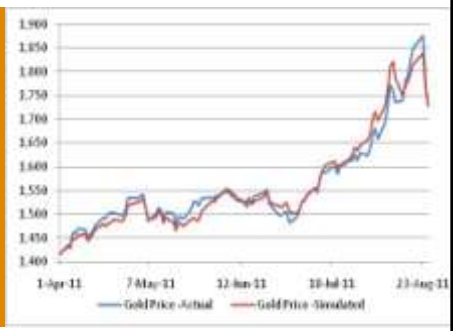
14th November 2011

Commodity Trading

Ideas, Products, Risks, Limits



alchemy Analysts. Actuaries.

WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Jawwad Intro

Fellow Society of Actuaries, Investments

MBA, Columbia Business School

19 years consulting: US, UK, ME & Pakistan

Risk Management, Product Development, Regulatory Reporting, Actuarial Practice

Prefers - Jawwad

alchemy Analysts. Actuaries.

WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Alchemy Intro

Actuarial & Risk Advisory firm

8 years, 4 Markets

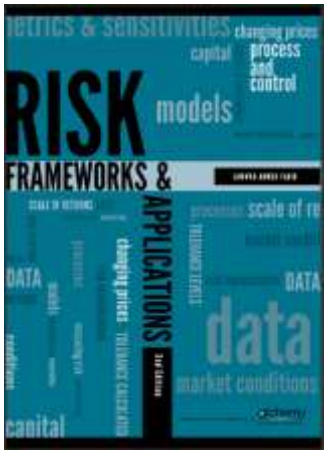
Derivative & Risk Management models, ALM, ICAAP, Stress Testing, Financial Product Development, Training workshops

125th workshop - 1750 trained professionals

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Books and course portfolio



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

What is this course about

Price

Risk

Value

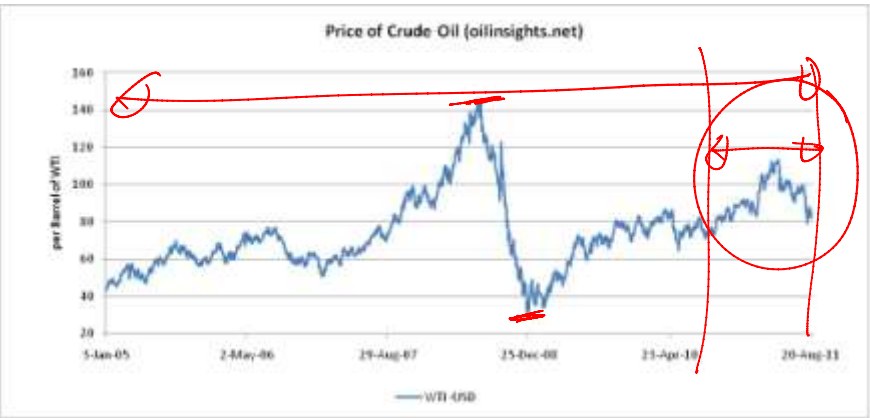
Products

Limits

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Price



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Volatility

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Models

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

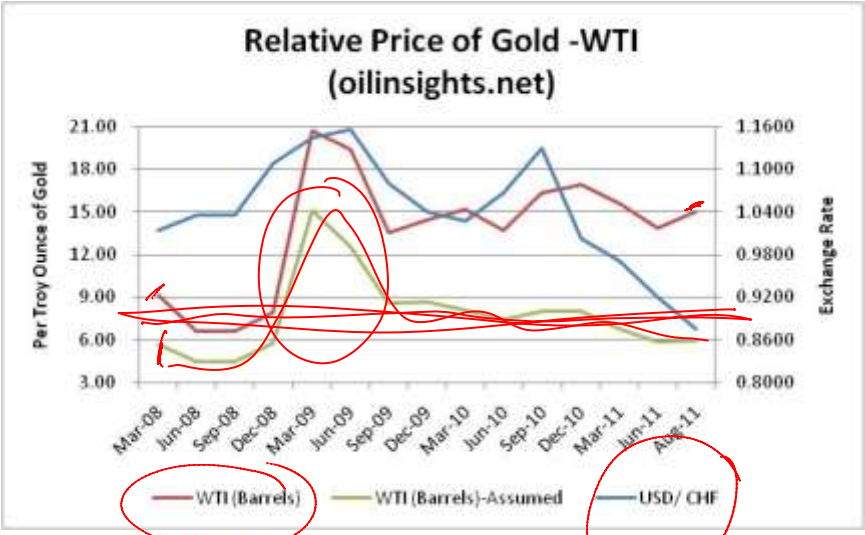
FinanceTrainingCourse.com

Relative Value

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Relative Value - II



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

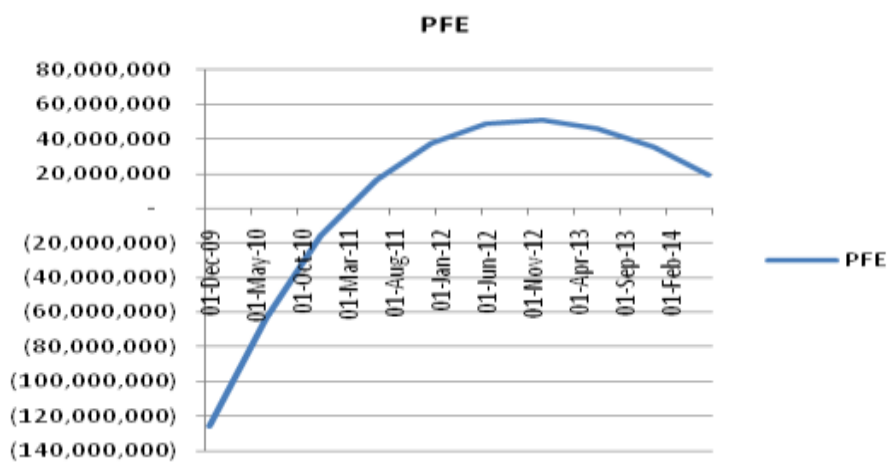
10

Products & Payoffs

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Limits



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Action Plan – Session One

Volatility

- Trailing volatility

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Action Plan – Session Two

Working with Oil & Gold

- Fundamental models

Limits

- Limits allocation – PSR and PFE

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Distribution & Volatility

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Sigma

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Volatility 3% — 6% — 1%

Variance ==> expectations not met

>Std-deviation ==> square root (Variance)

