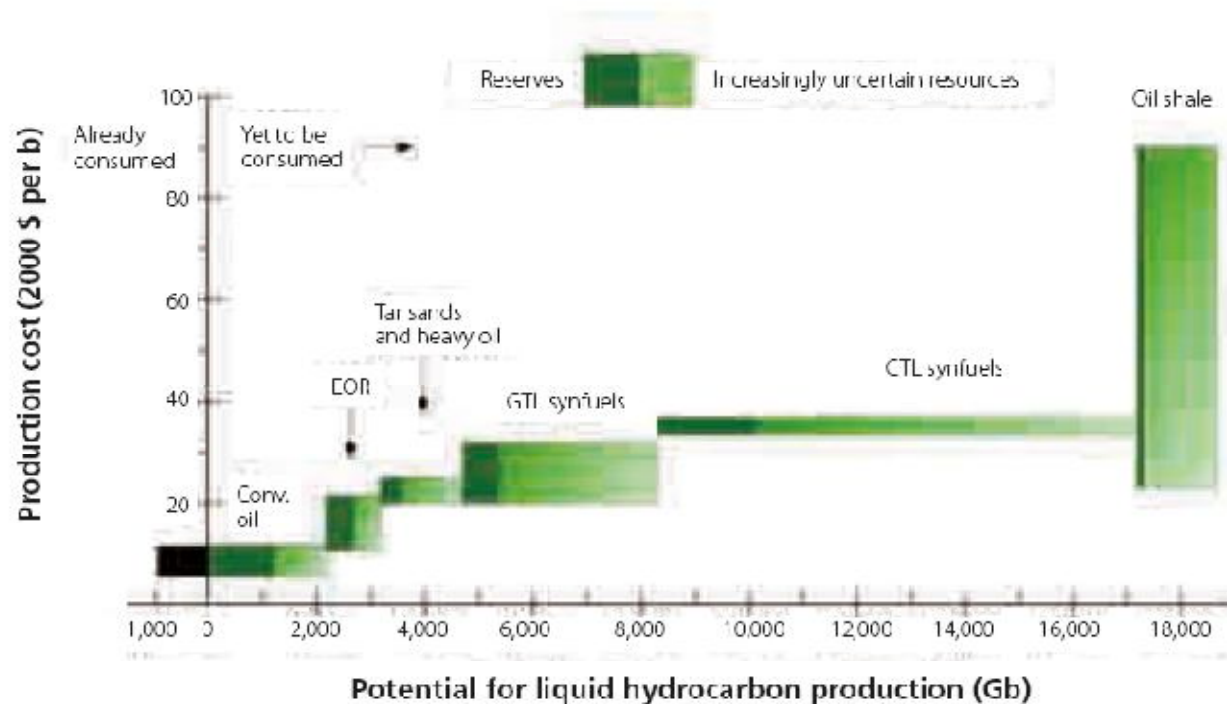
Figure 6. Global Cumulative Long Run Availability Curve for Conventional Petroleum and Unconventional Sources of Liquids Including Heavy Oil, Oil Sands and Oil Shale



Source: R.F.Aguilera, R.G.Eggert, G.Lagos C.C., J.E.Tilton. Depletion and the Future Availability of Petroleum Resources. Colorado School of Mines/Pontificia Universidad Catolica de Chile. Version 20 May, 2008, p.20.

The global resource base of potential liquid hydrocarbon fuels

Figure 1.2 The global resource base of potential liquid hydrocarbon fuels



Source: Farrell and Brandt (2006).

Note: Global resources of fossil hydrocarbons that could be converted to liquid fuels. EOR is enhanced oil recovery, GTL and CTL are gas- and coal-derived synthetic liquid fuels. The CTL and GTL quantities are theoretical maxima because they assume all gas and coal are used as feedstock for liquid fuels and none for other purposes. The lightly shaded portions of the graph represent less certain resources. Results are based on conversion efficiencies of current technologies available in the open literature. Gas hydrates are ignored due to a lack of reliable data.

Source: S.Sorrell, J.Speirs, R.Bentley, A.Brandt, R.Miller. Global Oil Depletion: An Assessment of the Evidence for a Near-Term Peak in Global Oil Production, UK Energy Research Center, August 2009, p.3

Where is the bottom of oil price fall?

