Macquarie
Commodities Research

The big oil picture:
We're not running out, but that doesn't mean we'll have enough

Jan Stuart
Macquarie Capital (USA) Inc.
125 W 55th Street, New York, NY 10019

1 212 231 2485 / jan.stuart@macquarie.com

September 2009

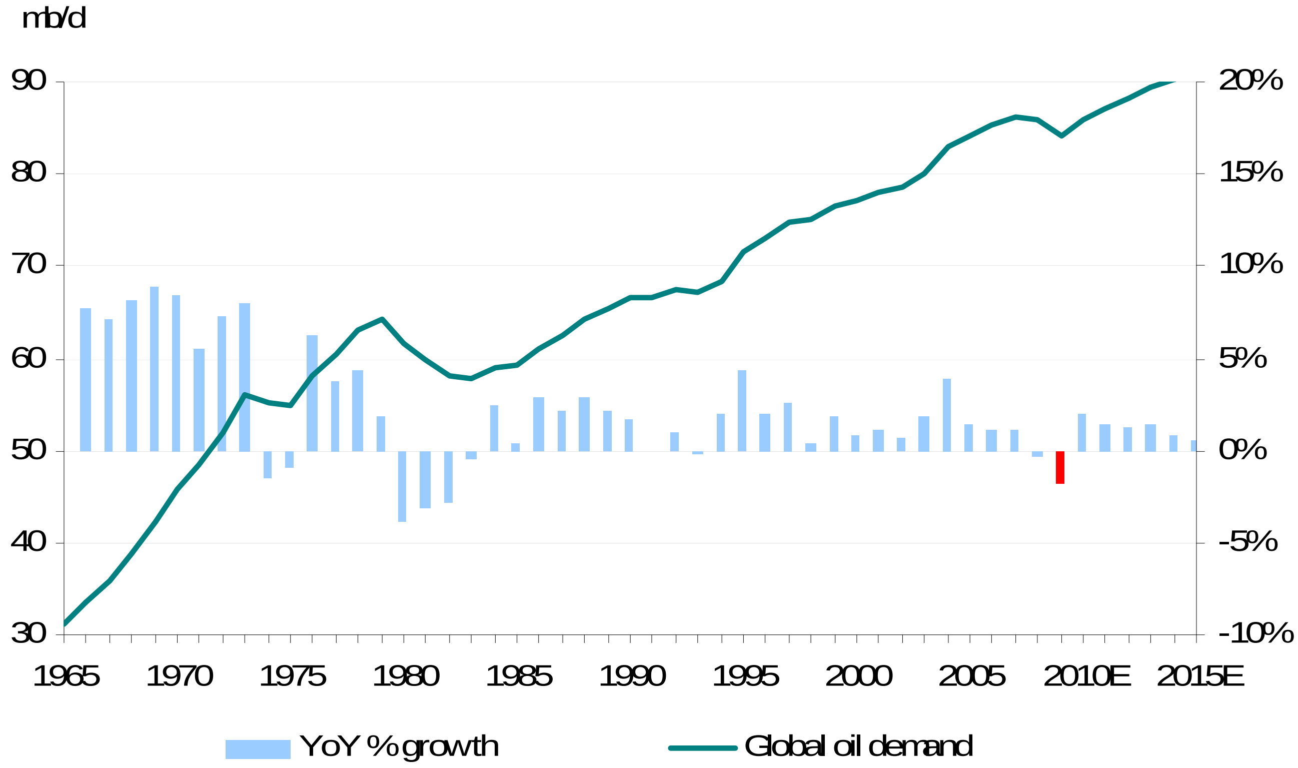
Please read Important Disclosures on Pages 19–20.

Oil prices are a story of fundamentals & trends

- ➔ Global oil s/d balances will tighten up materially, but not until next year
- ➔ As the *Great Recession* recedes, oil demand is already poised to rebound
- ➔ … and global demand declined no more than 3% (which is a lot to oil economists but a rounding error to most everyone else)
- ➔ So there is no end in sight to the rising trend in global oil demand
- ➔ On the supply side, the industry is not using the opportunity to add to capacity structurally
- ➔ OPEC cannot do much more either (although Saudi Arabia faces choices)
- ➔ Longer term, we expect to see demand constrained by supply again
- ➔ But that scarcity is not necessarily going to last …

50 years of global oil demand

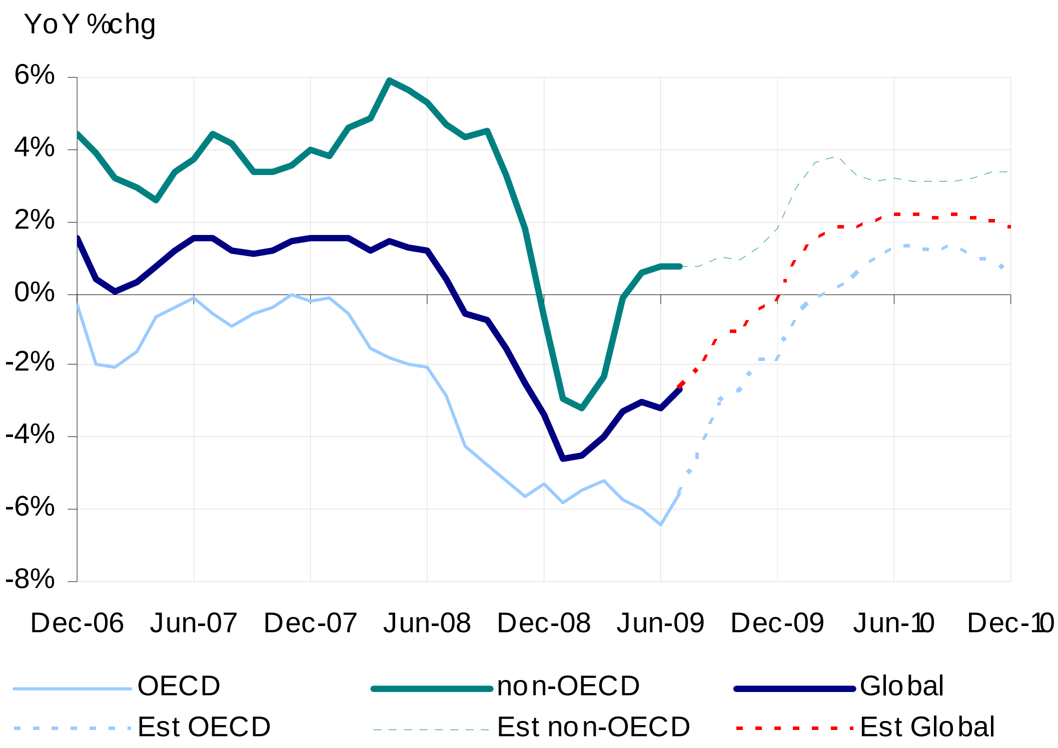
OECD oil demand propelled global totals in the 1960s and much of the 70s. A deep retrenchment in the early-1980s took years and enormous political drive to achieve. Then, emerging economies join the party in the 1990s. By 2015, the OECD economies should use less oil than EM.



Source: BP, IEA, Macquarie Research, September 2009

Our oil demand outlook plots V, W, L and U recoveries in key economies

Emerging markets oil demand growth collapsed in 4Q08. Earlier, the US had begun to drag down OECD oil use. While oil demand in emerging markets has begun to bounce back, oil demand in the OECD is still tracking along the bottom of a trough. Nonetheless, as industrial production begins to grow sequentially and emerging market growth gains traction, we may be forecasting too little of a recovery.



