



Microeconomic drivers of drybulk timecharter rates – Implications for data collection

NHH

Professor Roar Ådland

Center for Shipping and Logistics
Norwegian School of Economics





Objective of study

- What is "priced in" by the market in individual TC fixtures?
 - Consider drybulk only - a liquid TC market
 - TC more interesting than VC as fuel savings accrue directly to charterer
 - Charterers should be willing to pay a premium for fuel efficient tonnage, all else equal
- **Absence of a premium would be a "market failure"**
 - Innovation and investment in energy efficiency does not pay!
 - Will slow down the take-up of new technology
 - Smart operators can take advantage and extract economic value from chartering efficient vessels and re-letting in the voyage charter market



Potential variables

Independent variable	Expected sign	Interpretation
Macro variables		
Market rate	+	Market rate for standardised vessel
Fuel price	-	Rotterdam 380cst HFO price on report date
Contract variables		
Period	0	Duration of timecharter contract (mid-point of min/max)
Forward	-	Days between report date and delivery (mid-point laycan)
Option_D	+	Dummy for the presence of an extension option
Atlantic_D	+	Dummy for Atlantic Ocean delivery at start of TC
Pacific_D	-	Dummy for Pacific Ocean delivery
Indian_D	0	Dummy for Indian Ocean delivery
Ship variables		
DWT	+	Deadweight carrying capacity of ship
Age	-	Age of ship on contract report date
AgeSq	-	Squared age to capture non-linear effects
Speed	+	Vessel design speed
Consumption	-	Fuel consumption at design speed
EVDI	-	Rightship Existing Vessel Design Index
FEI	-	Fuel efficiency index: consumption/(speed*DWT)
Build1_D	+	Dummy for builder countries Japan and South Korea
Build2_D	-	Dummy for builder country China
Engine_D	-	Dummy for manufacturer other than MAN B&W
Gear_D	+	Dummy for the presence of cranes
Flag_D	-	Dummy for Flag of Convenience according to ITF
Boom_Cons	+	Interaction dummy for Consumption during 2003 - 2008
Boom_FEI	+	Interaction dummy for FEI during 2003 - 2008
Boom_EVDI	+	Interaction dummy for EVDI during 2003 - 2008



Panel data study of individual fixtures

- Data from Clarkson Research Ltd.:
 - 8,618 individual timecharters between 2001 and 2014 (May)
 - Broken down by size
 - Capesize (100,000 DWT+)
 - Panamax (60 – 100,000 DWT)
 - Handymax (40 – 60,000 DWT)
 - 60%+ built in Japan/South Korea
 - 80%+ have M.A.N. B&W engine
 - 60%+ of ships are delivered to charterer in the Pacific
 - Average age 6 – 8 years
 - Average design speed abt. 14.3 knots



Main general results

- The "market rate" explains 94%+ of individual rates
 - Contract and vessel specifications are not very important...
- Factors that never matter for pricing:
 - Engine make, flag, speed, build country – statistically insignificant
- Factors that always matter:
 - DWT – within a segment, larger ships get higher rates
 - Age: Nonlinear relationship – older ships obtain much lower rates
 - Fuel prices: Higher fuel prices means lower rates
 - Delivery lag: Charters starting further into the future get lower rates (effect of downward sloping term structure)
- Factors that matter for some segments:
 - Atlantic delivery (Panamax, Handymax)
 - Energy efficiency (Panamax)



Closer look at the energy efficiency premium

- Does not exist for Capesizes and Handymaxes
 - Irrespective of measure (tpd, grams per tonnemi, EVDI)
 - Irrespective of whether we account separately for the 2003 – 2008 boom
- Mixed results for Panamaxes
 - Does not exist for traditional measures (tpd, grams per tonnemi) unless you account for the "boom"
 - EVDI is highly significant both with and without a "boom" dummy
- Energy efficiency matters less during good times
 - High freight rates = high value of time = go for speed and power!
- Green credentials (low emissions, EVDI) appear to matter for Panamaxes
 - Some charterers only take vessels with good "grades" – market impact?
 - Only existed since 2010 so unlikely to have mattered in the past



Key takeaways

- "The market" dominates rates – not specs
- Weak support for the existence of an energy efficiency premium
 - Not robust across vessel sizes (Panamax only)
 - Not robust across sample periods (bad times only)
 - CO2 emissions (EVDI) matter more than \$? - unlikely....
- ...but it gets worse for owners
 - Not only do they not get paid for fuel efficiency
 - Charterers pay less for the ship in times of high fuel prices (owners effectively sponsor part of the charterers' fuel bill)
- The saviour?
 - Being "first pick" in the market = improved utilisation



