Discussion of "Whither News Shocks?" by Barsky, Basu & Lee

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- ► *"Does news about future productivity cause business-cycle fluctuations?"* (first sentence of BBL abstract)
- ► *"Are changes in expectations a key driver of business cycles?*
  - × This raised the question: *"How to identify "pure" changes in expectations?"*
  - × *"Let's look at information about future productivity contained in Stock Prices"* (as followed by Beaudry & Portier 2006)
- ► Another interesting question is *"What are the features of a permanent shock to productivity and how does it impact the economy?"*
- ► All are interesting questions, but each on them needs to be answered in a specific way.

0. Introduction

- The question one answers cannot be known when choosing one particular way to identify the relevant shock.
- Only with the obtained response of TFP one can decide to coin the shock as a "news" or not
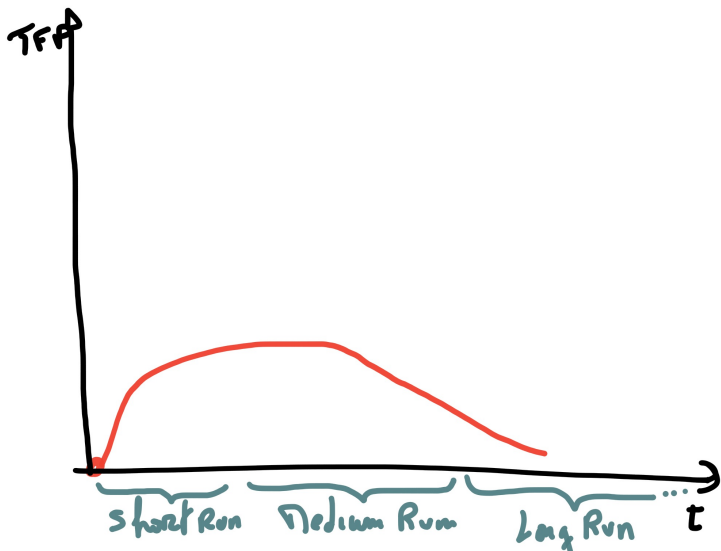
0. Introduction
Which question BBL are answering?

- ▶ BBL propose a particular identification.
- ▶ They identify *"those shocks which are orthogonal to current TFP and whose share of the FEV of TFP at horizon h (20 quarters) is maximum"*.
- ▶ Very good.
- ▶ There is no way one can put a name on those shocks before we see what do the look like.
- ▶ They *might be*
  - × TFP short run shock (not much of an expectation component)
  - × TFP quick increases with long run impact
  - × TFP long run increase with not much of a short/medium run impact
  - × No TFP changes at all.
- ▶ One needs to see the results to qualify the estimated shocks as TFP news.

0. Introduction
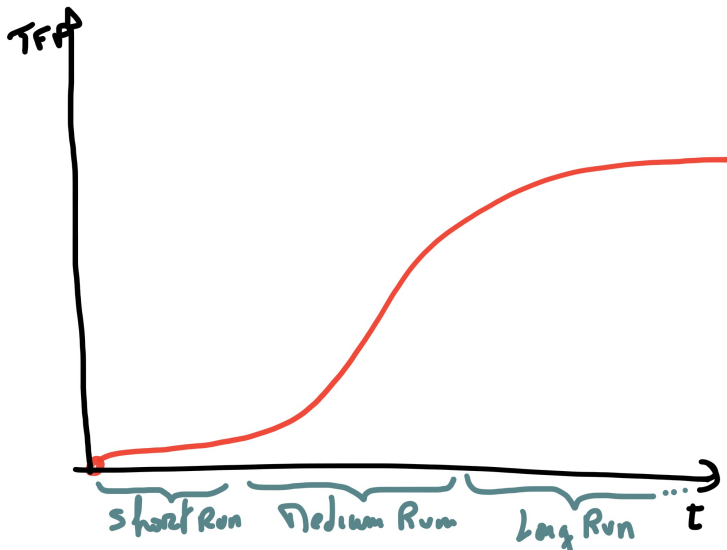TFP short run shock (not much of an expectation component)
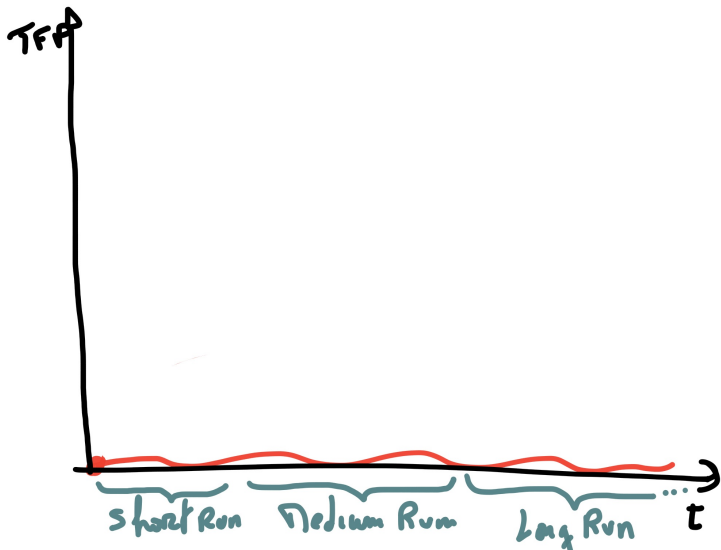
0. Introduction
TFP quick increases with long run impact
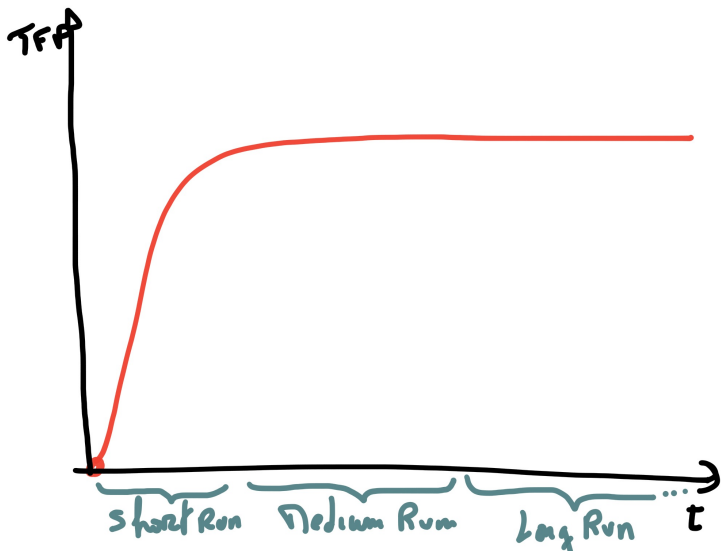
0. Introduction
TFP long run increase with little short/medium run movements

- ▶ Quick refresher on what we knew before BBL
- ▶ Dissection of BBL results
- ▶ Propose an extreme identification (that I call ZR for ZeRos)
- ▶ Illustrate the difference between those two identifications for some models implications

Roadmap

1. Where did we stand before BBL?
2. Understanding BBL results
3. Imposing the news to be a news (ZR)
4. Feeding models with BBL or ZR "news"

