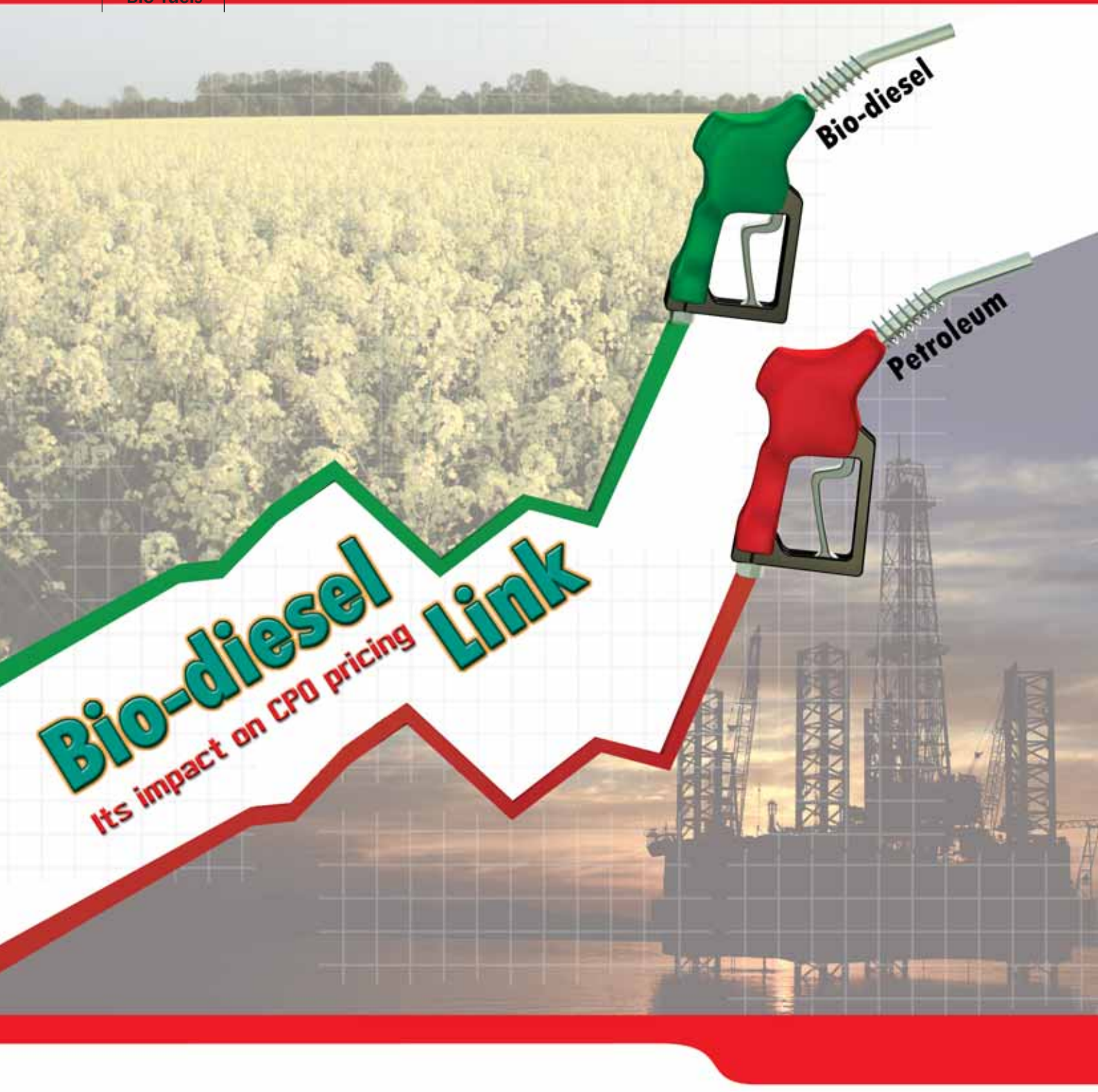


Bio-diesel Link

Its impact on CPO pricing

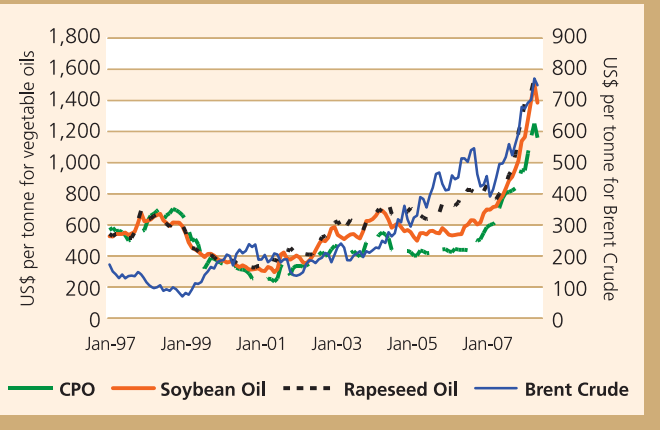
Once upon a time, you could explain CPO price levels very effectively in terms of movements in palm oil stocks. Higher stocks meant lower prices, and *vice versa*.

Then, a Fairy Godmother appeared (at least, from the perspective of producers). Bio-diesel users didn't ask whether vegetable oil stocks were high or low; they merely looked at crude petroleum prices and government subsidies and incentives, and decided whether to buy bio-diesel – and how much to buy.

As long as petroleum prices were high and subsidies and incentives were strong, bio-diesel demand was wonderful for producers. Prices went on rising, and people started to think that nothing could stop these from going to RM3,000, RM4,000 and even RM5,000.

Then, the users started to ask: would they make money making bio-diesel blends? Bio-diesel manufacturers also started to cut back output. Moral: *A margin business needs positive margins to survive.*

Diagram 1: Price Behaviour of Vegetable Oils and Brent Crude Petroleum



Going back a few years (Diagram 1), we see that prior to 2002 vegetable oil prices were unrelated to fuel prices. In fact, the statistical correlation between vegetable oil and fuel prices was negative: when fuel prices rose, vegetable oil prices tended to fall.

After fuel prices started to soar in 2002, the world changed. Vegetable oil prices, led initially by rapeseed oil (over a quarter of its world output is now used for bio-fuels) but now including all major oils, have become more closely linked to fuel prices.