>Dispersion, Diffusion

>Volatility

>Vol

>Trading Vol

>Implied Vol

10u$ — 3%

100$ — 6%

100%

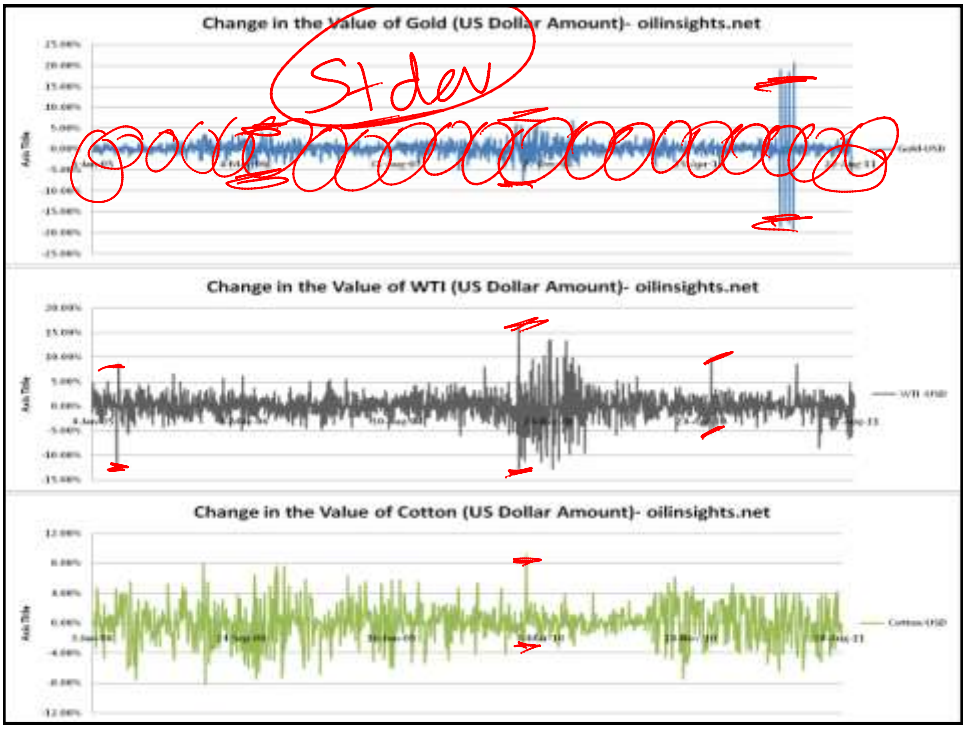
X2

Optionality - Volatility - Convexity

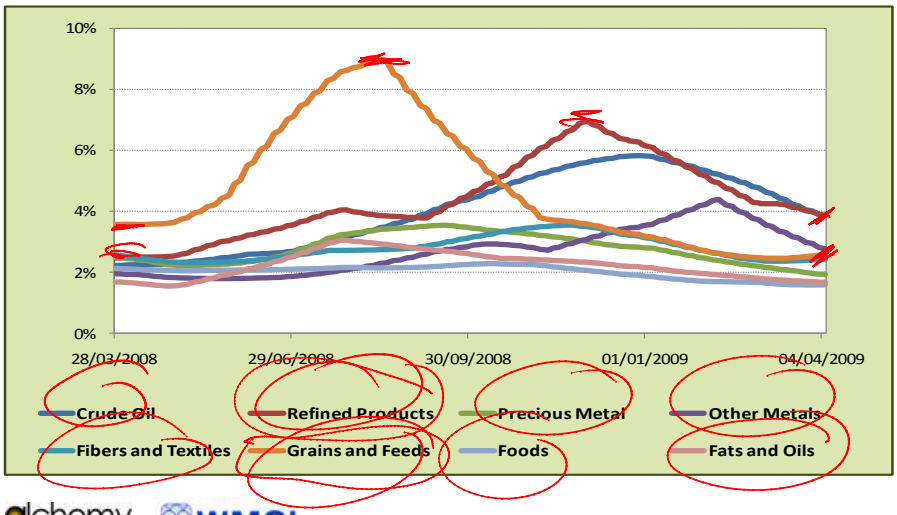
1000% X 10

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com



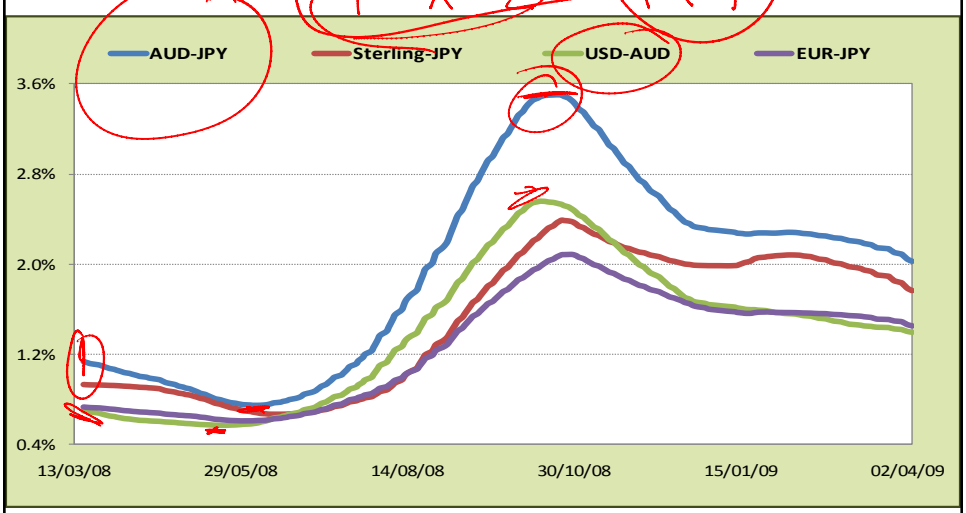
Vol Trend



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited FinanceTrainingCourse.com

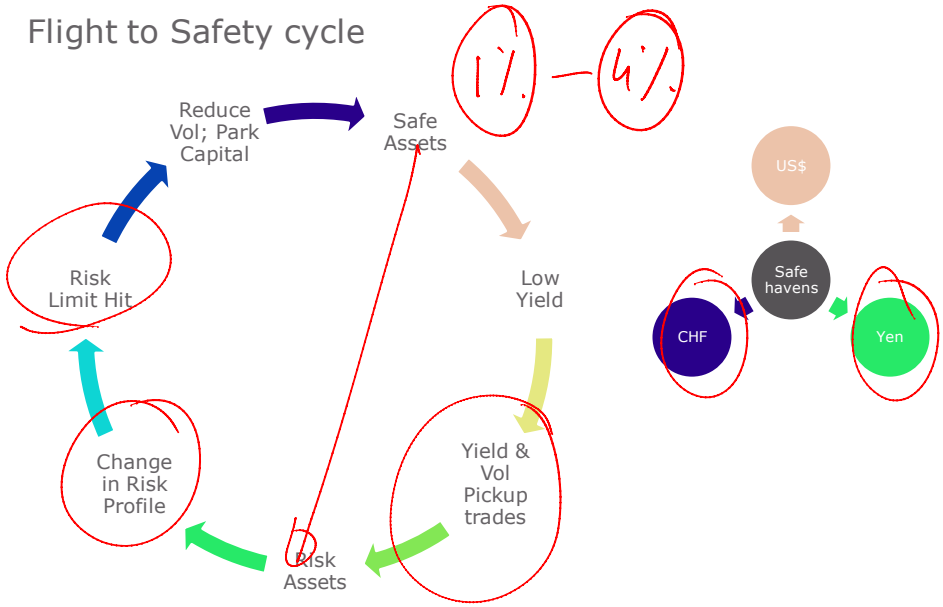
Lagged effects

1 x 10
1 x 2
1x7



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited FinanceTrainingCourse.com

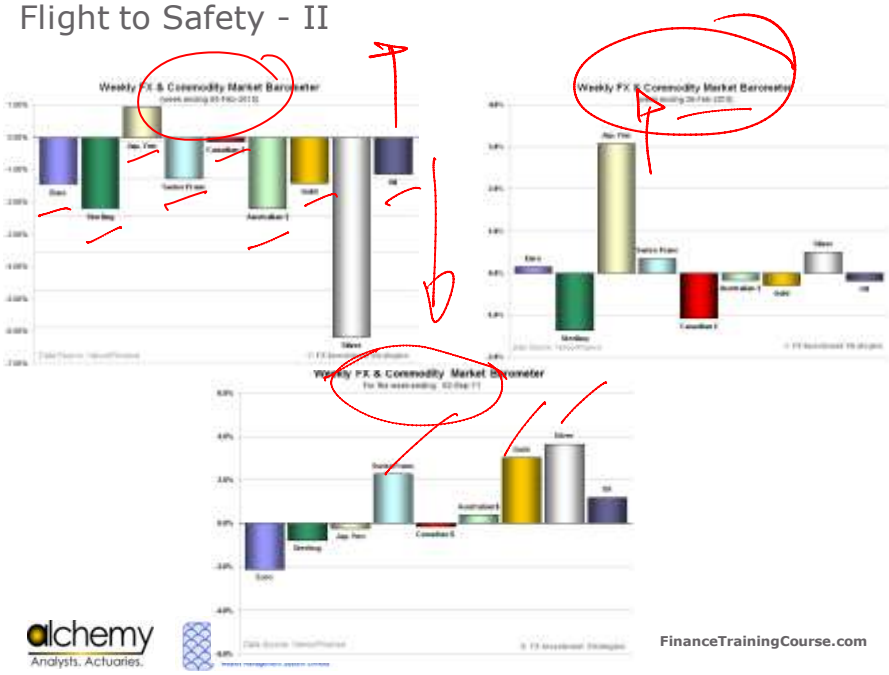
Flight to Safety cycle



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Flight to Safety - II



alchemy Analysts. Actuaries.

