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Cyclical fluctuation in dry bulk market caused by non-supply/demand factors

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- Industry players started to try statistical market analyses/forecasts.
 - IHS Markit Freight Rate Forecast
 - Maersk Tankers and CargoMetrics collaboration
- Their concern is the mid-term deviation from long-term market equilibrium. Some of these deviation seem to have cyclical nature and not related to supply and demand directly.
- If a deviation is specified and its properties are estimated, it would improve market forecasts.

- Cyclicity is a well-known characteristic of shipping market and explained in textbooks such as Stopford (2009).
- Mathematical methods are employed to find out cycles, such as Fourier transform by Chisté and van Vuuren (2013) or EMD by Angelopoulos (2017).
- Effects of factors other than supply and demand on shipping markets are also studied.
- No previous study to focus on cyclicity caused by non-supply/demand factors and investigate its characteristics.

Objective of Study

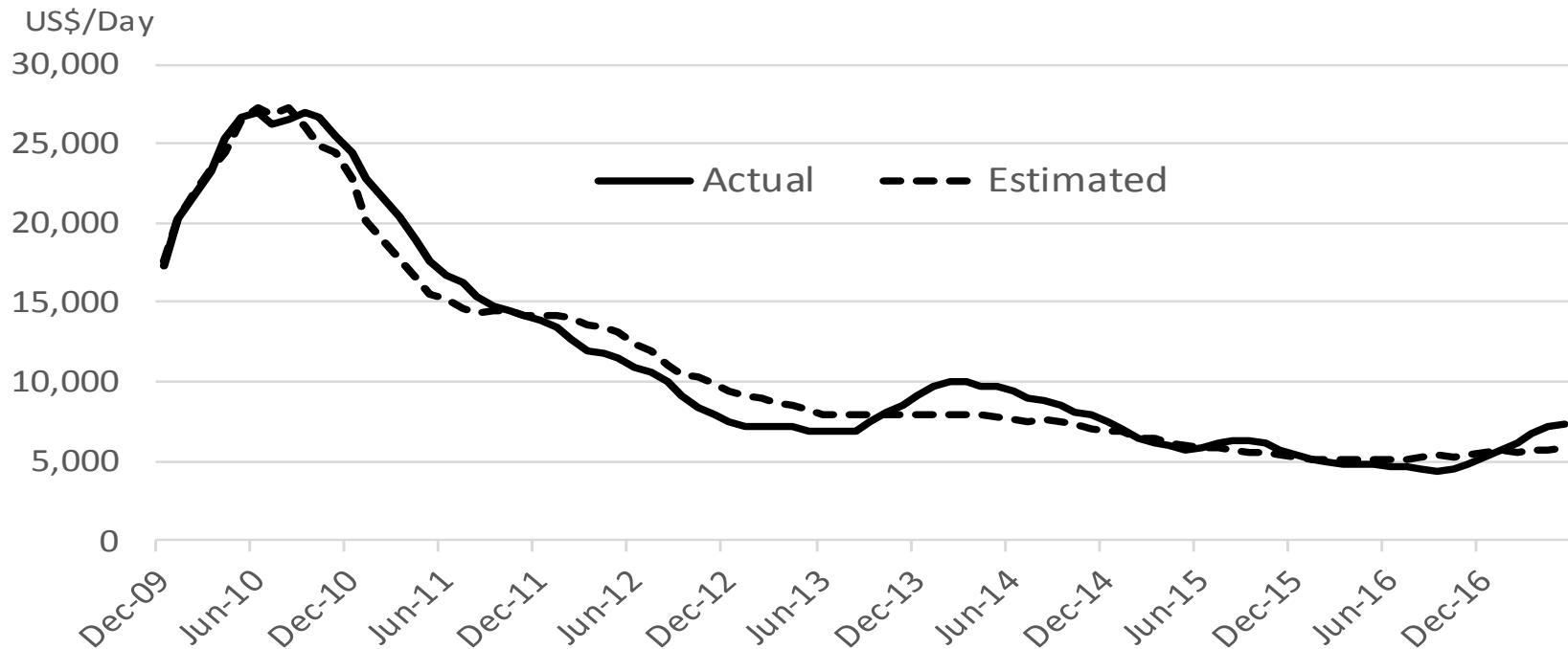
- Separate a specific fluctuation from the whole market movement.
 - With cyclicity of one-year or longer length.
 - Not related to supply/demand factors.
- If such a fluctuation exists, investigate the properties of the above fluctuation, such as size and frequency.
- Provide a hypothesis how the fluctuation is caused.