In Diagrams 2 and 3, I plot a series of rolling 12 month correlations between the monthly prices of selected oil products and fuel prices. In these diagrams, the December 2007 value is the correlation over the 12 months from January to December 2007. The January 2008 correlation is for the period from February 2007 to January 2008, and so on, moving the 12-month period one month forward each time.

The prices of vegetable oils do not always move together, since differentials fluctuate. Harvest problems or changes in import tariffs (e.g. those in India that lifted the CPO discount on soybean oil after 2001) are important. In the past 24 months, however, monthly prices of different oils and fats have become more closely linked than ever before. The bio-fuel boom is undoubtedly the major factor behind this transformation.

The high correlations between monthly prices of vegetable oils and animal fats leave no doubt that the changes in prices throughout the whole spectrum of products are now very closely linked to changes in Brent crude oil prices. In broad terms, a given change in fossil fuel prices is transmitted directly throughout the oils and fats market.

The question I would like to pose is: *Does the convergence between price changes for fossil fuels and for different oils and fats signal a new era for vegetable oil prices?*

Looking ahead, the evidence may seem ambiguous; there is good reason to think that the prices of crops used for bio-fuels will, in future, be linked to fuel prices, but the evidence of a general commodity bull market in the past few months suggests that there is also speculative 'froth' that occasionally infects commodity prices, and this should not be considered to represent normal behaviour.

Nevertheless, under current policies, bio-fuel demand is now so important for vegetable oils as a whole that the fuel price link will remain, even when fuel prices drop back.