Roadmap

1. <u>Where did we stand before BBL?</u>
2. Understanding BBL results
3. Imposing the news to be a news (ZR)
4. Feeding models with BBL or ZR "news"

1. Where did we stand before BBL?
Data

- ▶ 1948-2012
- ▶ C includes durable goods
- ▶ I does not
- ▶ In the other parts of my discussion, I will use BBL data

1. Where did we stand before BBL?
Structure

- ▶ VAR model
- ▶ 3 lags, $n - 1$ cointegration relations except when H are included (levels)
- ▶ In the other parts of my discussion, I will use only levels

$$X_t = \begin{pmatrix} TFP_t \\ X_{2t} \\ \vdots \\ X_{nt} \end{pmatrix} = A(L) \begin{pmatrix} \varepsilon_{Nt} \\ \varepsilon_{2t} \\ \vdots \\ \varepsilon_{nt} \end{pmatrix}$$

- ▶ Matrix of Forecast Error Variance shares at horizon h

$$\begin{pmatrix} v_{ijh} \end{pmatrix}$$

- ▶ v_{ijh} : share of the FEV of variable X_i accounted by shock ε_j at horizon h

1. Where did we stand before BBL?
Identification

- I will express identifying restrictions as restrictions on the matrices of Forecast Error Variance shares at horizon h.
- For example, in a n variables VAR, Choleski decomposition corresponds to:

$$
\begin{array}{ccccc}
0 & \cdots & h & \cdots & \infty
\end{array}
$$

$$
\begin{pmatrix}
\times & 0 & \cdots & \cdots & 0 \\
\times & \times & 0 & \cdots & 0 \\
\vdots & \vdots & & \ddots & \vdots \\
\times & \times & \cdots & \cdots & \times
\end{pmatrix}
\qquad
\begin{pmatrix}
\times & \cdots & \cdots & \times \\
\vdots & \ddots & & \vdots \\
\vdots & & \ddots & \vdots \\
\times & \cdots & \cdots & \times
\end{pmatrix}
\qquad
\begin{pmatrix}
\times & \cdots & \cdots & \times \\
\vdots & \ddots & & \vdots \\
\vdots & & \ddots & \vdots \\
\times & \cdots & \cdots & \times
\end{pmatrix}
$$

1. Where did we stand before BBL?
Beaudry & Portier 2006

$$X_t = \left(\begin{array}{c} TFP_t \\ SP_t \end{array} \right) = A(L) \left(\begin{array}{c} \varepsilon_{Nt} \\ \varepsilon_{2t} \end{array} \right)$$

1. Where did we stand before BBL?
Beaudry & Portier 2006

$\times$ BP Short run

Horizon :   1 $\cdots$ h $\cdots$ ∞

FEV share : $\begin{pmatrix} 0 & 100 \\ \times & \times \end{pmatrix}$ $\begin{pmatrix} \times & \times \\ \times & \times \end{pmatrix}$ $\begin{pmatrix} \times & \times \\ \times & \times \end{pmatrix}$

$\times$ BP Long Run

Horizon :   1 $\cdots$ h $\cdots$ ∞

FEV share : $\begin{pmatrix} \times & \times \\ \times & \times \end{pmatrix}$ $\begin{pmatrix} \times & \times \\ \times & \times \end{pmatrix}$ $\begin{pmatrix} 100 & 0 \\ \times & \times \end{pmatrix}$

1. Where did we stand before BBL?
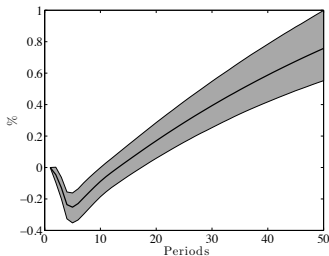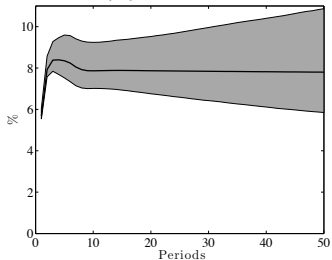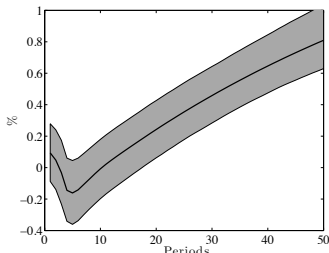
Beaudry & Portier 2006
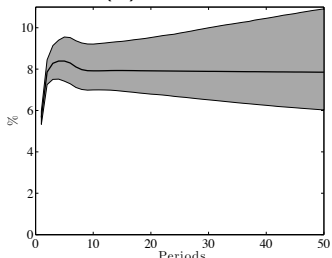
1. Where did we stand before BBL?
Beaudry & Portier (JEL 2014), 3-VAR

- ▶ Only two shocks can have permanent impact of TFP (one of the two being the news)
- ▶ Only one shock can have impact effect on TFP

$$
\begin{array}{ccc}
0 & h & \infty
\end{array}
$$

$$
\begin{pmatrix}
0 & \times & 0 & \cdots & 0 \\
\times & \times & \cdots & \cdots & \times \\
\times & \times & \cdots & \cdots & \times \\
\vdots & \vdots & \ddots & & \vdots \\
\vdots & \vdots & & \ddots & \vdots \\
\times & \times & \cdots & \cdots & \times
\end{pmatrix}
\begin{pmatrix}
\times & \cdots & \cdots & \cdots & \times \\
\vdots & \ddots & & & \vdots \\
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\end{pmatrix}
\begin{pmatrix}
\times & \times & 0 & \cdots & 0 \\
\times & \cdots & \cdots & \cdots & \times \\
\times & \cdots & \cdots & \cdots & \times \\
\vdots & \ddots & & & \vdots \\
\vdots & & \ddots & & \vdots \\
\times & \cdots & \cdots & \cdots & \times
\end{pmatrix}
$$

1. Where did we stand before BBL?
Beaudry & Portier (JEL 2014), 3-VAR

(a) *TFP* (b) Stock Prices
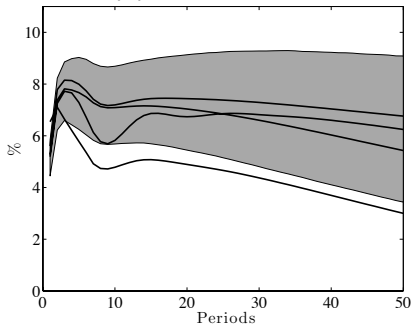
1. Where did we stand before BBL?
Beaudry & Portier (JEL), 3-VAR