FinanceTrainingCourse.com

Vol	r
0	0
0	1
1	0
1	1

Volatility Drag?

Vol = ?, r = ?

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

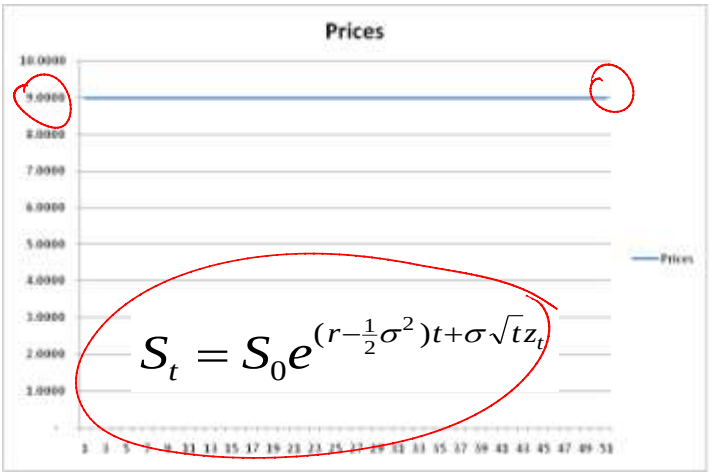
FinanceTrainingCourse.com

Thought Experiments?

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Vol = 0, r = 0



$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Vol = 0, r = 1

$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Vol = 0, r = ?

$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Vol = ?, r =1

$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Vol = ?, r =0

$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

nceTrainingCourse.com

Volatility drag

$$S_t = S_0 e^{(r-\frac{1}{2}\sigma^2)t+\sigma\sqrt{t}z_t}$$

vol=10%; vol² = 1%.

=20%

1%

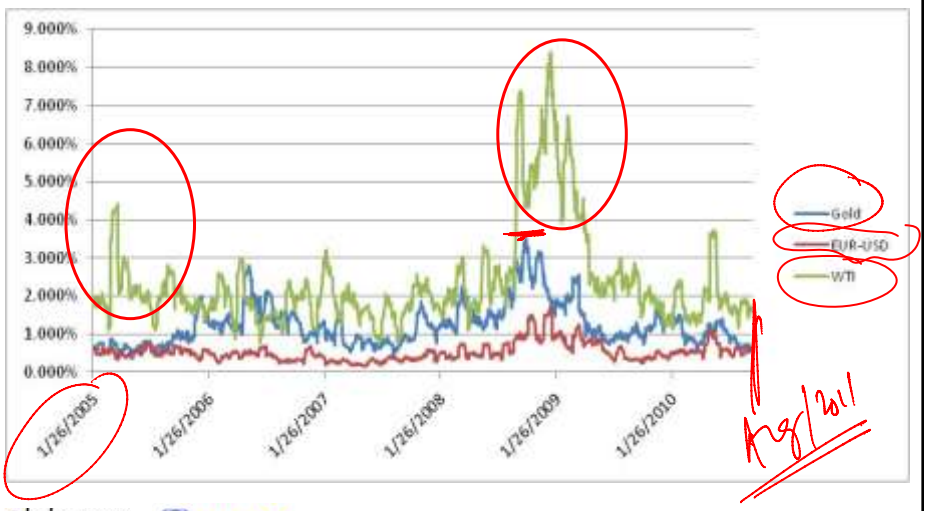
$$(r-\frac{1}{2}\sigma^2)t$$

1% − 1/2 1% =

r	sigma	1/2 * sigma^2	vol-drag
1%	10%	0.5%	0.500%
1%	15%	1.1%	-0.125%
1%	20%	2.0%	-1.000%
1%	25%	3.1%	-2.125%
1%	30%	4.5%	-3.500%
1%	35%	6.1%	-5.125%

FinanceTrainingCourse.com

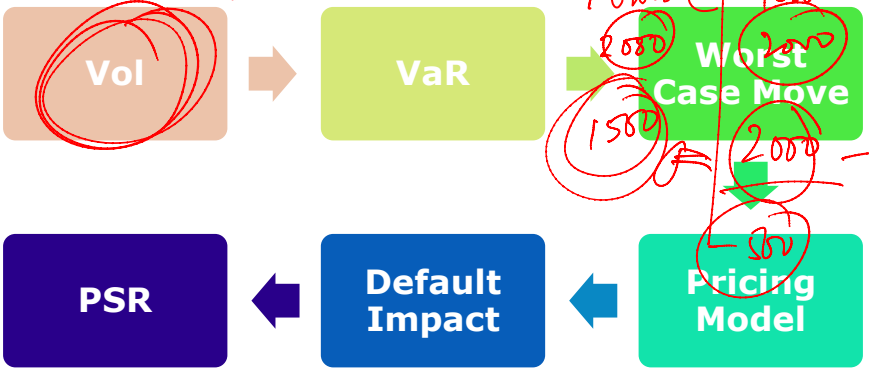
Trailing Volatilites



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

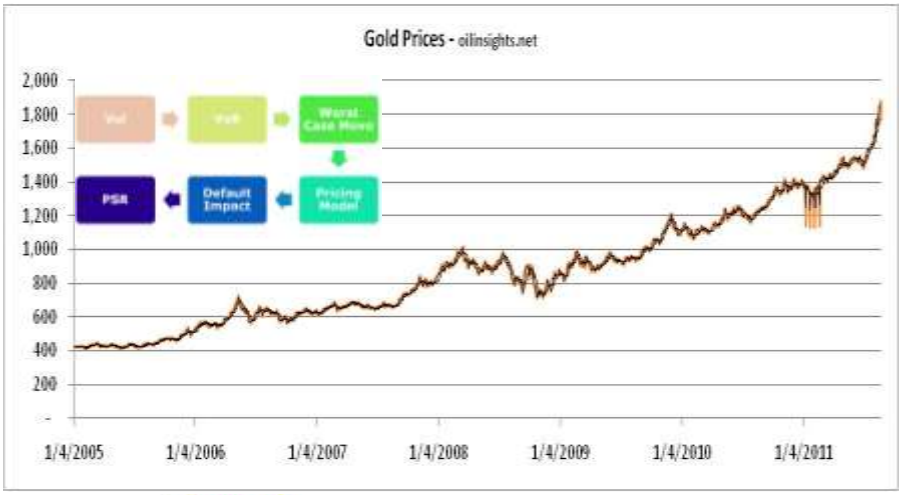
Thought experiment - PSR Process



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Framing the problem – What is long term?

