

TIBERIUS

Introduction to
Commodity Markets

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- I. Commodity Markets – An Overview
 - II. Introduction to Commodity Futures
 - Case Study: Crude Oil
 - III. Asset Allocation and Portfolio Management
 - IV. Real Economy versus Financial Markets
 - V. Fazit
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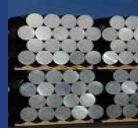
Commodities

Energy



Crude Oil (WTI, Brent, WCS, LLS), Heating Oil, Gasoline, US Natural Gas, Coal, Uranium, ...

Base Metals



Copper, Aluminium, Zinc, Nickel, Lead, Tin, ...

Precious Metals



Gold, Silber, Platin, Palladium, ...

Agriculture and Livestock



Wheat, Corn, Soybeans, Sugar, Cotton, Coffee, Cocoa, Palmoil, Lean Hogs, Live Cattle, ...

Other (,Exotics‘)



Water, Electricity, CO2, Minor Metals* / Rare Earths, ...

*Minor Metals (inc. REE) are metals not traded at LME, CME, SHFE or other public exchanges: Antimony (Sb), Arsenic (As), Beryllium (Be), Bismuth (Bi), Cadmium (Cd), Cerium (Ce), Chromium (Cr), Cobalt (Co), Gadolinium (Gd), Gallium (Ga), Germanium (Ge), Hafnium (Hf), Indium (In), Lithium (Li), Magnesium (Mg), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Neodymium (Nd), Niobium (Nb), Iridium (Ir), Osmium (Os), Praseodymium (Pr), Rhenium (Re), Rhodium (Rh), Ruthenium (Ru), Samarium (Sm), Selenium (Se), Silicon (Si), Tantalum (Ta), Tellurium (Te), Titanium (Ti), Tungsten (W), Vanadium (V), Zirconium (Zr). Characteristic: small production volume and often mined together with other metals (byproduct).

Commodities versus Commodity Futures

Comparison of Spot und Total Return (S&P GSCI), 1980 to 2015

Components:

Spot Return

+ Roll Return

= Excess Return

+ Collateral Return

Total Return



Data: Bloomberg 2015

» Returns of fully collateralized commodity futures outperform commodity prices in the medium to long term.

Commodities versus Commodity Futures

Future Pricing:

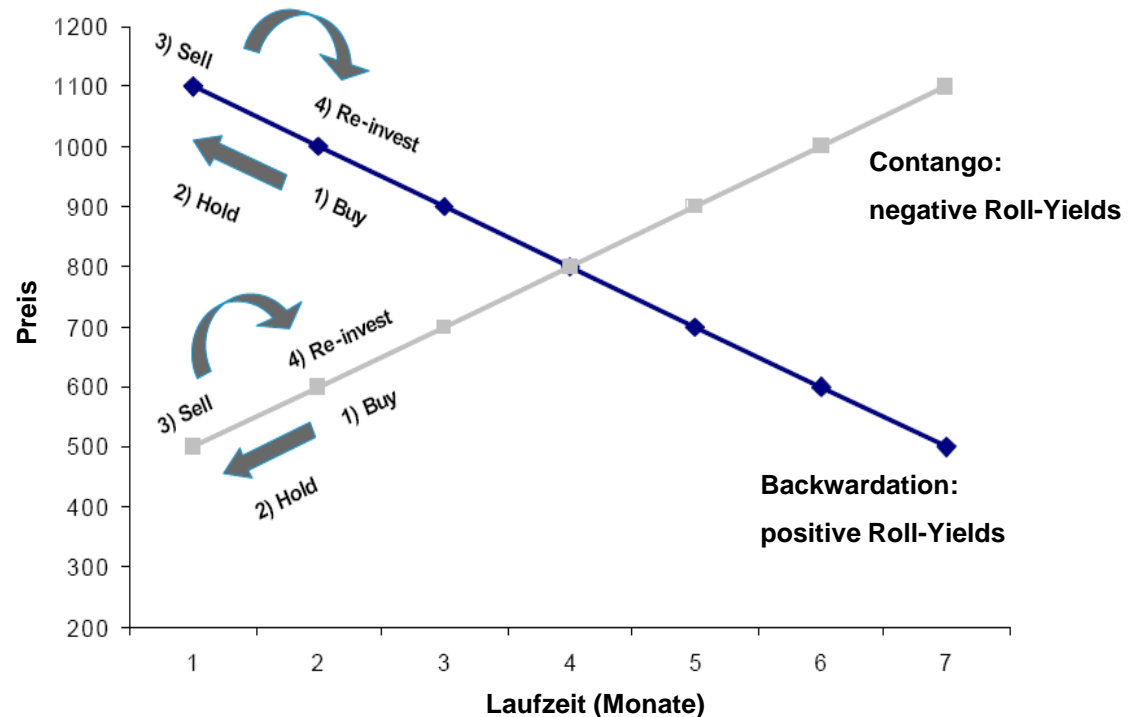
$$F = S e^{(r+y-q-u)T} \quad / \quad F = S e^{rT}$$

Backwardation:

- Future Price < Spot Price
- Positive roll-yields for long-only investors

Contango:

- Future Price > Spot Price
- Negative roll-yields for long-only investors

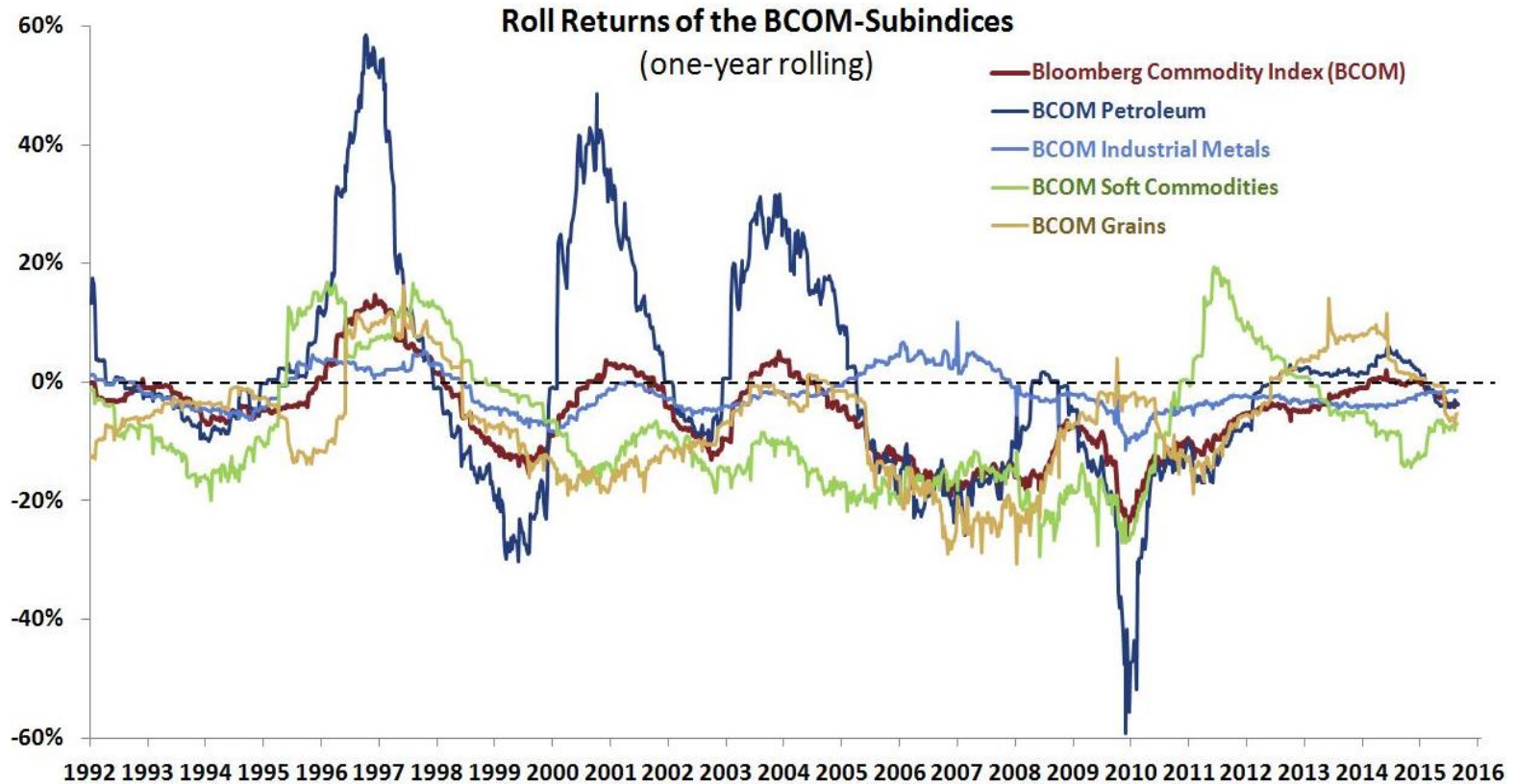


» Depending on the structure of the future curve, returns from rolling positions can be positive or negative.

