Measuring World Real Economic Activity

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World market for shipping

![Graph showing supply and demand for shipping with price at Pt and quantity along the x-axis labeled Quantity, and supply and demand curves labeled St and Dt respectively.]
• Demand shifts right most years as global economic activity increases

• Supply shifts right as capacity added and technology improves

• Supply shifts usually dominate and relative price falls
Kilian (AER): Model shifts in supply and growth in potential output using deterministic time trend, interpret deviations from trend as real economic activity
\( x_t = \text{index of nominal shipping cost} \)

\( x_{1968:1} = 1 \)

\( x_t = x_{t-1} + \text{avg change in log of individual measures} \)

\[ \text{for } t \leq 2007:12 \]

\( x_t = x_{t-1} + \Delta \log(BDI_t) \text{ for } t \geq 2008:1 \)

\[ \Rightarrow x_t = \log(BDI_t) + x_{2008:1} - \log(BDI_{2008:1}) \]

\[ = \log(BDI_t) - 5.236 \text{ for } t \geq 2008:1 \]
Calculate
\[ \log(x_t/CPI_t) = \log(x_t) - \log(CPI_t) \]
Regress
\[ \log(x_t) - \log(CPI_t) = \alpha + \beta t + \varepsilon_t \]
residuals \( \varepsilon_t \) are the Kilian REA index
Real activity index when $x(1968) = 1$
\[ x_t = \log(BDI_t) - 5.236 \text{ for } t \geq 2008:1 \text{ when } x_{1968:1} = 1 \]

\[
\log(x_t) - \log(CPI_t) = \alpha + \beta t + \varepsilon_t
\]

\[
= \log[\log(BDI_t) - 5.236] - \log(CPI_t) \text{ when } x_{1968:1} = 1
\]

Would be

\[
\log[\log(BDI_t) - 5.694] - \log(CPI_t) \text{ if } x_{1973:1} = 1
\]
Real activity index for different normalizations of x
Why would linear trend fit to
\[ \log[\log(BDI_t) - c_0] - \log(CPI_t) \]
summarize growth in shipping capacity, improvements in shipping technology, and potential GDP?
Alternative option:

- OECD Main Economic Indicators of industrial production in OECD + 6 major countries goes back to 1958:1
- Includes China since 1999
- Updated by Baumeister and Hamilton (2018)
- Isolate cyclical component as in Hamilton (forthcoming) by $\log(y_t / y_{t-24})$
- If want to use shipping cost instead, better measure is $x_t - x_{t-24} - \log(CPI_t / CPI_{t-24})$
Daily cyclical component of real shipping cost, Mar 16, 2011 - Jul 16, 2018