(c) Consumption
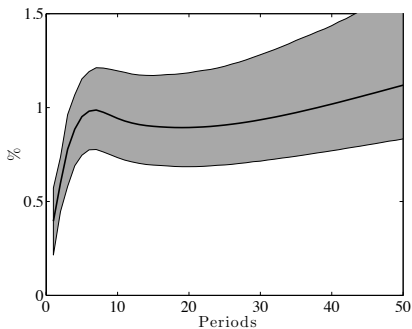
(d) Investment
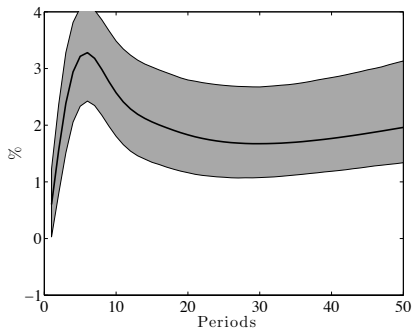
1. Where did we stand before BBL?
Beaudry & Portier (JEL), 3-VAR

(e) GDP   (f) Hours

1. Where did we stand before BBL?
Barsky & Sims

$$
\begin{matrix}
0 & & & 1 & & & \cdots \\
\begin{pmatrix} 0 & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} & &
\begin{pmatrix} \bullet & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} & & & \cdots
\end{matrix}
$$

$$
\begin{matrix}
h & & & \cdots & & & \infty \\
\begin{pmatrix} \bullet & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} & & & \cdots & & &
\begin{pmatrix} \times & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix}
\end{matrix}
$$

$\sum_{j=0}^{h} \bullet$ is max

1. Where did we stand before BBL?
Barsky & Sims

- ▶ (TFP, C, Y, H) VAR and (TFP, SP, Y, H or C) one (dashed)
- ▶ $h = 40$
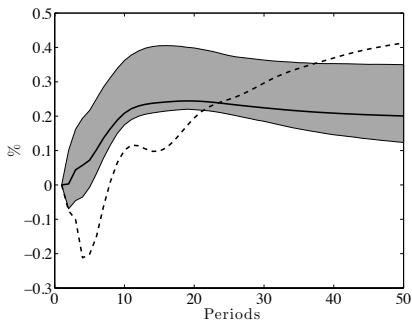
(a) TFP   (b) Consumption
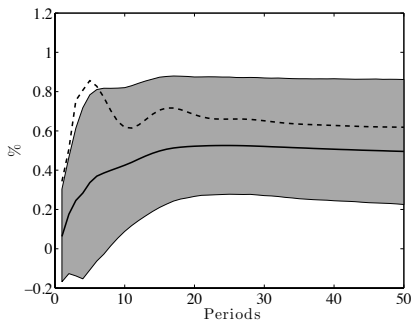
1. Where did we stand before BBL?
Barsky & Sims

(c) Output (d) Hours
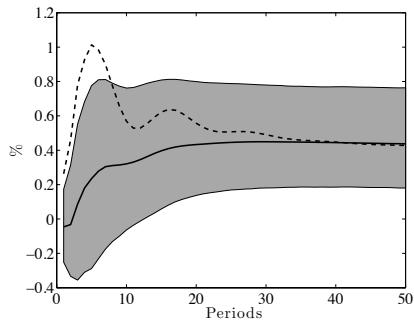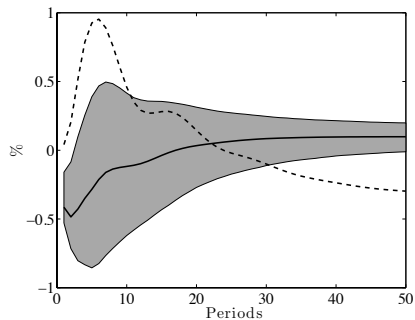
Summary

- ▶ When one obtains a slow diffusion of TFP, one observes business cycles fluctuations

Roadmap

1. Where did we stand before BBL?
2. <u>Understanding BBL results</u>
3. Imposing the news to be a news (ZR)
4. Feeding models with BBL or ZR "news"

2. Understanding BBL results
Data

- ▶ From now on, data are BLL
- ▶ Sample is either 1948-2012 or 1960-2012 (confidence)
- ▶ Always 3 lags and levels

$$0 \qquad\qquad 1 \qquad\qquad \cdots$$

$$\begin{pmatrix} 0 & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} \quad \begin{pmatrix} \times & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} \qquad \cdots$$

$$h \qquad\qquad \cdots \qquad\qquad \infty$$

$$\begin{pmatrix} \bullet & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix} \qquad \cdots \qquad \begin{pmatrix} \times & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix}$$