Diagram 2: Rolling 12-month Price Correlations of Leading Vegetable Oils with Brent Crude Petroleum

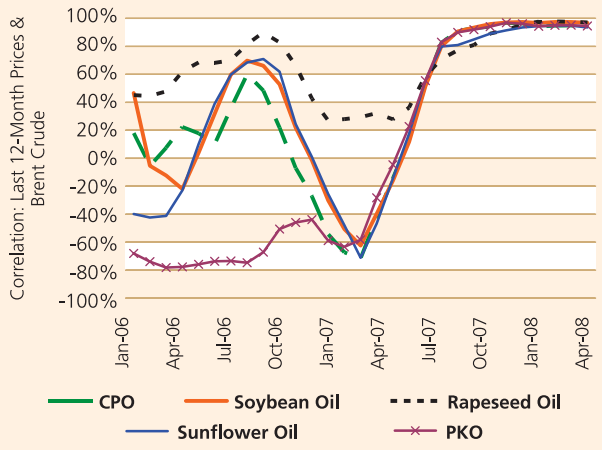
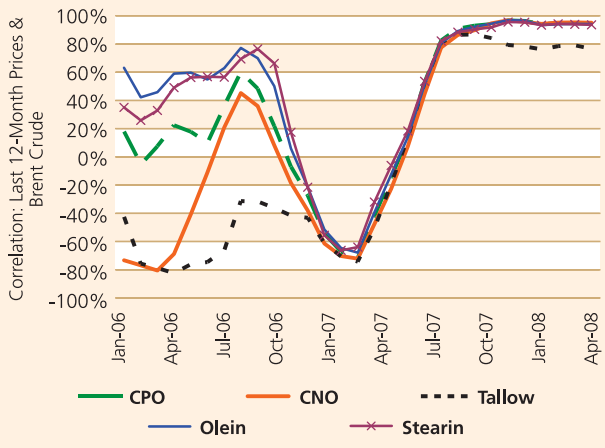


Diagram 3: Rolling 12-month Price Correlations of Other Vegetable Oils with Brent Crude Petroleum



Close price link

Why is there this close price link? The answer is that many countries' bio-fuel policies do not insist upon the use of bio-fuels without regard to the economics of their use.

In the world's two main bio-diesel markets, the EU and US, bio-diesel demand is supported by a mixture of policies: tax incentives, targets, penalties for failing to achieve targets and direct mandates.

It is only with mandates that the demand for bio-diesel is a given, and is completely unaffected by the level of fossil fuel prices. With all other policies, a drop in fossil diesel prices is translated directly into a drop in the price that blenders are prepared to pay for bio-diesel, and hence pay for vegetable oils.

Diagram 4 depicts how EU policy created price-sensitive ranges of demand for vegetable oils for bio-diesel in 2007. I have taken the specific example of a North Sea Brent crude oil price of US$100 per barrel and have ranked the 27 EU member-states in decreasing order, in terms of the incentives that their governments provide (either in a positive manner, via reduced fuel taxes, or via negative incentives in the form of penalties to buy out blending obligations).

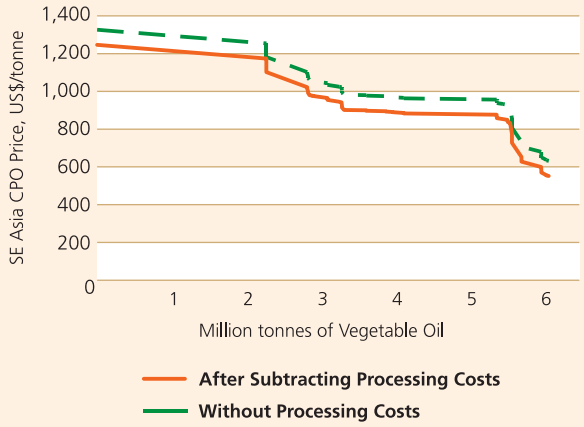
For each EU member-state, I have computed its target volume of bio-diesel use in 2007.The last stage in the construction of the diagram is to calculate the Southeast Asian CPO price which, once processing and shipping costs and import tariffs are included, would represent a break-even price for Malaysian bio-diesel producers in each country when the Brent crude price is $100 per barrel.

