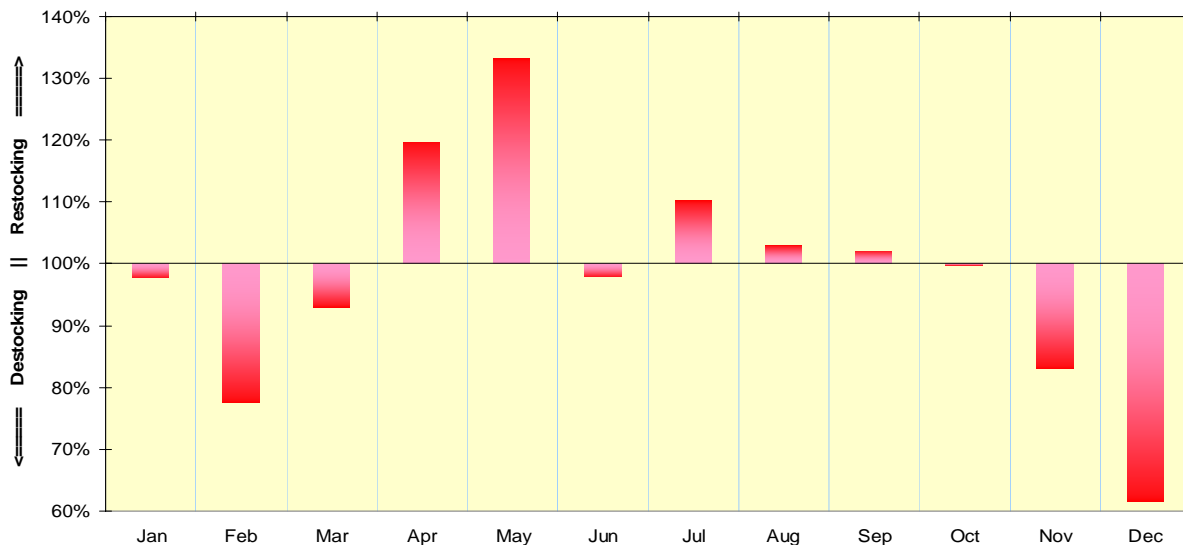


## The Importance Of Global Petroleum Inventories

Few words can set your teeth grinding more than, “global.” Every two-bit investment banker who barely has the authority to order paper clips has a business card proclaiming the arrival of a Senior Global Managing Director. Worse, in those corners of commodities where geography really matters, we spend too little time paying attention to global issues.

Most of the world’s landmass and population is in the Northern Hemisphere. This creates a very natural seasonal cycle for global heating fuel demand and by extension a global petroleum inventory cycle. If we run the monthly supply, demand and implied inventory data generated by the OPEC Secretariat through a seasonal analysis, we can extract the global inventory cycle. Inventories are built up during the spring and summer, with the April-May period being the most pronounced, and are drawn down in fall and winter, with December having the most pronounced seasonal drawdown.