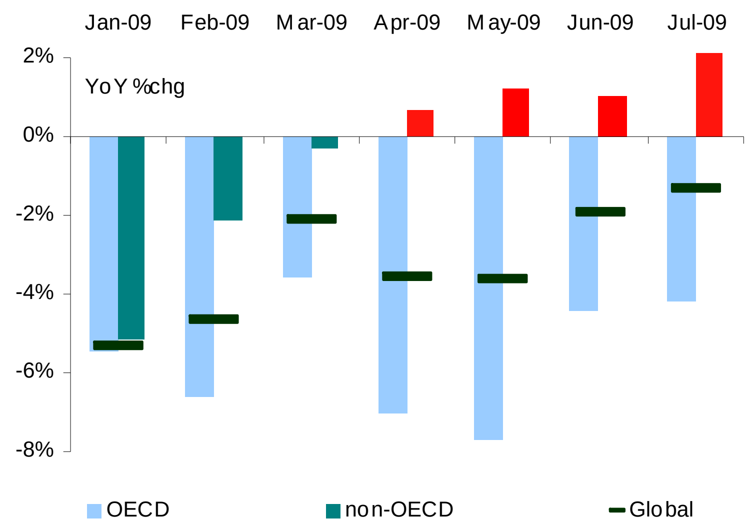
Source: Bloomberg, IEA, Macquarie Research, September 2009

Oil demand growth emerges

When we put this year's contraction of global oil demand in numbers (by region), things appear to be getting less bad.

In fact, oil demand in emerging markets began to grow in April and accelerated through July, but growth is lumpy, not very robust outside Asia, nor evenly distributed. We see +4% by 4Q for EM.

In the OECD, however, total declines are still more than twice as big as aggregate EM growth.

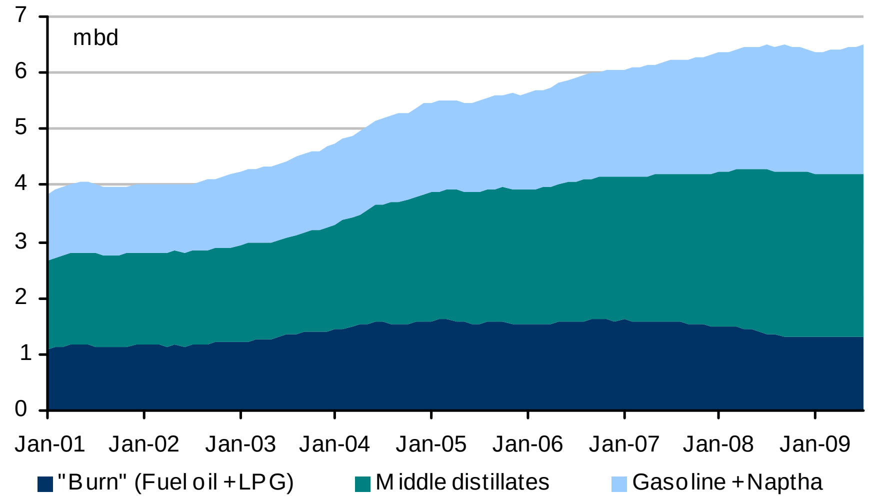


y/y 1,000 b/c	Jan	Feb	Mar	Apr	May	Jun	Jul
Global	**-4,660**	**-4,100**	**-1,820**	**-3,130**	**-3,130**	**-1,660**	**-1,160**
OECD	**-2,690**	**-3,300**	**-1,720**	**-3,390**	**-3,610**	**-2,060**	**-1,980**
NA	-1,320	-1,580	-1,240	-1,580	-1,920	-1,290	-1,200
Europe	-790	-610	40	-1,100	-970	-520	-700
Asia-Pac	-570	-1,110	-520	-710	-720	-250	-90
EM	**-1,970**	**-800**	**-110**	**270**	**480**	**410**	**830**
Lat Am	-30	-240	80	-20	-140	60	90
Asia	-1,060	-60	360	380	510	530	780
Mideast	-160	110	-120	140	530	260	280
FSU	-730	-630	-370	-110	-460	-460	-360

Source: International Energy Agency, US Department of Energy, national statistical agencies, national oil companies, BP's Statistical Review of World Energy, Reuters, Bloomberg, Macquarie Research, September 2009

China’s growth is real

China's oil demand is about transportation



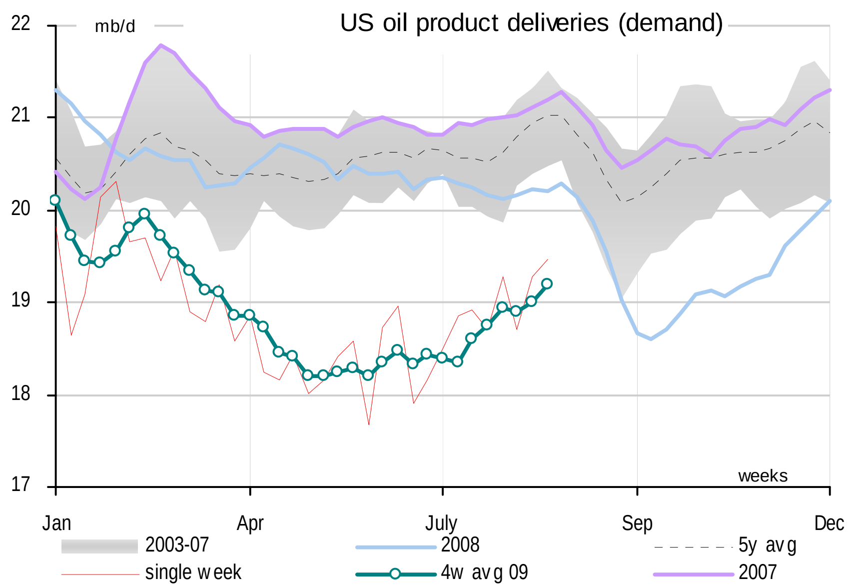
China's oil product demand adjusted for gasoline and diesel inventory shifts

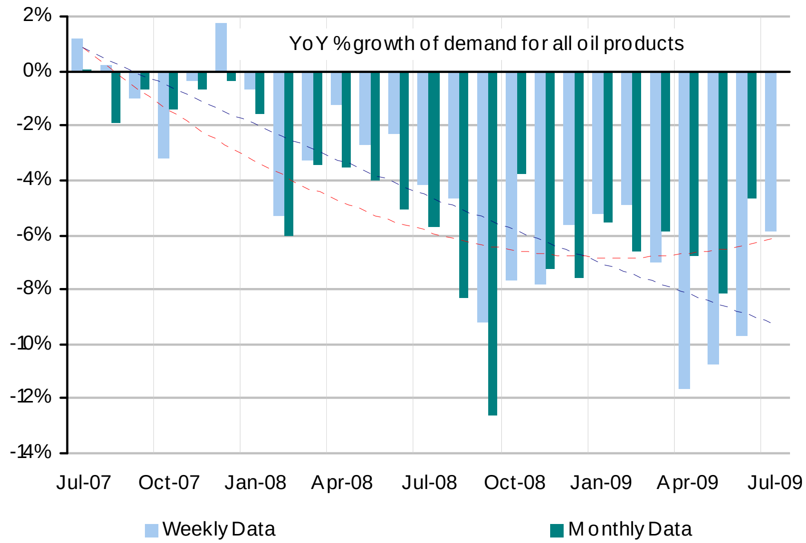
(1,000 bbls/d)	2008	ytd'09	July*	YoY change 2008	ytd'09	July
Gasoline	1,428	1,624	1,596	10.5%	13.6%	10.0%
Kerosene	267	294	316	4.3%	10.1%	26.2%
Diesel	2,662	2,640	2,800	8.2%	-3.0%	-0.2%
MD	2,928	2,934	3,116	7.8%	-18%	2.0%
Fuel oil	657	710	717	-18.5%	-12%	15%
LPG	651	684	671	-6.6%	4.9%	5.4%
Naptha	764	790	871	-6.2%	-4.5%	11.1%
"Drive"	4,356	4,558	4,712	8.7%	3.2%	4.6%
"Burn"	2,071	2,184	2,259	-10.6%	-0.7%	6.2%
Total	**6,427**	**6,742**	**6,971**	**1.6%**	**1.9%**	**5.1%**