- Focusing Panamax spot market between Dec. 2008 and May 2017.
 - Panamax market is most liquid and competitive.
 - Market turmoil is over at Dec. 2008
- Baltic 4T/C Average is used as a spot rate.
- Clarkson's Panamax DWT Fleet is fleet capacity.
- Cargo volume is the sum of export volume of coal and grain from major export countries.

Commodity	Export Countries
Coking Coal	USA, Australia and Canada
Steam Coal	Australia, South Africa and Indonesia
Wheat	USA, Canada, Russia and Australia
Corn	USA, Argentina, Ukraine and Brazil
Soybean	USA, Brazil and Argentina

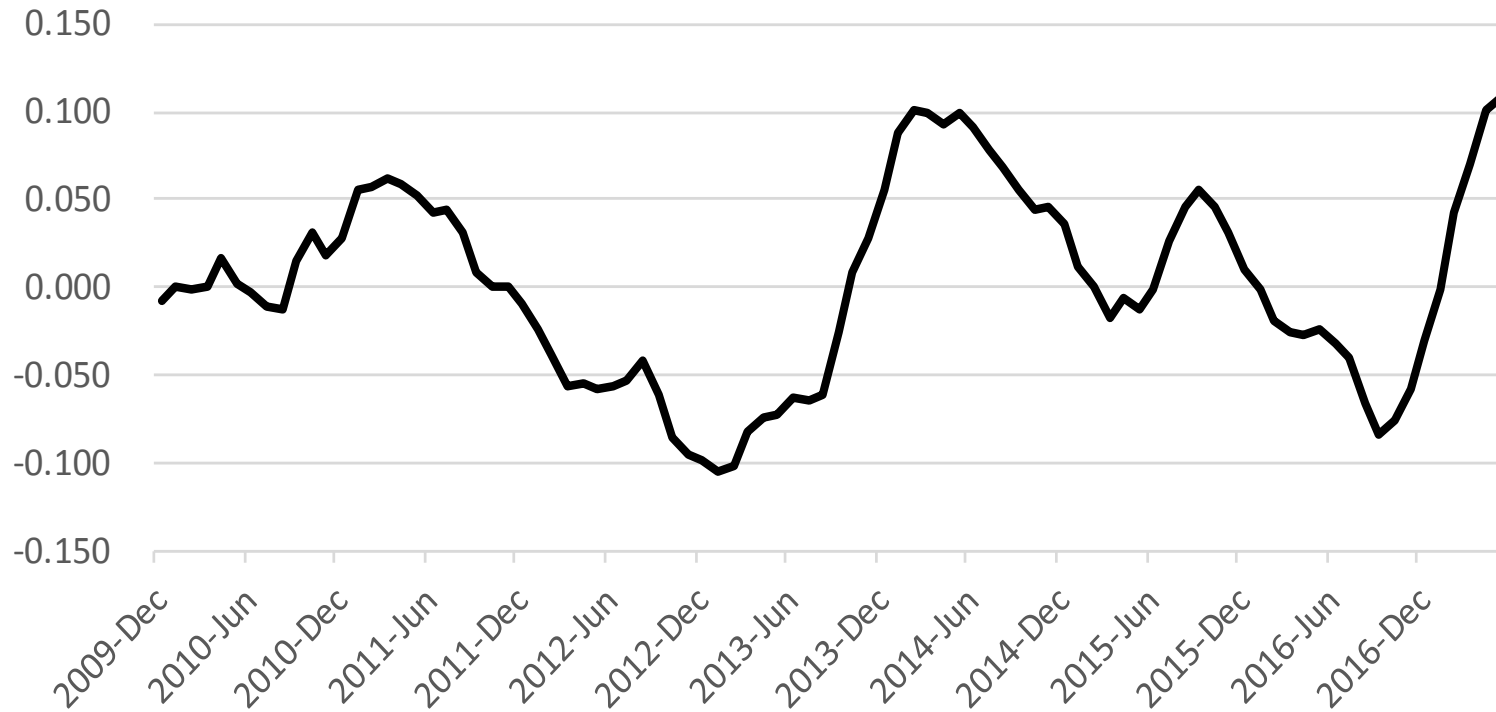
- A) Assume a model " Spot Rate = F(supply/demand factors) + F(non-supply/demand factors)"
- B) Remove fluctuations with shorter cycles by calculating 12-months moving average.
- C) Doing linear regression between 12-month MA spot rate and supply/demand calculated at step B), then get an equation to get estimated spot rate based on supply and demand.
- D) By subtracting estimated spot rate calculated at step C) from 12-month MA freight, you get the fluctuation caused by non-supply/demand factor and with a cycle longer than 12 months.