Source: DB Global Markets, 2012

Symbols: Spot Price (S), Future Price (F), Interest Rate (r), Storage Costs (y), Dividends(q), Convenience Yield (u), Time Horizon(T)

Commodities versus Commodity Futures



» Roll-Yields can be positive or negative, and differ between the sectors

Data: Bloomberg 2015



Crude. What is it all about? – North America

1) Crude	2) OSPs		3) Products			4) Swap Benchmarks		5) Retail		99) Feedback		Wholesale Crude							
11) Americas		12) Europe		13) NAF		14) WAF		15) Asia Pacific		16) Saudi Arabia		17) Iran		18) Other Mid East					
	Time	Price	Chg	Diff	Chg		Time	Price	Chg	Diff	Chg		Time	Price	Chg	Diff	Chg		
Canada						Colombia													
Edmonton Syncrude Sweet	15:11	104.74	+1.65	3.25	+1.00	Vasconia	15:11	103.19	+0.71	-5.75	+0.00								
West Canada Select (WCS)	15:11	82.74	+0.50	-18.75	-0.15	Ecuador													
United States						Oriente						15:11	95.44	+0.71	-13.50	+0.00			
Alaska North Slope	15:11	108.74	-0.35	7.25	-1.00	Mexico													
Bakken UHC	15:11	97.74	+1.15	-3.75	+0.50	Mexican Mix	4/28	95.89	+0.36	--	--								
Bloomberg USGC Sour Index	15:11	97.16	+0.95	-4.33	+0.30	Isthmus													
Bonito Sour	15:11	100.49	+0.65	-1.00	+0.00	to Europe	5/31	--	--	.05	N.A.								
Cal Merc Avg (CMA) Diff	15:11	--	--	1.04	+0.02	to Asia	5/31	--	--	.00	N.A.								
Eugene Island	15:11	100.49	+0.65	-1.00	+0.00	to USA	5/31	--	--	1.05	N.A.								
Heavy Louisiana Sweet (HLS)	15:11	103.59	+0.65	2.10	+0.00	to USA (Bloomberg)	15:11	101.97	+0.81	--	--								
Light Louisiana Sweet (LLS)	15:11	103.59	+0.65	2.10	+0.00	Maya													
Mars Blend	15:11	98.09	+1.00	-3.40	+0.35	to Europe	5/31	--	--	-1.50	N.A.								
Poseidon	15:11	97.09	+1.00	-4.40	+0.35	to Asia	5/31	--	--	-9.35	N.A.								
Southern Green	15:11	96.29	+0.85	-5.20	+0.20	to USA	5/31	--	--	-.45	N.A.								
Thunder Horse	15:11	100.49	+0.65	-1.00	+0.00	to USA (Bloomberg)	15:11	94.20	+0.52	--	--								
WTI Cushing	15:11	101.49	+0.65	.00	+0.00	Olmeca													
WTI Midland	15:11	94.74	+0.90	-6.75	+0.25	to USA	5/31	--	--	2.35	N.A.								
WTI Posting Plus Diff	15:11	--	--	4.42	+0.02	to USA (Bloomberg)	15:11	104.70	+0.82	--	--								
West Texas Sour (WTS)	15:11	95.24	+0.90	-6.25	+0.25	Venezuela													
						Venezuela Basket						4/25	97.71	N.A.	--	--			

Data: Bloomberg 2014

» Global benchmark is WTI (West Texas Intermediate, USA) and Brent (Europe).
Criteria for crude valuation are gravity/viscosity (°API) and sulfur content.

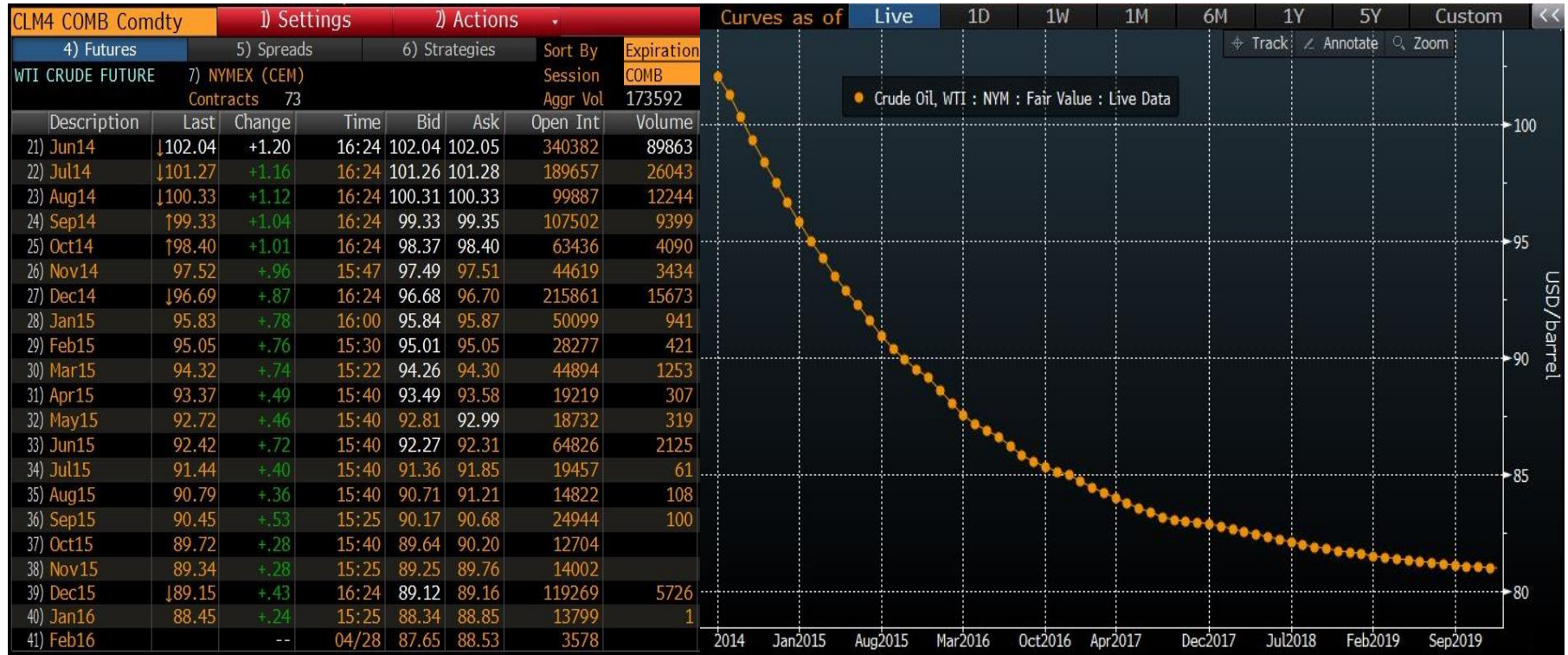
Future Contract – Example US Crude (WTI)

CLM4 ↑ 101.36 +.52  ic101.36 / 101.37 13x17 Prev 100.84	
At 19:00 Vol 149154 Op 100.89 Hi 102.20 Lo 100.57 OpenInt 340382	
CLM4 COMB Comdty 99 Feedback Page 1/2 Futures Contract Description	
1) Contract Information 2) Linked Instruments	
CLM4 Comdty WTI CRUDE FUTURE Jun14 NYM-New York Mercantile Exchange	
3) Notes	
Crude oil is the world's most actively traded commodity, and the NYMEX Division light, sweet crude oil futures contract is the world's most liquid forum for crude oil trading, as well as the world's largest-volume futures contract trading on a physical commodity. Because of its excellent liquidity and price transparency, ...	
4) Contracts (CT) Jan:F Feb:G Mar:H Apr:J May:K Jun:M Jul:N Aug:Q Sep:U Oct:V Nov:X Dec:Z	
Contract Specifications	
Contract Size	1,000 Barrel
Value of 1.0 pt	\$ 1,000
Tick Size	0.01
Tick Value	\$ 10
Price	101.36 USD/bbl.
Contract Value	\$ 101,360
Last Time	18:59:47
Exch Symbol	CL
BBGID	BBG000W9H4D3
Daily Price Limits	
Up Limit	110.84
Down Limit	90.84
Trading Hours	
Exchange	Local
Electronic	00:00-23:15
Pit	15:00-20:30
6) Related Dates (EXS)	
First Trade	Mon Apr 16, 2007
Last Trade	Tue May 20, 2014
First Notice	Thu May 22, 2014
First Delivery	Sun Jun 1, 2014
Last Delivery	Mon Jun 30, 2014
8) Holidays (CDR NM)	
9) Weekly COT Net Futs (COT)	
5) Price Chart (GP)	
Intraday History Curve	
	
Prc Chg 1D +0.52/+0.516%	
Lifetime High 141.79	
Lifetime Low 52.62	
Margin Requirements	
	Speculator Hedger
Initial	3,135 2,850
Secondary	2,850 2,850

➤ 1 lot WTI (100.000 USD) equals 1.000 barrel crude (each 159l) Liter.
 During the past 10 years crude traded between USD 35 and USD 145 per barrel.

Data: Bloomberg 2014

Future Contracts and Term Structure – US Crude Oil (WTI)



Data: Bloomberg 2014

- » Changes in price and structure of future curve are the two most important factors in commodity investing
- Example: crude spot trades at USD 102 while Dec-2015 crude is at USD 89 (-13%)
- But: structure and steepness of future term structure can change very fast

Term Structure Dynamics – Example #1

Shift in US Crude (WTI) in 2013/2014



Data: Bloomberg 2014

Term Structure Dynamics – Example #2

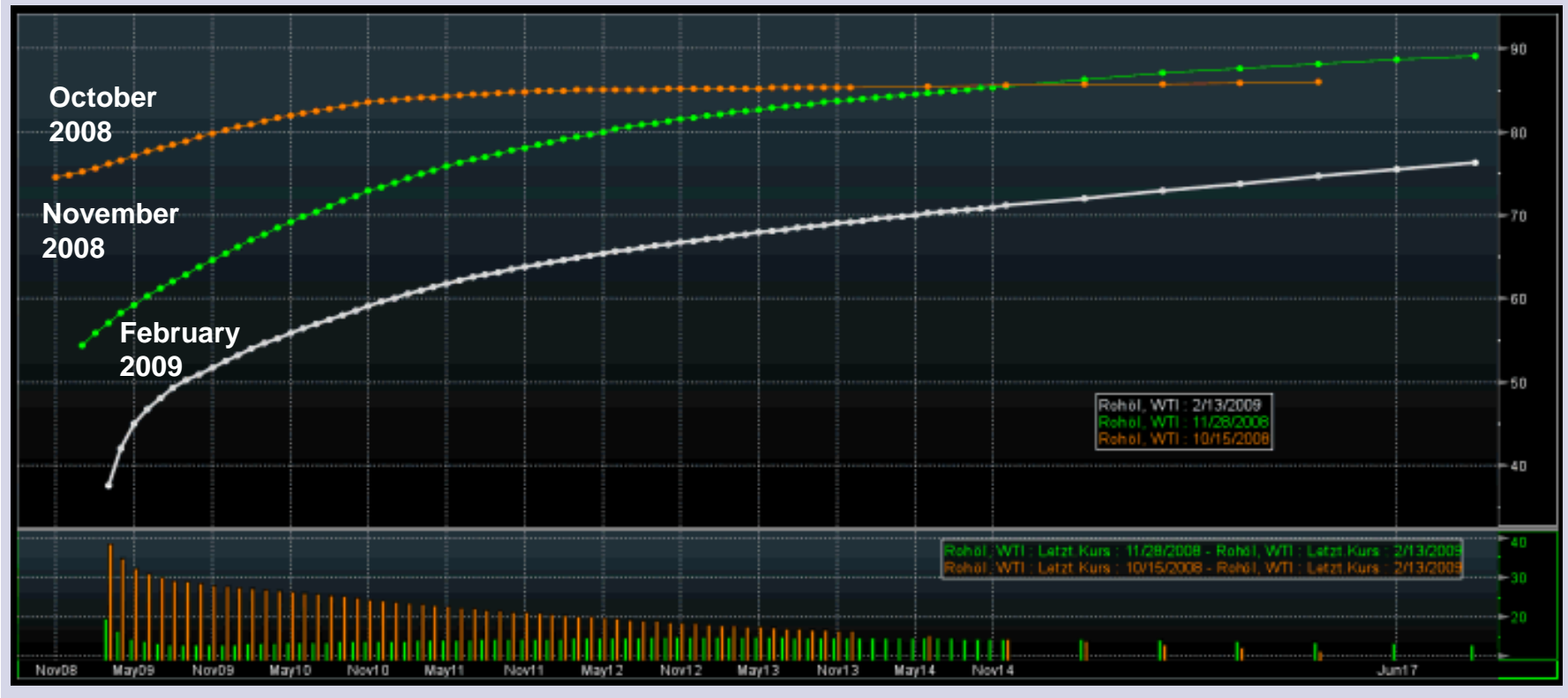
Different dynamics in WTI and Brent in 2014