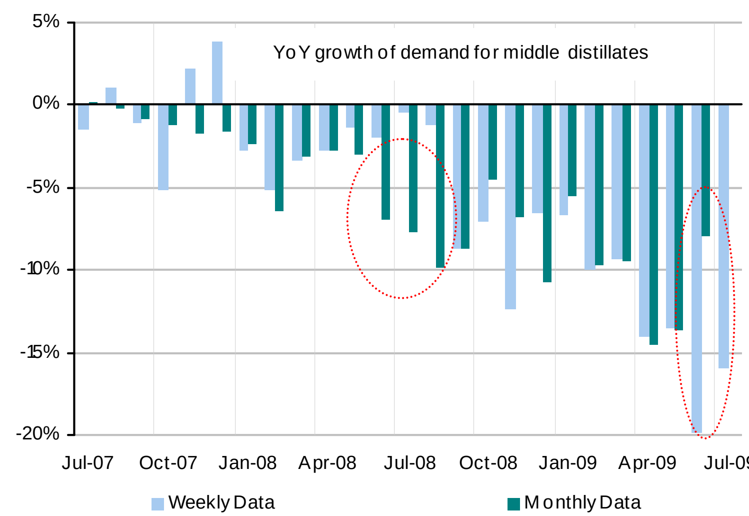
* three month rolling average. "Drive" = gasoline + diesel + kerosine

Source: National Bureau of Statistics, Macquarie Research, September 2009

Demand is in dire straits in the world's biggest oil market







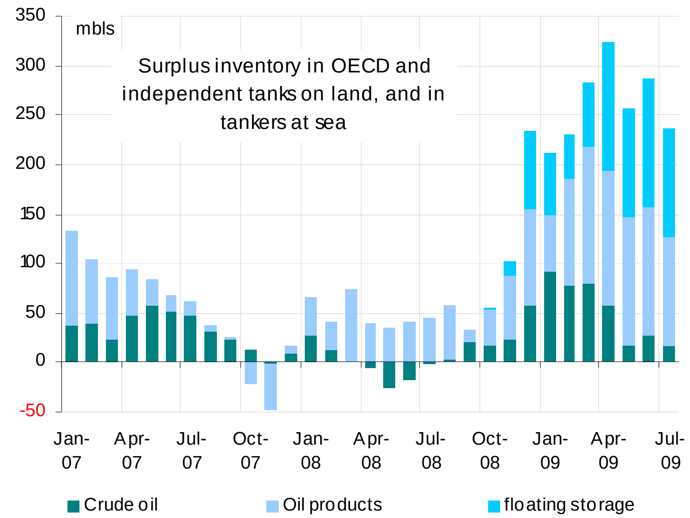
Source: US Department of Energy, IEA, Macquarie Research, September 2009

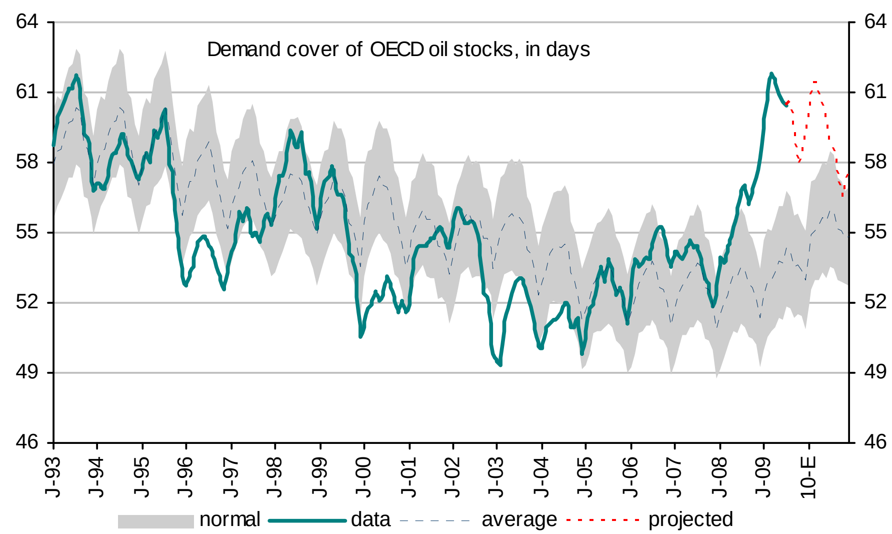
OECD oil inventories

Oil inventories across the OECD regions

	Volume			July surplus/deficit				June	
End month	**May**	**Jun**	**Jul**	**YoY**		**5yr**		**YoY**	**5yr**
OECD	mbls	mbls	mbls	mbls	%	mbls	%	mbls	mbls
Crude oil	990	988	977	26	+2.7	17	+1.8	50	27
Products	1,751	1,756	1,772	67	+4.0	82	+4.9	88	106
All oil	**2,740**	**2,745**	**2,749**	**93**	**+3.5**	**100**	**+3.8**	**138**	**133**
N America	**May**	**Jun**	**Jul**	**YoY**		**5yr**		**YoY**	**5yr**
Crude oil	503	487	492	54	+12.3	51	+11.5	51	37
Products	865	886	899	82	+10.1	72	+8.8	82	80
All oil	1,368	1,373	1,391	136	+10.9	123	+9.7	133	117
Europe	**May**	**Jun**	**Jul**	**YoY**		**5yr**		**YoY**	**5yr**
Crude oil	331	344	341	-4	-1.1	0	+0.0	9	7
Products	644	640	633	-3	-0.4	26	+4.4	16	43
All oil	975	984	973	-7	-0.7	26	+2.8	26	50
Asia Pacific	**May**	**Jun**	**Jul**	**YoY**		**5yr**		**YoY**	**5yr**
Crude oil	156	157	145	-25	-14.5	-33	-18.8	-11	-18
Products	242	230	241	-12	-4.8	-16	-6.4	-10	-17
All oil	397	387	386	-37	-8.7	-50	-11.5	-20	-35

Source: International Energy Agency, US Department of Energy, OPEC, national statistical agencies, national oil companies, BP's Statistical Review of World Energy, Reuters, Bloomberg, Macquarie Research, September 2009





Supply side: Not your average peak oil theory

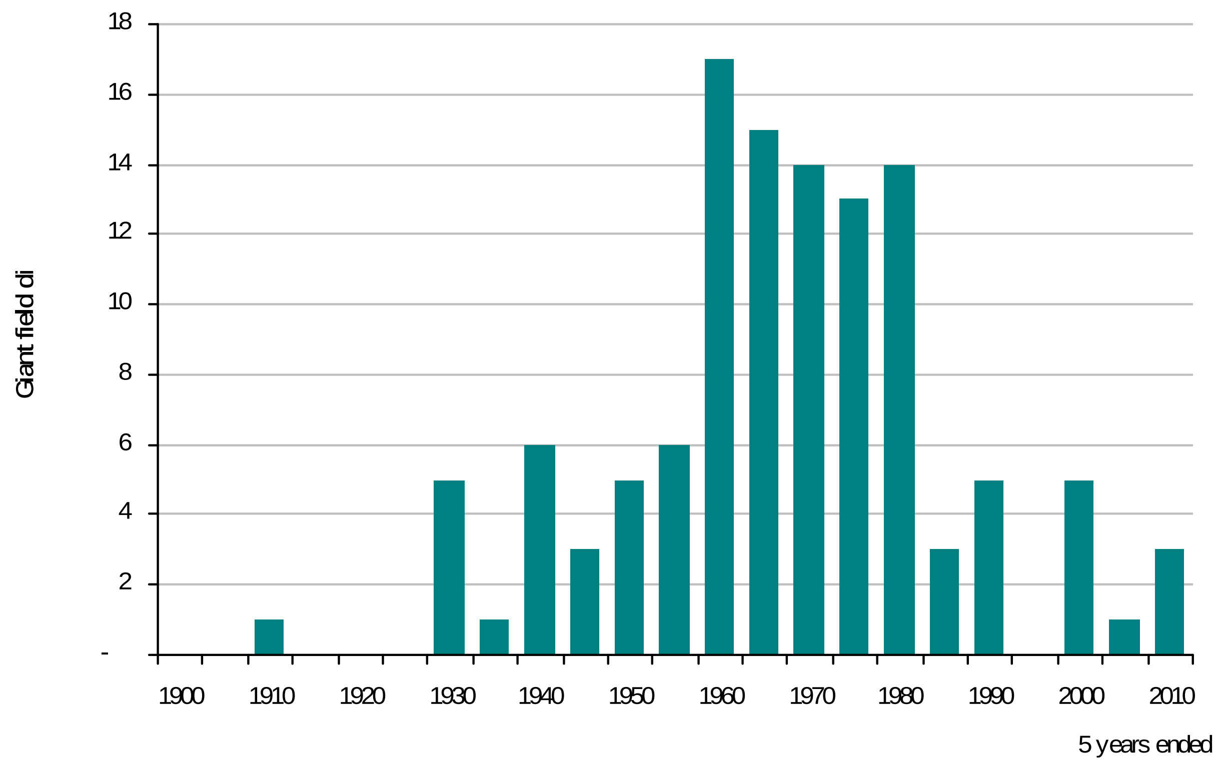
- There is no lack of oil reserves
- But there are problems of access, technology and risk