Actual and Estimated Spot Rates



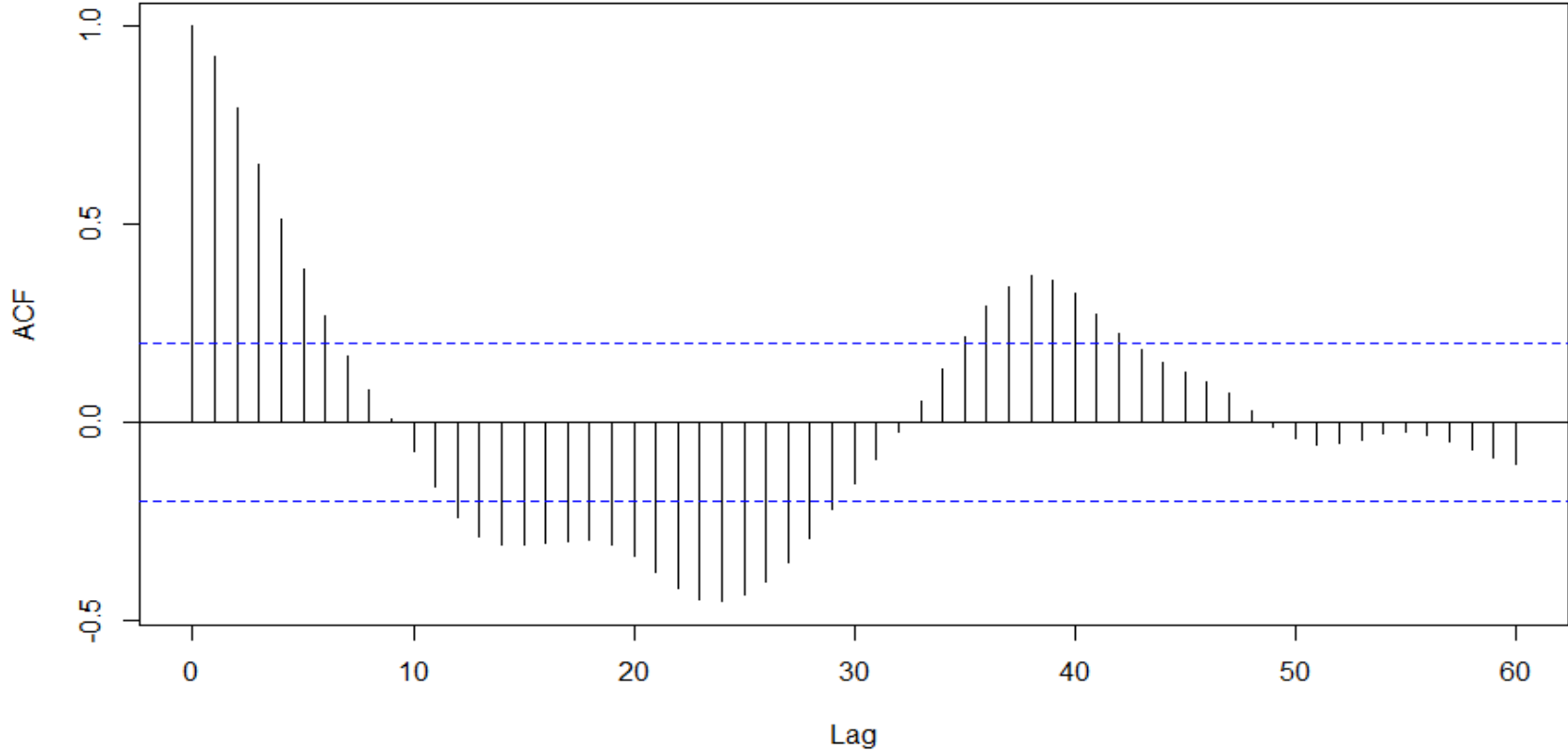
- Actual and estimated spot rates decrease almost monotonically and move in a similar way, often intersect.