- • is max

2. Understanding BBL results
BBL baseline results

- ▶ Sample is 1960-2012
- ▶ Form now on, no confidence bands are shown.
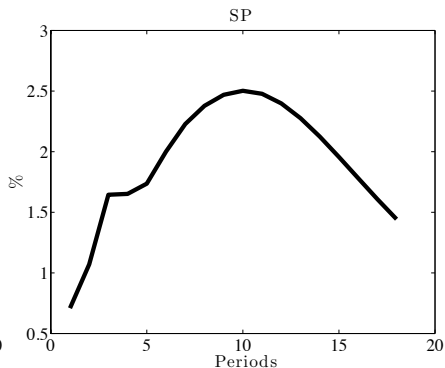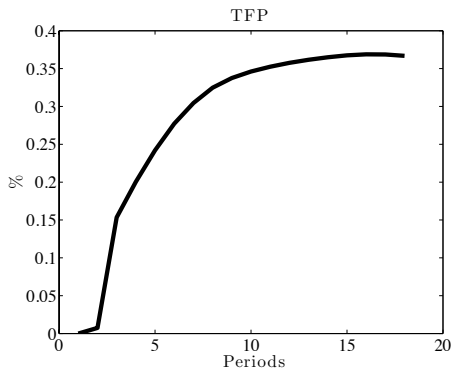
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BBL baseline results
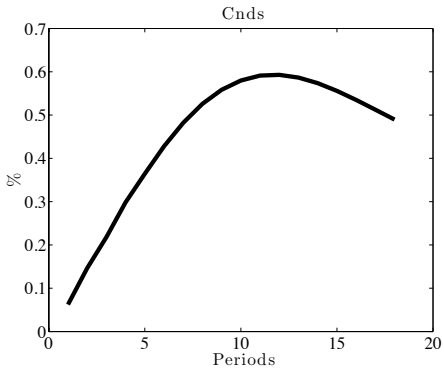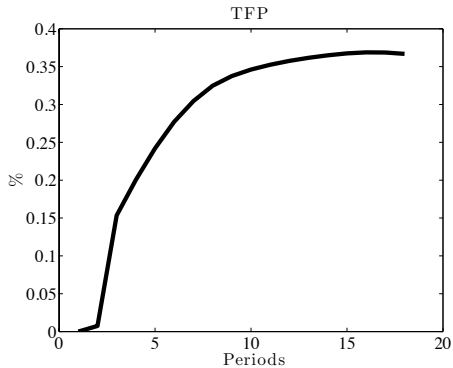
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BBL baseline results
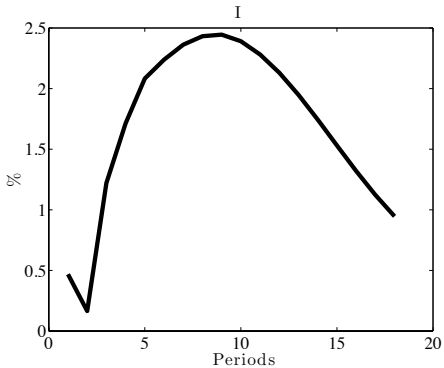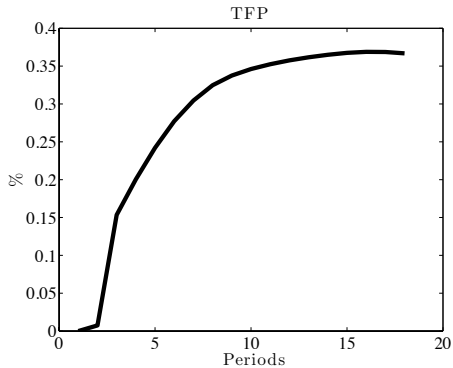
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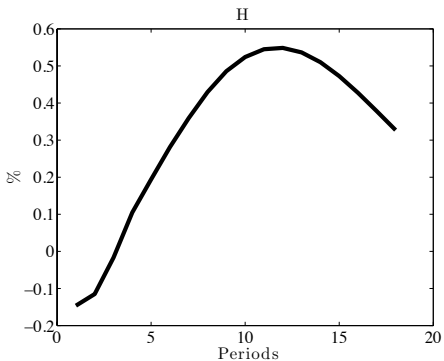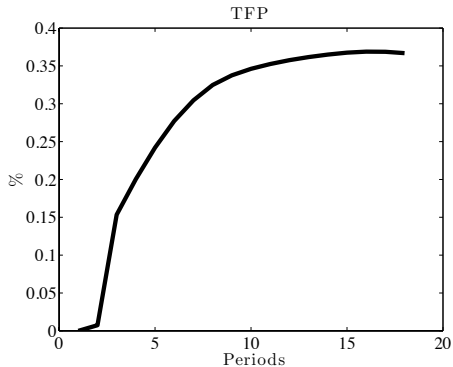
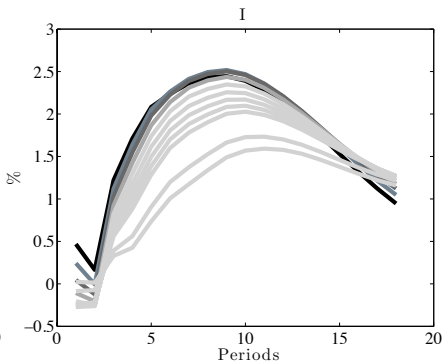# 2. Understanding BBL results
BBL baseline results
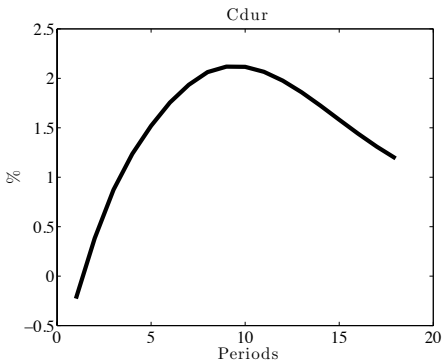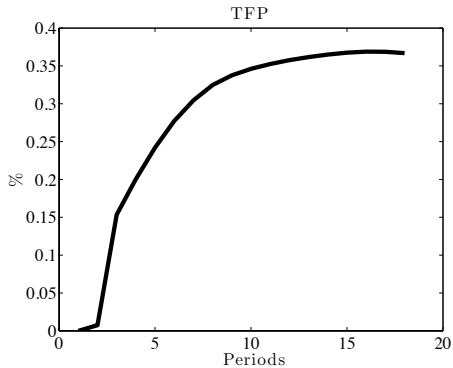
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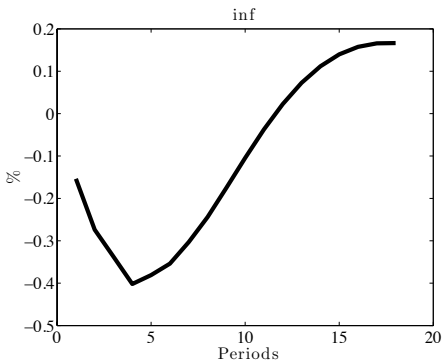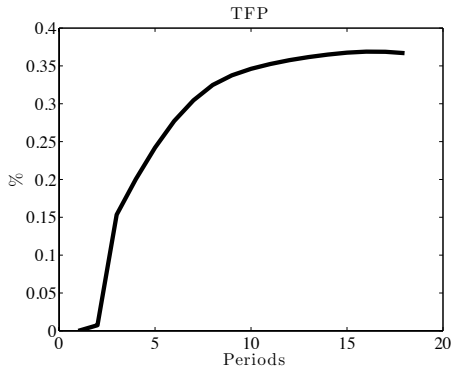
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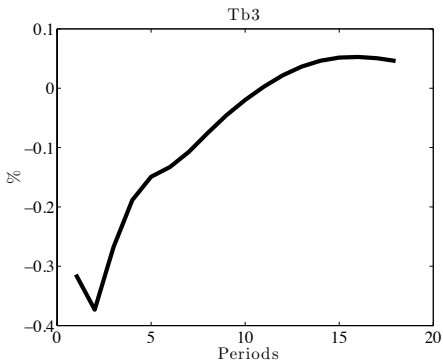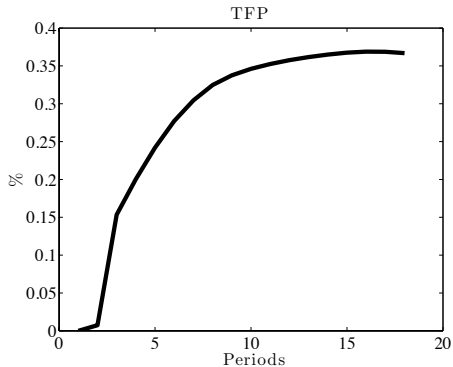
2. Understanding BBL results
BBL baseline results: Long run response of TFP
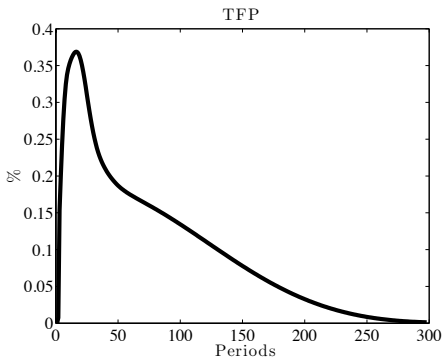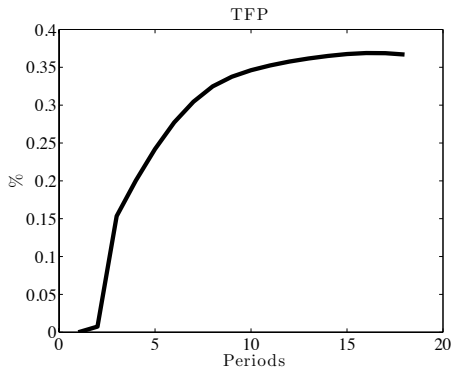
2. Understanding BBL results
The role of the horizon

▶ Black line is $h = 20$, then the lighter the line, the longer the horizon (up to $h = 200$)