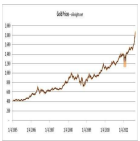


alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

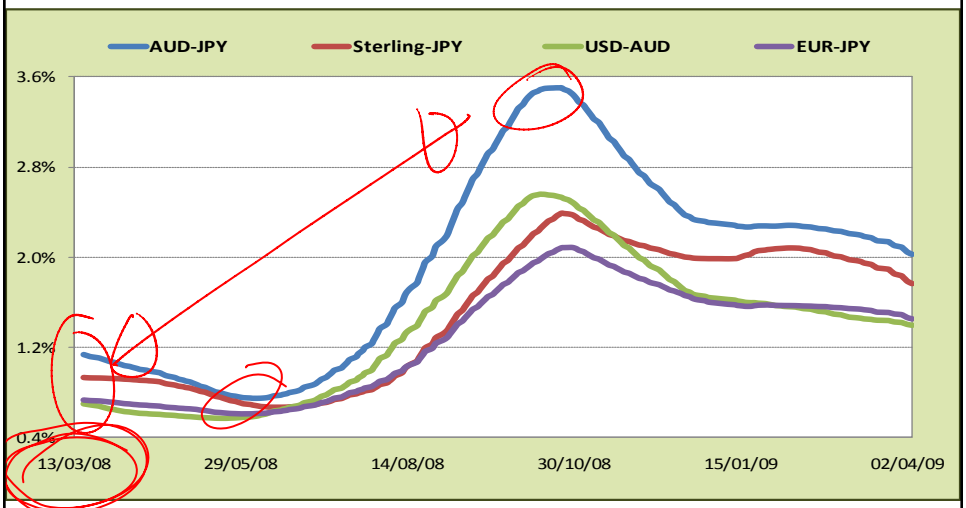
Framing the problem – What is long term?

Framing the problem – What is long term?



Lagged effects

1 x .5 x 7

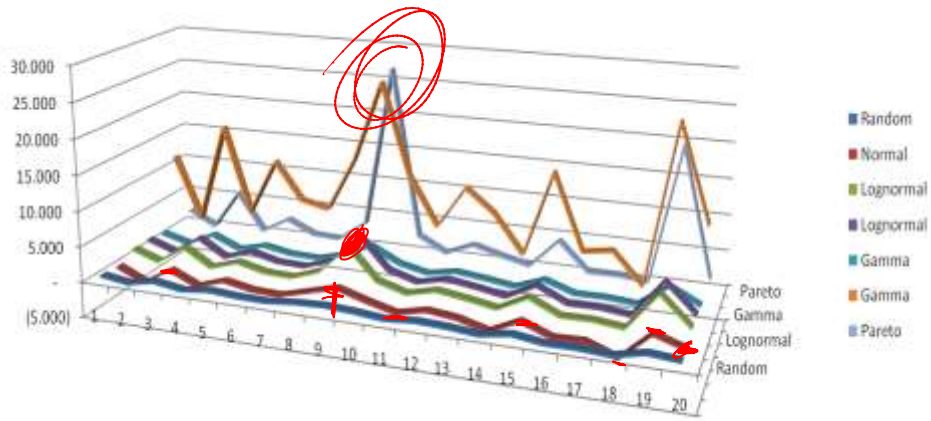


alchemy Analysts. Actuaries.

WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Distributions - Simulations



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Mindset – Distributions - Models

ALL MODELS ARE WRONG

SOME MODELS ARE MORE USEFUL THAN OTHERS

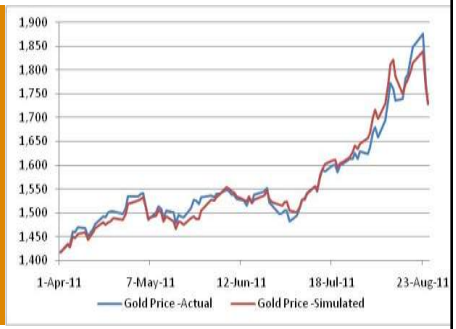
alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Set date in Header & Footer

Products & Models

Session II



alchemy Analysts. Actuaries. WMSL

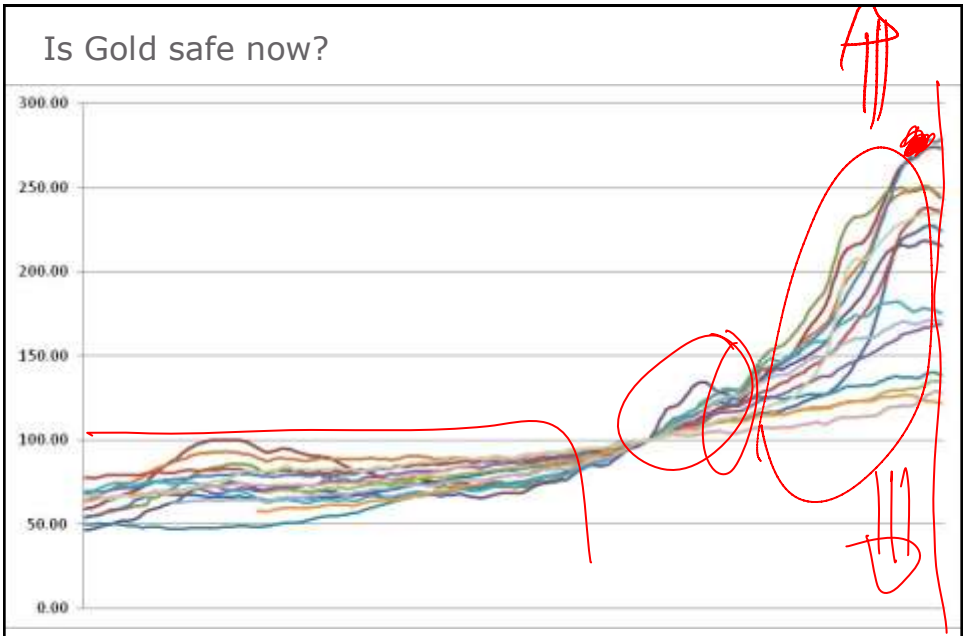
FinanceTrainingCourse.com

THOUGHT EXPERIMENTS

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

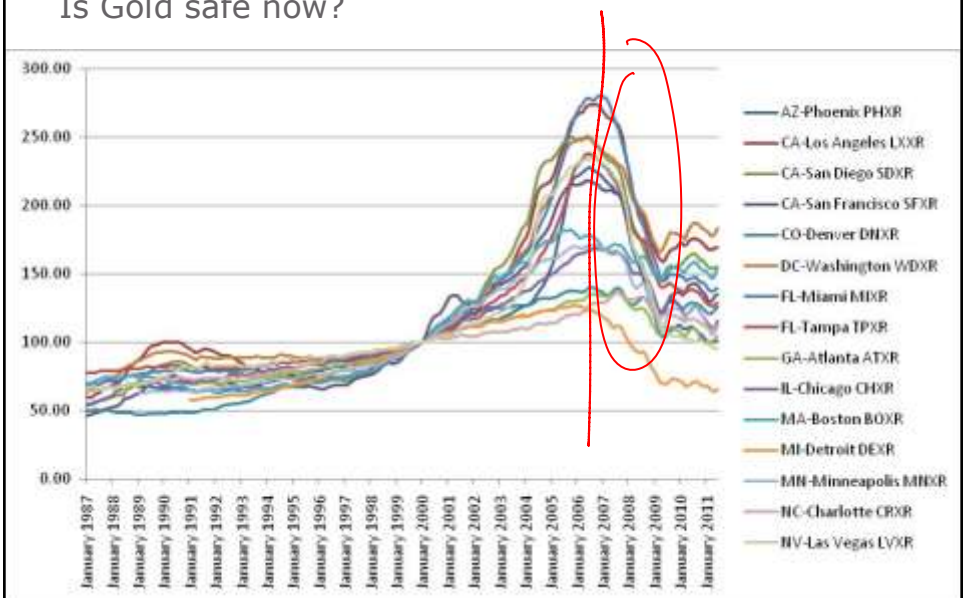
Is Gold safe now?