Data: Bloomberg 2014

Term Structure Dynamics – Example #3

„Super-Contango“ of US Crude (WTI) in 2008/2009



Data: Bloomberg 2014

Term Structure Dynamics – Example #4

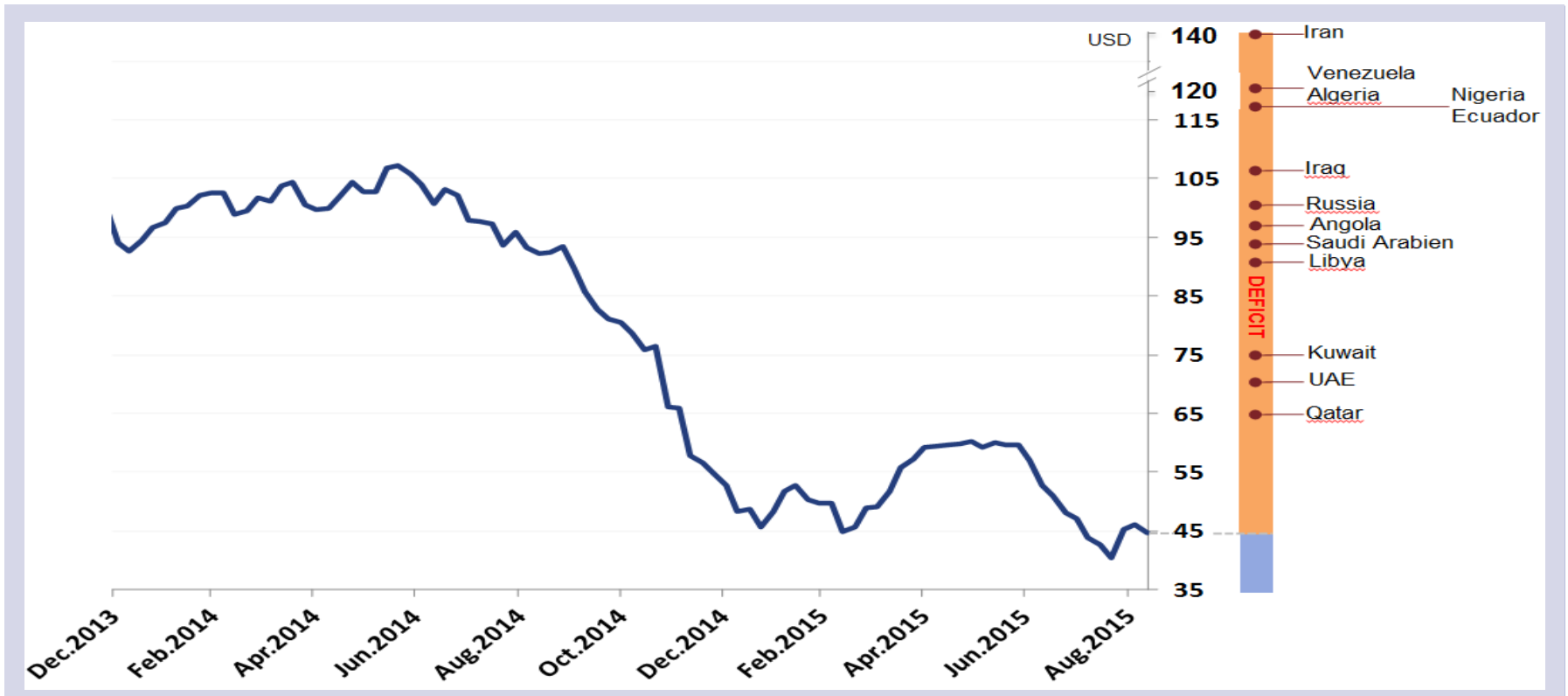
Seasonality of US Natural Gas



Data: Bloomberg 2014

Case Study – Crude Oil

Three dominant topics: OPEC, USA and China. Break-Even Prices*.



Data: Bloomberg, 31.12.2013 to 11.09.2015, *Break-Even Oil price regarding the state budget.

Case Study – Crude Oil

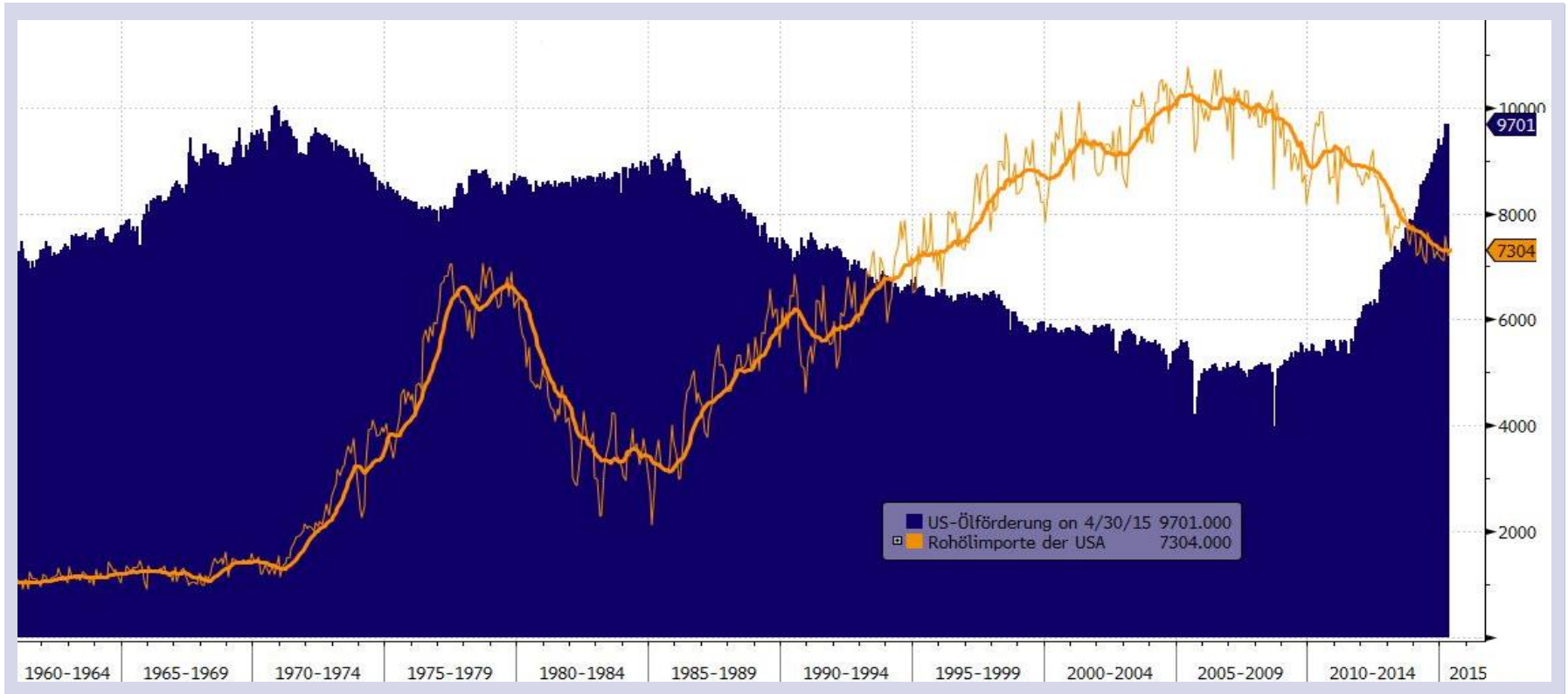
Market Balance Crude Oil



Data: Bloomberg, IEA

Case Study – Crude Oil

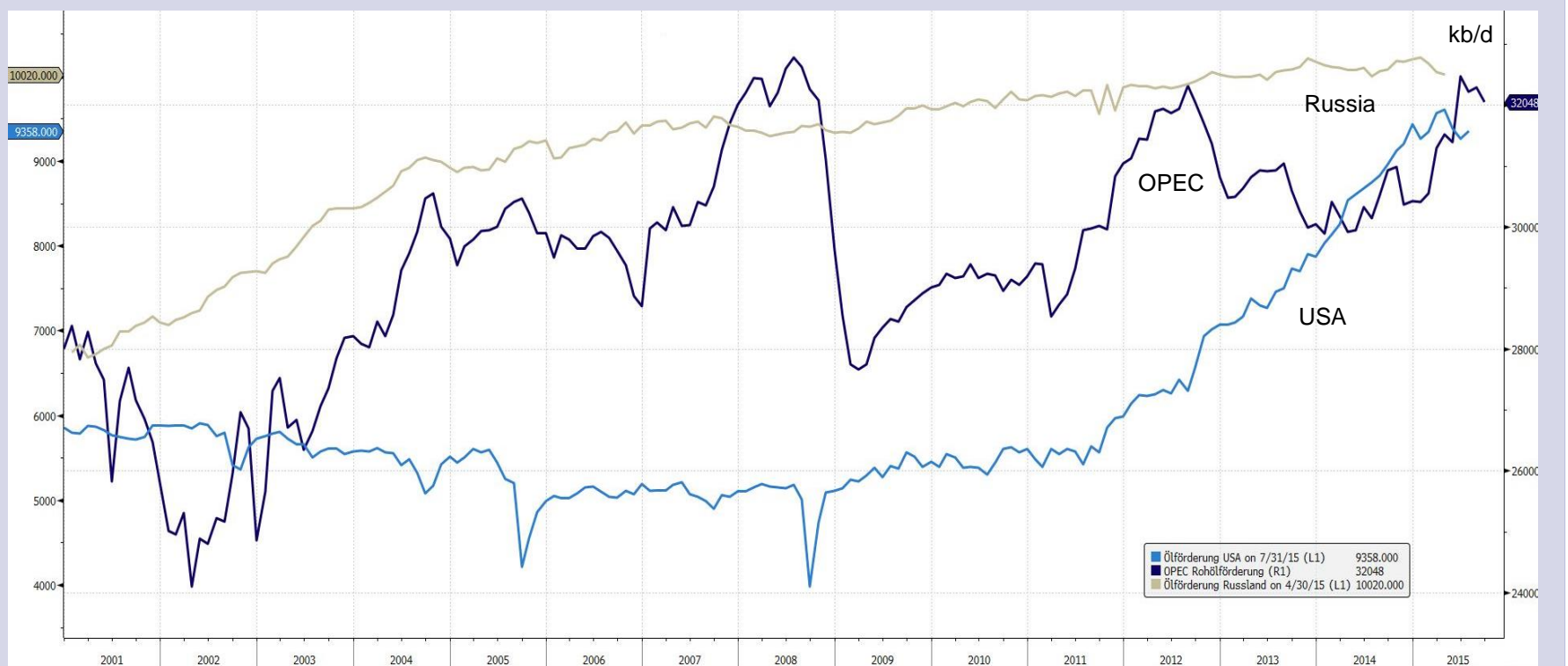
USA. Crude Production and Imports.