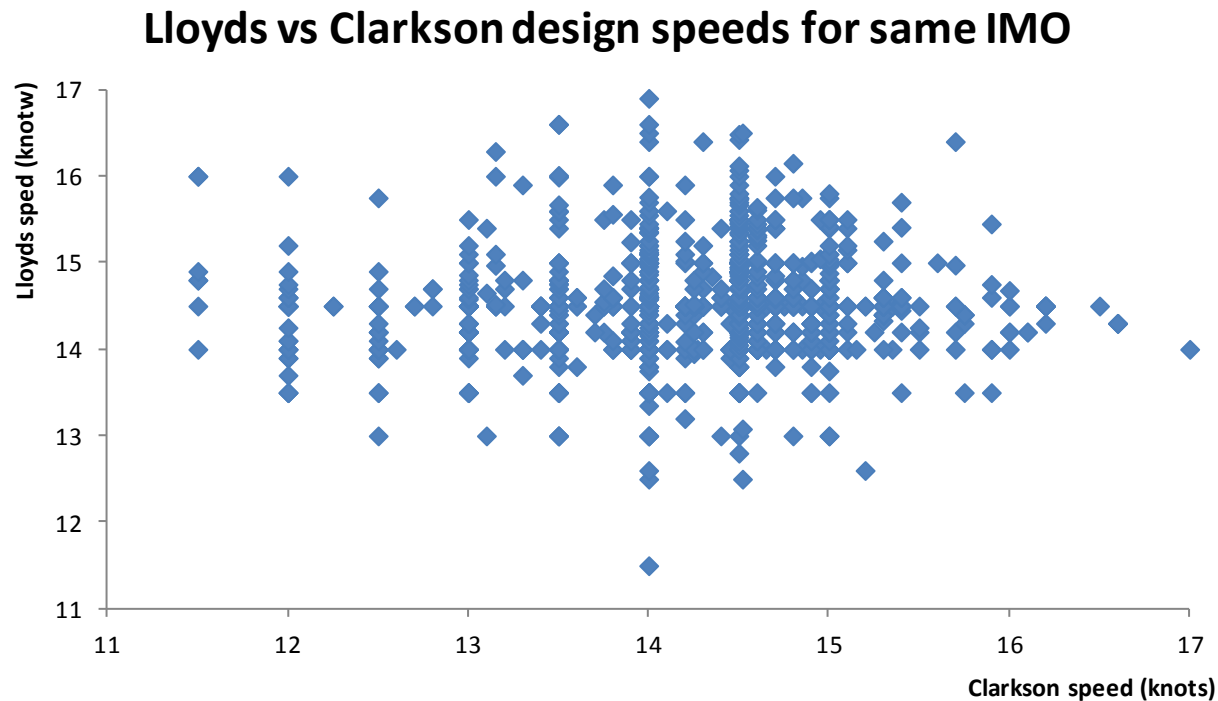
Can this be aligned with an efficient market?

- We have an apparent "market failure" – why?
 - Asymmetric information – owners know real performance better
 - Imperfect information – real seaway fuel consumption hard to measure and conditional on transitory weather conditions
 - In a "slow steaming world" differences in fuel efficiency are smaller than what design parameters indicate – not worth paying for
- Problems with the study?
 - Most TC vessels are high-spec vessels and this selection bias makes "no premium" hard to reject
 - Might get better result with tripcharter rates, but then impact (duration) is lower



Huge data quality problems

- No agreement on *design* speed & fuel consumption, never mind not having the real numbers...
- Many missing observations





Implications for data collection

- Speed & consumption

- Agree on common standards (flat water, summer DWT, 80% MCR)?
- Collate and disseminate more of the speed/consumption curve
 - E.g. consumption at 10, 11,...,15 knots
 - Ballast vs laden
 - Quantify the uncertainty of “real” numbers?
- EU/IMO will require better quality data here for emission calculation eventually anyway, whether owners like it or not.
- Open source collection?

- Timecharter rate series

- Standardise and specify both commercial terms and specs. (“average of Atlantic & Pacific delivery”, laycan in 30 days etc.

NHH



Thanks for you attention

