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# Shipping Sustainability: Economic & Financial Perspectives

5<sup>th</sup> Athens Triennial Meeting  
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# UK National Clean Maritime Research Hub



- ❑ Since September 2023, the Hub has been carrying out innovative research in sustainable marine fuels and their safe use, low-carbon power and propulsion systems for shipping, decarbonised port operations and infrastructure, improved maritime operations, and vessel efficiency
- ❑ It consists of 13 UK universities, 72 project partners, and 25 international organisations
- ❑ Bayes leads on the “**Digitisation, Maritime Operations, and Finance**” project theme
- ❑ Funding includes £7.4m from EPSRC and the UK Department for Transport, with an additional £13.9m financial and in-kind match funding from universities and project partners



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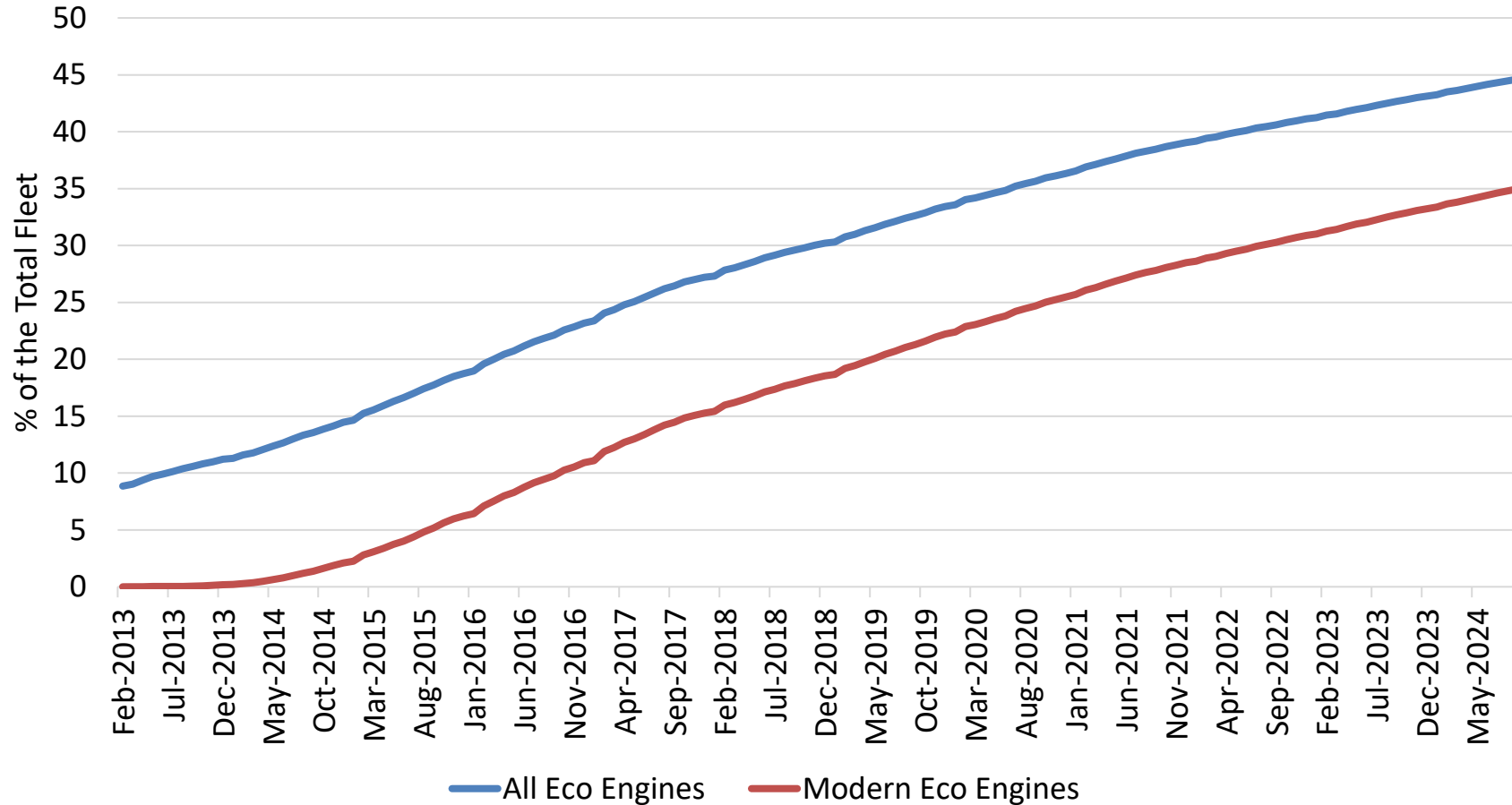
# Need to Examine the Business Dimensions of Sustainability