Data: Bloomberg 2015

Case Study – Crude Oil

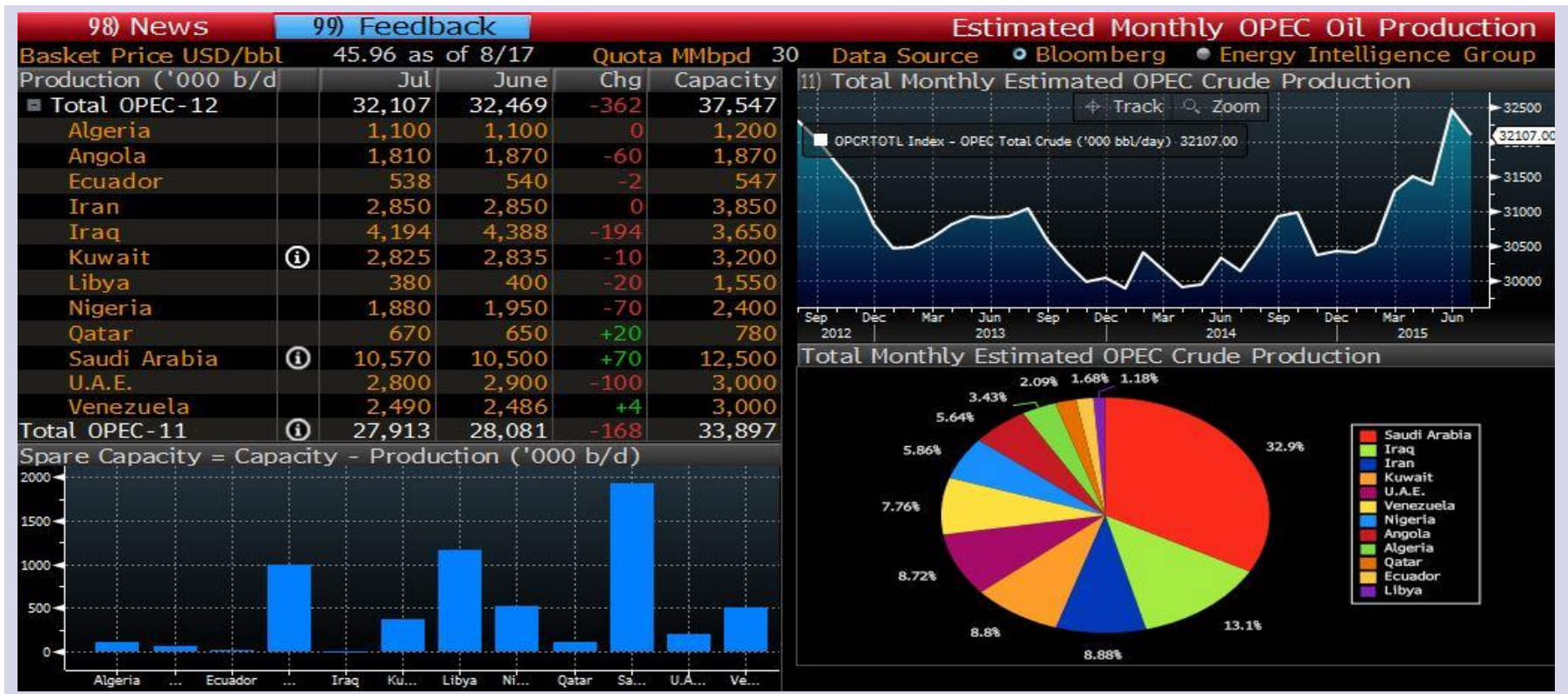
Competition for Production. OPEC, USA and Russia.



Data: Bloomberg 2015

Case Study – Crude Oil

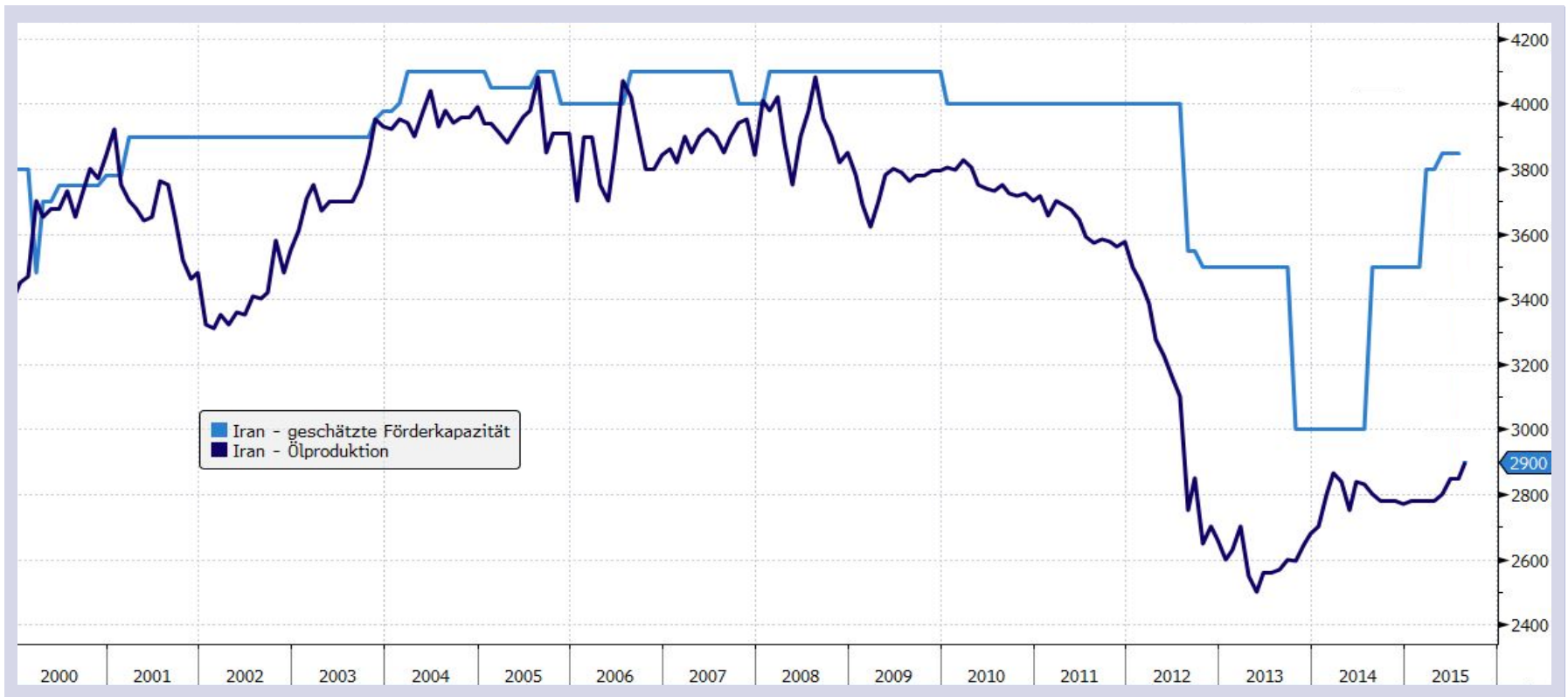
Structure of OPEC Crude Production.



Data: Bloomberg 2015

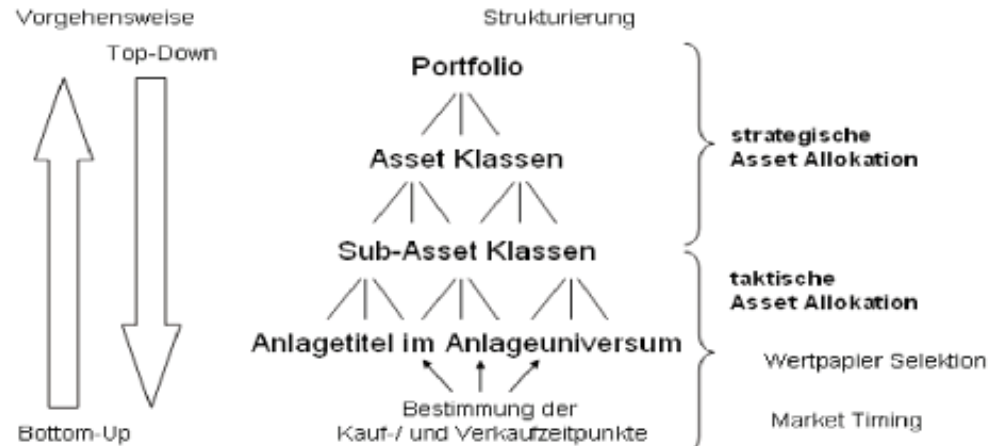
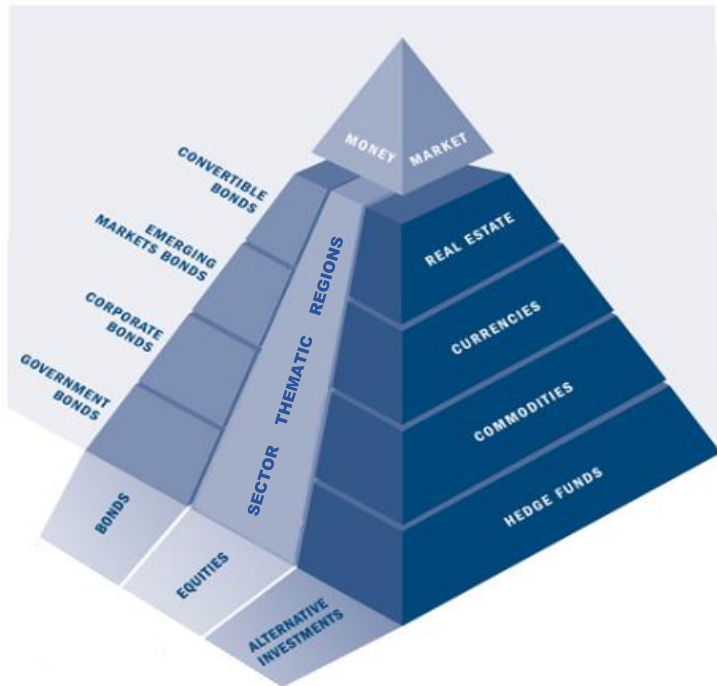
Case Study – Crude Oil

Iran. High Potential after lift of Sanctions.