“Fair (justified)” bottom of oil price fall (mean for the pay-back period of upstream projects) – nor less than long-term (marginal) production costs for current and future reserves

IEA :

- **110 \$/bbl.(\$2008)**
- through 580 major fields
- **10 trln. bbl**

CSM / PUCC /

IIASA :

- **35 \$/bbl.(\$2006)**
- through 937 discovered & undiscovered oil & gas provinces
- **32 trln. bbl**

UK Energy

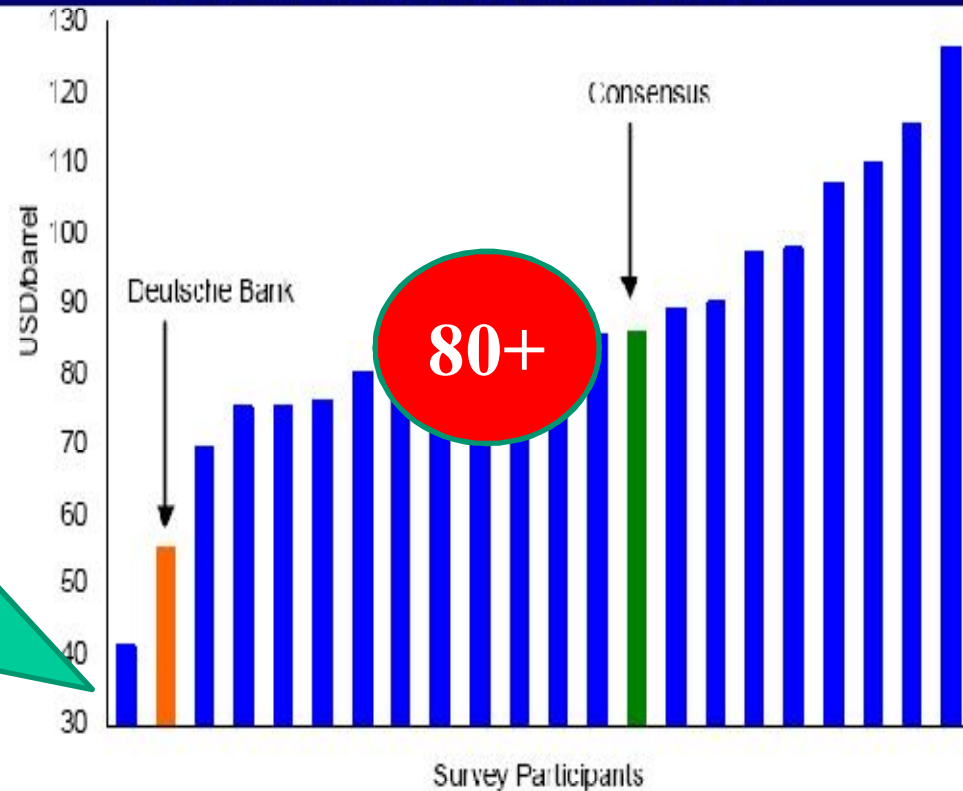
Research

Center:

- **90 \$/bbl (\$2000)**
- **19 trln. bbl**

Mutually exclusive results ?

2010 WTI crude oil price forecasts



Low level of marginal oil E&P costs forecasts
(35 USD/bbl)

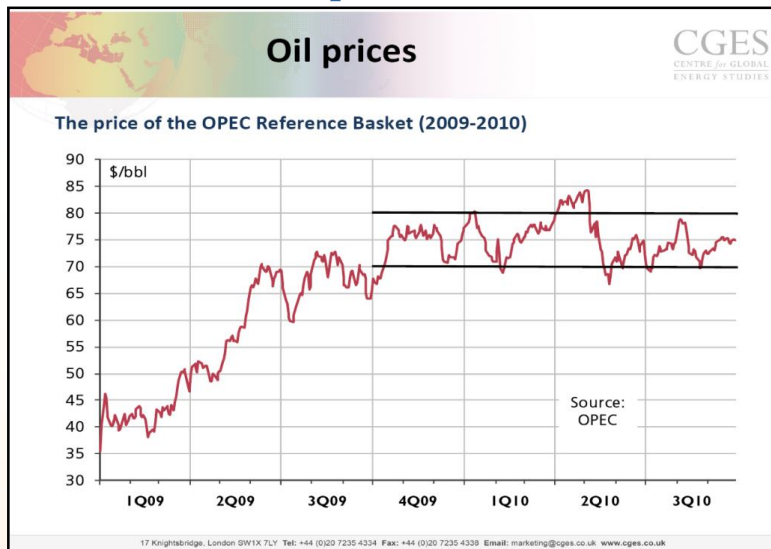
Upper level of marginal oil E&P costs forecasts
(110 USD/bbl)

Source: Feuters Oil Poll (As of 26-Nov-08) DB Global Markets Research (Forecast as of 05-Dec-08)

Source Deutsche Bank. Commodities Weekly. 5 December 2008, p.1.

7. Oil market: price expectations & marginal costs, “fair oil price”

Why so-called "fair oil price" = 70-80 \$/bbl ?