The diagram implies that in 2007 over 2 million tonnes of palm methyl ester (PME) could have been sold profitably for blending with fossil diesel at a CPO price of over $1,200 per tonne and Brent crude price of $100. As the CPO price dropped below $900, the potentially profitable market for PME would have been in excess of five million tonnes.

In practice, PME had to compete with other methyl esters for this market, but Diagram 4 demonstrates that bio-diesel policies last year created a sizeable volume of demand for oil for bio-fuels that was very sensitive to the vegetable oil price. This demand tended to keep the CPO price within a fairly narrow price range linked to Brent crude.

In the EU, the leading national market for bio-diesel, Germany, illustrates the complexity of the real world.The bio-diesel sector has two separate segments. One – to meet the official bio-diesel B5 target blend – allows blenders the option of paying a penalty to buy out their blending obligation, but the penalty is so high that the B5 blend target is always met.

Diagram 4: Building a Demand Curve in 2007 for Vegetable Oil (in terms of Malaysian CPO Prices) in the EU Bio-diesel Market at US$100/bbl. Brent Crude Oil



The other market segment – the sale of B100 bio-diesel fuel for heavy transport vehicles – has, since August 2006, paid a gradually increasing level of fuel taxation, which has risen to the equivalent to 17.5 US cents per litre in 2008 and is due to be raised again in January 2009.

This specific B100 tax inevitably reduces the profitability of such B100 sales, as well as the sales of vegetable oils for direct use in diesel engines. Diagram 5 illustrates how monthly sales of B100 and direct use of pure vegetable oils collapsed when the tax on these fuels was last increased at the start of 2008.

Rapeseed methyl ester enjoys a premium over other forms of bio-diesel in the EU market and is particularly well placed for bio-diesel sales at times of the year when winter fuel standards apply and FAME-20 is the only methyl ester permitted for use in northerly regions of Europe.

Nevertheless, Diagram 6 reveals that crude rapeseed oil prices rose to the point where bio-diesel margins on B5 sales in late 2007 fell so low that, once the bio-diesel processing costs are added to rapeseed oil prices, processors could not cover their full costs. For the B100 sales, the processors' average gross margin (the difference between the B100 sales price and the price of crude rapeseed oil) was actually negative for nine months from mid-2007.

Diagram 5: German Monthly Use of Vegetable Oil-based Fuels

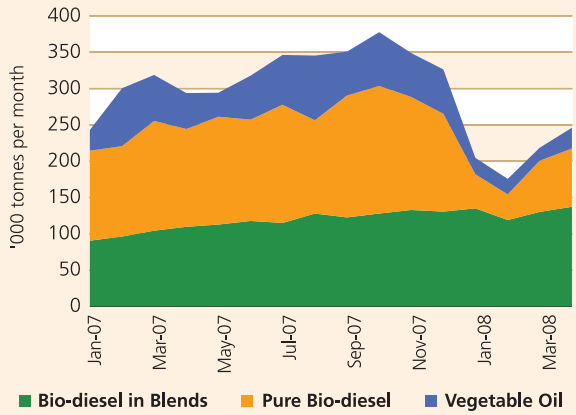
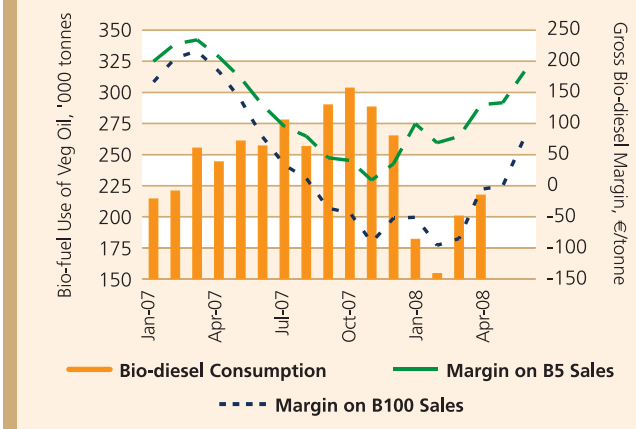


Diagram 6: German Gross Margins on B5 and B100 Production from Crude Rapeseed Oil vs Use of Vegetable Oil-based Fuels



Actions of exporters

The overall bio-diesel picture is made more complicated by the actions of governments in countries exporting bio-diesel. For example, the US government provides blending credits of $1/gallon (over US$300/tonne) on all bio-diesel blended with fossil diesel.