Data: Bloomberg 2015

Asset Classes and Asset Allocation



- » Defining an asset class: a) returns are independent from other asset classes, b) significant excess return to money market, c) returns not dependent on positive alpha of a manager, d) positive contribution to portfolio diversification

Commodities as an Asset Class

- Expected **return and risk** comparable to equities
- Low to negative **correlation** to equities and bonds
- Positive higher moments of return distribution (**skewness/kurtosis**)
- Partly positive correlation to **geopolitical risks**
- Partly positive correlation to **inflation** (inflation hedge)
- Commodity prices follow a **mean reversion** process

» An asset class can be replicated by an index/ETF. Managers can add active alpha if market efficiency is low (emerging markets and commodities).

For commodities two reference indices are recognized by investors:

- **Bloomberg Commodity Index (BCOM)**, and
- **S&P Goldman Sachs Commodity Index (S&P GSCI)**

Commodities as an Asset Class. Correlation Statistics.

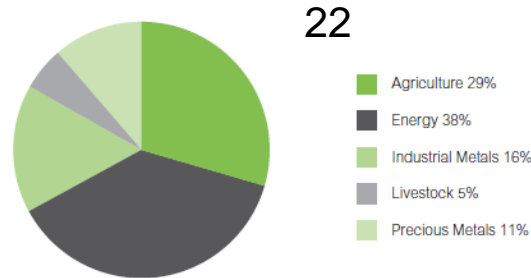
<u>10 Years</u>	MSCI W	S&P 500	Bonds	BCOM	Rohöl	Gold	USD
MSCI World	1	0.95	0.12	0.53	0.45	0.11	-0.45
S&P 500	0.95	1	-0.03	0.43	0.39	0.01	-0.30
Anleihen	0.12	0.43	1	0.20	0.07	0.37	-0.72
BCOM	0.53	-0.03	0.20	1	0.77	0.48	-0.50
Rohöl	0.45	0.39	0.07	0.77	1	0.29	-0.35
Gold	0.11	0.01	0.37	0.48	0.29	1	-0.44
USD	-0.45	-0.30	-0.72	-0.50	-0.35	-0.44	1

<u>3 Years</u>	MSCI W	S&P 500	Bonds	BCOM	Rohöl	Gold	USD
MSCI World	1	0.96	-0.07	0.30	0.28	-0.06	-0.05
S&P 500	0.96	1	-0.17	0.24	0.25	-0.13	0.06
Anleihen	-0.07	-0.17	1	0.14	-0.08	0.47	-0.72
BCOM	0.30	0.24	0.14	1	0.65	0.33	-0.34
Rohöl	0.28	0.25	-0.08	0.65	1	0.01	-0.10
Gold	-0.06	-0.13	0.47	0.33	0.01	1	-0.40
USD	-0.05	0.06	-0.72	-0.34	-0.10	-0.40	1

Data: Bloomberg 2015

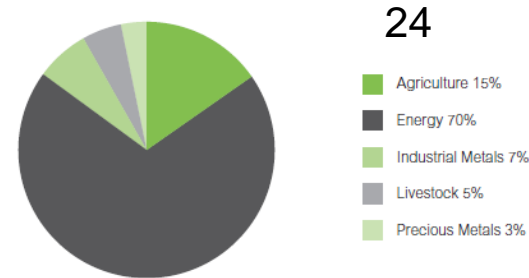
Investable Commodity Indices

Dow Jones UBS Commodity Index



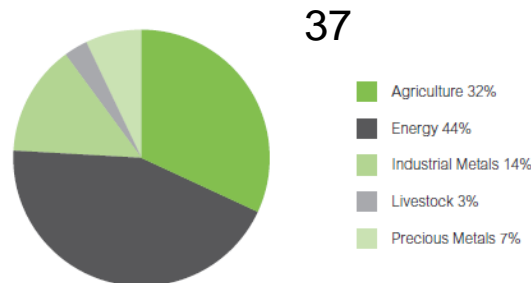
Source: ETF Securities, index providers
Data: Latest public available data as of December 31, 2013

S&P Goldman Sachs Commodity Index



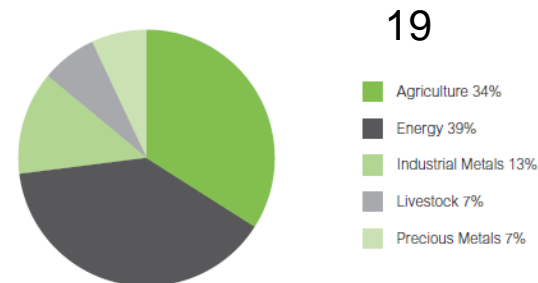
Source: ETF Securities, index providers
Data: Latest public available data as of December 31, 2013

Rogers International Commodity Index



Source: ETF Securities, index providers
Data: Latest public available data as of December 31, 2013

Thomson Reuters Jefferies CRB Index

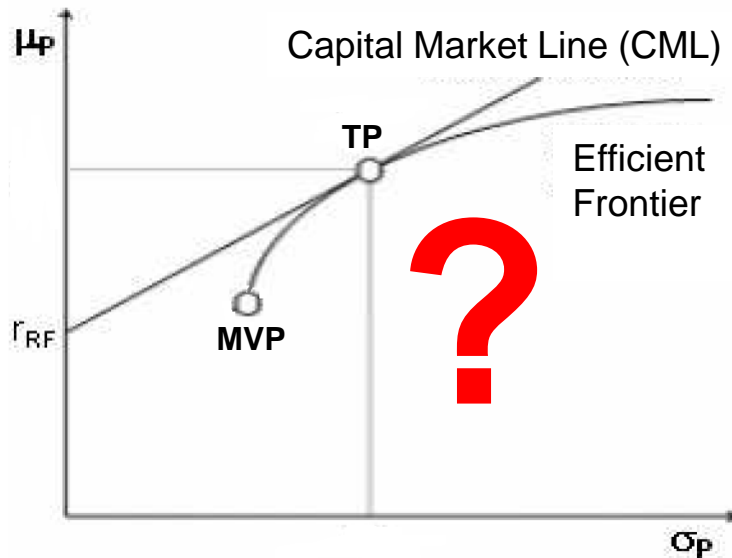


Source: ETF Securities, index providers
Data: Latest public available data as of December 31, 2013

» Commodity indices differ in terms of a) number of components, and b) weighting scheme

Efficient Frontier: Challenges in the New World Order or what we call it...

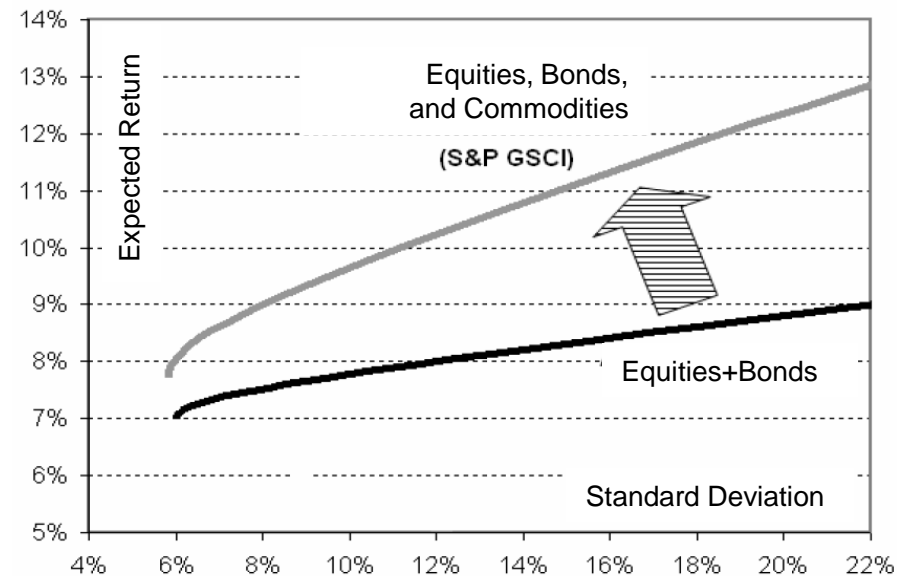
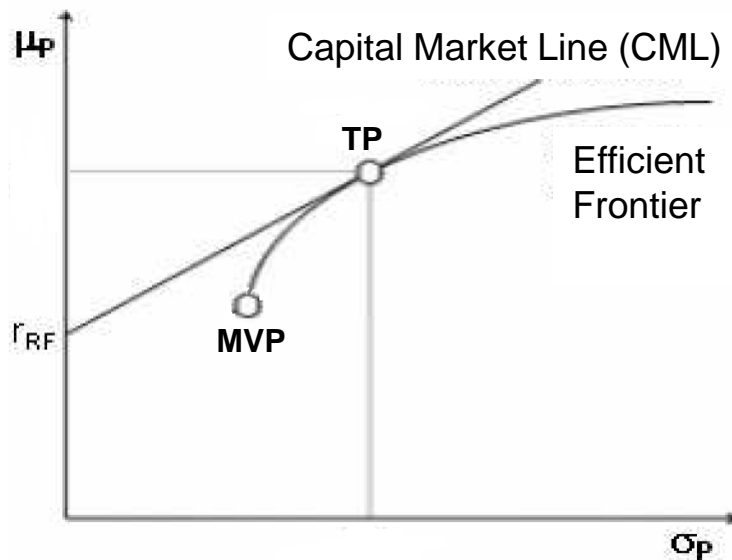
THE REAL WORLD