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

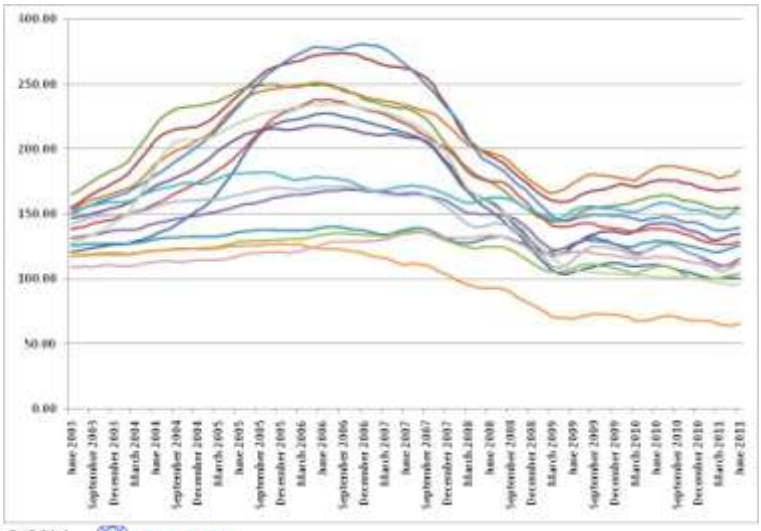
Is Gold safe now?



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Bubble and after



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Indicators?

7th September 2011 / Columbia Alumni List

I am seeking principals or brokerage houses who can handle a very large trade of gold from Asia. These are Gold Bars that carry the Credit Suisse hallmark that are in 1kg, 5kg, 10kg and 12.5kg bars and serial numbers can be provided. Credit Suisse Gold Bars are .9999 pure gold and the Credit Swiss Gold Bar has its weight, purity, content, and a unique serial number stamped on the bar.

Would prefer Comex member firms. The amount is large enough to ask for senior members/head of trading, or higher for this commodity.

