Research Topic

Monday, June 03, 2013

The Volatility
Of individual stock returns

Factor: The concentration of firm's customer networks

The firm Size

Economic Linkages, customer networks
Firms are aggregators of downstream shocks

Granularity: a small number of large firms drive aggregate outcomes

\[ \frac{1}{\sqrt{N}} \]

Contribution

Our model’s contribution is to link the size distribution to network formation, which in turn affects volatility. The relevance of this mechanism extends beyond the specific context in our paper where shocks travel upstream from customers to suppliers.
The Environment

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\[ g_{t+1} = \mu_g + \gamma W_t g_{t+1} + \varepsilon_{t+1}, \quad \text{where } \varepsilon_{t+1} \sim N(0, \sigma^2 \varepsilon I) \]

**Firms' growth rates**

Variance of aggregate growth rate

\[ V_t(g_{a,t+1}) = \sigma^2 \tilde{S}_t (I - \gamma W_t)^{-1} (I - \gamma W_t')^{-1} \tilde{S}_t. \]

Effect of customer network

\[ V_t(g_{i,t+1}) \approx \sigma^2 \varepsilon (1 + \gamma^2 H_{i,t}) \]

**Firms' size story**

\[ w_{i,j,t} = \frac{b_{i,j,t} S_{j,t}}{\sum_{k=1}^N b_{i,k,t} S_{k,t}} \]

\[ p_{i,t} = \frac{S_{i,t}}{Z \sum_j (S_{j,t})} \]

Bernoulli random links

Cross-sectional differences in volatility are driven by differences in size, rather than differences in customer concentration, and are captured by one over the linkage probability, \( p_{i,t} \)

\[ \text{v}ariance \text{ in firm log sizes} \rightarrow \text{mean and the variance of the volatility distribution.} \]

Standard factor regression is **misspecified**
**The Evidence**

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**Size:** equity market value at the end of the calendar, or total sales during the calendar (Log)

**Volatility:** standard deviation of daily stock returns during the calendar + fundamental volatility (Log)

**Size Dispersion factor:** st.dev. of the lagged log market equity distribution

**Micro Evidence**

Supply customer information req. by FAS131
Truncation issue
Data facts generally support the upstream model
Large Herfindahl issue
Robust cross-sectional relation between customer concentration and volatility