- Punishment of holding Cash (-0.2%)
- Bond>Returns are not safe (eg Greece, Venezuela)
- Current Return of 10 Year Bonds
 - USA: 2.3%
 - Germany: 0.6%
 - Switzerland: -0.3%
- QE drove equity prices up
- What about gold & commodity prices

» The real world challenges Modern Portfolio Theory

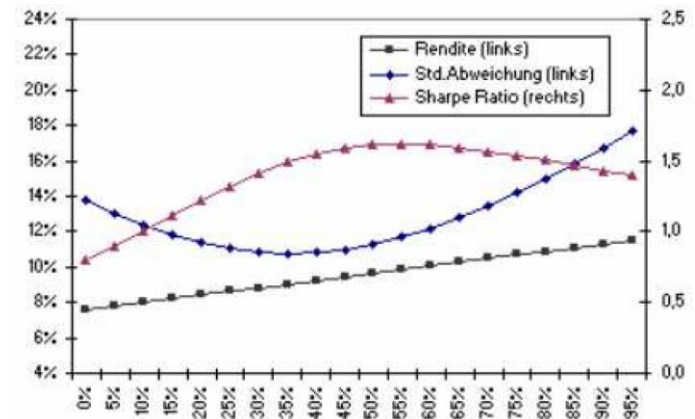
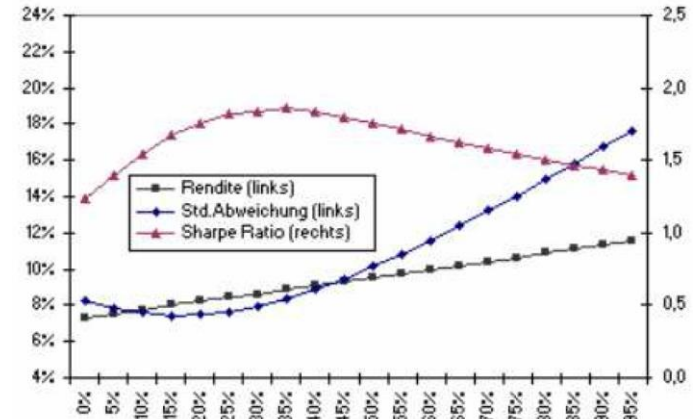
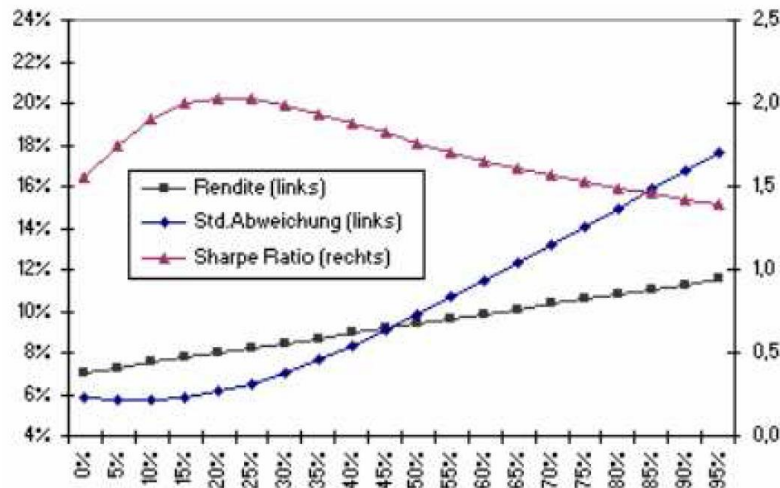
Efficient Frontier: Minimum-Variance-Portfolio und Tangential Portfolio



» Efficient Frontier improves by adding commodities to investment opportunity set

Variation of Commodity Allocation

	Substanz	Balance	Dynamik
Liquidität	5%	5%	5%
Anleihen	95%	45%	0%
Aktien	0%	50%	95%



➤ An allocation to commodities results for every portfolio model in reduction of volatility, increase of return, and increase of Sharpe-Ratio. Maximum Sharpe-Ratio has been achieved at a commodity allocation of 22% („Substanz“), 33% („Balance“), and 54% („Dynamic“)

Investment Strategies and Instruments

Indices

Indices

Example:
 S&P GSCI
 DJUBS/BCOM
 R/J CRB
 RIC1
 DBLCI

Beta

Differentiation:
 number of components,
 weighting scheme

Enhanced Indices

Example:
 DBLCI Optimum Yield
 UBS CMCI, RIC1 Enhanced

Differentiation:
 methodology of
 roll optimization

Enhanced Beta

Quantitative Strategies

Rule Based Strategies

Example:
 DBLCI Mean Reversion
 DB Platinum Commodity Euro
 DB Commodity Harvest
 Commodity IGAR (JPM)
 ComBATS, Corals (Barclays)
 GAINS (CS)
 LBBW Rohstoffe 1/2

Different trading strategies;
 Criteria:
 long only; long/short, cash

**Beta
 Alpha+Beta
 Alpha**

Discretionary

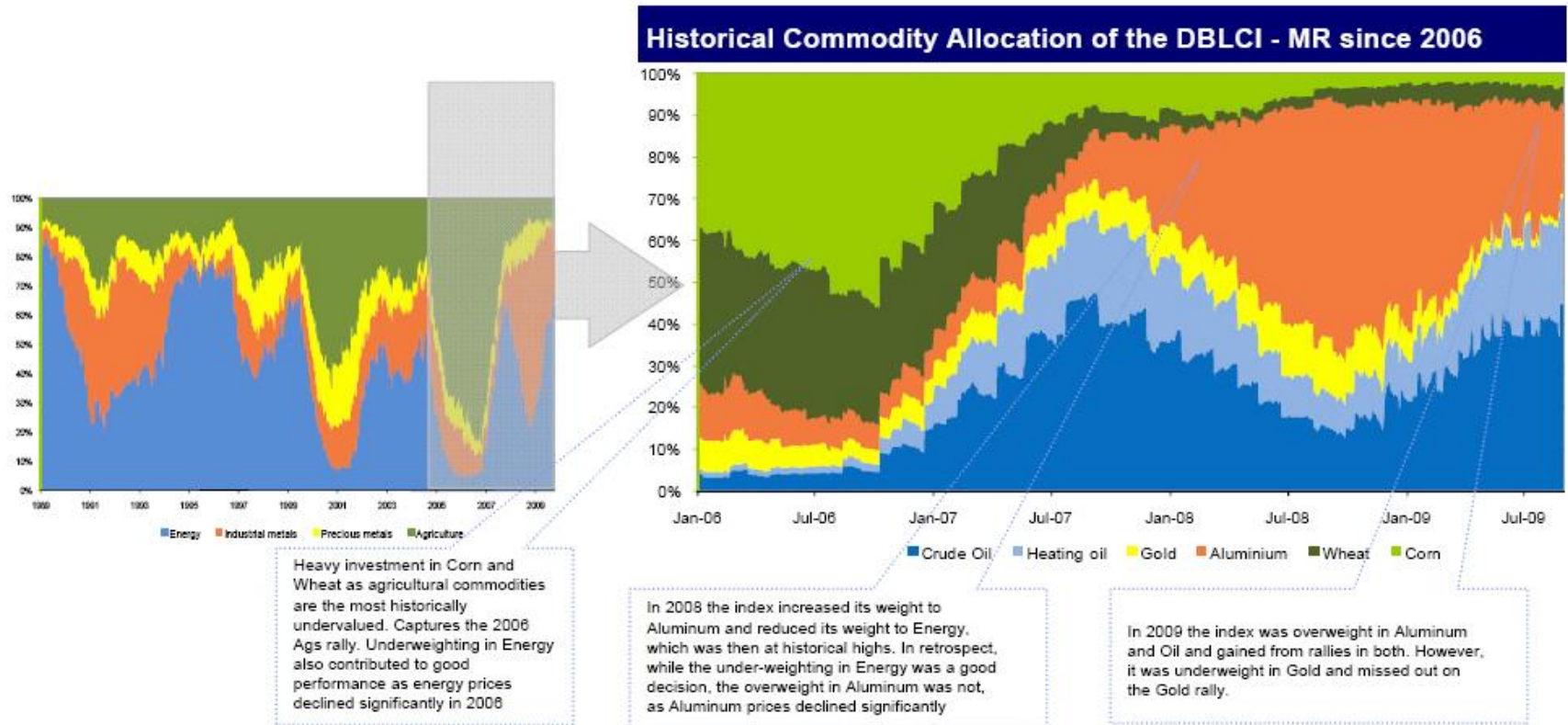
Active Management

Example:
 DWS Invest Commodity Plus
 Lupus Alpha Commodity
 Sarasin Commodity
 Schroder AS Commodity
 Tiberius Active Commodity
 Tiberius Commodity Alpha
 Vontobel Belvista Dynamic

Discretionary decision; Criteria:
 long only; long/short, cash

**Beta
 Alpha+Beta
 Alpha**

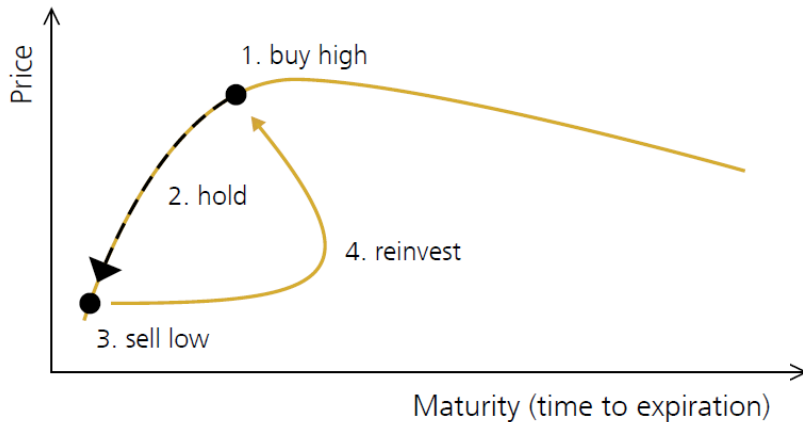
Investment Strategies – Example Deutsche Bank / Mean Reversion (DBLCI MR)



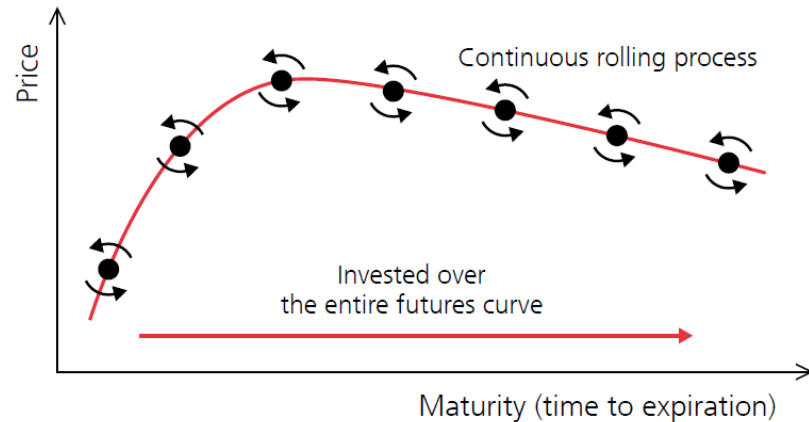
» Mean reversion methodology overweights „cheap“ commodities and underweights „expensive“ commodities based on their respective 5Y moving average versus 1Y moving average price.