Thanks,

John X
Chief Executive Officer

494 8th Avenue, Suite 1403

New York, NY 10001

① Selling Gold

② Perception

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

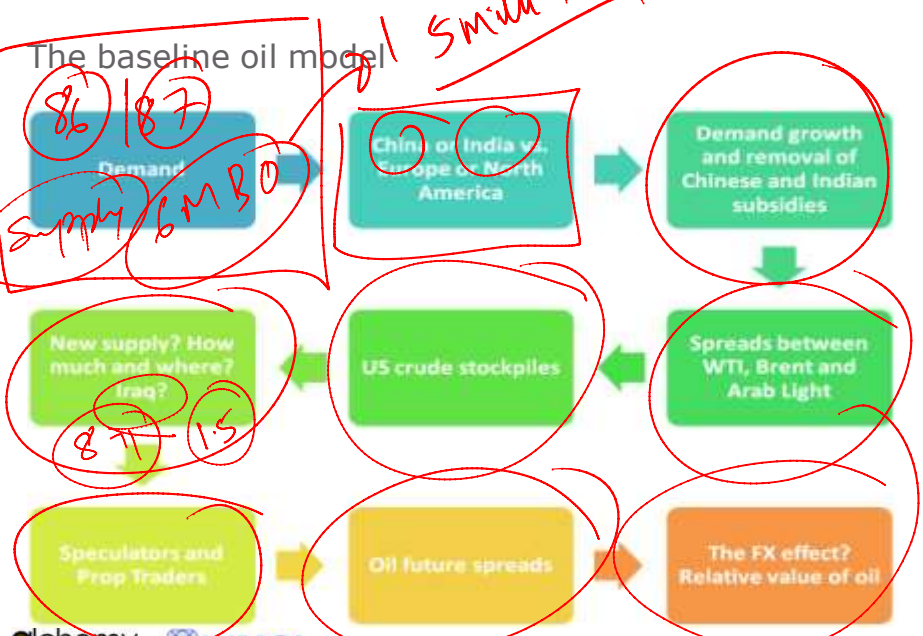
FinanceTrainingCourse.com

OIL & GOLD

alchemy Analysts. Actuaries. WMSL

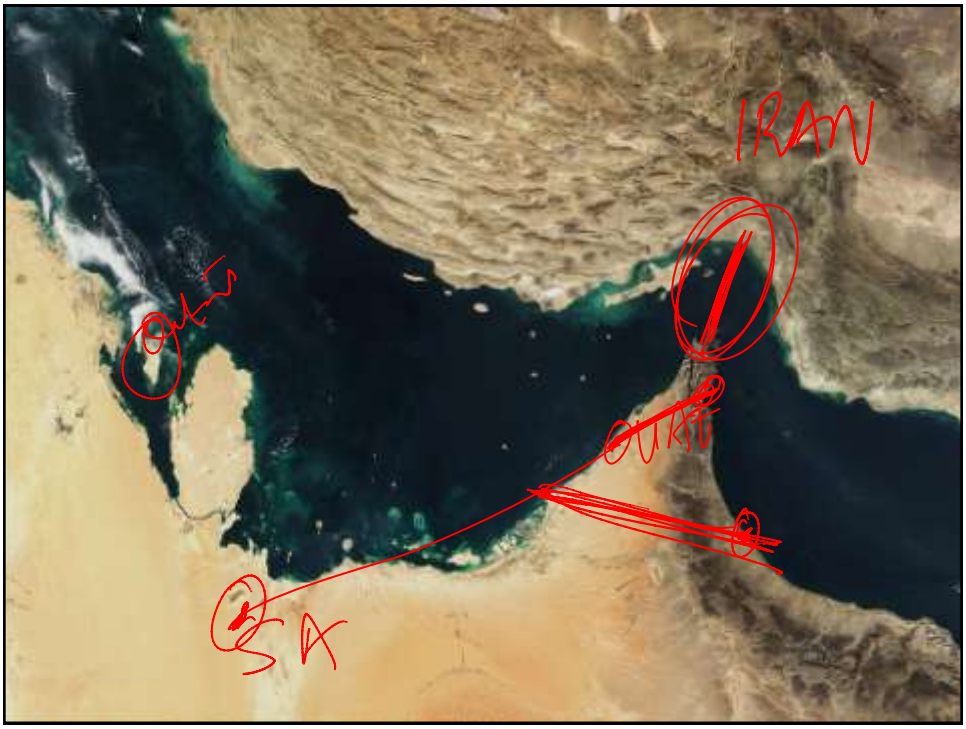
FinanceTrainingCourse.com

The baseline oil model



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com



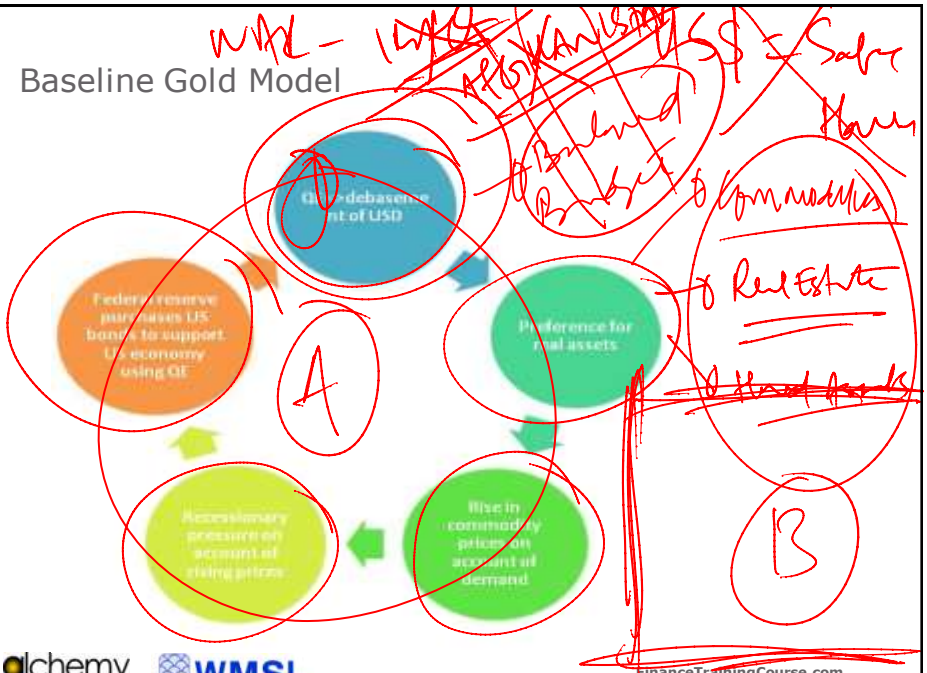
Oil Model - drivers

Factors	Unit	CY08	Current	CY10P	CY11F	Trend
GDP	%		3.80%	3.80%	3.20%	Bullish
Crude Oil Demand	mbpd	86.6	86.1	86.5	87.15	Bullish
WTI-Brent Spread	USD/BBL	2.02	2	-	-	Neutral
WTI-AL Spread	USD/BBL	4.74	2	-	-	Bearish
Brent-AL Spread	USD/BBL	2.72	-0.01	-	-	Bearish
Non-OPEC Supply	mbpd	50.7	51.9	51.12	51	Bullish
OPEC Surplus Capacity	mbpd	1.35	6.47	5.5	5.7	Bearish
US Crude Inventory stockpile	mbpd	306	343	-	-	Bullish
% Change in US Crude Inventory stockpile	%	3%	2%	-	-	Bullish
Spot to 3-mth Future Spreads before USD147/bbl	USD/BBL	-0.54	0.71	-	-	Neutral
Spot to 3-mth Future Spreads before USD147/bbl	USD/BBL	-1.45	1.63	-	-	Neutral
Spot to 3-mth Future Spreads before USD147/bbl	USD/BBL	-2.57	2.69	-	-	Neutral
USD to EURO	USD	1.47	1.36	1.39	1.06	Bullish

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Baseline Gold Model



alchemy Analysts. Actuaries. WMSL

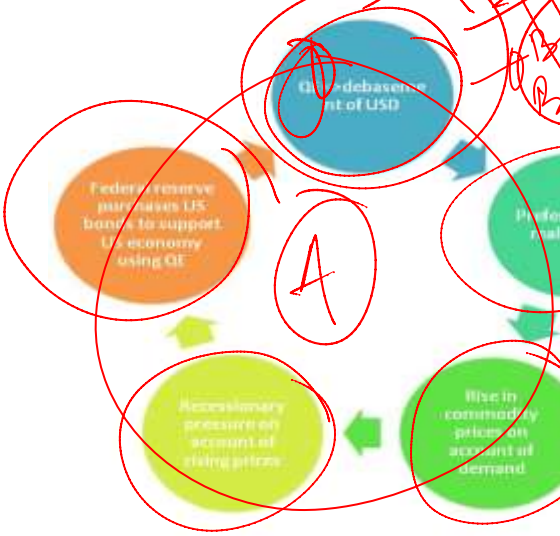
FinanceTrainingCourse.com

Reserve currency?

alchemy Analysts. Actuaries. WMSL

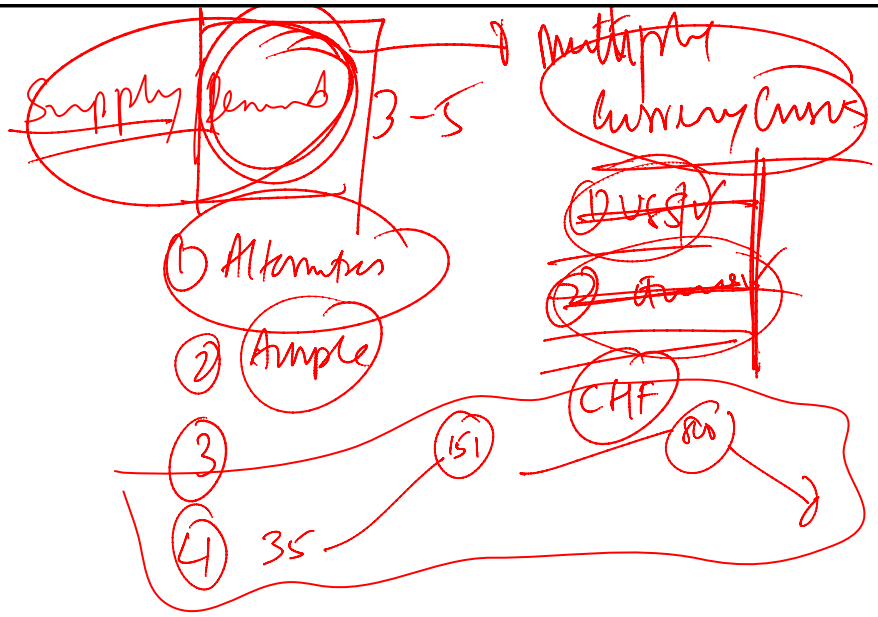
FinanceTrainingCourse.com

Baseline Gold Model



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

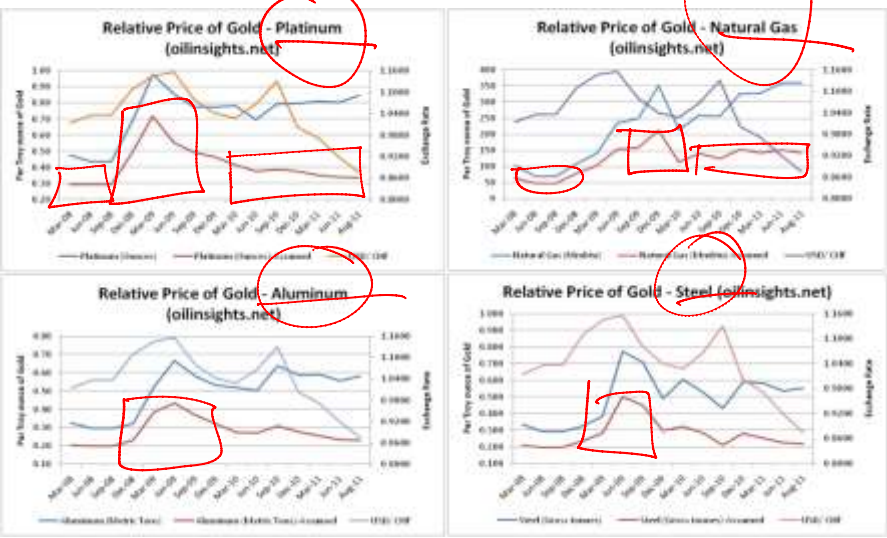
FinanceTrainingCourse.com

Reserve currency – II>?

