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Tech Talk - Oil Tankers in the wake of the Egyptian Crisis

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Gail Tverberg's analysis of some of the underlying causes of the current Egyptian crisis is cogent, but one of the other consequences caught my attention today. For, as was noted in Forbes

> While most equity-related assets got battered, a select group of stocks, oil shippers, were corking champagne bottles. Apart from Overseas Shipholding, Frontline Ltd. had a killer day, gaining 7.8% or $1.96 to $27.10.
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> An analyst for a shipping hedge fund explained that the spike is connected to fears surrounding the continued operations of the Suez Canal, amidst social unrest caused by massive riots against President Hosni Mubarak's 30 year rule. "While Suez closure is not much of a threat, shippers are refusing to load in the Red Sea and transit the Canal," explained the trader. "What's probably going to happen is that they re-rout ships to the Cape [of Good Hope]," he noted.
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> "[Re-routing] makes voyages longer, which ties up ships and in turn diminishes supply," said the analyst, "[this] is positive for the tanker market."

The change involved is not just giving a tanker captain a different map and saying "get on with it." Because of the relative size of the Suez Canal, there are different sizes of tankers involved, and so I thought it useful to talk about the different sizes of tankers, how fast and where they go, (and what the cost of that re-routing might be) in the post today.

To begin with let's look at the traffic along the Suez Canal itself. Note that there is no immediate port of access into the Mediterranean, and thus to Europe, from Saudi Arabia or the nations of the Gulf.

Overview of the Suez Region (EIA)

The EIA, in writing about the Canal noted that

> Almost 35,000 ships transited the Suez Canal in 2009, of which about 10 percent were petroleum tankers. With only 1,000 feet at its narrowest point, the Canal is unable to handle the VLCC (Very Large Crude Carriers) and ULCC (Ultra Large Crude Carriers) class crude oil tankers. The Suez Canal Authority is continuing enhancement and enlargement projects on the canal, and extended the depth to 66 ft in 2010 to allow over 60 percent of all tankers to use the Canal.

There are restrictions on the tanker size that can fit through the canal. This is mainly based on draft, or the depth of the tanker underwater, which has to be less than the 66 ft depth of the Canal, but there is also a bridge over the canal that the tankers must pass under. Those that fit into this range are designated as Suezmax tankers. In terms of the classification of tanker sizes they lie in the mid-range of those available. In a typical day about 1.8 mbd of oil passes through the Canal, which is about 5% of the global oil tanker trade.

The smallest of the tankers are those that act as coastal tankers. Typically from 300 to 670 ft long, with a draft that can go from 20 to 52.5 ft, they are used locally for the trans-shipment of refined fuel products. Ranging from 1,000 to 50,000 tons deadweight they are, most typically, the small local vessels that are often the only tankers that folk will see coming into harbor.

> The design objectives for coastal tankers are demanding and sometimes contradictory, maximum volume in minimum dimensions. Operation in coastal service means frequent harbor calls, often through very restricted waterways having high currents and winds.

> Good manoeuvring capabilities are thus also required and, of course, high system availability to avoid incidents and accidents in case of system malfunction.

One of the more modern ones is fitted to carry either oil or liquefied gas.

The coastal tanker Seychelles Paradise

But before I go on, I now need to define deadweight (DWT). It is not the weight of the empty tanker, but rather the weight of the cargo and fuel that the ship carries. In other words almost everything but the weight of the ship (which, just to be confusing, is known as the lightweight). Put them both together and you get the displacement of the vessel. So, that a tanker with a 50,000 ton DWT, with 6.3 barrels to the ton, would carry 315,000 barrels of oil. Now this is not all cargo since perhaps 5% of that total would be the fuel oil to drive the ship, which in this case would be around 15,000 bbl, giving a capacity of around 300,000 bbl. The density of the oil varies, and I used a value from one of the shipping companies, rather than the 7.3 value I have used in the past when converting shipped product.

And remember that bridge over the Canal that I mentioned? Well that brings in the other measure, known as "air draft." This is the head room that the tanker needs, and for Suezmax this is 223 ft.