Investment Strategies – Example UBS / Constant Maturity (CMCI)

Traditional commodity indices



UBS Bloomberg CMCI



» CMCI methodology diversifies across the entire future curve. Leads to lower volatility compared with traditional indices (also reduction of negative roll yields).

Investment Strategies – Example Deutsche Bank / Optimum Yield (DBLCI OY)

Contract Selection

On the first DBLCI business day of each month (the "Verification Date") each commodity futures contract currently in the index is tested for continued inclusion in the index based on the month in which the contract delivery of the underlying commodity can start (the "Delivery Month"). If, on the Verification Date, the Delivery Month is the next month, a new contract is selected. For example, if the first New York business day is May 1, 2012, and the Delivery Month of a contract currently in the index is June 2012, a new contract with a later Delivery Month will be selected.

For each commodity in the index, the new commodity futures contract selected will be the contract with the maximum "implied roll yield" based on the closing price for each eligible contract. Eligible contracts are any contracts having a Delivery Month (i) no sooner than the month after the Delivery Month of the commodity future currently in the index, and (ii) no later than the 13th month after the Verification Date. For example, if the first New York business day is May 1, 2012 and the Delivery Month of the contract currently in the index is therefore June 2012, the Delivery Month of an eligible new contract must be between July 2012 and June 2013. The roll yield is expressed as:

$$Y(t, i) = \left(\frac{PC(t, b)}{PC(t, i)} \right)^{\left(\frac{1}{F(t, i, b)} \right)} - 1$$

Where:

- Y(t,i) = On any day t, the implied roll yield for entering into the commodity futures contract with exchange expiration month i
- PC(t,b) = Closing price of the base commodity future b
- PC(t,i) = Closing price of any eligible futures contract i
- F(t,i,b) = Fraction of year between the base futures contract b and the futures contract with exchange expiration month i. Calculated as number of calendar days between dates divided by 365
- b = Base commodity future is the commodity future currently in the index

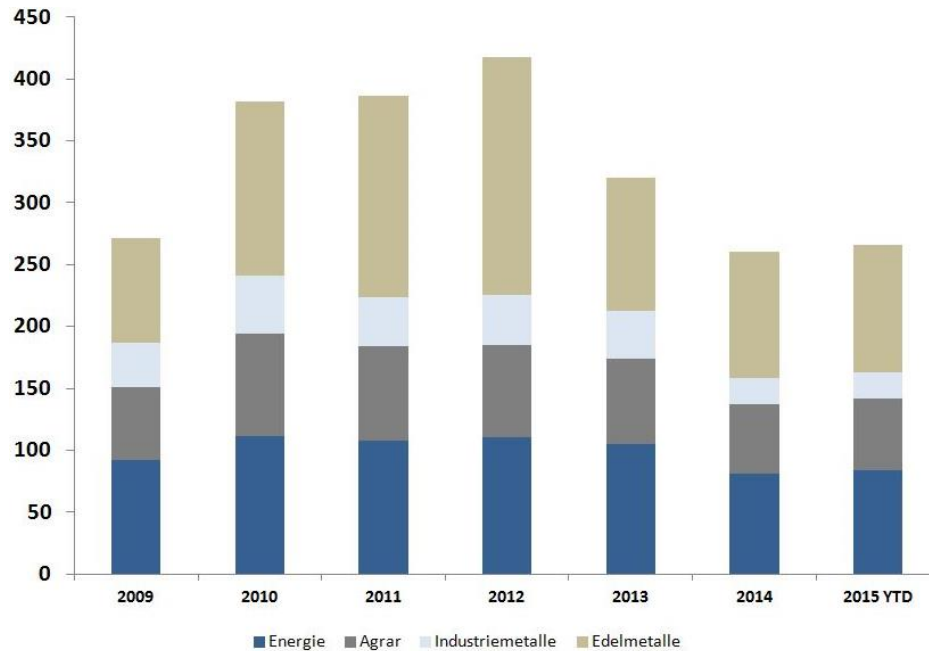
The contract with the maximum roll yield is selected. If two contracts have the same roll yield the contract with the minimum number of months to the exchange expiry month is selected.

➤ Optimum yield methodology selects a maximum backwardation or minimum contango future contract.

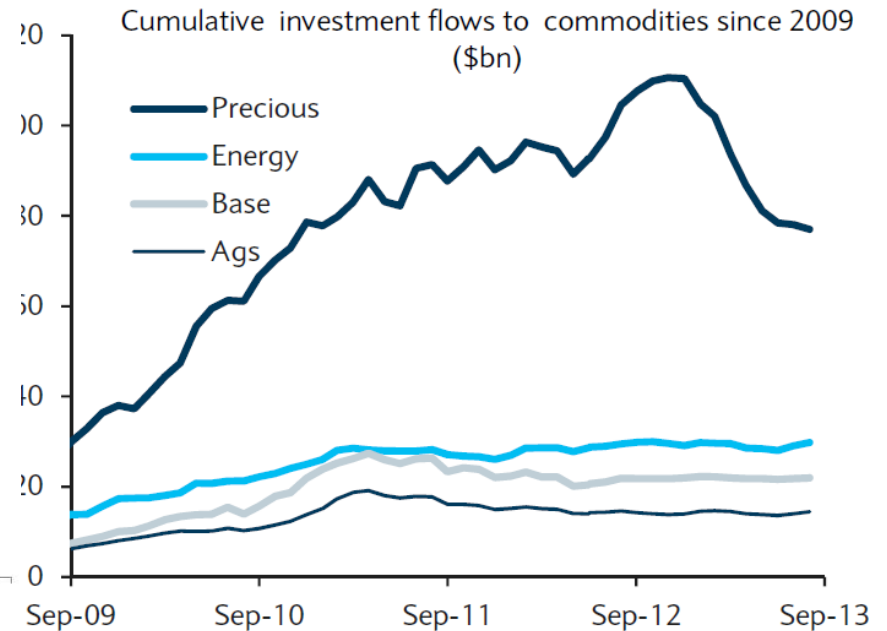
Real Economy versus Financial Markets

(Physical) Commodities	Commodity Futures (fully collateralized)	Commodity related Equity
<ul style="list-style-type: none"> ■ Focus on precious metals ■ Private investors ■ Return (Price) ■ Low to negative correlation to traditional asset classes ■ Alternative Investment 	<ul style="list-style-type: none"> ■ Exchange listed and OTC ■ Institutional Investors (Discretionary or Index based) ■ Separate asset class ■ Return (Price, Roll-Yield, Collateral Yield) ■ Low to negative correlation to traditional asset classes ■ Alternative Investment 	<ul style="list-style-type: none"> ■ Industries: oil&gas, metals&mining, and agriculture (consumer) ■ Higher correlation to equity markets than to commodity prices ■ Natural resources equities (public equity): global equity allocation ■ Natural resources equities (private equity): Alternative Investment
(physical) Commodity Trading		

Financial Markets



Quelle: Barclays 2015

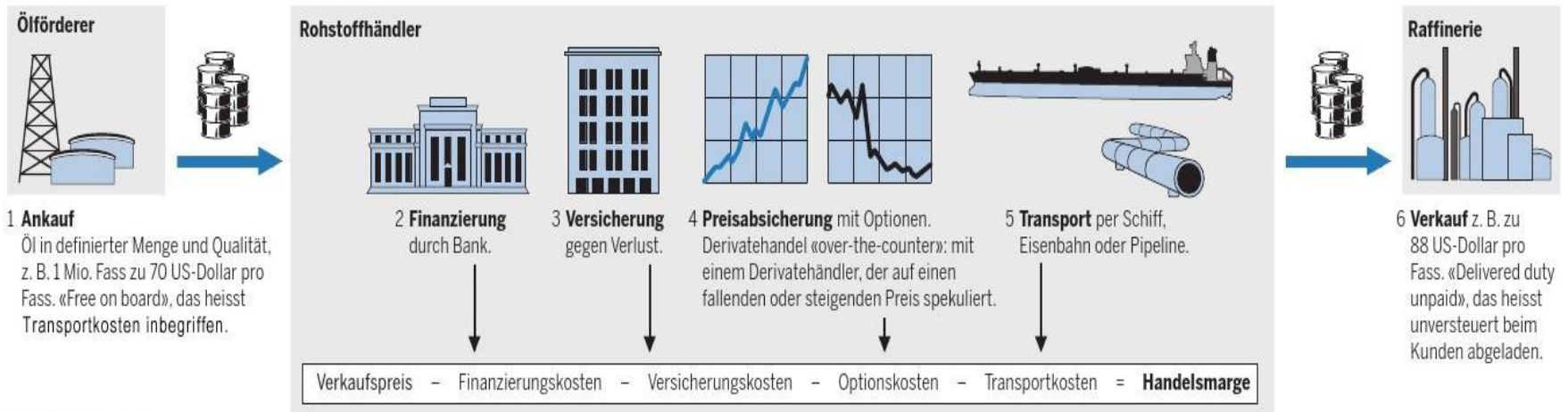


Quelle: Barclays 2014

» Assets under Management (AUM) rose from USD 150 bn in 2008 to over USD 350 bn in 2013. Now down 33% to 260 bn USD. Precious metals attracted most of the assets.