Deviation of Actual Rate from Estimated



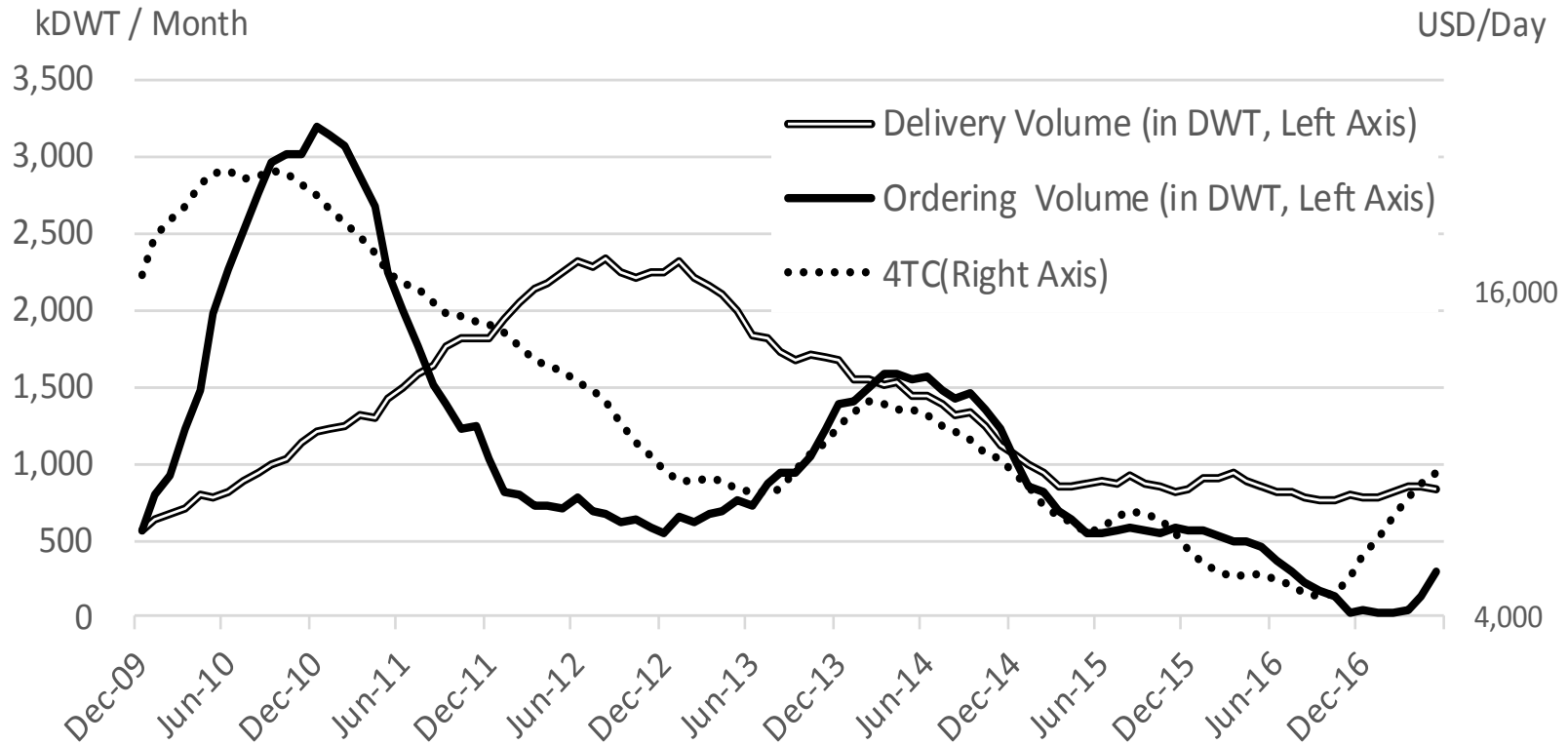
- The deviation seems to have cyclicity.
- Maximum deviation is around 25 percent from the estimated spot rate.