- ❑ The cumulative investment needed between 2030 and 2050 to reduce shipping CO<sub>2</sub> emissions by at least 50% by 2050 is roughly \$1–1.4 trillion ([Krantz et al, 2020](#))
- ❑ It is a new environment for shipping stakeholders
  - E.g. shipping companies need to expand/train their operating, chartering, financing, and legal functions to understand and account for the changing regulations
- ❑ The existing academic literature has focused on the technological and regulatory challenges related to sustainable shipping
- ❑ Instead, our research at Bayes focuses on the economic, financial, insurance but also on the policy dimensions of shipping decarbonisation

# Investment Trilemma

- ❑ To reduce CO<sub>2</sub> emissions, among other measures, the shipping industry has started utilising ships that are more eco-friendly compared to conventional ones
- ❑ **More eco-friendly ⇒ CO<sub>2</sub> emissions ↘**
- ❑ Ship owners are faced with a *trilemma*:
  1. Investing in a cheaper but (much) more polluting conventional ship
  2. Investing in a more expensive but eco-friendly one
  3. Postponing their investment decision
- ❑ We have examined the case of vessels with eco versus non-eco engines
  - Moutzouris, I.C., Papapostolou, N.C., Marchese, M., Tamvakis M.N., and Shi, Y. (2024). Determinants of the Price Premium for Eco Vessels. Transportation Research Part D: Transport and Environment (136), 104414.

# Vessels With Eco and Modern Eco Engines



- While vessels with modern eco engines are still well below 40% of the fleet, the fraction has increased significantly over the last years
- From 19% in 2019 to 35% in September 2024

Source: Data are from Clarksons' SIN.

# Specifications for Conventional and Eco-friendly Vessel Types

☐ More eco-friendly engines ⇒ Fuel consumption ↘ ⇒ CO<sub>2</sub> emissions ↘

Ship Type	Typical DWT	Age (years)	SOx Scrubber	Speed Laden (knots)	Speed Ballast (knots)	Consumption at Sea Laden (t/day)	Consumption at Sea Ballast (t/day)	Consumption in Port
Capesize								
Conventional	180,000	5	None	12	13	43	43	5 (t/day)
Eco-friendly	180,000	5	None	12	13	33	32	5 (t/day)
Aframax								
Conventional	115,000	5	None	12.5	12	38	31	100 (t gross)
Eco-friendly	115,000	5	None	12.5	12	30	24	100 (t gross)

