EXECUTIVE SUMMARY

November 2024

The price sensitivity of efficiency in shipping

Do higher fuel prices lead to greener shipping behaviour?

Energy efficiency and decarbonisation

Many policy-makers in the European Union (EU) and the International Maritime Organization (IMO) argue that the higher prices that result from emissions pricing and fuel standards will lead to energy efficiency improvements and emissions reduction. There is, however, no consensus in scientific literature that real-world evidence validates this claim.

T&E commissioned CE Delft to study the relationship between fuel prices and technical and operational efficiency over 3 decades to find out to what extent shipping companies behave more efficiently either by ordering more efficiently designed ships or by operating more efficiently (using sailing speed as a proxy).

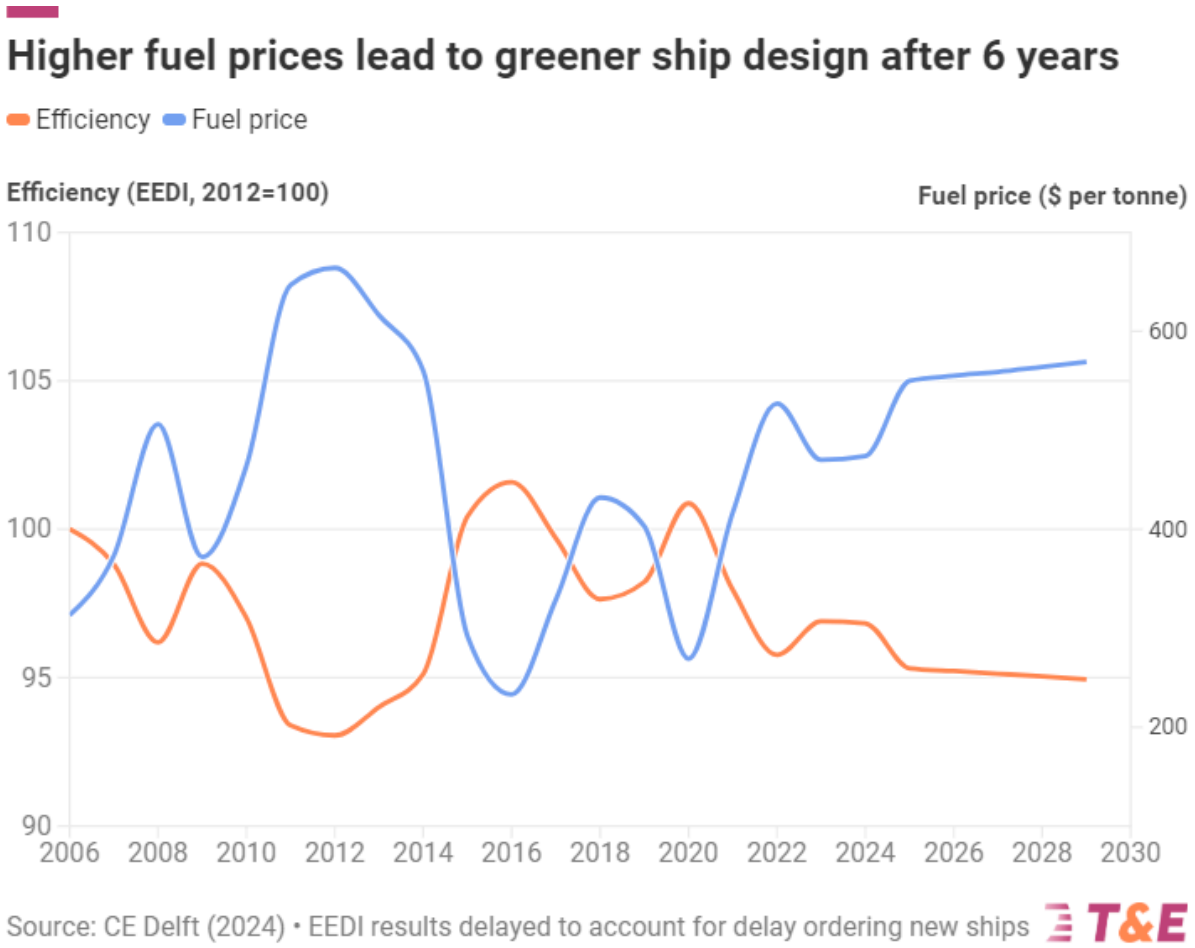
While the novel analysis on technical efficiency shows that **shipping companies order slightly more efficient ships as a result of higher fuel prices** (albeit with a time lag of around 6 years), **the analysis found no clear relationship between higher fuel prices and better operational efficiency**.

The results suggest that the only way to ensure energy efficiency improvements is with bespoke action. Policy-makers in the EU, IMO and other regions should therefore ensure their policy measures to reduce shipping emissions include concrete, explicit measures to improve energy efficiency.

Findings: Design efficiency

- **Higher fuel prices lead shipping companies to order more energy-efficient ships**
    - Results differ between ship type: tankers are less sensitive to changes than container ships and the impact on bulk carriers is negligible
    - The effect is delayed: there is a lag of between 4 and 8 years between higher prices and the arrival of more efficiently-designed vessels
    - The effect is lower since the introduction of the IMO's Energy Efficiency Design Index (EEDI)
- Higher charter prices (a sign of better general economic conditions) are also shown to lead to more more efficiently-designed ships

- The Estimate Index Value (EIV) - an approximation for technical energy efficiency - of tankers is much more sensitive (about four times as sensitive) to charter rate changes than container ships, while the EIV of new-build bulk carriers is slightly less sensitive to charter rate changes than container ships



