Discussion of "Noisy News in Business Cycle" by Forni, Gambetti, Lippi, and Sala

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IV International Conference in memory of Carlo Giannini
Great contribution in the literature of NEWS and NOISE shocks: Barsky and Sims (2011, JME) and Blanchard, L’Huillier, and Lorenzoni (2013, AER)

"... news shocks are the permanent productivity shocks that because of their gradual effect on productivity, are largely information about future productivity rather than changes in current productivity. Noise shocks, by contrast, are shocks to the signal that are unrelated to changes in productivity. Ideally agents would ignore the noise shocks, but they are unable to fully distinguish between noise and news." [Krusell and Mckay, Economic Quarterly, 2010]
The paper proposes to achieve identification using dynamic rotations (dynamic identification) of the reduced form residuals in case of non-fundamentalness.

A contemporaneous linear combination of the VAR residuals cannot deliver the structural shock, but a dynamic combination (i.e. a combination of present and future residuals) can.

The structural shock are recovered as function of future reduced form ones, not current ones.

MAIN RESULTS: the "noisy news" (the real and the noise shocks together) explain more than half fluctuations of GDP, consumption and investment.
We assume that the potential output

\[ a_t = a_{t-1} + \varepsilon_{t-1} \]  \hspace{1cm} (1)

where \( \varepsilon_t \) (REAL SHOCK) is a Gaussian, serially uncorrelated process affecting the output with a one-period delay.

Consumers observe a noisy signal of \( \varepsilon_t \) (REAL or NEWS SHOCK), the SIGNAL \( s_t \):

\[ s_t = \varepsilon_t + \nu_t \]  \hspace{1cm} (2)

where \( \nu_t \) (NOISE SHOCK)
\[
\begin{pmatrix}
\Delta a_t \\
\sigma_t
\end{pmatrix}
= \begin{pmatrix}
L & 0 \\
1 & 1
\end{pmatrix}
\begin{pmatrix}
\epsilon_t \\
\nu_t
\end{pmatrix}
\] (3)

we can rewrite as:

\[
\begin{pmatrix}
\Delta a_t \\
\sigma_t
\end{pmatrix}
= \begin{pmatrix}
1 & L \sigma^2_\epsilon / \sigma^2_\nu \\
0 & 1
\end{pmatrix}
\begin{pmatrix}
\nu_t \\
\sigma_t
\end{pmatrix}
\] (4)

where

\[
\begin{pmatrix}
\nu_t \\
\sigma_t
\end{pmatrix}
= \begin{pmatrix}
L \frac{\sigma^2_\nu}{\sigma^2_\epsilon} & -L \frac{\sigma^2_\epsilon}{\sigma^2_\nu} \\
1 & 1
\end{pmatrix}
\begin{pmatrix}
\epsilon_t \\
\nu_t
\end{pmatrix}
\] (5)

\(\nu_t\) is the LEARNING SHOCK which represents the new information about past structural shocks.
• Different names for shocks: noise, news, real, noisy news, signal, learning, ... :-)

• Focus on MA representation in shocks and fundamentalness test :-)

• An identification strategy ad-hoc to use VAR in this topic :-)

⇒ Future applications to medium scale DSGE models with a VARMA representation :-))}
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Focus on **MA representation in shocks** and fundamentalness test :-)

In Beaudry and Portier (2013)

Figure 6: A structural nonfundamental news-rich MA(1) process and its fundamental representation

![Graph showing impulse response functions](image)

*Note: This Figure displays the impulse response functions to a unit shock for the structural non-fundamental process (18) and its Wold representation (19).*
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Different names for shocks: noise, news, real, noisy news, signal, learning, ... :-(

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<tr>
<th>Variable</th>
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</table>

Table 3: Variance decomposition in the 5-variable VAR, E12M ordered second. The entries are the percentage of variance explained by the shocks.
Maybe we can identify ONLY the noise shock ... NOT a NOISY NEWS ...  

how?
We combine the identification of noise shock with real-time data, using different vintages.

We focus on the economic implications using a simple VAR and the Impulse Responses.

We assume that early vintages of data are a NOISY version of the final release.