2. Understanding BBL results
The role of the horizon

2. Understanding BBL results
The role of the horizon

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2. Understanding BBL results
Confidence and short sample do not matter for the results

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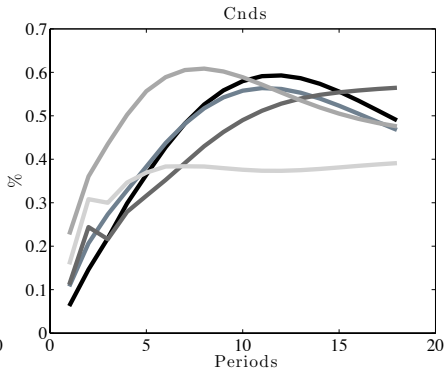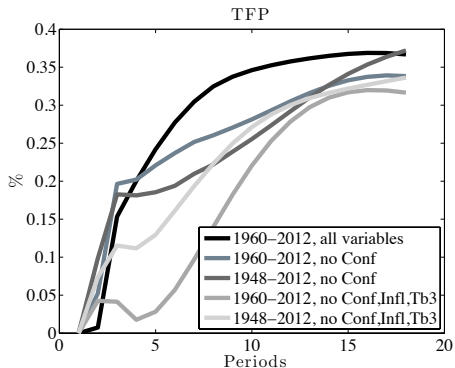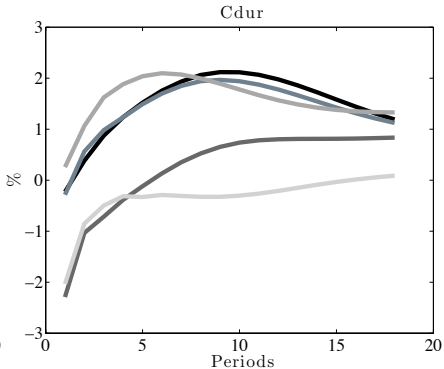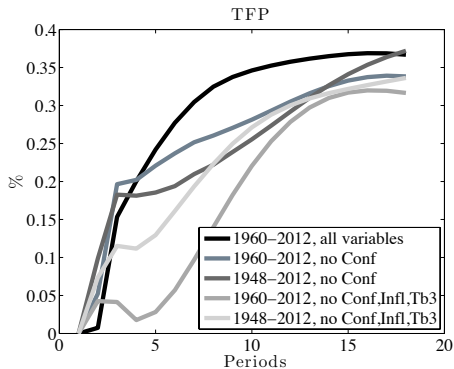Confidence and short sample do not matter for the results

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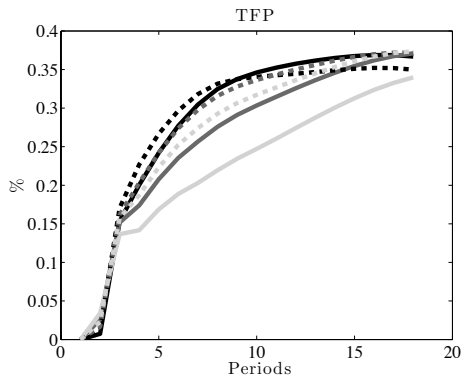
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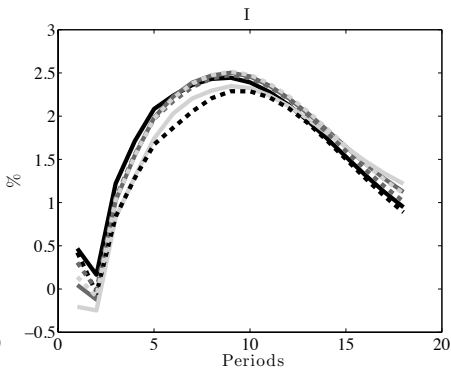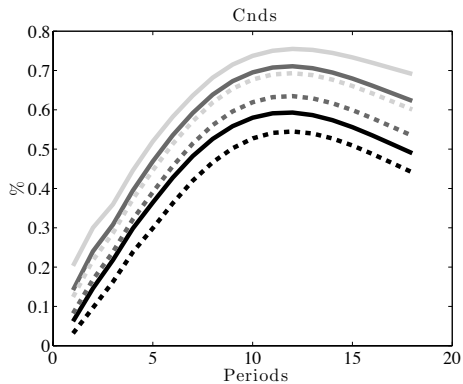
2. Understanding BBL results
BBL or BS identification ($h = 20, 40, 60$)

- ▶ Plain lines is BBL identification, dashed lines is BS (Barsky-Sims)
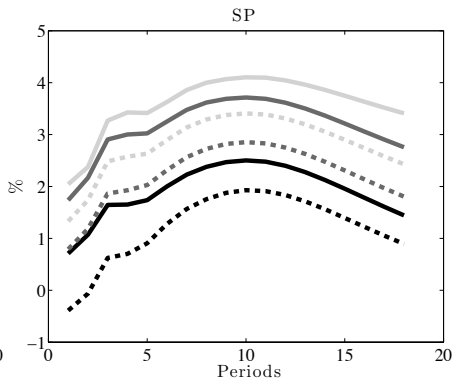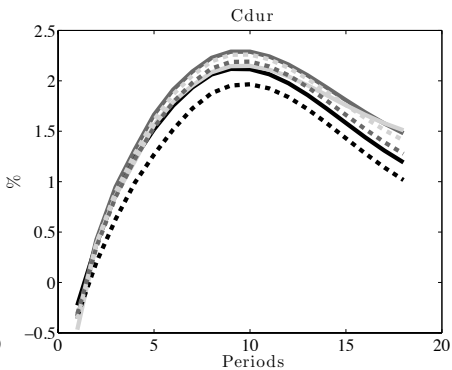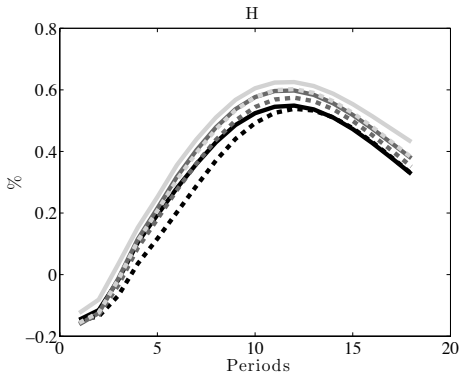
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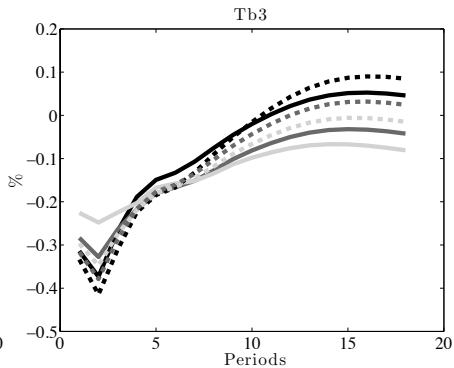BBL or BS identification ($h = 20, 40, 60$)