The next significant size category up are known as Aframax, and for a long while I thought that this related to some African capability. However it actually refers to the Average Freight Rate Assessment (AFRA) for the classification. A typical tanker will have DWT range from 80,000 to 120,000 tons (i.e. typically a useful cargo of around 690,000 bbl), a draft of 49 ft and a length of 820 ft. It has a typical speed of 14.7 knots. For those interested, Venezuela just bought 10 of these for $70 million each from Russia. Lloyds see a continuing oversupply of this category, to the point that (until this weekend) they projected rental costs of $10,000 a day or less, below operating costs. However there is a current hope in the industry that the rates may now rise (hence the champagne).

The Aframax tanker Tamara (currently for sale)

The next category will be the Suezmax category which has the restrictions that I mentioned above. They range up to 160,000 tons DWT.

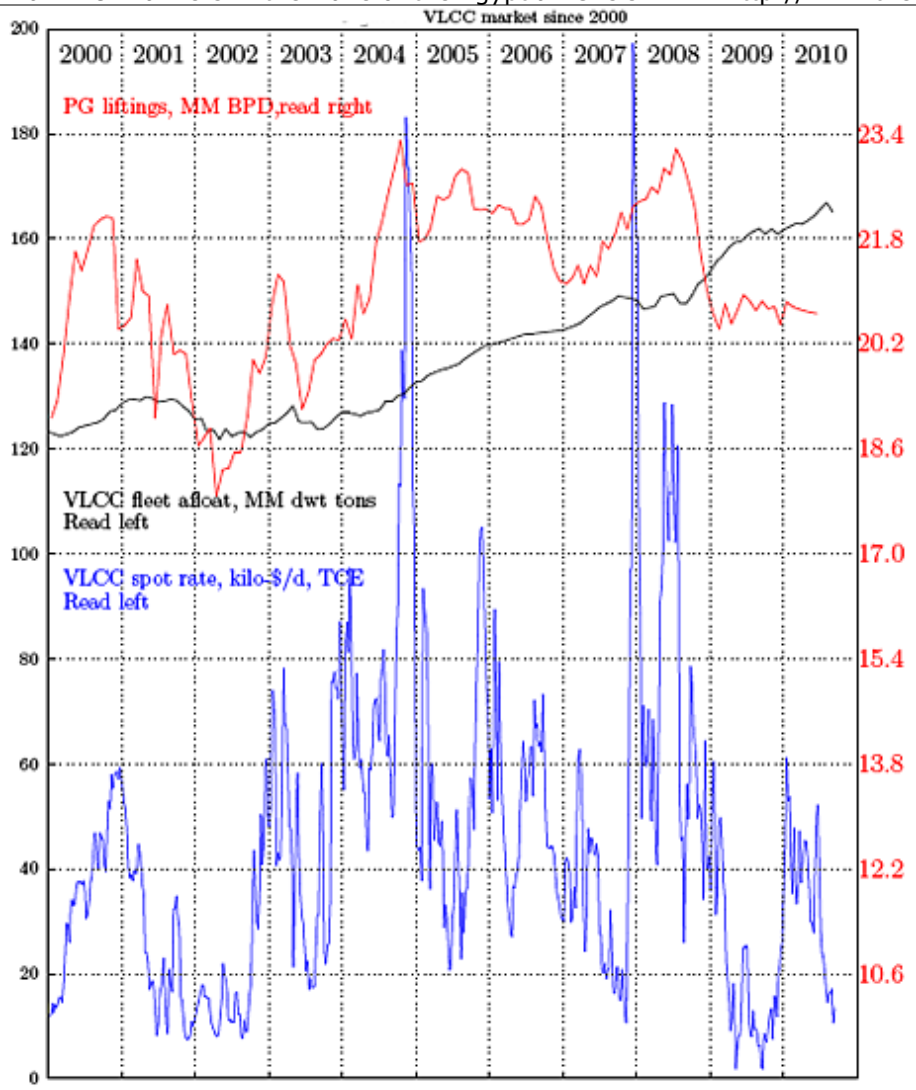
Tanker in the Suez Canal (photo by Bob Wallace)

In addition to the air draft, the vessels are limited to a maximum width of 230 ft. Such a tanker might consume 410 barrels of oil a day, and travel at about 15 knots.