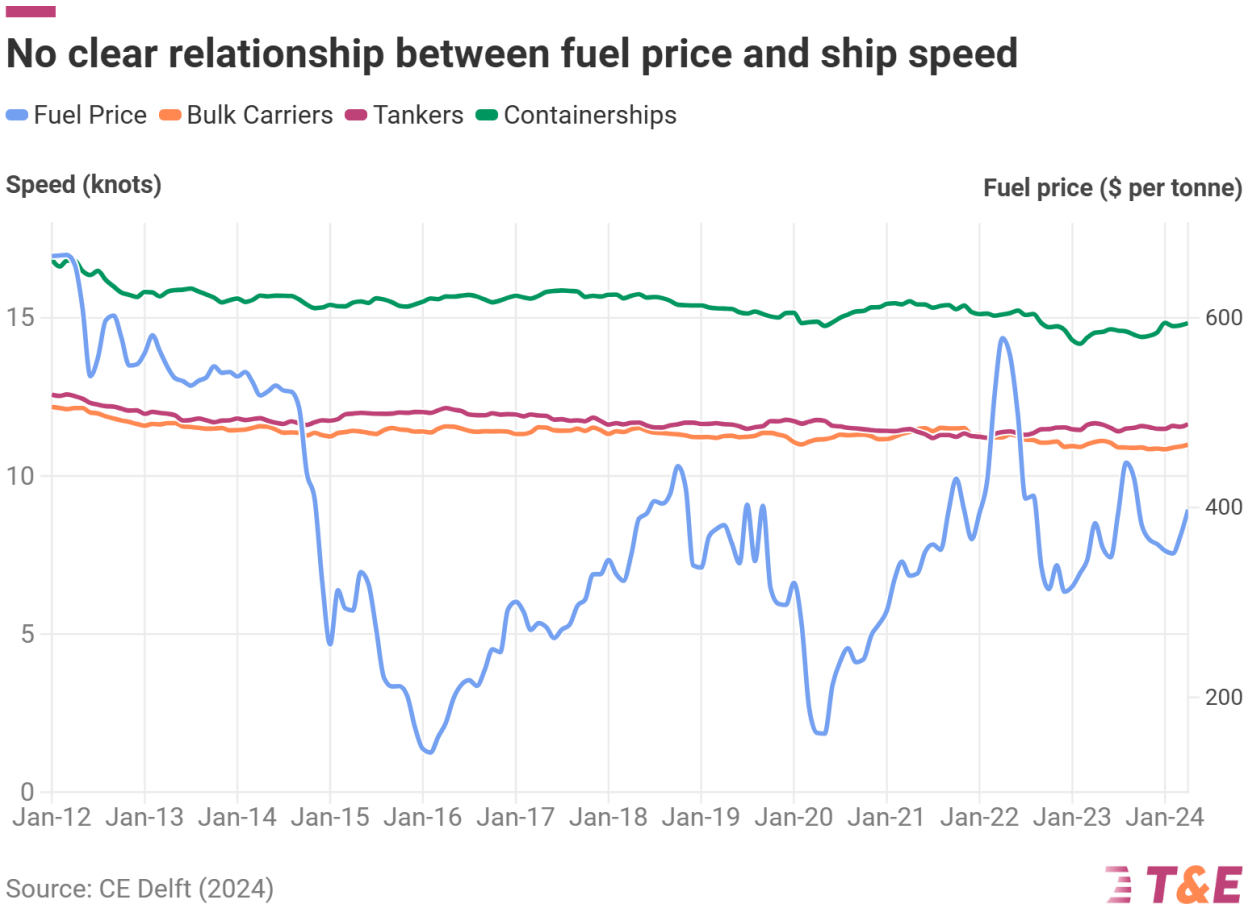
- Converting the results to the price increases estimated for the EU's green shipping package (EU ETS and FuelEU, known at fit for 55, FF55), the consultants estimated that, while the design efficiency of vessels coming online in 2031 will be 4% better than 2023, given that newbuilds are a small share of the entire fleet, **technical energy efficiency of all ships visiting EU ports would only increase 0.03% by 2031, with negligible impacts on total emissions**

    - However, there is no certainty that more efficient ship design means lower emissions per ship. As per the Jevons Paradox (also known as the rebound effect), in many instances higher technical efficiency is associated with higher, not less, resource use

EU laws will have negligible impact on shipping efficiency by 2031

Findings: Operational efficiency

- **No correlation found between higher fuel prices and better operational efficiency**
    - In fact, a weak correlation was found for the opposite: higher fuel prices lead to higher speeds for all ship types. The model fit is, however, too poor to definitively support this finding. While it is possible that no correlation exists in reality between higher fuel prices and better efficiency, it is also possible that some factors where there was a lack of data, such as contract type or weather conditions, influence the relationship



    - This doesn't mean that a correlation between prices and operational efficiency doesn't exist, just that with the variables considered, no strong correlation was found. Nonetheless, real-world evidence - for example of container companies overcharging customers for their

emissions pricing liabilities - shows that in practice the nature of the shipping industry means that higher prices do not automatically translate into more environmentally-efficient behaviour

- Lower charter rates (a sign of bad general economic conditions) were also associated with higher vessel speeds, and the inverse (higher charter rates, lower speeds). However, there was similarly a poor model fit meaning this finding cannot be definitively supported
    - For tankers and bulk carriers, higher charter rates correlated with higher vessel speeds, however the model fit is also poor

Recommendations

1	The new **European Commission** should propose bespoke energy efficiency regulation, given that evidence shows FuelEU Maritime and the EU ETS will not sufficiently promote energy efficiency improvements to reach 2030 targets. This may also present an opportunity to promote European energy efficiency technologies like wind-assist
2	At the **IMO**, negotiators should transform the Carbon Intensity Index (CII) into a true energy efficiency measure and align it with the IMO's 2030, 2040 and 2050 emissions reduction objectives, setting ambitious and enforceable targets