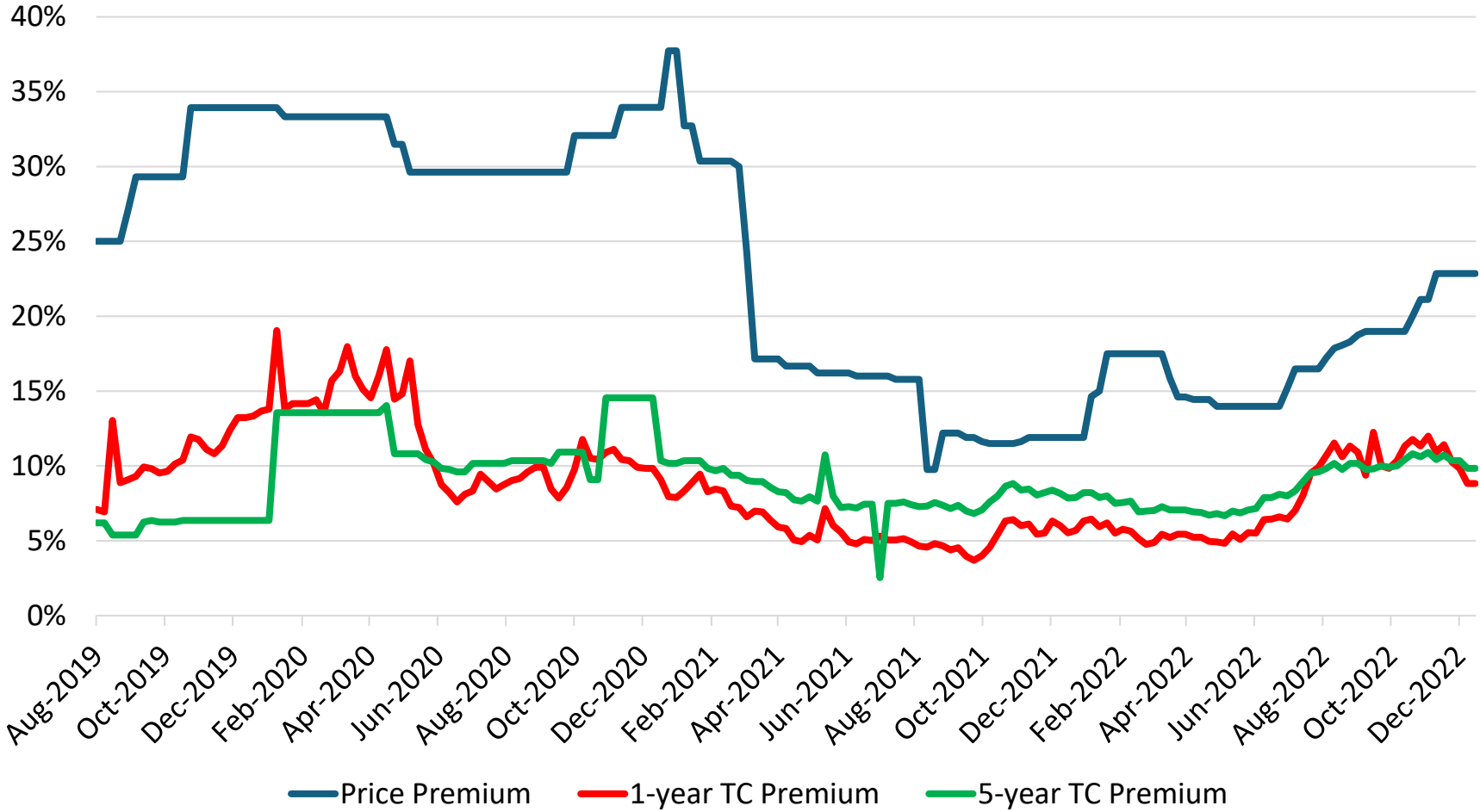
Source: Clarkson's SIN

Shipping Sustainability: Economic & Financial Perspectives

# Technological, Investment, and Operating Perspectives

- ❑ From a **technological perspective**, eco-friendly vessels should trade at a price premium compared to their conventional (i.e. non-eco) counterparts
- ❑ From an **investment perspective**, for an investor to be willing to pay for such premium and for a capital provider (e.g. banks and funds) to finance such acquisition, the eco vessel must generate higher net cash flows or/and have a lower cost of capital than the conventional one
- ❑ From a **shipping operations perspective**, reduced fuel consumption implies:
  - Less fuel costs
  - Less carbon emissions and, thus, less EU ETS allowances costs (FuelEU)
  - If/when carbon pricing is in place, it also will also mean less carbon taxes paid