Three recent mini-trends:

- Resource nationalism, eg, Brazil
- New reservoirs where the industry does have access tend to involve pushing technology envelopes, and thus much higher operational risks
- In general, more promising ‘easy oil’ is in less stable places (eg, Nigeria)

Oil supply is the weak link

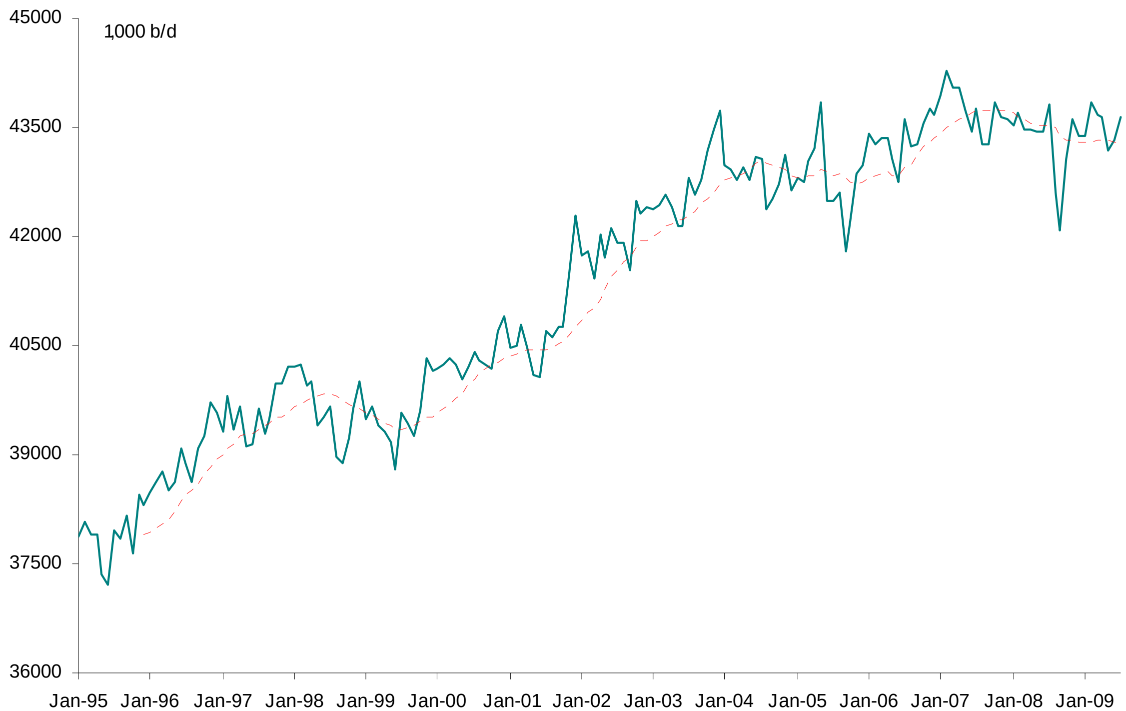
A familiar and critically significant story about not discovering as many big oil fields and growing declines in mature fields



Source: EIA, IEA, Macquarie Research, September 2009

Feverish development activity much of this decade has little to show for it

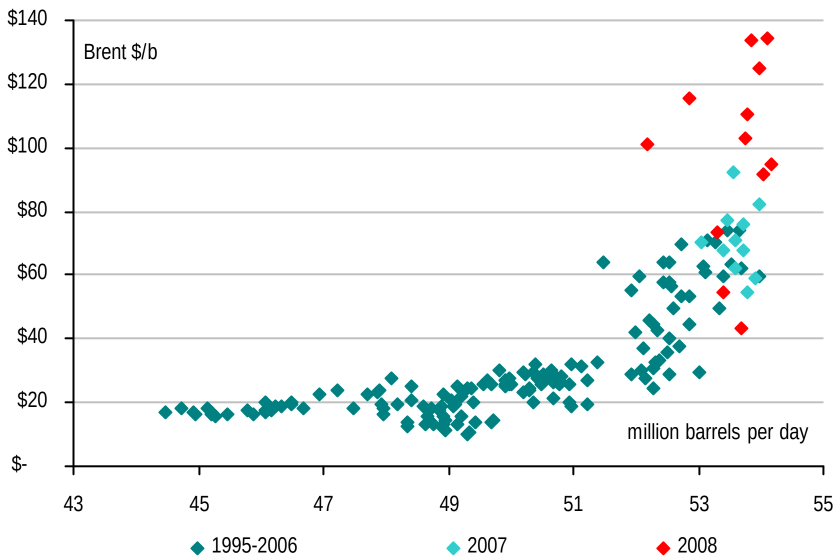
We track total non-Opec oil supply every month. Here is its history (including Angola and Ecuador).



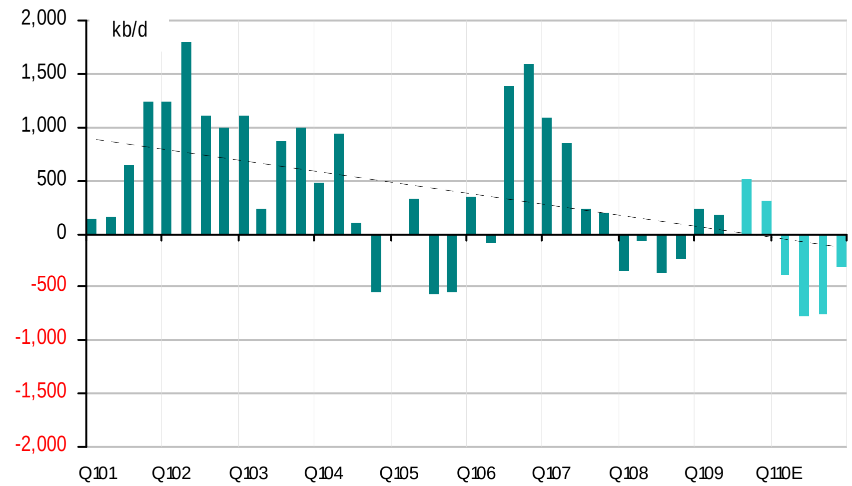
Source: IEA, Macquarie Research, September 2009

Non-OPEC supply should fall

Crude oil production (ex Saudi Arabia, Kuwait, Iran, Mexico)