Those vessels that are too large for the Suez Canal, (and for that matter many ports) divide into two categories. The smaller is the VLCC (very large crude carrier) which are those carriers above 200,000 tons DWT, and then there are the ULCC (Ultra Large Crude Carriers) carriers, which are those above 320,000 tons DWT. These are large enough that they have been used for oil storage, as well as for transport. Just over a year ago there were more than 30 such supertankers parked around the globe. At that time rates of up to $75,000/day were being charged for the use of those tankers. In September 2010 Lloyds reported that the number was around 57, holding around 70 million bbl. These are the vessels that are very hard to turn, and take a long time and distance to stop. (Don't for example try throwing out an anchor.)

VLCC at sea

Once one gets to this size of vessel, the amount of fuel that is used in making a voyage becomes a significant factor in deciding how fast the ship will steam. Though that, in turn, is controlled by how valuable and necessary the cargo is at the time. For example in 2007 spot rates went from $30,000 a day to $300,000, but more recently have fallen steadily.



Recent VLCC market (after Devanney)

According to Devanney VLCC move at between 12.5 knots, (50% power) and 18 knots, though at increasing fuel demand (which at top speed and loaded may reach up to 800 barrels of fuel oil a day.) As he notes in one example:

> Once we get to 12.5/14 kts, we note that by speeding up another half knot, we can save 1.53 days at a cost of $63,000. This is a good idea if and only if we can earn $44,000 per day (about WS53)) or better with the days saved.

The 12.5/14 knot selection refers to the difference in speeds between when running loaded, and when in ballast (i.e. empty).

If one knows the intended travel speed, then one can look up the relative distances to be travelled (remembering that the vessel has to go both ways to complete one trip). The distance from Ras Tanura in Saudi Arabia to Port Sucre in Venezuela, for example, is 10,245 nautical miles. At 12.5 knots this would take 35.6 days at sea, each way (providing that the tanker was small enough to fit through the Suez Canal).

Going from Ras Tanura to Rotterdam via the Cape of Good Hope adds an additional 74% of the miles traveled going through the Suez Canal (from 6,399 to 11,109) while adding 20 days (from 41 to 61) to the round trip.

> The costs incurred from going round the Cape is related to the extra fuel consumption but also to the extra capacity required and related insurance premium increase in order to lift the same quantum of cargo in the same amount of time. Conversely, the costs incurred in going through the Suez Canal consist of canal tolls, extra insurance risk premium and the use of services such as tugs, pilotage and mooring. Canal costs have decreased by 5% over the last five months.

The break-even point at the moment is related to the cost of bunker fuel. Should this be below $370 a tonne, then it is cheaper to go around the Cape, should it be over $370 a tonne then it is cheaper to go through the Canal. (It is currently well above that price). However the break-even is a function of charter rates and other values, and so varies with time.

There is one other way of shipping oil through Egypt and that is to put some of the liquid in a Suezmax vessel to transship the canal, and send the surplus up through the Suez-Mediterranean pipeline. With the enlargement of the canal this option is less favored, and the EIA note that volume in the pipeline dropped from 2.3 mbd in 2007 to 1.1 mbd in 2009.

I have not written much on ULCC since they have proved unpopular.

> As of 2010, only 12 tankers above 320,000 dwt remain. Of this, only two "true" ULCC of around 430,000 dwt are left in operation, the TI Europe and the TI Oceana, which were part of a group of four ships constructed between 2002 and 2003. The other two ships, TI Africa and TI Asia were converted into floating storage and mooring units in 2010.

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The TI Europe

The vessel TI Europe was built in 2002. It is 1,246 ft long, it is 223 ft wide and has a draught of 80 ft. It can carry 3.2 mb of oil. (DWT 441,893 tons.) The optimal speed of TI Europe is 16.5 knots laden and 17.5 knots in ballast.