**Seasonal Adjustment Factors For Global Petroleum Stocks**

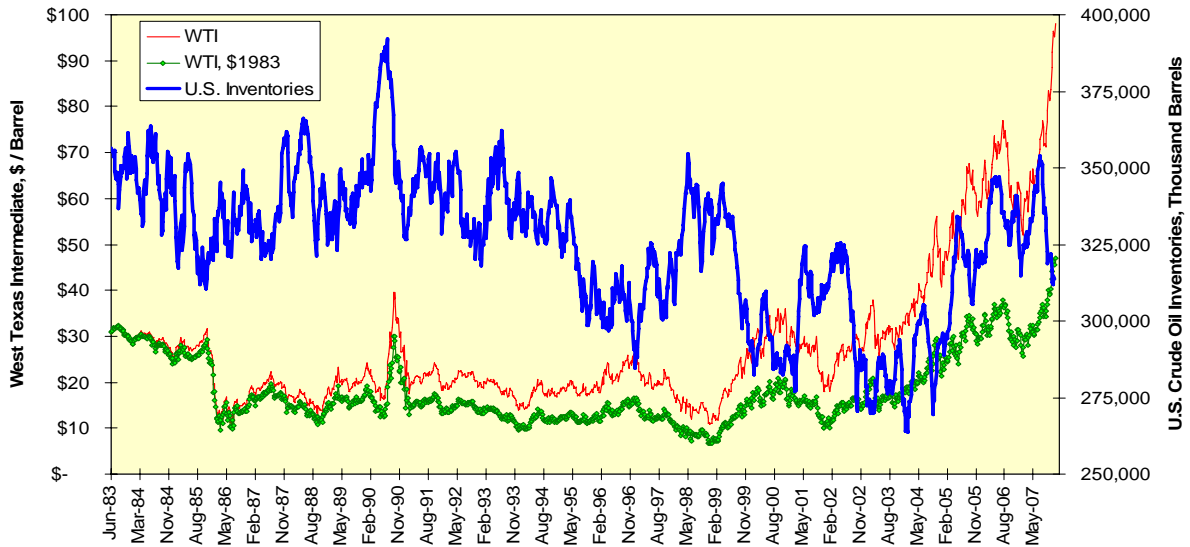


Before we move on any further, let’s try to lay one myth to rest, and that is the importance of the weekly U.S. crude oil inventory data to U.S. crude oil prices. These figures are reported breathlessly, reacted to violently...and then consigned to oblivion with good reason.

If we map the prices of U.S. benchmark West Texas Intermediate crude oil both on a current and on an inflation-adjusted basis against the crude oil inventories reported by the Department of Energy, we would be hard-pressed to find a long-term statistical relationship. The large inventory drawdown between 1991 and 1996 produced no upwards movement in price, and the huge price rally of 2003-2006 occurred during a major inventory buildup.

The weekly inventory trading numbers are useful trading artifacts, but they are useless for establishing long-term price trends. We will return to the role of U.S. inventories below.

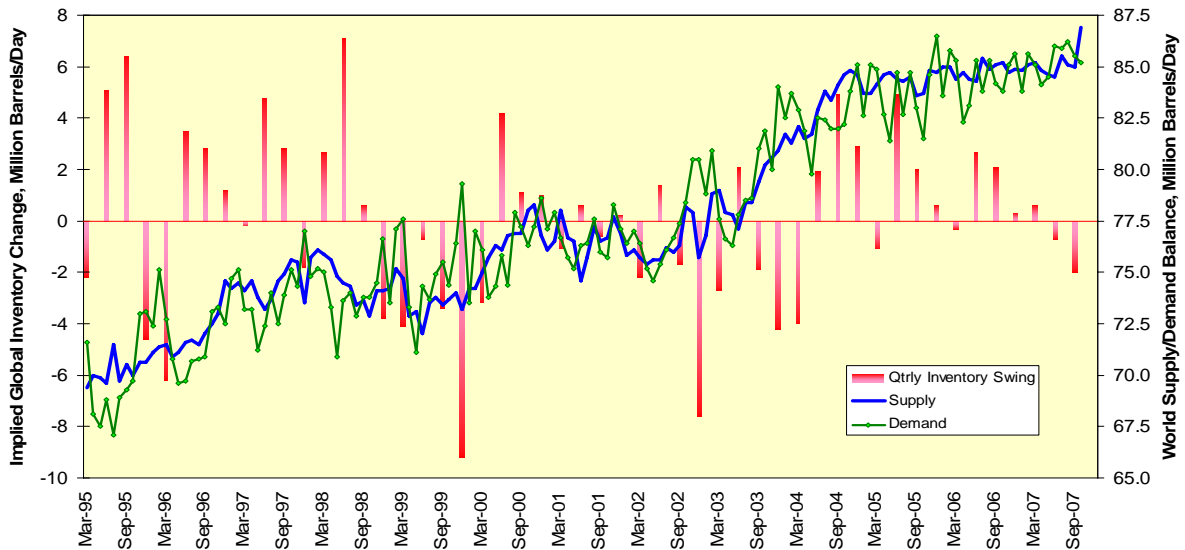
### Price Surge Occurred When Inventories Were Rising