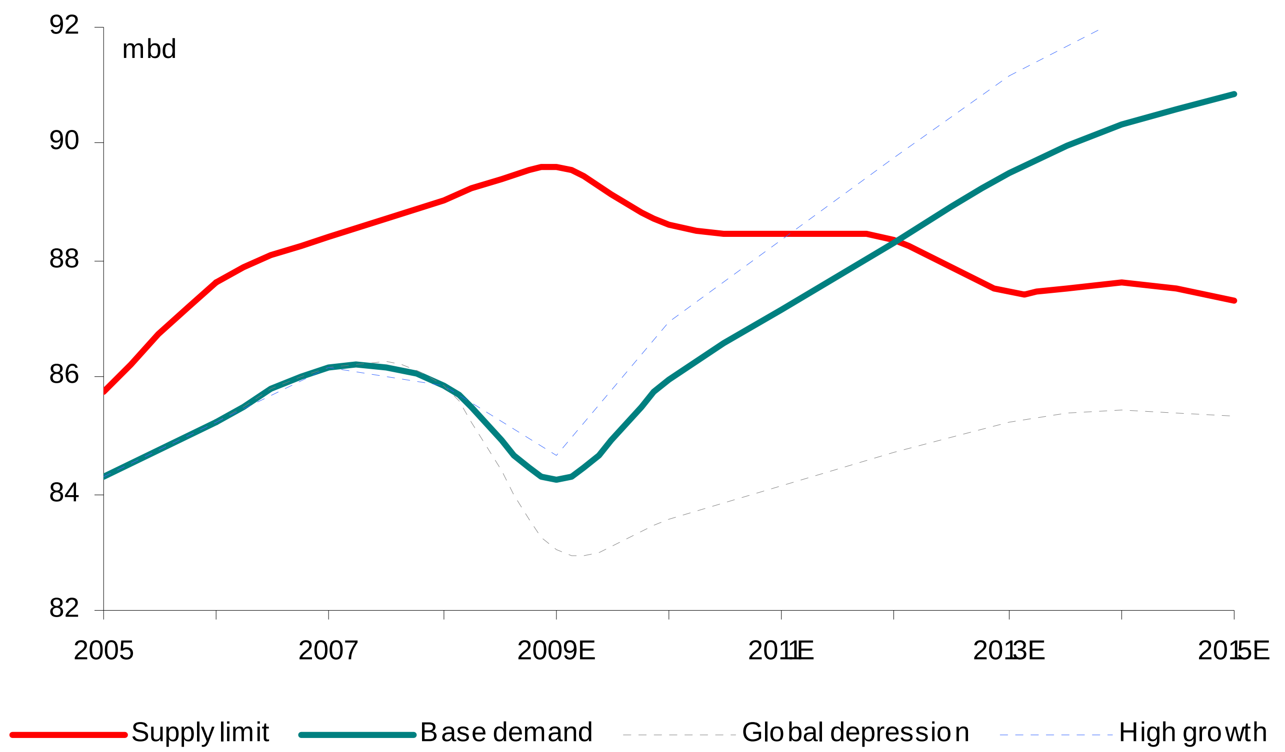


YoY change in all non-OPEC oil production



Source: IEA, Macquarie Research, September 2009

Global oil production limits are in sight, demand should again become constrained, oil sands et al will be needed



Source: Macquarie Research, September 2009

MACQUARIE

Our medium-term global oil balance does not balance post 2013 …

million barrels a day	2003	2004	2005	2006	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E
Demand													
OECD America	24.6	25.4	25.6	25.4	25.5	24.2	23.3	23.8	23.9	24.0	23.9	23.8	23.3
OECD Europe	15.5	15.5	15.7	15.7	15.3	15.3	14.6	14.5	14.5	14.5	14.5	14.4	14.3
OECD Asia Pac	8.6	8.5	8.6	8.5	8.4	8.1	7.7	7.7	7.7	7.7	7.7	7.7	7.7
OECD	48.7	49.5	49.8	49.5	49.2	47.6	45.6	46.0	46.1	46.2	46.2	45.9	45.3
FSU	3.9	3.9	4.0	4.2	4.0	4.1	3.8	4.0	4.1	4.1	4.1	4.1	4.0
China	5.7	6.6	6.7	7.1	7.5	7.7	8.1	8.6	9.0	9.4	9.8	10.3	10.9
Other Asia	8.1	8.7	8.9	9.0	9.3	9.4	9.4	9.6	9.7	9.9	10.2	10.4	10.6
South America	4.9	5.2	5.3	5.5	5.8	6.0	6.0	6.1	6.3	6.4	6.5	6.5	6.5
Mideast	5.4	5.7	6.1	6.4	6.7	7.2	7.4	7.7	8.0	8.2	8.5	8.9	9.2
Africa	2.6	2.7	2.9	2.9	3.0	3.1	3.1	3.2	3.3	3.4	3.5	3.5	3.6
Non-OECD	31.3	33.6	34.5	35.7	37.0	38.3	38.6	40.0	41.0	42.2	43.3	44.4	45.5
Total	79.9	83.1	84.3	85.2	86.2	85.8	84.2	85.9	87.2	88.3	89.5	90.3	90.9
Supply													
Americas	18.2	17.6	17.3	18.0	18.1	17.9	18.2	17.9	18.0	17.9	17.5	17.5	17.4
Europe	6.5	6.3	5.9	5.5	5.4	5.2	4.9	4.7	4.3	4.0	3.7	3.4	3.1
FSU	10.4	11.4	11.8	12.2	12.8	12.8	13.1	13.0	12.8	12.8	13.0	13.4	13.7
Africa	2.1	2.4	2.4	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.3	2.3
Mideast	2.0	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.5	1.4	1.3
Asia	7.7	7.8	7.8	7.9	8.1	8.2	8.2	8.2	8.1	8.2	8.3	8.2	8.0
Non-Opec Supply	47.0	47.3	47.1	47.9	48.5	48.2	48.5	48.0	47.3	47.0	46.3	46.1	45.9
Opec Crude Oil	27.7	29.9	30.8	31.3	31.1	31.8	29.2	30.6	32.1	33.5	34.6	34.7	34.5
Opec 11	26.2	27.8	29.0	29.4	29.1	29.5	26.8	28.1	29.3	30.5	31.2	30.8	30.2
Opec non-crude	3.4	3.8	4.2	4.3	4.3	4.4	4.6	5.0	5.5	5.7	5.8	5.9	6.0
Processing Gain	1.9	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.4	2.4
Total	79.9	83.0	84.1	85.6	86.1	86.5	84.4	85.7	87.0	88.4	89.0	89.1	88.8
Memo:													
Capacity	83.4	84.5	85.8	87.6	88.4	89.0	89.6	88.6	88.5	88.4	87.5	87.6	87.3
Spare	3.5	1.5	1.7	2.0	2.3	2.5	5.2	2.9	1.5	0.0			
Relative			2.0%	2.4%	2.7%	2.9%	6.2%	3.3%	1.7%	0.0%			
To Balance													
Implied stock change	-0.0	-0.1	-0.2	+0.3	-0.1	+0.7	+0.2	-0.2	-0.1	+0.1	-0.6	-1.2	-2.1

Last in the OECD, NA (US) oil demand peaks in 2007

Real demand growth limited to China, emerging market Asia, South America & Africa

Non-Opec oil peaks are behind us already, except for some growth & potential in the FSU & Asia