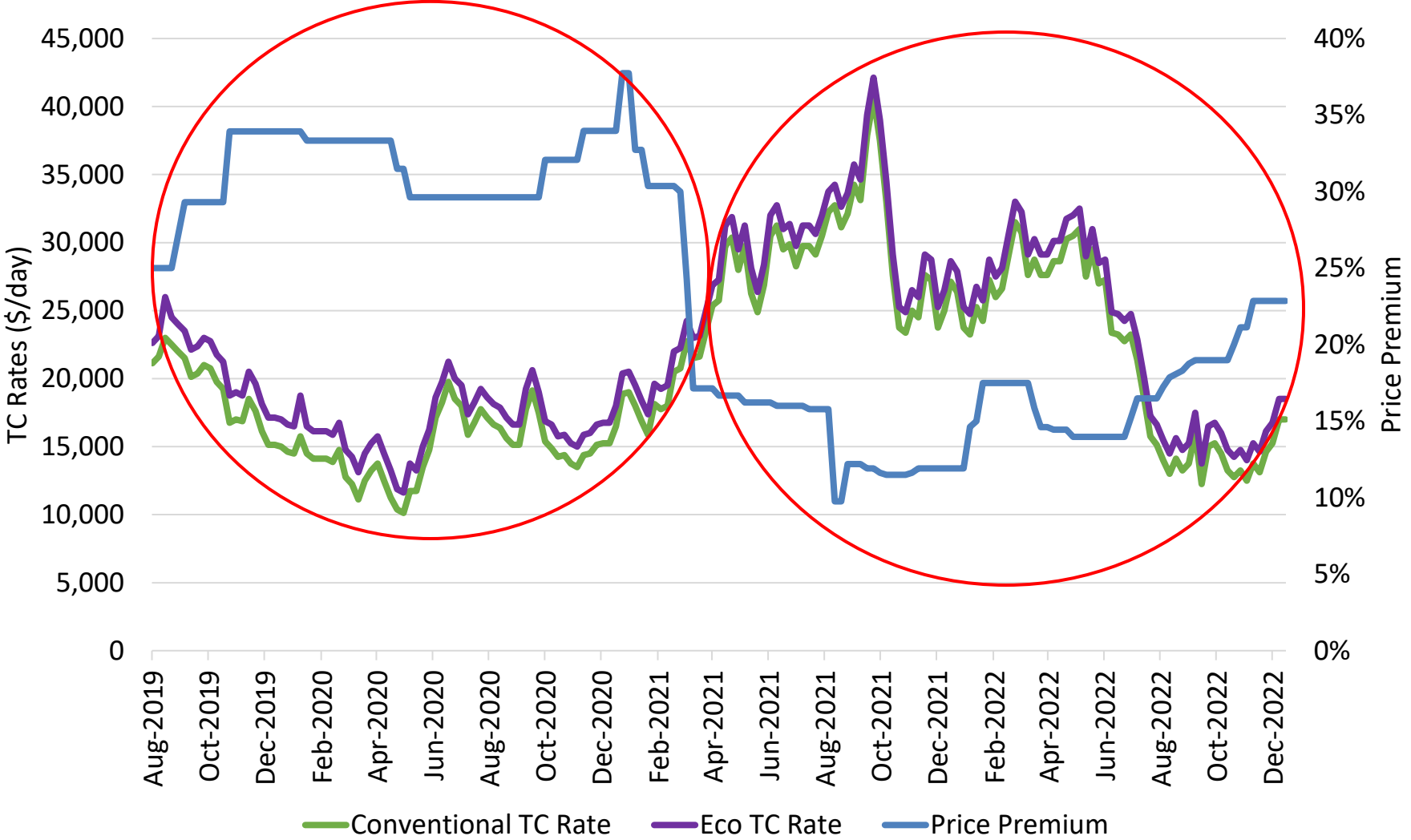
# Price Premia Are Much Higher Than Time-charter Premia



- Capesize vessels' premium is 23.2% on average while the TC premium close to 9.0%
- Aframax vessels' premium is 24.9% on average while the TC premium close to 15%

Source: Data are from Clarksons' SIN.