MAIN RESULTS: Significant Responses of Output, Unemployment and Investment to a NOISE SHOCK suggest that revisions are important in the behavior of macro variables.
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**Cholesky Identification Scheme in Data**

\[ x_t^0 = x_t^f + v_t \] (6)

\( x_t^0 \) is the **EARLY RELEASE**, \( x_t^f \) is the **FINAL RELEASE**, 
\( v_t = x_t^0 - x_t^f \) is a **NOISE SHOCK**

We include two vintages of GDP growth and unemployment in a VAR and identify the noise shock as that shock which **contemporaneously** affects the early release of data but not the latest.

Our baseline specification:

\[
\begin{bmatrix}
\Delta y_t^f \\
\Delta y_t^0 \\
\Delta y_t^0
\end{bmatrix}
= \beta_0 + \beta_1
\begin{bmatrix}
\Delta y_{t-1}^f \\
\Delta y_{t-1}^f \\
\Delta y_{t-1}^0
\end{bmatrix}
+ C
\begin{bmatrix}
\nu_t^1 \\
\nu_t^2 \\
\nu_t^3
\end{bmatrix}
\] (7)
Cholesky Identification Scheme in Data

Our identification strategy identifies $\nu^3_t$ as the noise or revision shock.

$$C = \begin{bmatrix} ... & 0 \\ 0 \\ ... & C_{33} \end{bmatrix}$$

(8)

Noise shocks are identified by the fact that they contemporaneously affect only the early release of data. As a result:

$\nu^3_t \perp \Delta y^f_{t-1}, u^f_{t-1}, \Delta y^0_{t-1}, \Delta y^f_t, u^f_t$
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Impulse Response Functions

Response of Output to a Noise Shock

0.6
0.4
0.2
0
-0.2
0 2 4 6 8 10 12 14 16 18 20
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Impulse Response Functions

Response of Unemployment to a Noise Shock

Graph showing the response of unemployment to a noise shock over time, with different lines indicating varying scenarios.
The paper is a FANTASTIC contribution!!!!
Noise vs News

Mankiw and Shapiro (1986) and Aruoba (2008)

- **Noise**: the initial announcement is an observation of the final series, measured with error. The revision is uncorrelated with the final value but correlated with the data available when estimate is made.

- **News**: the initial announcement is an efficient forecast which depends on all information. The revision is correlated with the final value but uncorrelated with the data available when estimate is made.
Proposed state equation for a model with dispersed information (i.e. one in which additional information about the past is still relevant):

\[ x_t^f = A(L)x_{t-1}^f + B(L)v_{t-1} + \varepsilon_t \]  

(9)

- The final release is assumed to be the variable set by agents in the model
- With the benefit of hindsight the information set of the econometrician is richer than that of model agents
- Main assumption: the early release for the current period is not available when agents make their decisions (hence \( v_t \) does not show up in the law of motion)
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Classical Noise

\[ x_t^0 = A(L)x_{t-1}^f + B(L)v_{t-1} + \varepsilon_t + \nu_t \]  

(10)

The revision is orthogonal to the final release

**Identification Assumption**: the noise shock contemporaneously affects the early but not the final release
Data

- Quarterly vintages and quarterly observations of the **Real GNP/GDP** (OUTPUT). We take the first difference logarithmic transformation, considering it as a quarterly (annualized) growth rate → **Early and final vintages**
- Quarterly vintages and monthly observations of the **Unemployment Rate** (RUC). We transform our data from monthly to quarterly frequency considering the first observation of the quarter
- All the series are taken from 1966:1 to 2006:4, considering the latest revision of 2011:3
- Source: FED of Philadelphia
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Impulse Response Functions

Response of Investment to a Noise Shock

\[ x \times 10^{-3} \]

\[ \text{Response of Investment to a Noise Shock} \]

[Graph showing response of investment to a noise shock over time]
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Impulse Response Functions

Response of Output to a Noise Shock

-0.2 0 0.2 0.4 0.6
0 2 4 6 8 10 12 14 16 18 20
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Variance Decomposition

Percent Share of Output Growth Forecast Error Variance attributed to Noise Shocks

Percent Share of Unemployment Forecast Error Variance attributed to Noise Shocks
### Variance Decomposition: Comparison

<table>
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<tr>
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<th>Unemployment</th>
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<td>BQ</td>
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<tr>
<td>Supply</td>
<td>43.48</td>
<td>41.23</td>
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<tr>
<td>Demand</td>
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<td>54.04</td>
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<tr>
<td>Noise</td>
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