Global capacity peaks in 2009

No more balance

Source: Macquarie Research, September 2009

Our medium-term global oil balance, YoY change of demand and supply

Demand	2003	2004	2005	2006	2007	2008	2009E	2010E	2011E	2012E	2013E	2014E	2015E	
OECD America	1.8%	3.4%	0.7%	-0.8%	0.4%	-5.1%	-3.8%	2.2%	0.5%	-0.1%	-0.3%	-0.8%	-1.4%	The critical shift of US demand trends
OECD Europe	0.8%	0.4%	0.8%	0.1%	-2.1%	-0.1%	-4.5%	-1.2%	0.0%	0.3%	0.3%	-0.7%	-0.7%	
OECD Asia Pac	1.7%	-1.3%	0.8%	-1.6%	-1.0%	-3.6%	-4.8%	0.4%	-0.1%	-0.1%	-0.2%	-0.2%	-0.3%	
OECD	1.5%	1.7%	0.7%	-0.6%	-0.7%	-3.3%	-4.2%	0.8%	0.3%	0.0%	-0.1%	-0.7%	-1.0%	
FSU	0.9%	0.6%	0.5%	5.3%	-4.3%	3.8%	-7.6%	7.4%	2.0%	1.0%	0.0%	-1.0%	-2.0%	Downside risk
China	9.3%	16.6%	1.9%	5.8%	5.1%	2.7%	6.2%	5.6%	4.0%	4.3%	4.9%	5.1%	5.4%	
Other Asia	1.7%	7.1%	1.7%	1.3%	3.6%	1.0%	0.0%	2.0%	1.3%	2.3%	2.4%	2.1%	2.1%	Biggest up-side risk
South America	-1.6%	5.9%	2.1%	3.6%	5.8%	3.6%	0.1%	1.7%	2.6%	1.8%	1.4%	0.7%	0.3%	
Mideast	2.0%	7.3%	5.4%	5.9%	5.0%	7.3%	2.9%	3.7%	3.4%	3.4%	3.7%	3.8%	4.1%	Downside
Africa	2.5%	3.8%	4.6%	0.0%	3.5%	4.7%	0.2%	3.0%	3.3%	2.7%	2.1%	1.4%	1.4%	
Non-OECD	2.5%	7.4%	2.6%	3.7%	3.6%	3.4%	1.0%	3.7%	2.7%	2.8%	2.8%	2.5%	2.5%	
TOTAL DEMAND	1.9%	3.9%	1.5%	1.1%	1.1%	-0.4%	-1.9%	2.1%	1.4%	1.3%	1.3%	0.9%	0.7%	More balanced risk
Global GDP growth	3.7%	4.9%	4.4%	4.9%	4.8%	4.0%	-1.4%	2.2%	4.0%	4.0%	4.0%	3.5%	3.5%	
Supply														
Americas	0.2	-0.7	-0.2	0.7	0.1	-0.2	0.3	-0.3	-0.7	0.0	-0.4	0.0	0.0	
Europe	-0.2	-0.3	-0.4	-0.4	-0.2	-0.2	-0.3	-0.2	-0.4	-0.3	-0.4	-0.3	-0.3	Geological, credit, execution as well as some political risk
FSU	1.0	1.0	0.4	0.5	0.5	0.0	0.3	-0.1	-0.3	0.0	0.2	0.4	0.3	
Africa	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	
Mideast	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	
Asia	-0.1	0.0	0.1	0.0	0.2	0.1	0.0	0.0	-0.1	0.1	0.0	-0.1	-0.1	
Non-Opec Supply	0.8	0.2	-0.2	0.8	0.6	-0.2	0.3	-0.6	-1.6	-0.3	-0.7	-0.1	-0.2	
Opec Crude Oil	1.1	2.2	0.9	0.6	-0.2	0.6	-2.6	1.4	1.9	1.1	0.9	0.2	-0.2	Political & execution risks dominate
Opec 10	1.8	1.6	1.2	0.4	-0.3	0.4	-2.7	1.3	1.8	0.8	0.5	-0.3	-0.6	
Opec non-crude	0.2	0.5	0.3	0.1	0.0	0.1	0.2	0.5	0.5	0.2	0.1	0.1	0.1	
Processing Gain	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	
TOTAL SUPPLY	2.2	3.1	1.1	1.5	0.5	0.5	-2.1	1.3	0.9	1.1	0.4	0.2	-0.3	Downside risk mostly

Source: Macquarie Research, September 2009

Conclusion: Keep your eye on the big trends

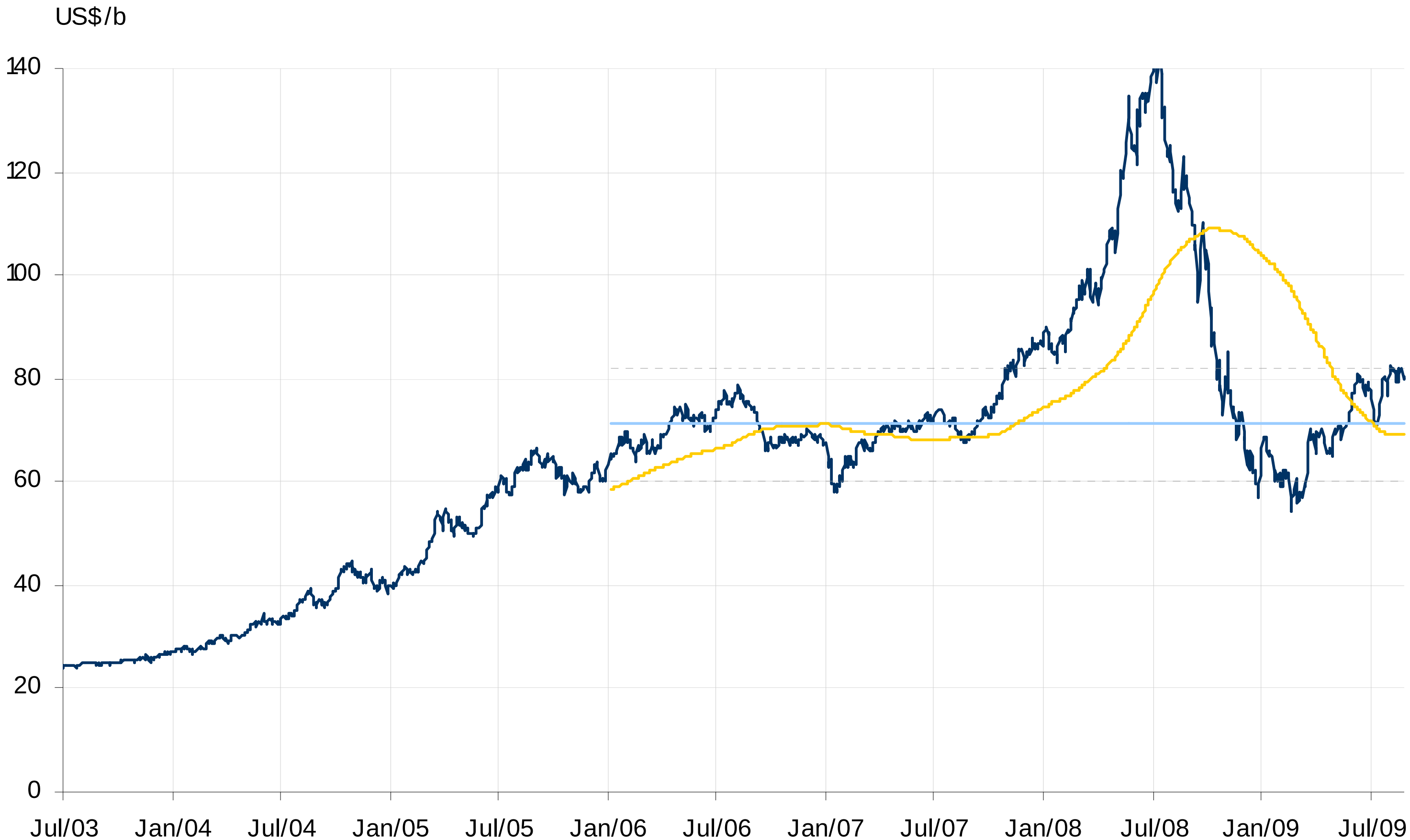
- ➔ Global demand for oil is much more resilient than one would think
- ➔ Adding sufficient productive capacity on time is nearly impossible
- ➔ Episodes with higher prices are an obvious consequence

But nothing lasts forever

- ➔ If US$50/b is the low end of the range, what's the ceiling, US$150/b?
- ➔ Political and technological wild cards
- ➔ One of our favorite observations is still: "The stone-age did not end because we ran out of rocks."

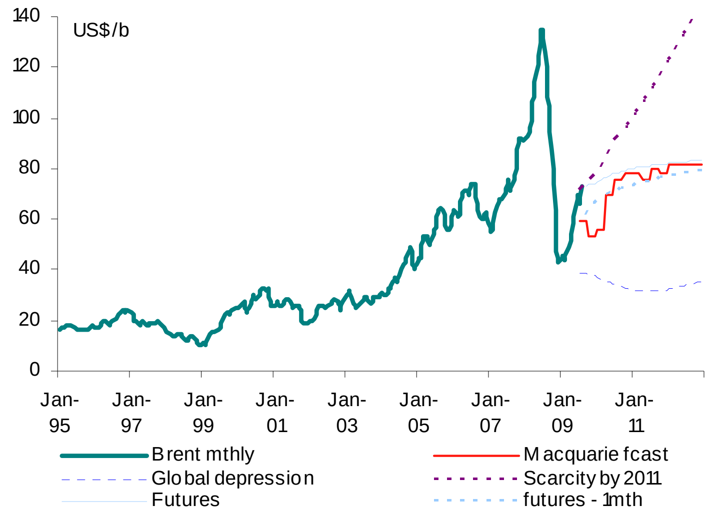
Markets are useful in clearing information. This is the one we watch.

