The Leading Premium

Croce, Marchuk & Schlag

Discussion – SFS Cavalcades May 2019

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Motivation

Leading Indicators

- Large forecasting literature: *how do we predict recessions?*
- Important for policy analysis

This paper: micro leading (or lagging) indicators

- Different firms or industries carry different information about business cycle
- Leading Industries: higher returns (4%)

Interpretation: timing premium

- Quantitative benefit from early resolution of uncertainty: 1.5%

Discussion

What do we learn from identifying leading industries?

- Policy: useful for forecasting?
- Incremental information content of leading industries

Identification

- Are leading industries simply leading because they "cause" the business cycle
- Granger causality from actual causality

Structural Approach

- Links to existing industry lead-lag asset pricing

Plan

1. Constructing leading indicators
2. What do we learn from leading indicators
3. Identification
4. Structural approach

Lead-lag indicator

Correlogram

$$\rho^i_{t,h} = \operatorname{corr}\left(\Delta Y_t, \Delta \mathsf{CF}^i_{t-h}\right)$$

Maximum correlation

- Which time shift h maximizes

$$\arg\max_h |\rho^i_{t,h}|$$

Reduced form approach

- Why do some firms lead and other lag?
- Take the structure of economy at time t as given

Plan

Heuristic approach

Leading indicators

- Stock & Watson: leading indicators are a heuristic way of improving forecasting
- Use classic indicators like hours worked, industrial production...

Leading Premium

- Leading firms earn higher average returns
- Why?

Leading Forecast

- Prices of leading firms forecast economic activity

$$\Delta g_{t+h} = \gamma_0 + \gamma_h pd_t^{\text{lead}} + \dots$$

- What does $\gamma_h > 0$ mean?

Heuristic approach

Leading indicators

- Stock & Watson: leading indicators are a heuristic way of improving forecasting
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Leading Premium

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- Why?

Table 1: Lead-Lag Portfolio Sorting (Max Correlation)

	Lead	Mid	Lag	LL	LL Strong
Average return	9.43***	6.03**	5.24*	4.20**	5.24***
	(2.27)	(2.76)	(3.04)	(1.79)	(1.96)
CAPM α	3.17***	−0.63	−1.79	4.96***	6.12***
	(1.05)	(0.47)	(1.30)	(1.89)	(1.95)
FF3 α	3.02***	−0.71	−1.66	4.68**	6.23**
	(1.16)	(0.54)	(1.43)	(2.08)	(2.49)

Heuristic approach

Leading indicators

- Stock & Watson: leading indicators are a heuristic way of improving forecasting
- Use classic indicators like hours worked, industrial production...

Leading Premium

- Leading firms earn higher average returns
- Why?

Leading Forecast

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Table 8: Predictive Properties of Leading Price-Dividend Ratio

Industrial production growth				
	$h=1$	$h=2$	$h=3$	$h=4$
Eq. (1)-(3), γ_h	0.023***	0.032***	0.040***	0.046***
	(0.005)	(0.007)	(0.008)	(0.008)
Adj. R^2	0.467	0.188	0.040	0.020
Adj. R^{2*}	0.461	0.176	0.017	−0.013

- What does $\gamma_h > 0$ mean?

Heuristic approach

Leading Forecast

- Prices of leading firms forecast economic activity

$$\Delta g_{t+h} = \gamma_0 + \gamma_h pd_t^{\text{lead}} + \dots$$

- What does $\gamma_h > 0$ mean?
- Leading premium only captures $|\rho|$ and not the sign
  - High early absolute correlation $\rightarrow$ high expected returns
  - Low PD ratio $\rightarrow$ low growth rate **unconditionally**?
- Look at conditional correlation: non symmetric?
- Use leading portfolio for forecasting?

Plan

Interpretation of Leading Premium

Long run risk economy with news shocks

$$\Delta c_{t+1} = \mu + x_{t-h_c} + \varepsilon^c_{t+1}$$
$$\Delta d^{\text{lead}}_{t+1} = \mu + \phi^l_x x_t + \phi^l_c \varepsilon^c_{t+1} + \varepsilon^l_{t+1}$$

- What is x_t?
- LRR model: hard to detect slow moving component
  - h_c estimated to be 27 quarters ... contrast with max of 4 quarters in empirical section
- What is the structural parameter ϕ^l_x?
  - why leading firms load early on x_t
  - Industry composition in lead portfolio varies

How do we find a way out

- Borrow from news shock literature
- Go more structural: estimate factor model

News Shocks

Barsky-Sims approach.

- *"Identify the news shock as a structural shock orthogonal to technology innovations that best explains future variation in technology"*

Two explanations

- Are leading indicator actually leading indicator: information gets in early in some industries?
- Are leading indicators (industry) technology shocks that have to make their way through the aggregate economy?