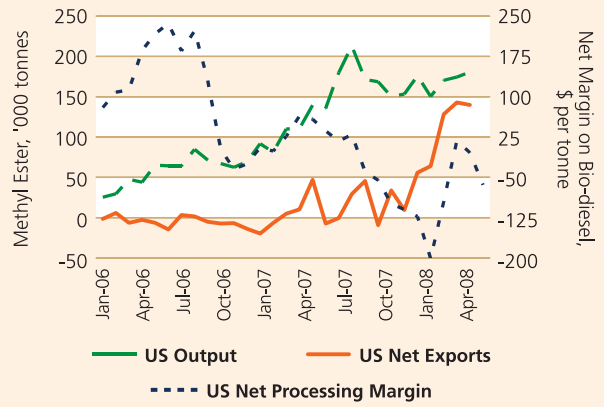
This is given on all blends, both exported, as well as for local use, and has led to a surge in imports of bio-diesel for blending with 1% fossil diesel for re-export as B99, with the benefit of the blending credit, and has also led to a boom in blending US-produced bio-diesel with fossil diesel for export as B99. Most of the exports go to the EU, where the bio-diesel enjoys a further subsidy.

US net exports of bio-diesel have recently been over 75% of local production, i.e. close to 150,000 tonnes per month vs almost 200,000 tonnes of output. As the same time, US bio-diesel imports have also been growing. Recently, they have been well over half of local production, peaking at more than 125,000 tonnes in one month. Most imports used to be of PME from Southeast Asia, but South American supplies are steadily becoming larger, notably from Argentina.

Until the slump in vegetable oil prices after mid-2008, US bio-diesel producers faced growing pressure on two fronts in their local sales. Their product was increasingly expensive vs fossil diesel, which restricted its ability to sell in the domestic market.

At the same time, RBD soybean oil prices were so high that net processing margins were negative (Diagram 7). This meant that 'splash and dash' exports – whereby a 'splash' of fossil diesel is added to bio-diesel to secure the $1/gallon blending credit – became vital to US bio-diesel producers for their short term survival.

Diagram 7: US Output and Net Exports of Bio-diesel vs Net Processing Margins on RBD Soybean Oil



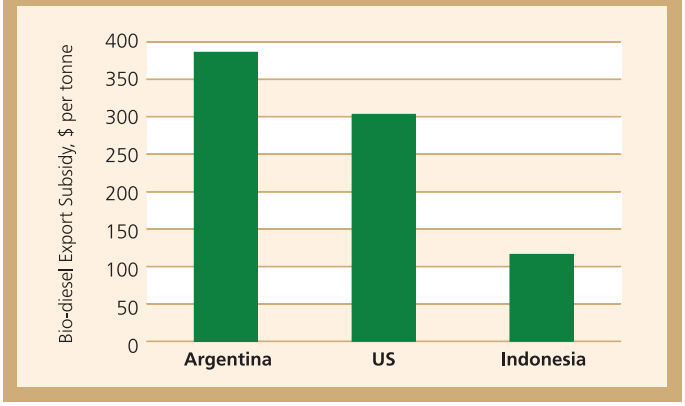
While US and EU bio-diesel processing margins were hit by high vegetable oil prices, new exporters were emerging with subsidised bio-diesel exports, alongside the existing 'splash and dash' US exports. The export subsidies are contrasted in Diagram 8.

Both Argentina and Indonesia apply lower differential export taxes (DETs) on bio-diesel than they do on vegetable oil. In Argentina, soybean oil exports pay a tax of 32%, while bio-diesel exports pay a net export tax on bio-diesel just 2.5%. This gave Argentine bio-diesel exporters an advantage of close to $380/tonne in July 2008.

Indonesian RBD olein in August 2008 is paying an export tax of 15%, while bio-diesel pays a 5% export tax. This gives local processors a current bio-diesel export subsidy of around $110/tonne.