Here are daily settlement prices of the New York oil futures contracts for delivery of WTI two years out and its average price in 2006/07 (US$71/bbl), a range and a rolling 200-day moving average



Source: Bloomberg, Macquarie Research, September 2009

Macquarie's oil price forecast



Source: Bloomberg, Macquarie Research, September 2009

Brent	**2008A**	Q109A	Q209A	Q309E	Q409E	**2009E**	**2010E**	**2011E**	**2012E**	**Long Run**
US$	**98.52**	45.72	59.90	59.00	53.00	**54.41**	**70.00**	**78.00**	**82.00**	**73.00**
Futures				73.65	74.25	63.89	78.18	81.96	83.47	92.02
WTI										
US$	**99.75**	43.31	59.79	58.00	52.00	**53.28**	**71.00**	**80.00**	**84.00**	**75.00**
Sell-side consensus				63.06	65.26	57.03	68.86	75.52		
Tapis										
US$	**104.14**	47.94	61.44	62.00	56.00	**56.84**	**73.00**	**82.00**	**82.00**	**77.00**
Dubai										
US$	**92.32**	44.60	59.09	57.00	51.00	**52.92**	**67.50**	**75.50**	**79.00**	**70.00**

Note: Futures are 10-day averages on 25 August
Source: Bloomberg, Macquarie Research, September 2009

Important disclosures:

Recommendation definitions

Macquarie - Australia/New Zealand

Outperform – return > 5% in excess of benchmark return
Neutral – return within 5% of benchmark return
Underperform – return > 5% below benchmark return

Macquarie - Asia

Outperform – expected return >+10%
Neutral – expected return from -10% to +10%
Underperform – expected <-10%

Macquarie First South - South Africa

Outperform – return > 10% in excess of benchmark return
Neutral – return within 10% of benchmark return
Underperform – return > 10% below benchmark return

Macquarie - Canada

Outperform – return > 5% in excess of benchmark return
Neutral – return within 5% of benchmark return
Underperform – return > 5% below benchmark return

Macquarie - USA

Outperform (Buy) – return > 5% in excess of benchmark return
Neutral (Hold) – return within 5% of benchmark return
Underperform (Sell) – return > 5% below benchmark return

Recommendation – 12 months

Note: Quant recommendations may differ from Fundamental Analyst recommendations

Volatility index definition*
This is calculated from the volatility of historic price movements.

Very high–highest risk – Stock should be expected to move up or down 60-100% in a year – investors should be aware this stock is highly speculative.

High – stock should be expected to move up or down at least 40-60% in a year – investors should be aware this stock could be speculative.

Medium – stock should be expected to move up or down at least 30-40% in a year.

Low–medium – stock should be expected to move up or down at least 25-30% in a year.

Low – stock should be expected to move up or down at least 15-25% in a year.

* Applicable to Australian/NZ stocks only

Financial definitions

All "Adjusted" data items have had the following adjustments made:

Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense
Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests

EPS = adjusted net profit /efpowa*
ROA = adjusted ebit / average total assets
ROA Banks/Insurance = adjusted net profit /average total assets
ROE = adjusted net profit / average shareholders funds
Gross cashflow = adjusted net profit + depreciation
*equivalent fully paid ordinary weighted average number of shares

All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions – For quarter ending 30 June 2009

	AU/NZ	Asia	RSA	USA	CA	EUR	
Outperform	40.38%	48.53%	40.00%	44.02%	57.42%	40.20%	(for US coverage by MCUSA, 1.54*% of stocks followed are investment banking clients)
Neutral	39.25%	17.08%	45.00%	37.45%	32.90%	39.21%	(for US coverage by MCUSA, 1.16% of stocks followed are investment banking clients)
Underperform	20.38%	34.40%	15.00%	18.53%	9.68%	20.59%	(for US coverage by MCUSA, 0.77% of stocks followed are investment banking clients)

Analyst Certification: The views expressed in this research accurately reflect the personal views of the analyst(s) about the subject securities or issuers and no part of the compensation of the analyst(s) was, is, or will be directly or indirectly related to the inclusion of specific recommendations or views in this research. The analyst principally responsible for the preparation of this research receives compensation based on overall revenues of Macquarie Group Ltd ABN 94 122 169 279 (AFSL No. 318062)(MGL) and its related entities (the Macquarie Group) and has taken reasonable care to achieve and maintain independence and objectivity in making any recommendations.

General Disclaimers: Macquarie Securities (Australia) Ltd; Macquarie Capital (Europe) Ltd; Macquarie Capital Markets Canada Ltd; Macquarie Capital Markets North America Ltd; Macquarie Capital (USA) Inc; Macquarie Capital Securities Ltd; Macquarie Capital Securities (Singapore) Pte Ltd; Macquarie Securities (NZ) Ltd; and Macquarie First South Securities (Pty) Limited are not authorized deposit-taking institutions for the purposes of the Banking Act 1959 (Commonwealth of Australia), and their obligations do not represent deposits or other liabilities of Macquarie Bank Limited ABN 46 008 583 542 (MBL) or MGL. MBL does not guarantee or otherwise provide assurance in respect of the obligations of any of the above mentioned entities. MGL provides a guarantee to the Monetary Authority of Singapore in respect of the obligations and liabilities of Macquarie Capital Securities (Singapore) Pte Ltd for up to SGD 35 million. This research has been prepared for the general use of the wholesale clients of the Macquarie Group and must not be copied, either in whole or in part, or distributed to any other person. If you are not the intended recipient you must not use or disclose the information in this research in any way. If you received it in error, please tell us immediately by return e-mail and delete the document. We do not guarantee the integrity of any e-mails or attached files and are not responsible for any changes made to them by any other person. MGL has established and implemented a conflicts policy at group level (which may be revised and updated from time to time) (the "Conflicts Policy") pursuant to regulatory requirements (including the FSA Rules) which sets out how we must seek to identify and manage all material conflicts of interest. Nothing in this research shall be construed as a solicitation to buy or sell any security or product, or to engage in or refrain from engaging in any transaction. In preparing this research, we did not take into account your investment objectives, financial situation or particular needs. Before making an investment decision on the basis of this research, you need to consider, with or without the assistance of an adviser, whether the advice is appropriate in light of your particular investment needs, objectives and financial circumstances. There are risks involved in securities trading. The price of securities can and does fluctuate, and an individual security may even become valueless. International investors are reminded of the additional risks inherent in international investments, such as currency fluctuations and international stock market or economic conditions, which may adversely affect the value of the investment. This research is based on information obtained from sources believed to be reliable but we do not make any representation or warranty that it is accurate, complete or up to date. We accept no obligation to correct or update the information or opinions in it. Opinions expressed are subject to change without notice. No member of the Macquarie Group accepts any liability whatsoever for any direct, indirect, consequential or other loss arising from any use of this research and/or further communication in relation to this research. Clients should contact analysts at, and execute transactions through, a Macquarie Group entity in their home jurisdiction unless governing law permits otherwise.