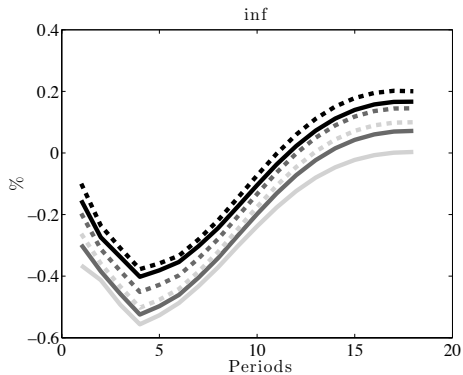## 2. Understanding BBL results
BBL or BS identification ($h = 20, 40, 60$)
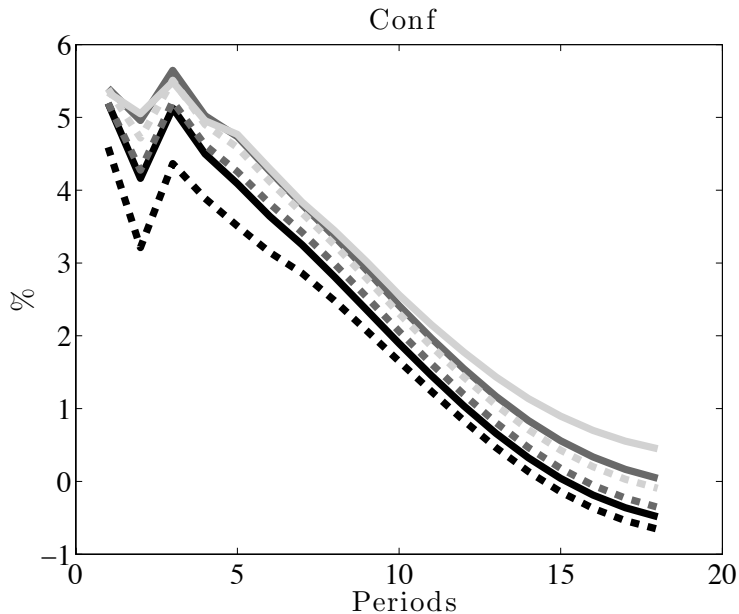
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BBL or BS identification ($h = 20, 40, 60$)

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BBL or BS identification ($h = 20$, 40, 60)

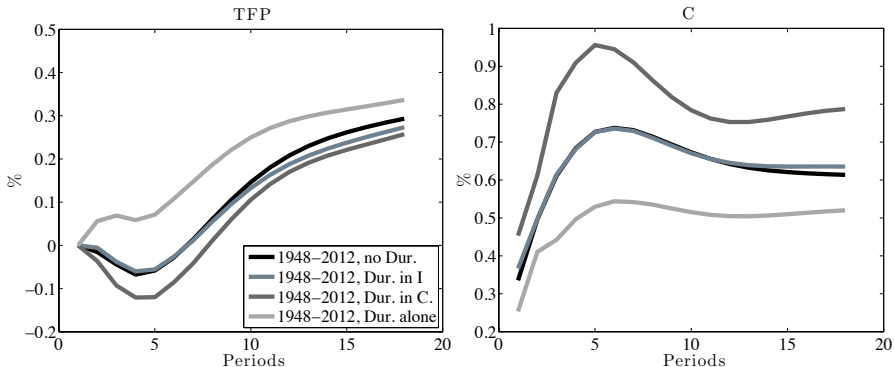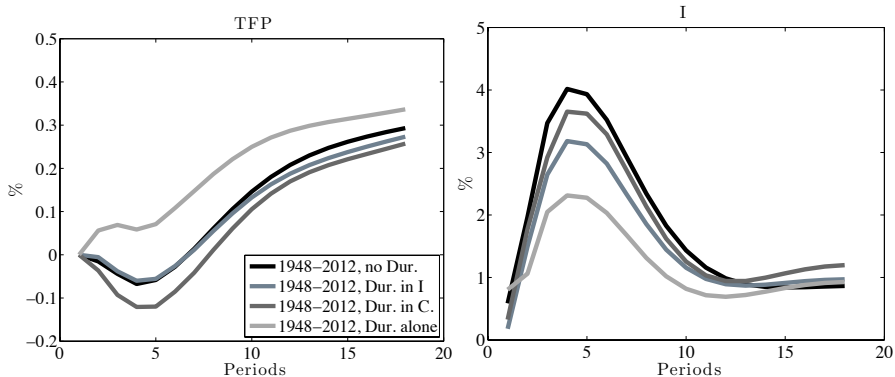

Conf

2. Understanding BBL results
Including durables in consumption or in investment
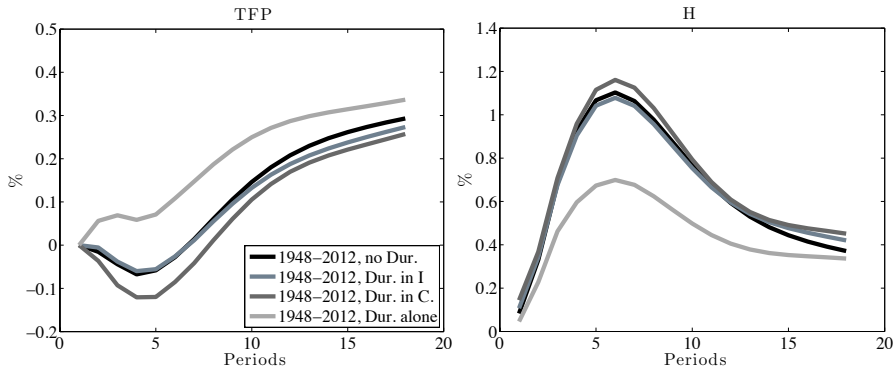
▶ In the following, no Conf, Infl and Tb3

2. Understanding BBL results
Including durables in consumption or in investment

2. Understanding BBL results
Including durables in consumption or in investment

2. Understanding BBL results
Summary

- ▶ When one obtains a slow diffusion of TFP, one observes business cycles fluctuations

Roadmap

1. Where did we stand before BBL?
2. Understanding BBL results
3. Imposing the news to be a news (ZR)
4. Feeding models with BBL or ZR "news"

3. Imposing the news to be a news
"($n - 1$)-zeros Identification"

- ▶ Let's identify a shock that has no impact on TFP for $n - 1$ periods
- ▶ Could this shock predict the long run of TFP?
- ▶ If yes, we would like to coin this shock a *news* shock