Both were also able to 'double-dip' by shipping to the US and then claiming the US 'splash and dash' subsidy of $300/ tonne, creating a veritable merry-go-round in the global bio-diesel market.

Diagram 8: Subsidies on Bio-diesel Exports, August 2008



What does this surging demand for bio-diesel and the new links between vegetable oil and mineral oil prices mean for the behaviour of world vegetable oil prices?

The nice inverse relationship between year-on-year MPOB palm oil stock changes and local CPO price changes that prevailed for years, as may be seen from Diagram 9, has been shaken since 2006.

Two years ago, there was no statistical link between fuel and CPO prices. Looking back today, we see we can identify when the impact of fuel prices started to make itself felt. Some time near the start of 2006, increases in stocks were not associated with declines in palm oil prices.

Instead, both stocks and prices moved ahead, leading to the unexpected situation in which MPOB reported palm oil stocks were at their all-time high at the end of June 2008, and yet prices were also at their peak. This is not what conventional economies would lead one to expect.

The explanation is that petroleum has become part of the equation (as is evident from Diagram 10), thanks entirely to the bio-fuel link. Since bio-fuel demand for vegetable oil switches on and off at short notice in response to changes in the differentials between petroleum and vegetable oil prices, one now has to take account of two factors when trying to analyse palm oil prices: the petroleum price and the level of stocks.

Diagram 9: Year-on-Year Changes in Malaysian Stocks vs Changes in CPO Prices

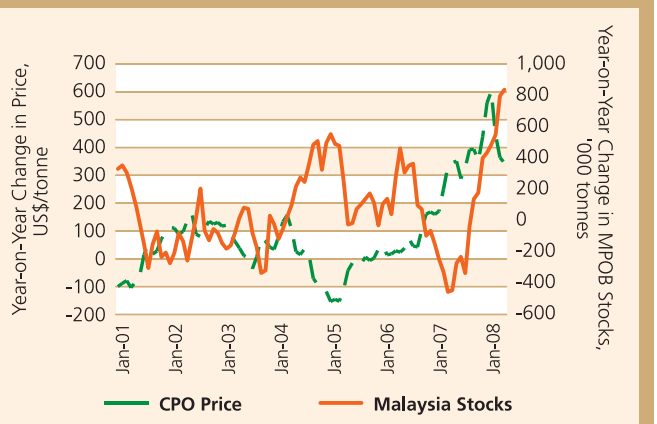
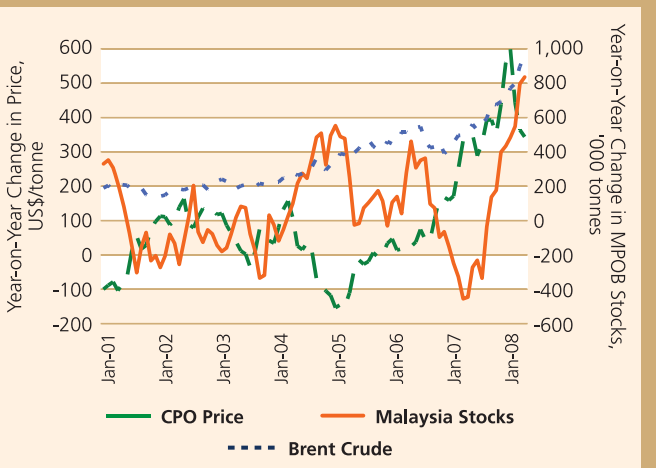


Diagram 10: Contrasting Brent Crude Oil Prices with Year-on-Year Changes in Malaysian Stocks and Changes in CPO Prices



The former determines the price band within which palm oil will trade; the latter determines how high or low palm oil prices will lie within the trading range.

Dr James Fry
LMC International

Acknowledgements for data: International Finance Corporation, International Monetary Fund, Jacobsen Letter, LMC International, Malaysian Palm Oil Board, Oil World, Public Ledger, UFOP (Germany), the US Departments of Agriculture and of Energy, and the World Bank