### Returning To Global

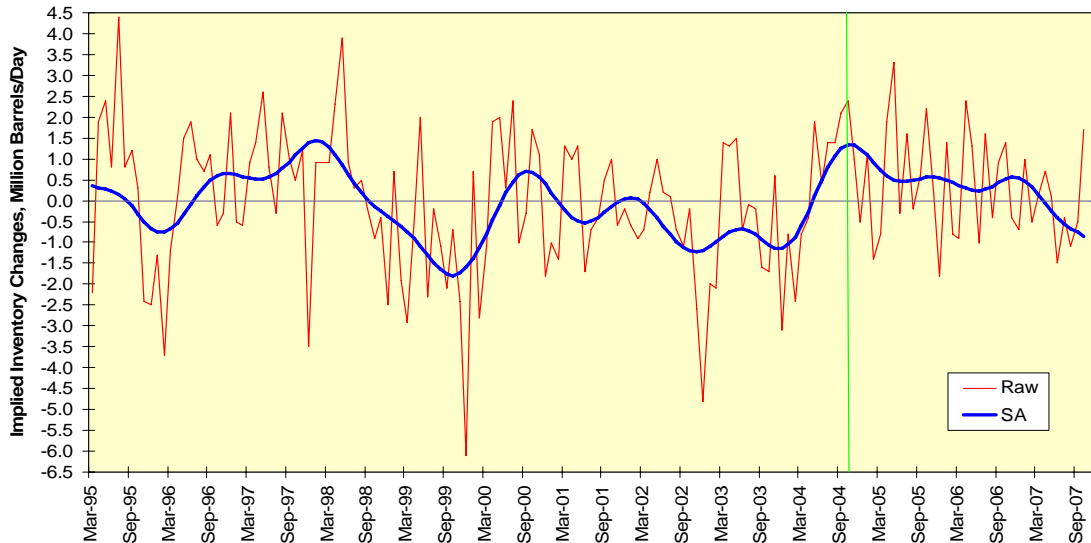
There is no denying one reality, and that is a global inventory destocking is underway. Unless you are cheering for higher crude oil prices, this should be viewed with alarm. Despite record prices both on nominal and inflation-adjusted bases, global demand continues to grow, primarily in the Asian markets. Supply has been growing as well, but this is likely to be a losing battle. Resource discovery and production always faces diminishing returns on investment – you have to keep spending more and more to find less and less – despite the occasional and very significant lucky find. As an aside, the history of the world oil industry is replete with those lucky finds, but all traders understand “trading by hope” is a good way to lose large sums of money in a short period of time.

### Global Petroleum Inventory Destocking Underway



The data in the chart above can be rearranged to produce a seasonally adjusted trend of global petroleum inventories. The world’s refiners have been destocking steadily on a seasonally adjusted basis since November 2004, marked with the green line, more than three years. Is this a rational course of action?

### Seasonality A Dominant Factor In Global Petroleum Inventories



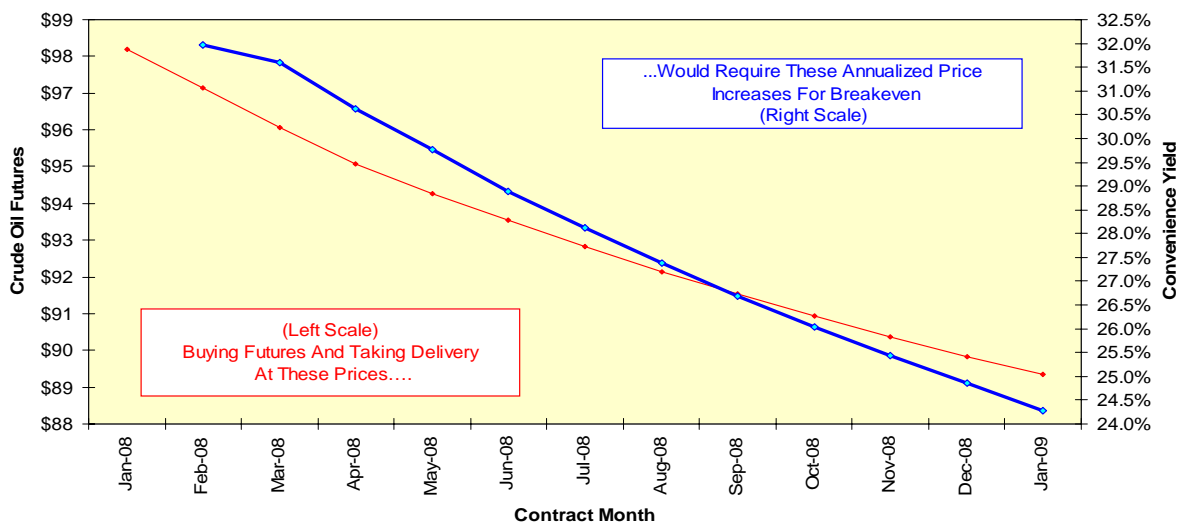
### The Cost Of Inventory Maintenance

Inventories are not cheap to maintain. Costs include capital charges, physical storage costs and physical losses. Much of the 1991-1996 U.S. inventory drawdowns can be attributed to the domestic refining industry moving to a “just-in-time” inventory policy.

We can measure the cost of inventories by the convenience yield. This measure can be conceived of two different ways. The first represents the annualized insurance cost a producer is paying by selling discounted futures forward in a backwardated market; if the market is in contango, these insurance costs are negative. The second is the annualized price increase a buyer of inventories would require to break even by taking delivery. The two numbers are equivalent.

Convenience yields can reach very high levels. A snapshot of the NYMEX forward curve for crude oil futures taken in late November 2007 shows convenience yields ranging between 24 and 32 percent. Those are very steep insurance costs by anyone’s reckoning.