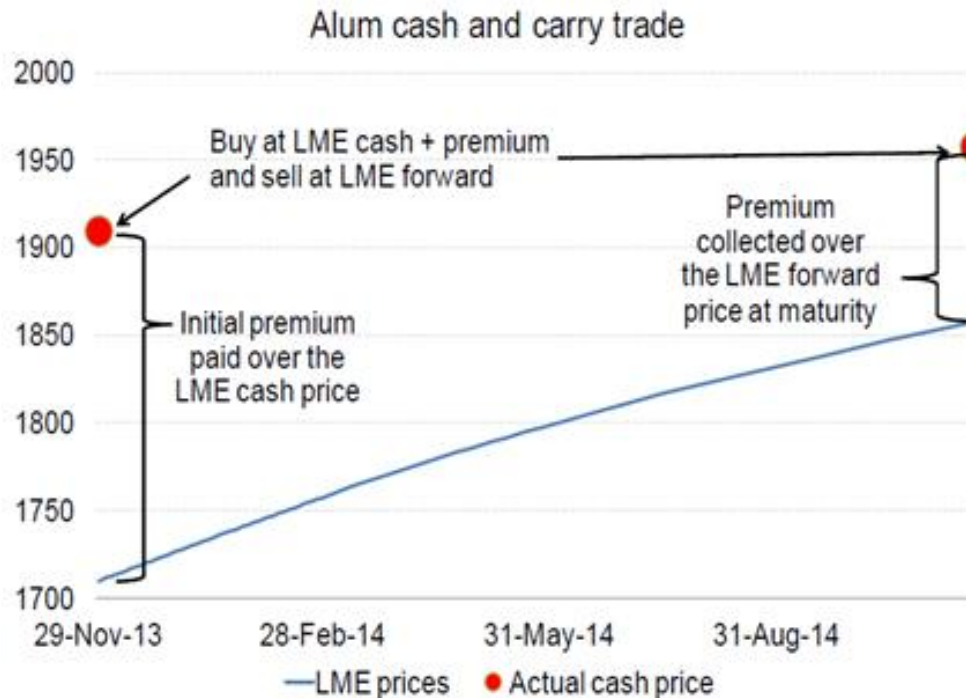
(Physical) Commodity Trading / Switzerland

- What does commodity trading mean? **Example Crude Oil**



- Global commodity exports value more than **USD 6000 bn** (2012). More than 50% is energy related (WTO/UNCTAD).
- In Switzerland commodity trading equals **3.5% of GDP** (aprox. CHF 20 bn) and employs about 10,500 people.
- About 570 commodity trading companies are registered in Switzerland. Most of them are based in Geneva (400), Zug (100), and Lugano (70).

(Physical) Commodity Trading: Example Aluminium Cash&Carry Trade



Now:

- Pay \$1909/MT =
LME cash price \$1709/MT + premium \$200/MT
- Hedge forward at \$1857/MT
- LME rent cost \$35.5/MT
Curve implies 42c/MT/day - LME rent is 10c/MT/day = 32c/MT/day for 355 days

1Y later:

- If premium = \$200/MT at maturity, then receive the LME forward + premium = \$2057/MT

Final PnL at maturity:

\$112.5 per MT

» Buying Spot (S+P) and selling it forward (P+F) is larger than warehouse rental rate (R)

«Secret» Giants of Commodity Trading

GlencoreXstrata About us | Our business | Investors | Media | Sustainability

Vitol ABOUT VITOL | TRADING | TERMINALS | UPSTREAM | REFINING | NEWS | RESPONSIBILITY | VITOL FOUNDATION | CAREERS | CONTACT

A WARM WELCOME
The Vitol Group exists to help meet the energy needs of a rapidly changing world. One of the world's largest independent energy trading companies, we find, extract, trade, refine, store and transport materials and resources from where supply is abundant to where demand is great. We forge connections; we help make things happen and markets work.

There, any apparent similarities with other oil and gas conglomerates end. We do things differently, and the difference lies less in what we do than *how* we do it.

[More about Vitol](#) | [View our introductory film](#)

TRADING • Trading is the engine of our business, and energy is the resource we trade the most.

TERMINALS • VTTI (50% Vitol owned) represents far more than simply a storage resource.

UPSTREAM • Speed, flexibility and local understanding are nowhere more relevant than in our upstream operations.

Trafigura ABOUT US | TRADING | INVESTMENTS | MEDIA CENTRE | FINANCIALS

"20 years of connecting commodity producers and consumers worldwide."

Mercuria Home About us Trading Assets Our people Media room Contact us

Global energy & commodity group.
5 continents. 50 countries.
1000+ employees. 38 offices.

Trading Commodities • We assure worldwide reliable energy and commodities supplies at competitive prices.

Asset Portfolio • Mercuria makes strategic investments providing access to key infrastructure and physical commodity markets.

Gunvor Who We Are Our Business Global Reach Responsibility Media

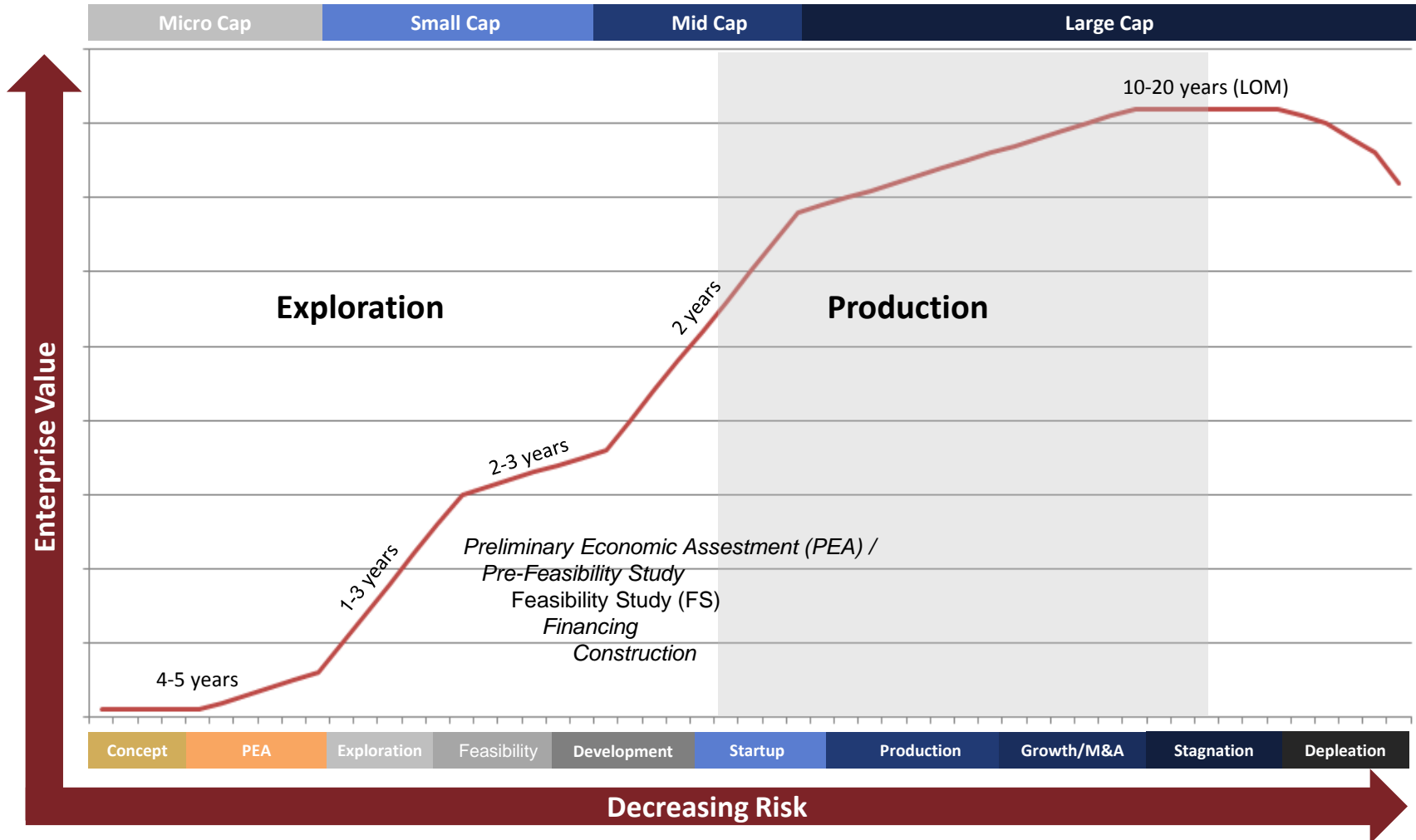
Background Energy Trading Products and Logistics Services

➤ Vitol, GlencoreXstrata, Trafigura, Gunwar and Mercuria are global champions in commodity trading. Sales volume of Vitol and GlencoreXstrata are higher than of any DAX30 company.

In Contrast: Public listed natural resources companies

	Energie				
	Metals & Mining				
					
	Agrarmärkte				
					

Life Cycle of Commodity Exploration and Development



Summary

- The majority of all commodities are part of the categories energy, metals, or agriculture
- Commodities are an established separate and investable asset class for institutional investors since more than 10 years
- It is important to segregate between commodities, commodity futures, physical commodity trading, and commodity linked companies
- Total return of fully collateralized commodity futures derives from three sources: price return, roll return, and collateral return
- Commodities as an asset class are part of alternative investment universe
- In the past commodities offered a equity-like risk/return-profile, while correlation to equities and bonds had been low to negative (positive diversification benefit)
- Including commodities in equity-bond-portfolios increased portfolio results (inc. higher sharpe ratio)

Suggested Further Reading

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Dr. Torsten Dennin

Head of Portfolio Management & Research

As Head of Commodity Portfolio Management and Research Dr. Dennin is responsible for the performance of all commodity investment strategies at Tiberius Asset Management AG in Zug, Switzerland.

Dr. Dennin holds a ten year+ track record in managing commodity related investments at Deutsche Bank AG and VCH Investments in Frankfurt am Main, Germany. For Deutsche Bank AG he has been responsible for managing commodity single accounts since 2004, and for the „db Flexible Commodity Strategy Fund“ since 2007. In 2008 he also has been appointed to be responsible for „PWM Commodity Optimum Fund“. In 2010 Dr. Dennin was hired by Altira Group in Frankfurt am Main, an independent asset management boutique, to build up commodity and natural resources business for VCH Investments. As Managing Director and Co-Head Natural Resources, he analyzed international commodity markets, covered natural resources equities, and managed „VCH Commodity Alpha Fund“ and co-managed „VCH Expert Natural Resources“. In April 2013 Dr. Dennin joined Tiberius Asset Management AG, an independent Swiss asset management company focused on commodities.

Dr. Dennin studied Economics at University of Cologne, Germany, and at Pennsylvania State University, USA. He wrote his PhD-thesis on collateralized commodity futures at Schumpeter School of Business and Economics. Dr. Dennin is author of several commodity related books and published numerous articles in industry journals.



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- ___ **[Book] Dennin (2009): Besicherte Rohstoffterminkontrakte im Asset Management**, Josef Eul Verlag, März 2009
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