3. Imposing the news to be a news
"$(n-1)$-zeros Identification"

0

$$\begin{pmatrix} 0 & \times & \cdots & \times \\ \times & \cdots & \cdots & \times \\ 0 & 100 & \cdots & 0 \\ \vdots & \ddots & \ddots & \vdots \\ 0 & \cdots & 0 & 100 \end{pmatrix}$$
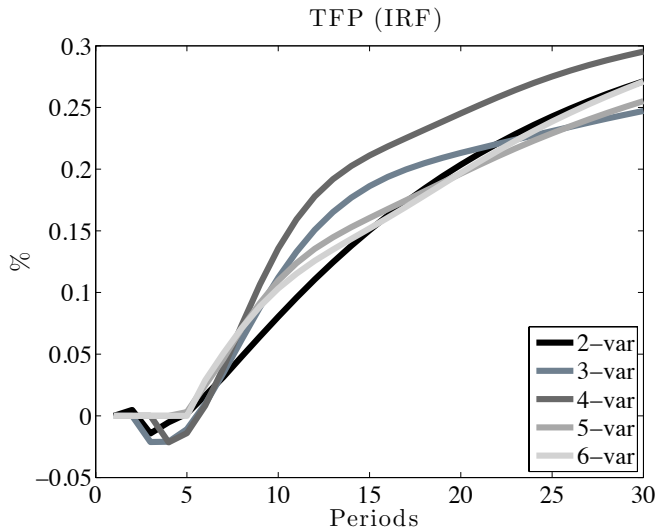
1

$$\begin{pmatrix} 0 & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix}$$

$\cdots$

$\cdots$

$n-1$

$$\begin{pmatrix} 0 & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix}$$

$\cdots$

∞

$$\begin{pmatrix} \times & \times & \cdots & \times \\ \times & \cdots & \cdots & \vdots \\ \vdots & \ddots & \ddots & \vdots \\ \times & \cdots & \cdots & \times \end{pmatrix}$$
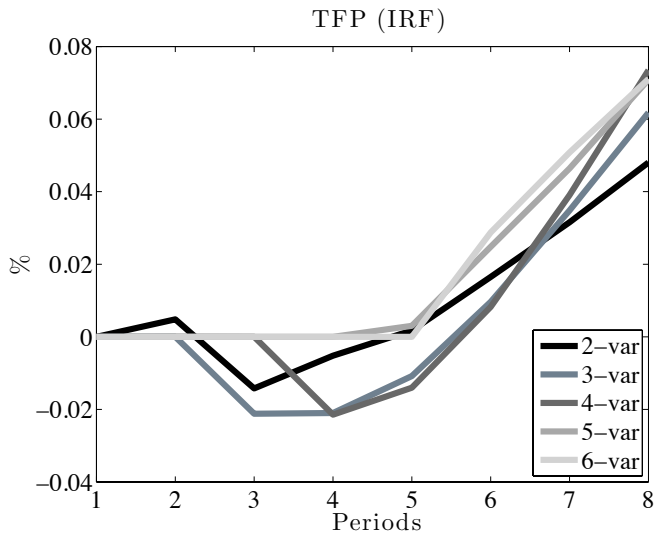
3. Imposing the news to be a news

- ▶ Let's estimate VARs with 2 to 6 variables
- ▶ Variables are (TFP, Cnds (C of non durable and service), Ipd (I plus durable), H, SP and Inflation (in that order of apparition)
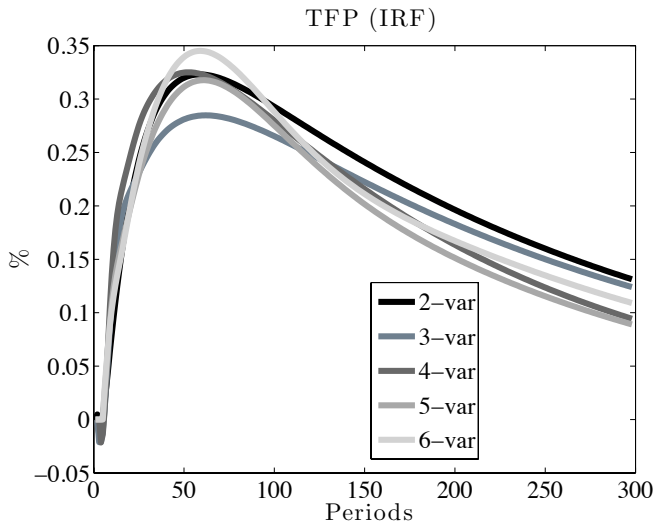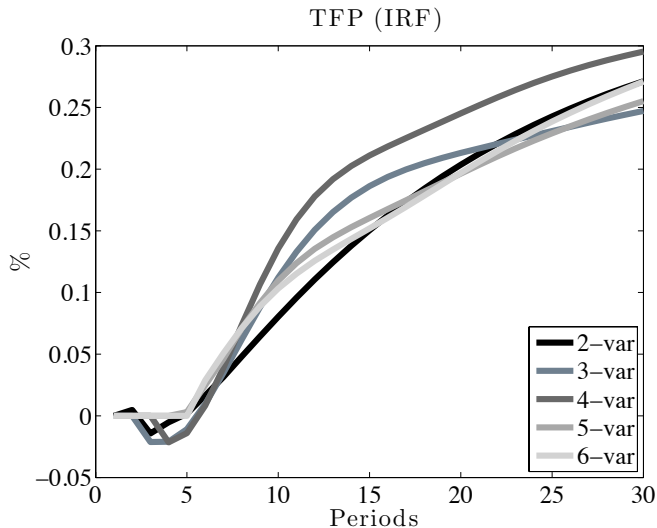
3. Imposing the news to be a news

TFP (IRF)
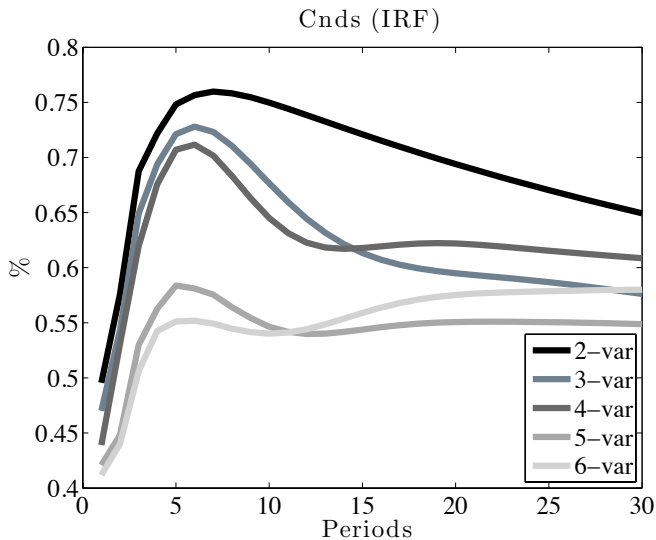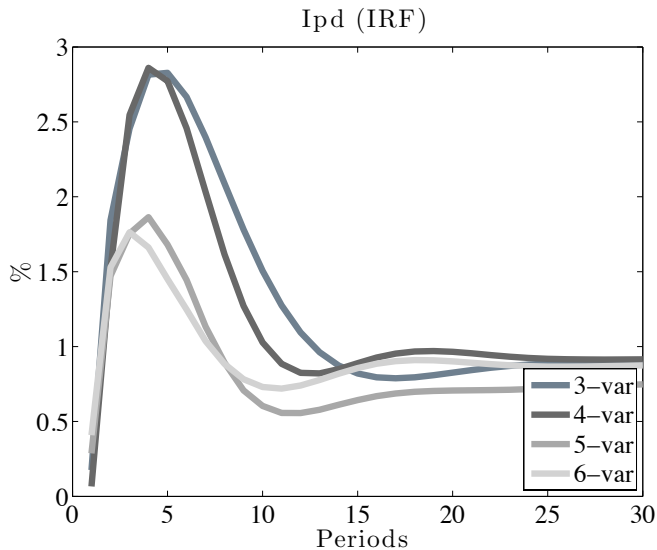
3. Imposing the news to be a news

