The Real Effects of Financial Uncertainty Shocks: A Daily Identification Approach

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Introduction

• Financial market uncertainty raises in recession. Why?
  – Ludvigson et al. (2018): uncertainty causes recessions
  – Berger et al. (2020): recessions cause uncertainty

This Paper

• We examine the puzzle using a novel identification strategy that exploits daily data to disentangle the interactions between stock prices, bond spreads and volatility.

A 3-stage Identification Strategy

1. Identify the structural shock of interest in a daily VAR
2. Average the estimated daily shocks to the monthly frequency
3. Use monthly averages as an instrument in a monthly VAR

• By using daily data, we can identify uncertainty shocks accounting for the fact that financial markets respond to many ‘macro news’ on a monthly or quarterly basis ⇒ High-frequency data help in disentangling exogenous shocks and endogenous responses.

Does the empirical strategy work?

• In theory, if temporal aggregation is obtained by skip-sampling or averaging, then an average of HF shocks correctly recovers the initial responses of the LF variables.
  – Intuition: in a linear model, \( \sum_{t \in \tau} \varepsilon_t \approx \varepsilon_\tau \)

• This strategy eliminates temporal aggregation bias if the DGP is a daily VAR.

• Monte Carlo experiments support this conclusion:
  – Simulate data from a known high-frequency DGP assuming that one or more variables are not observed every period.
  – We compute the Mean Absolute Distance (MAD) between the true and the estimated IRFs.
  – We compare our strategy (HF+LF VAR) to the standard approach (LF-VAR) in recovering the true IRFs under alternative frequencies/temporal aggregation schemes.

<table>
<thead>
<tr>
<th>Frequency Mismatch</th>
<th>Temporal Aggregation</th>
<th>Sample Size</th>
<th>MAD ratio over HF-VAR</th>
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</thead>
<tbody>
<tr>
<td>Monthly-Quarterly Case (3)</td>
<td>Skip-sampling</td>
<td>100</td>
<td>2.86</td>
</tr>
<tr>
<td>Monthly-Quarterly Case (3)</td>
<td>Averaging</td>
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<td>5.88</td>
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<tr>
<td>Daily-Monthly Case (30)</td>
<td>Skip-sampling</td>
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<td>20.03</td>
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<tr>
<td>Daily-Monthly Case (30)</td>
<td>Averaging</td>
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<td>5.00</td>
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<td>LF VAR</td>
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<td>5000</td>
<td>14.29</td>
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<tr>
<td>HF+LF VAR</td>
<td>Averaging</td>
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<td>33.33</td>
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<tr>
<td></td>
<td></td>
<td>10000</td>
<td>10.01</td>
</tr>
</tbody>
</table>

– We also compare it to established mixed-frequency VARs (Schorfheide & Song, 2015; Ghysels, 2016), and find it a valid alternative.

Impact of Financial Uncertainty Shocks

• Berger et al. (2020) ⇒ realized volatility (RV) versus option-implied volatility (\( V \approx VXO \)). Uncertainty shocks identified as the linear combination of residuals that maximizes the 2Y-ahead FEV of \( V \) but do not affect RV within a month.

• The theory says there is no contemporaneous impact of \( V \) on RV. Does that mean that RV does not respond for one month?

• We can answer using our 3-step procedure:
  – Estimate daily VAR with \( RV, V \) and financial covariates.
  – Assume uncertainty shocks maximize the 2Y-ahead FEV of \( V \) but do not affect \( RV \) within a day.
  – Average the daily series of uncertainty shocks and use them as external instruments in a monthly VAR.

• We also use the identification proposed by Caldara et al. (2016) but at daily frequency: identifying uncertainty shocks as the linear combination of daily residuals that maximizes the 6 month-ahead VXO response subject to orthogonality w.r.t. financial shocks.

• The shocks turn out to have similar effects in the two setups:

Conclusions

• We use daily data to identify uncertainty shocks with a more accurate information set and looser restrictions on LF variables.

• Temporal aggregation matters: uncertainty shocks reduce economic activity, and their impact is similar in Berger et al. (2020) and Caldara et al. (2016).