Correlogram of Deviation



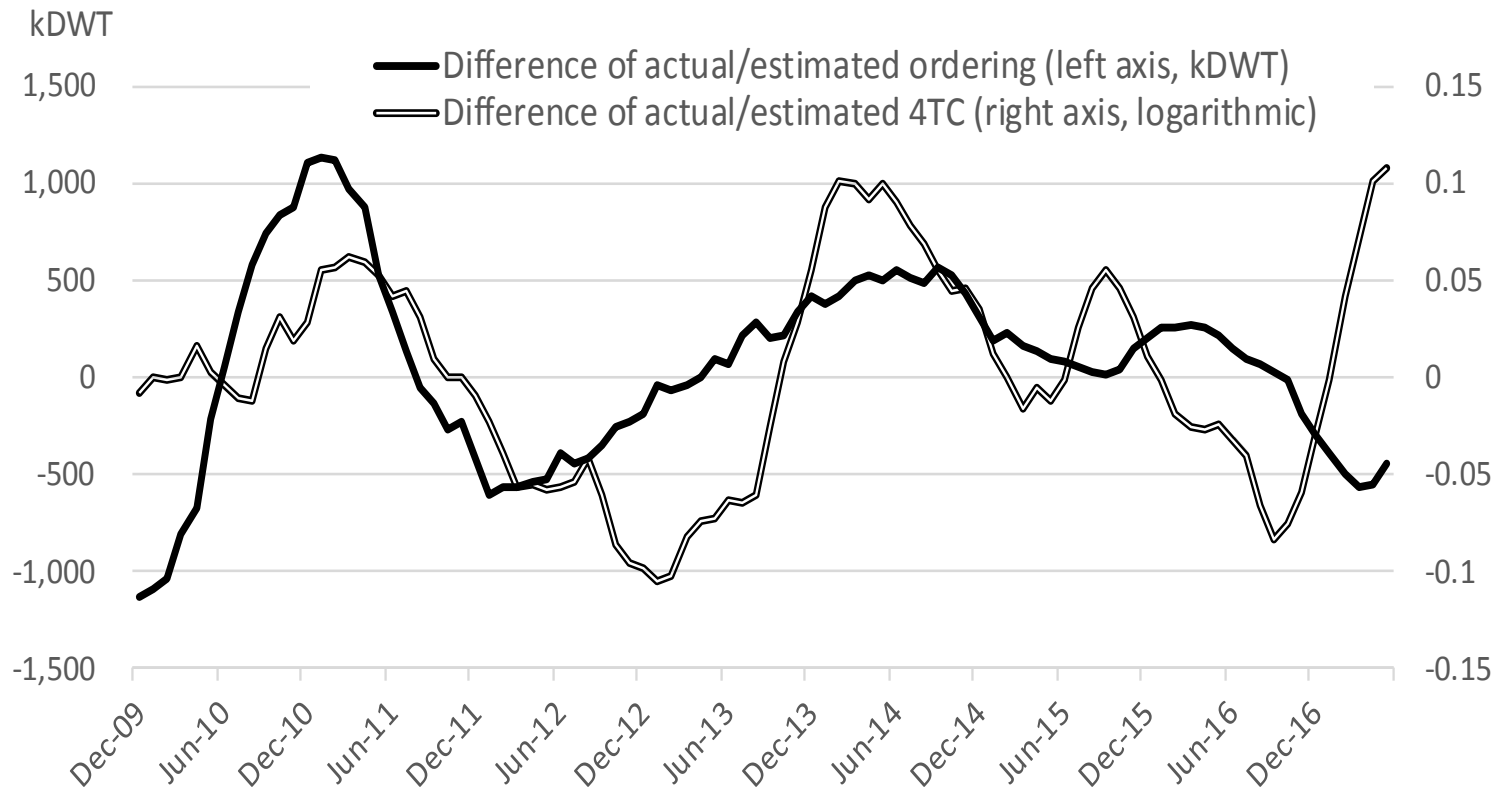
- The correlogram suggests 38 months-long cyclicality.

Cause of Fluctuation: Ordering Activities



- Ordering activities (contracts/cancels) and spot rate may affect each other.

Deviations: Spot Rate and Ordering Activity



- Deviations from estimated spot rates and ordering volume seem to move in a similar way.

- A cyclic fluctuation having a cycle longer than one year and not caused by supply/demand factors is found.
- The fluctuation is around +/- 25 percent deviation from the estimated spot rate. This is big enough to impact business decisions.
- Incorporating this fluctuation into a model will improve its accuracy.
- A hypothesis is proposed that this deviation may be related to ordering activities.

Further Discussions

- Employing more detailed model between spot rated and supply/demand factor.
 - Two-way correlation
 - Using ton-mile as demand factor
- Comparing the result with different approaches(e.g. spectral or frequency analysis)
- Applying this approach to other markets (e.g. Capesize).



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