A more structural empirical approach

Factor models: Long-Plosser approach

- Write down a factor model for output growth

$$\Delta c_{t+1} = \Gamma \mathbf{F}_t + \varepsilon_{t+1}$$

- Different firms/industries have different loadings Λ^i on factors:

$$\Delta d^i_{t+1} = \Lambda^i \mathbf{F}_t + \varepsilon^i_{t+1} = \sum_k \lambda^i_k f^k_t + \varepsilon^i_{t+1}$$

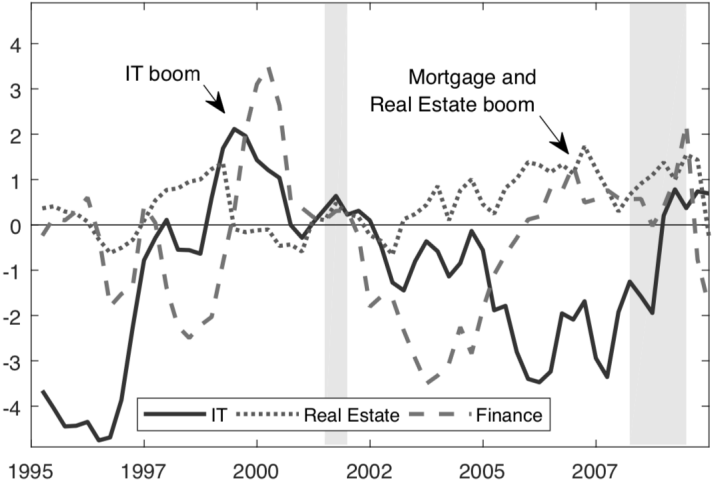
  - f^k_t can represent industry level shocks, $f^k_{t+1} = \rho_k f^k_t + A\mathbf{F}^{-k}_t + \varepsilon^{f_k}_{t+1}$
  - λ^i_k can represent production network, trade credit etc...

Leading interpretation

- Shut down all shocks but industry 1
  - Industry 1 predicts output *early* because it is the dominant factor
- High expected returns because it dominates the economy (Pastor & Veronesi, dominant beta argument)

A more structural empirical approach

- What do we learn from leading premium? A glimpse at the factor model

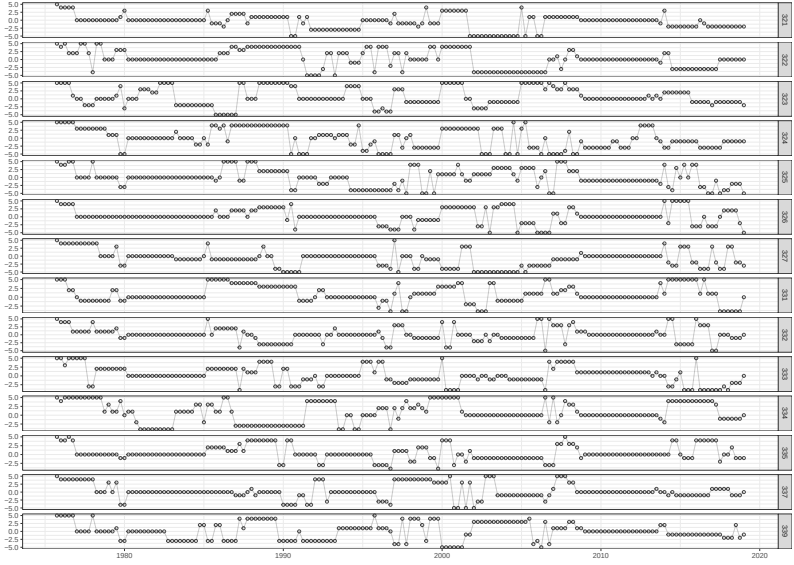


A more structural empirical approach

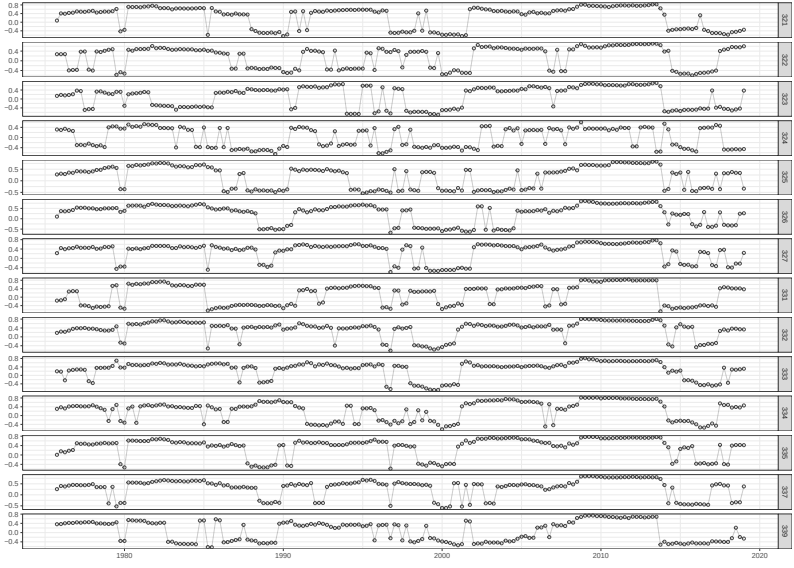
Structural leading interpretation

- What do we learn from leading premium? A glimpse at the factor model
- Hard to estimate in reduced form
  - High dimensionality and parameter stability
- Add some structure: parametric approach

Parameter stability



Parameter stability



Plan

Relation to production based asset pricing

Gofman, Segal & Wu

- Firms at top of the supply chain earn higher average returns
- Do we have evidence that firms at the top of the supply chain are also a leading indicator
- Related to Cohen & Frazzini information percolation result

Departing from endowment economy

- How do we interpret the results if leading industries can respond?

Final Thoughts

Results

- Great paper!
- Strong empirical fact

Some shortcomings

- Needs a better structural interpretation