70-80 \$/bbl



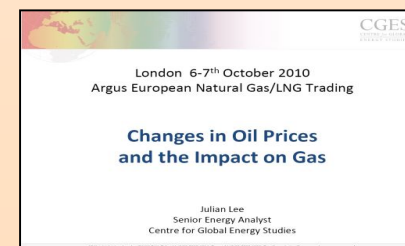
«With production 8.3 MBD (expected average 2010 level) Saudi Arabia needs OPEC basket price in 2010:

- **61 \$/bbl**: to cover budgetary spending & service debt,
- **71 \$/bbl**: same plus capital investment,
- **74 \$/bbl**: same plus reach budget profit»

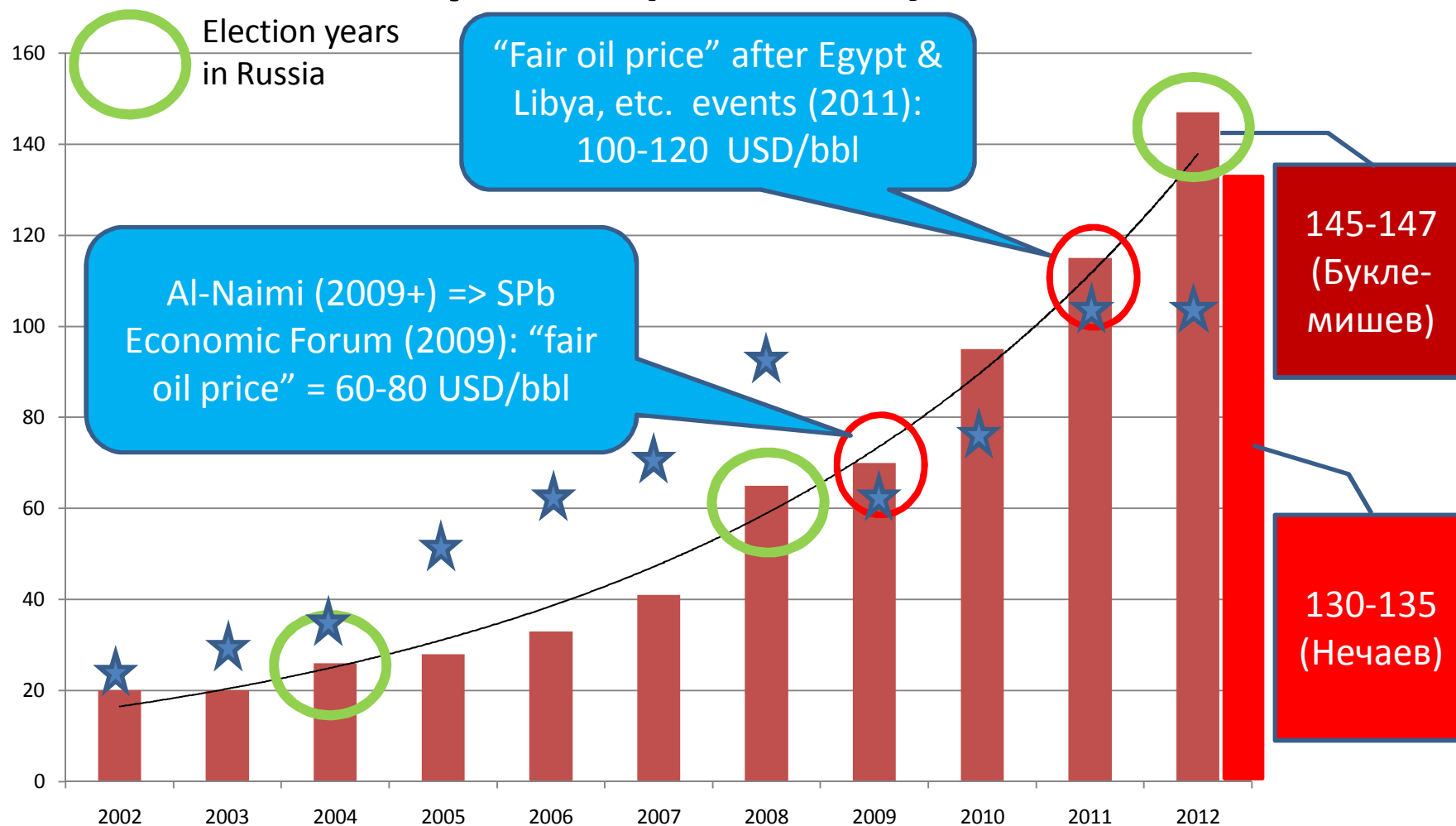
- **Al Naimi (2009+): "fair market price" = 60-70/70-80 \$/bbl** (GCF, Geneva, 31.01.2011: **70-80 \$/bbl** = "optimal diapason" =>

- **Saint-Petersburg Economic Forum (June 2009):** ("poll" among top managers of key oil companies in the presence of President D.Medvedev) => "fair oil price" = **60-70/70-80 \$/bbl**

Source



Oil price balancing Russian budget – and “fair oil price” (USD/bbl)



★ - Среднегодовая цена нефти Юралс, данные за 20011-2012 гг. – прогнозные значения

Построено на основе: Буклемишев О.В. Государство Российское с точки зрения экономиста. – Выступление на конференции «20 лет после СССР. Что дальше?», Москва, Центральный дом предпринимателя, 09.06.2011, слайд 25; Е.Арсюхин. Черные дни нефти. – «Известия», 18.05.2011, с.01-02.

Thank you for your attention

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