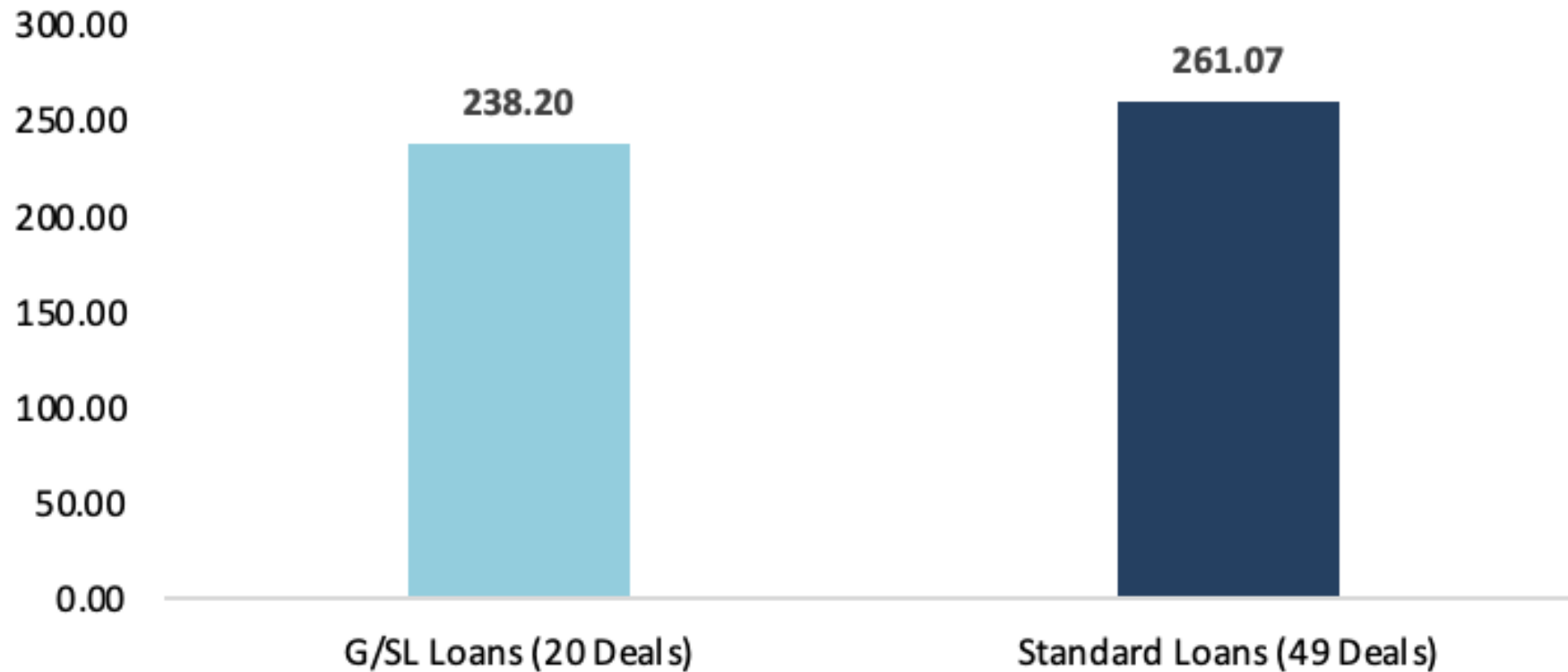
# Price Premia Depend on the Prevailing Market Conditions



- In bad markets, the demand for vessels is relatively low, especially for non-eco ones
- Prosperous markets are equivalent to high demand for seaborne trade and tight supply of vessels, even non-eco ones

Source: Data are from Clarkson's SIN.

# Average Spread of Shipping Loans (in b.p.), 2020-2023



- ❑ GLs/SLLs are cheaper by only 23 basis points
- ❑ Therefore, a lower cost of capital does not seem to explain the observed eco premium

Source: Data are from Marine Money and Clarksons' SIN.

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