**NYMEX Forward Curve And Convenience Yield**  
November 23, 2007



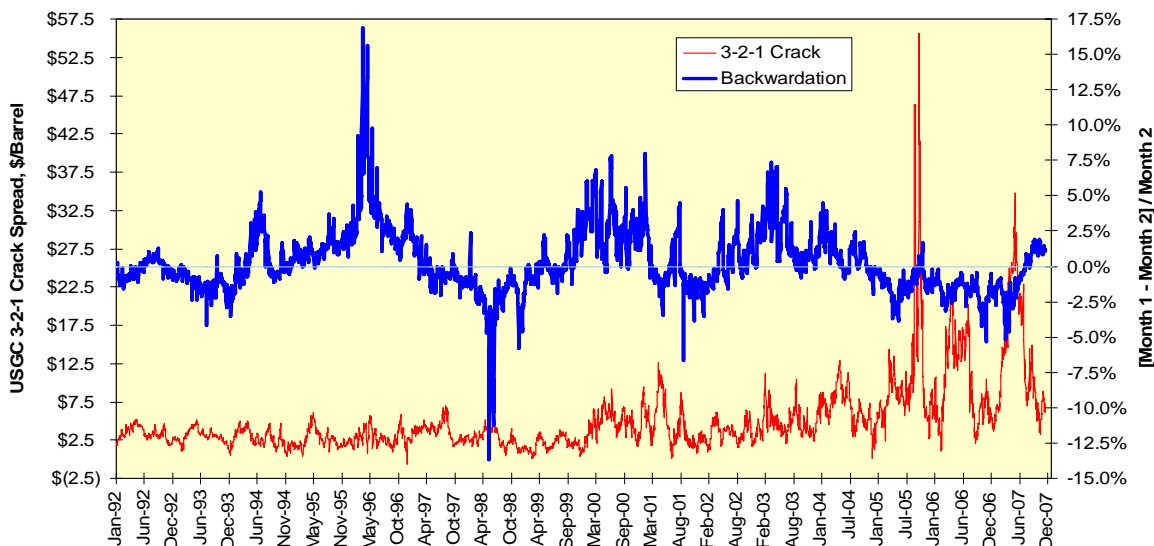
A backwardated market, one in which the back-month futures are priced less than the prompt futures, confronts refiners with a dilemma. They either have to hope their inventories appreciate enough in price to offset the cost of hedging them or they have to keep their inventory levels dangerously low and hope their last-minute purchases do not jump in price. Both are bad bets, but in practice refiners have chosen the latter.

## Adding The Crack Spread

A contango market, one in which the prompt futures are priced less than the back-month futures, rewards refiners who build inventories and sell the futures as a hedge. This is one of the two reasons why U.S. inventories rose during the 2003-2006 period; the market was in contango, so it made a great deal of sense – and profit – for refiners to build inventories.

The other reason was refining became a hugely profitable business. A scarcity of global refining capacity and strong demand for refined products pushed refining margins at the U.S. Gulf Coast to unprecedented levels, even ignoring the 2005 spike associated with Hurricane Katrina. Refineries had every incentive to buy as much crude oil as they could. It was profitable to hedge it and it was profitable to refine it. What more could they ask?

**Collapse In Refining Margins Plus Backwardation Encourages Inventory Drawdowns**



## The Imperfect Storm

The game came to an end by late 2007. As global demand growth for crude oil outstripped supply growth, refiners could not buy incremental barrels for purposes of inventory creation. The demand for immediate delivery pushed the forward curve of crude oil out of contango and into backwardation, and refiners responded by drawing down their inventories and hoping – there’s that word again – the price would fall.

However, the price did anything but fall in 2007. Crude oil’s surge squeezed refining margins and further lowered the incentive for refiners to build inventories. This combination of factors makes the drawdown in inventories seem perfectly rational for the simple reason it is.

But this situation exposes the world to a danger. Inventories represent a form of insurance in and of themselves. This is why you keep food in your kitchen and why we are taught the Aesop’s fable of the ant and the grasshopper and the Biblical story of Joseph when we are young. If refiners persist in keeping inventory levels at a minimum, they will not have a cushion to meet any supply disruption or unexpected demand surge.

Economists have marveled at how well the world has endured previously unthinkable crude oil prices. The simple reason is those prices were pulled higher by strong global demand; if you pay \$90 for a barrel and produce \$105 of economic value therefrom, you benefit. The previous oil shocks of our experience, such as 1974, 1980 and 1991, were supply-driven. Something pushed the price higher and as the value created by consuming energy was less than its cost, the economy suffered.

The global petroleum inventory situation is putting the world at risk for one of those supply shocks. If one occurs, it will not be pleasant either economically or politically as China and other rapidly growing economies get their aspirations dashed.