

Change in economies' structure affects tanker demand

It should be common sense that trade flows between countries, or regions, will develop over time in relation to the activity in various sectors of the economies, weighted more heavily to some sectors than to others and with the weights varying by cargo type.*

A common, indeed endemic mistake made by maritime forecasters is to simply expect cargo volumes to reflect GDP. For export led economies like China this is over-simplistic, as its export trade and some of its imports are more reflective of the economic activity in its main trading partners than of its own domestic economy.

That of course will change in scale as domestic demand expands, but the importance of worldwide economic drivers will remain.

A more subtle but significant omission is the effect of the changes in importance of different sectors of the economy on cargo volumes. For oil imports, it is particularly important, as the oil and oil derivatives intensity of different sector of the economy differ so much and hence the effect of changes in their contribution to GDP growth is critical.

Another prevalent error or, more honestly described as analytical carelessness, is that most forecasters implicitly assume that the relationship between GDP and/or its sectors and cargo remains immutable. Indeed, this is a problem even with the large private, government and international (eg IMF) economic forecasting models of economies and partly explains why they have been so poor in recent years.

Some changes are gradual, such as when new technology is taken up over time and this can be picked up accidentally but often effectively by the trend variable that forecasters use.

For example - Oil imports = f(GDP, trend)

But there are dramatic changes in the relationship between GDP and oil imports caused by the impacts of economic shocks. Such shocks change temporarily to permanently the importance of different sectors in an economy and hence alter the

relationship between oil demand and activity measured at the GDP level.

Unless the parameters / coefficients / multipliers that enumerate the relationship are allowed to change from time to time in the model used to test relationships over history, any model of trade flows estimated in terms of GDP before the shock will no longer be valid and any forecast produced on its back can be worse than useless.

Marine Traffic Forecasts (MTF) have shown in its Maricasts model used for port investment projects and due diligence that major shocks have this effect while lesser impacts, such as most one-off moderate or lesser recessions, do not.

If the shock is long drawn out, the impact on freight relationships can be dramatic, volatile and destabilising for that period, though not necessarily permanent.

China today is a classic example of this, partly because the epicentre of the financial earthquake was elsewhere. The crisis started in late 2006, as the housing market in the fastest growing US states took the first part of a long dive. Chinese exporters of, for example, bamboo floor tiles suddenly found their markets shrank and indeed the wood products sector as a whole began falling at that time.

Many elements of the international crisis had long lags (like a long fuse) with the Southern European bomb primed in 2007 finally going off in 2011. In total, there have been five years of continual shocks, with some abrupt positive ones in between time that were rapidly more than reversed.

The impact of all this on oil demand is illustrated by a simplified example relating to the contribution of sectors. One can contrast the effect on wood products in 2006 with plastic production weakening following the

drop in exports in 2011, both of which have the same negative impact on GDP.

But since one uses electricity (and hence coal) and the other uses oil to make plastic, the impact of these two mini shocks on oil consumption would have been completely different. Only detailed attention to the changes in the structure of the economy at such times, rather than reliance GDP, can explain oil demand and ultimately the volume of oil imports. This is separate from the usual supply side and technology effects that have to be considered for such commodities.

Once the economy emerges from the shock period, the changes to the relationships between freight and its drivers persist and in many cases do not change again until the next shock, as the structure of the economy stabilises, with a different mix to the pre-shock era. The ways the sectors swing around often persist; but their underlying relationship to GDP has changed and hence the relationship between GDP and cargo volumes will have altered.

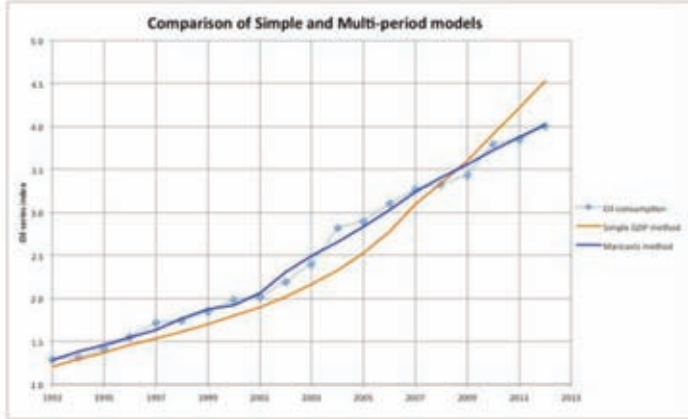
Forecasts based simply on historic relationship will mislead decision makers, whether ports or ship operators.

China is of great interest today and we can show how relationships change even using simple (but not simplistic) analysis. Since China only became a net oil importer in 1993, the charts shows only the later period, although the estimation model was run over a longer historic period (1968-2011). The analysis is of oil consumption which, once production is subtracted, is a proxy for oil import demand, given that China has hardly exported any oil over that period.

In depth preliminary analysis of the relationships between various sectors and GDP indicate that there were transformations from economic shocks centred on 1998 and

Start of period	End of period	GDP multiplier / coefficient estimated
1988	1998	0.1179
1998	2001	-0.0065
2001	2011	0.3466

Source: Marine Traffic Forecasts (Maricasts).



2001, or one extend shock effect over those three years, which changed relationships temporarily in one way and then permanently in another. The three periods defined by those two dates produce stable relationships when an econometric model was estimated between GDP and oil consumption producing different coefficients in each period, as shown in the table above.

The estimation was then re-run to find the best fit using the simple GDP method, used by forecasters, which forces the same multiplier for the whole period.

The chart above shows the results. The blue dotted line show actual annual oil consumption, while the red line shows how the oil consumption that the simple model generates from GDP data. The blue line shows the oil consumption that the Maricasts model generates from GDP by splitting the period into stable inter-shock periods.

It is immediately apparent that the conventional GDP model severely under-estimated consumption early on and later over-estimated it. The traditional method may have influenced some shipowners to over-order; especially if similar distortion were introduced for other routes from traditional GDP models.

The long drawn out impact of the current financial crisis in the West cannot yet be judged in retrospect by definition. Forecasts for the next few years must be based on careful consideration of the causes of these variations, even if the longer term relationship is re-established for the medium term.

There are, however, indications that new relationships are forming and that the next 10 years will show oil growing on a new path relative to GDP as the shocks, for example, induce a premature realignment from major growth in exports to consumption goods.

To analyse the impact this will have, it is necessary to model the movement in all sector of the Chinese economy, as well as the effects of technology, to enhance the estimates of the relationship between GDP and oil consumption over the short, medium and long term. A simple correlation with projected GDP growth estimates is simply inadequate. TO

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