Country-Specific Disclaimers: Canada: In Canada, securities research is prepared, approved and distributed by Macquarie Capital Markets Canada Ltd, a participating organisation of the Toronto Stock Exchange, TSX Venture Exchange & Montréal Exchange. Macquarie Capital Markets North America Ltd., which is a registered broker-dealer and member of FINRA, accepts responsibility for the contents of reports issued by Macquarie Capital Markets Canada Ltd in the United States and to US persons and any person wishing to effect transactions in the securities described in the reports issued by Macquarie Capital Markets Canada Ltd should do so with Macquarie Capital Markets North America Ltd. Securities research is issued and distributed by Macquarie Securities (Australia) Ltd (AFSL No. 238947) in Australia, a participating organisation of the Australian Securities Exchange; Macquarie Securities (NZ) Ltd in New Zealand, a licensed sharebroker and New Zealand Exchange Firm. The Research Distribution Policy of Macquarie Capital Markets Canada Ltd is to allow all clients that are entitled to have equal access to our research. **United Kingdom**: In the United Kingdom, securities research is issued and distributed by Macquarie Capital (Europe) Ltd, which is authorised and regulated by the Financial Services Authority (No. 193905). **Hong Kong:** In Hong Kong, securities research is issued and distributed by Macquarie Capital Securities Ltd in Hong Kong, which is licensed and regulated by the Securities and Futures Commission. **Japan:** In Japan, securities research is issued and distributed by Macquarie Capital Securities (Japan) Limited in Japan, a member of the Tokyo Stock Exchange, Inc., Osaka Securities Exchange Co. Ltd, and Jasdaq Securities Exchange, Inc. (Financial Instruments Firm, Kanto Financial Bureau (kin-sho) No. 231, a member of Japan securities Dealers Association and Financial Futures Association of Japan). **South Africa:** In South Africa, securities research is issued and distributed by Macquarie First South Securities (Pty) Limited in South Africa, a member of the JSE Limited. **Singapore:** In Singapore, securities research is issued and distributed by Macquarie Capital Securities (Singapore) Pte Ltd (Company Registration Number: 198702912C), a Capital Markets Services license holder under the Securities and Futures Act to deal in securities and provide custodial services in Singapore. Pursuant to the Financial Advisers (Amendment) Regulations 2005, Macquarie Capital Securities (Singapore) Pte Ltd is exempt from complying with sections 25, 27 and 36 of the Financial Advisers Act. **United States:** In the United States, securities research is issued and distributed by Macquarie Capital (USA) Inc., which is a registered broker-dealer and member of FINRA. Macquarie Capital (USA) Inc, accepts responsibility for the content of each research report prepared by one of its non-US affiliates when the research report is distributed in the United States by Macquarie Capital (USA) Inc. Macquarie Capital (USA) Inc.'s affiliate's analysts are not registered as research analysts with FINRA, may not be associated persons of Macquarie Capital (USA) Inc., and therefore may not be subject to FINRA rule restrictions on communications with a subject company, public appearances, and trading securities held by a research analyst account. Any persons receiving this report directly from Macquarie Capital (USA) Inc. and wishing to effect a transaction in any security described herein should do so with Macquarie Capital (USA) Inc. Important disclosure information regarding the subject companies covered in this report is available at www.macquarie.com/research/disclosures, or contact your registered representative at 1-888-MAC-STOCK, or write to the Supervisory Analysts, Research Department, Macquarie Securities, 125 W.55th Street, New York, NY 10019.

Contact Macquarie Capital (USA) Inc.

SALES

US

Greg Coleman	(212) 231 2567	greg.coleman@macquarie.com
Karen Blando	(212) 231 2515	karen.blando@macquarie.com
Brad Bullock	(212) 231 2573	brad.bullock@macquarie.com
David Chambers	(212) 231 2505	david.chambers@macquarie.com
Bill Cleary	(212) 231 2495	bill.cleary@macquarie.com
Renee Connolly	(212) 231 2480	renee.connolly@macquarie.com
Wes Dalton	(415) 762 5007	wes.dalton@macquarie.com
Roni Gudell	(617) 598 2504	roni.gudell@macquarie.com
Grant Hall	(617) 598 2507	grant.hall@macquarie.com
Brian McGeough	(212) 231 2615	brian.mcgeough@macquarie.com
Jack Rose	(415) 762 5002	jack.rose@macquarie.com
Richard Sears	(212) 231 2489	richard.sears@macquarie.com
Mark Swank	(212) 231 2415	mark.swank@macquarie.com
Eric Wellmann	(617) 598 2506	eric.wellmann@macquarie.com

Australia/NZ/SA

Eric Roles	(212) 231 2559	eric.roles@macquarie.com
Michael Burguieres	(212) 231 2506	michael.burguieres@macquarie.com
Rowland Hirst	(212) 231 2553	rowland.hirst@macquarie.com
Daniel Pittorino	(212) 231 2552	daniel.pittorino@macquarie.com

Asia-Ex

Scot Mackie	(212) 231 2484	scot.mackie@macquarie.com
Cody Chong	(212) 231 2548	cody.chong@macquarie.com
Don Kim	(212) 231 2422	don.kim@macquarie.com
Jeremy Koch	(212) 231 2504	jeremy.koch@macquarie.com
Mark Lawrence	(212) 231 2516	mark.lawrence@macquarie.com
Sheila Schroeder	(415) 762 5003	sheila.schroeder@macquarie.com
Joe Splendorio	(617) 598 2503	joe.splendorio@macquarie.com
Stephen Stuart	(212) 231 2524	stephen.stuart@macquarie.com
May Yee	(212) 231 2519	may.yee@macquarie.com

European Specialist

Doug Stone	(212) 231 2606	doug.stone@macquarie.com
John Macaskill	(212) 231 6398	john.macaskill@macquarie.com

India Specialist

Anumeha Pande	(212) 231 2483	anumeha.pande@macquarie.com

South Africa Specialist

Darrin Blumenthal	(212) 231 2562	darrin.blumenthal@macquarie.com

Japan

Greg Norton-Kidd	(212) 231 2527	greg.norton-kidd@macquarie.com
Paul Colaco	(212) 231 2496	paul.colaco@macquarie.com
Yoshiko Kariya	(212) 231 2558	yoshiko.kariya@macquarie.com
Todd Narter	(415) 762 5005	todd.narter@macquarie.com
Peter Slater	(617) 598 2502	peter.slater@macquarie.com
David Turner	(212) 231 2517	david.turner@macquarie.com

SALES TRADING

Austin Graham	(212) 231 2494	austin.graham@macquarie.com
Robert Risman	(212) 231 2555	robert.risman@macquarie.com
Pat Caufield	(212) 231 2581	pat.caufield@macquarie.com
Matt Coleman	(212) 231 2534	matt.coleman@macquarie.com
Steve Eckna	(212) 231 2639	steve,eckna@macquarie.com
Chris Gilmore	(617) 598 2505	chris.gilmore@macquarie.com
James Henry	(212) 231 2555	james.henry@macquarie.com
Kai Keller	(212) 231 2555	kai.keller@macquarie.com
Matt Lahey	(212) 231 2487	matt.lahey@macquarie.com
Marty Livingston	(212) 231 2523	marty.livingston@macquarie.com
Kristin McMurtrie	(415) 762 5069	kristin.mcmurtrie@macquarie.com
Samantha Molina	(212) 231 2555	samantha.molina@macquarie.com
Michael Nevitt	(212) 231 2408	michael.nevitt@macquarie.com
Sam Panageas	(212) 231 2459	sam.panageas@macquarie.com
Jon Patria	(212) 231 2488	jon.patria@macquarie.com
Robert Preziosi	(212) 231 2503	robert.preziosi@macquarie.com
Chris Reale	(212) 231 2555	chris.reale@macquarie.com
Marc Rosa	(212) 231 2555	marc.rosa@macquarie.com
Jeff Sanguinet	(415) 762 5068	jeff.sanguinet@macquarie.com
Peter Schwartz	(212) 231 6381	peter.schwartz@macquarie.com
James Trounson	(212) 231 2555	james.trounson@macquarie.com

CORPORATE ACCESS

Cari Siegal	(212) 231 2595	cari.siegal@macquarie.com
Heather Andersen	(212) 231 2520	heather.andersen@macquarie.com
Amara MacPhee	(212) 231 2589	amara.macphee@macquarie.com
Lauren Osterweil	(212) 231 2557	lauren.osterweil@macquarie.com

Macquarie Capital (USA) Inc.
125 W. 55th Street, Level 23
New York, NY 10019

(212) 231 1000

Macquarie Capital (USA) Inc.
Two Embarcadero Center, Suite 200
San Francisco, CA 94111

(415) 762 5000

Macquarie Capital (USA) Inc.
225 Franklin Street, Suite 1740
Boston, MA 02110

(617) 598 2500

24 Hour Toll-Free
1-888 MAC STOCK
1-888 622 7862