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

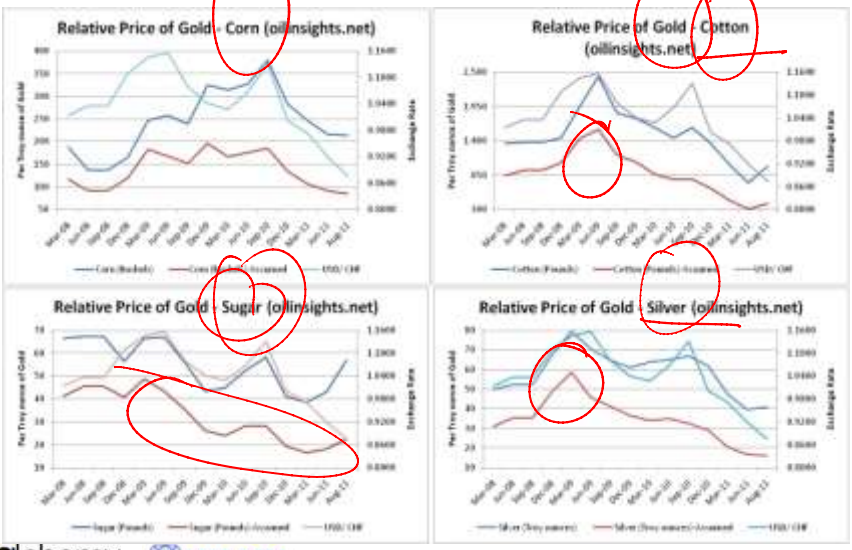
Return of relative value - I



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

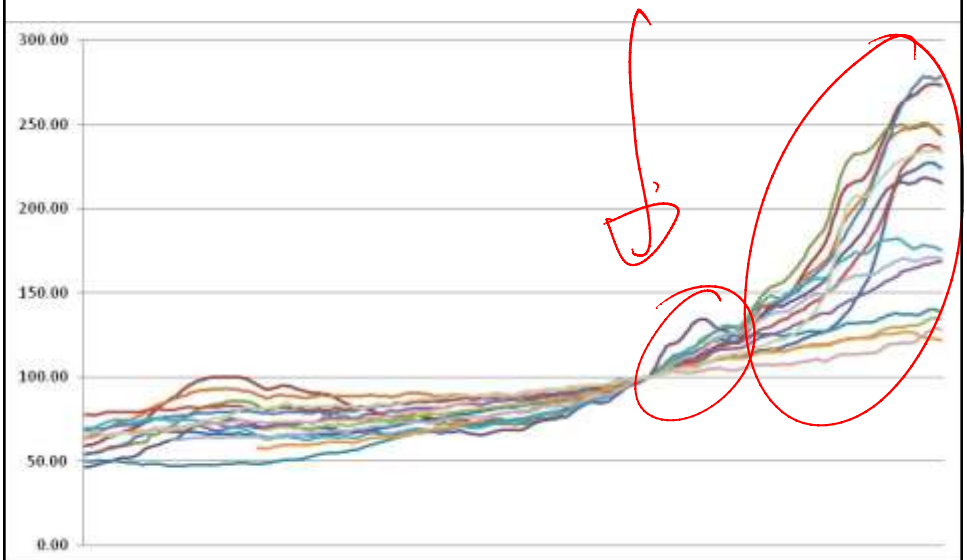
Return of relative value - II



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

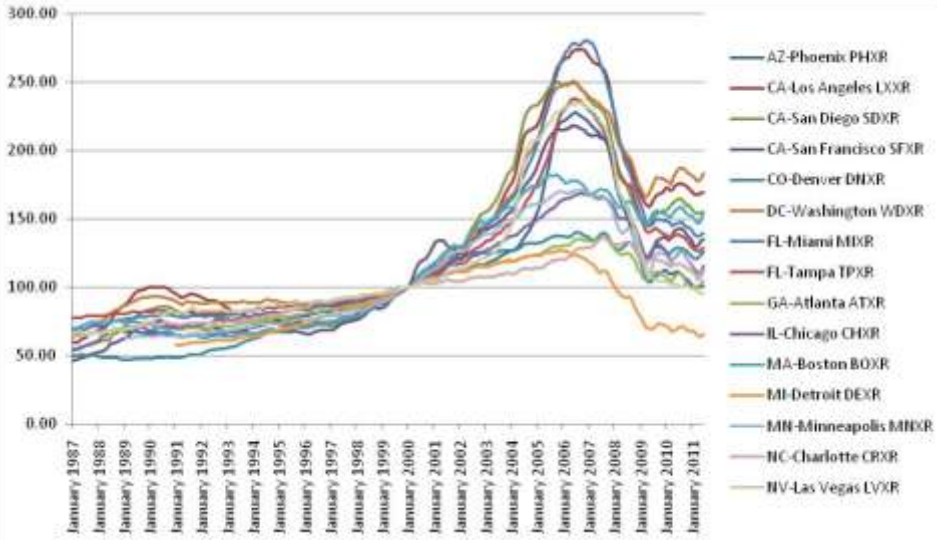
Is Gold safe now?



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

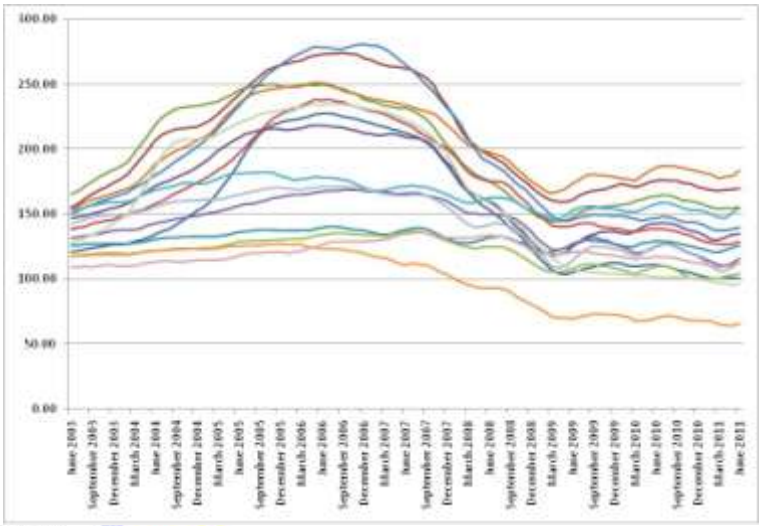
Is Gold safe now?



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Bubble and after



alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

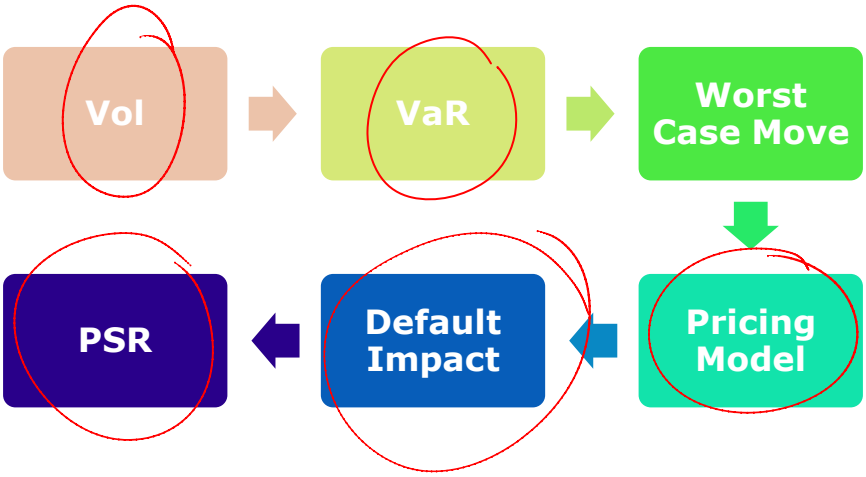
FinanceTrainingCourse.com

Limits

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Thought experiment - PSR Process



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

PSR – Simple Example

	Pre-Settlement Limit Example	
Product	Forward	Forward
Commodity	**Oil**	**Gold**
Volatility - annual	30%	25%
VaR Factor	3	3
VaR Percentile	99.9%	99.9%
Current Price	96	1800
Holding period	90	90
HP Vol	18%	15%
Worst Case Move	51	794

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited FinanceTrainingCourse.com

1,000,000 – OIL Buying
100 ± 30
100,000,000 – Notional
90 days → ± 18 1 Stdev
1 6 3x18
3 → 54

1,000,000 – Oil – Selling
100 ↑ 30
100,000,000 – Notional
90 days ± 18
3x18
3 → 54
3x
3.1
3.2
017
45
0 → 0 + 3
99.9%
-3

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited FinanceTrainingCourse.com

100,000,000

± 54.

Long

Bought oil.

100

-54

154

54

46

Counterparty

Short oil.

sold

sell @ 101 US$

90 days

Selling

154

-54

46

-54

alchemy Analysts. Actuaries.

WMSL Wealth Management System Limited

FinanceTrainingCourse.com

100,000,000 → Notional

30% → PSR limit

10%

54 Million US$

↓

18 Million

alchemy Analysts. Actuaries.

WMSL Wealth Management System Limited

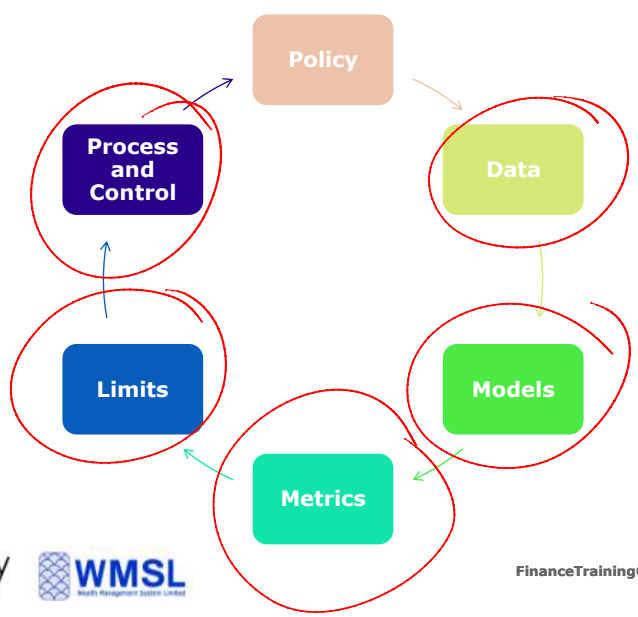
FinanceTrainingCourse.com

Monthly Crude Oil Change

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Issues



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Covariance

Sigma a,b

correlation

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Value @ Risk

alchemy Analysts. Actuaries. WMSL Wealth Management System Limited

FinanceTrainingCourse.com

Monthly Crude Oil Change

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Connections

Stop loss
Book Size
Slippage
Loss Capital

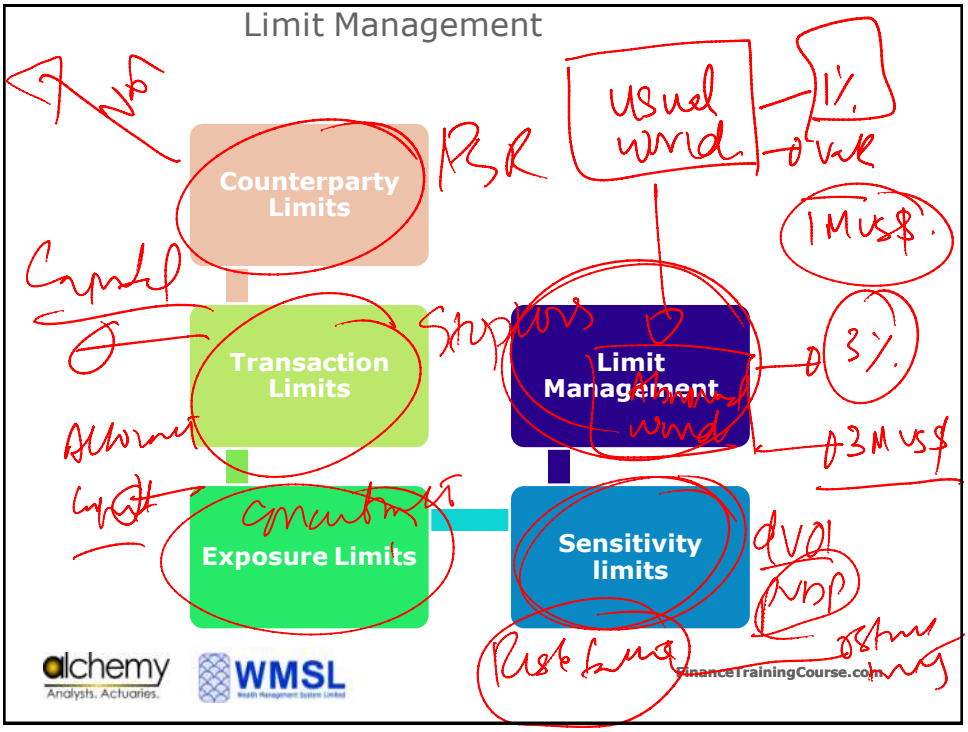
Value at Risk
Expectations
Threshold
Expected Loss

Transaction driven ⇄ **Expectation Driven**

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Limit Management



PRE SETTLEMENT RISK

alchemy Analysts. Actuaries. WMSL FinanceTrainingCourse.com

Counterparty Default

Agree to buy or sell something on future date

On settlement date, counterparty defaults

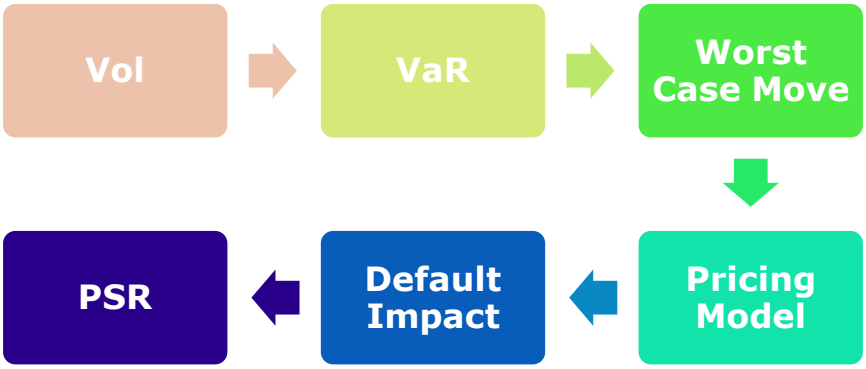
In case of default Buy or sell at market rate

Counterparty Credit Exposure & Limit

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

PSR Process



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

TRANSACTION & EXPOSURE LIMITS

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Transaction & Exposure Limits

Within a Trade	• Max Ticket size
Within a security	• Max Product limit
Within an operating cycle	• Max Daily limits
Within a tenor or maturity bucket	• Max Tenor Exposure
Within a risk classification or grade	• Max Ticket Size

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

SENSITIVITY LIMITS

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

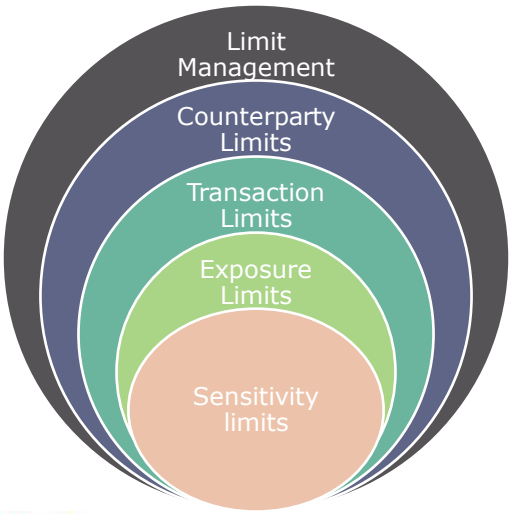
Sensitivity Limits

To Exchange Rates	• Change in USD Equivalent Exposure • Change in Position value per PiP
To Interest Rates	• Duration, PVBP, Gaps, Interest Rate Mismatch
To Volatility	• Vega, Change in value, Change in projected P&L, Gamma
Earnings	• Change in projected earning, Net Interest Income or Earnings at Risk
Shareholder Value	• Change in Income, Market Value of Equity or NPV
Equity or Capital	• Maximum Loss, Impact of ALM choices on Capital

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Limit Management



alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Stop Loss

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Stop Loss Limit Process

Risk appetite	• Loss Capital Amount – depends on Expected and Minimum Rates of Return, Capital Amount
Target Stop loss limit	• applicable for given period
Book Size	• Allocation of book size to individual business/ investment lines
Actual stop loss limits	• individual lines for given period

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

What is this course about

Price

Risk

Value

Products

Limits

alchemy Analysts. Actuaries. WMSL

FinanceTrainingCourse.com

Q&A

Contact

jawwad@alchemya.com

www.alchemya.com

http://financetrainingcourse.com

KHI Cell: +92300 251 9368

UAE Cell: +97150 142 3870