TFP (IRF)

3. Imposing the news to be a news

TFP (IRF)

3. Imposing the news to be a news

TFP (IRF)

3. Imposing the news to be a news

Cnds (IRF)

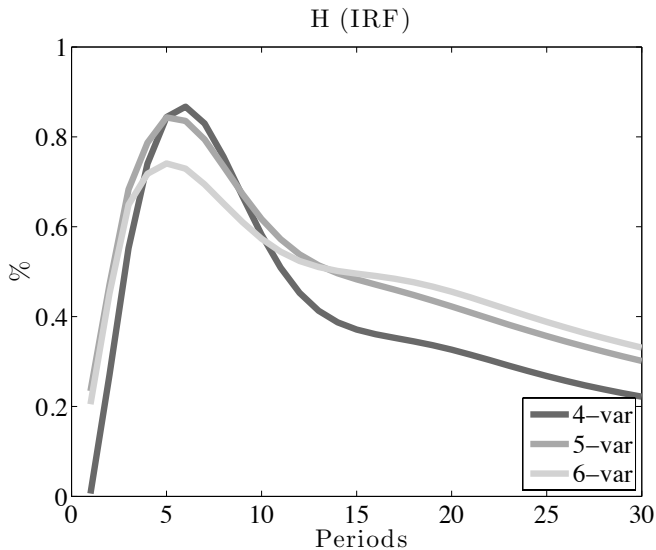# 3. Imposing the news to be a news

Ipd (IRF)

3. Imposing the news to be a news

H (IRF)

3. Imposing the news to be a news

SP (IRF)

3. Imposing the news to be a news

TFP (Share)

Legend: 2–var, 3–var, 4–var, 5–var, 6–var

3. Imposing the news to be a news

TFP (Share)

3. Imposing the news to be a news

Cnds (Share)

3. Imposing the news to be a news
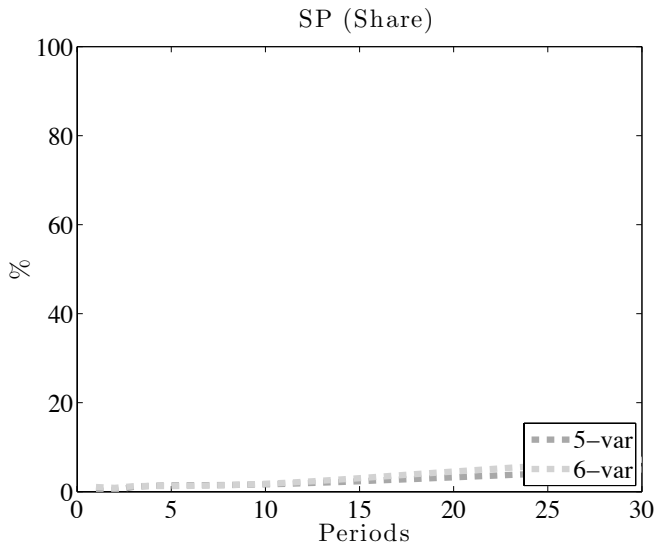

Ipd (Share)

3. Imposing the news to be a news

H (Share)

3. Imposing the news to be a news

SP (Share)
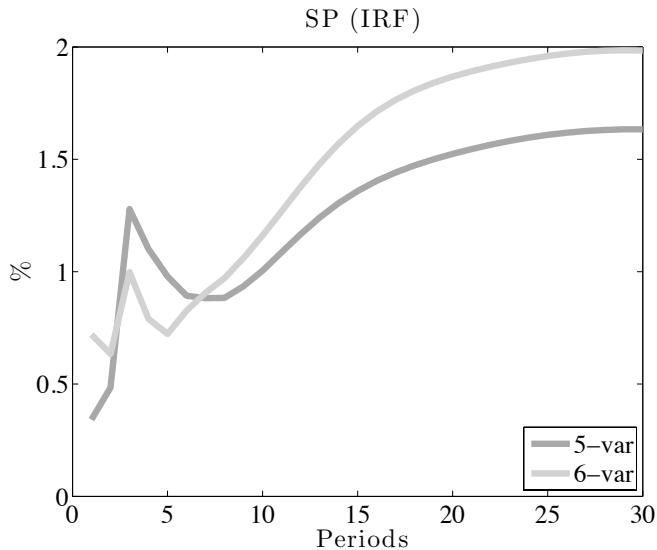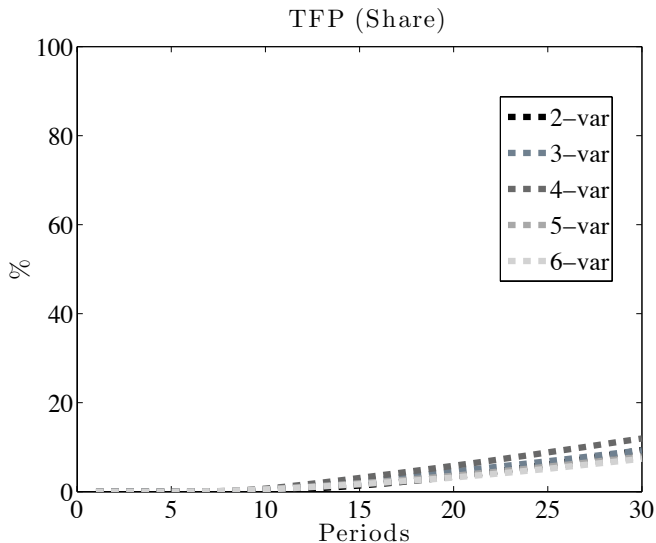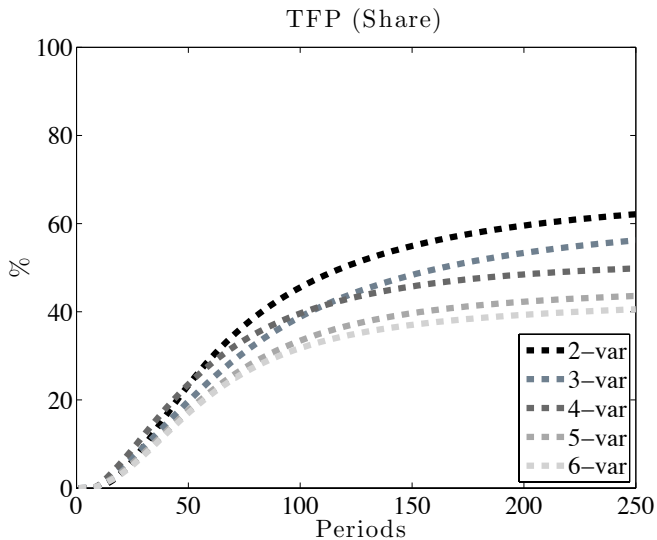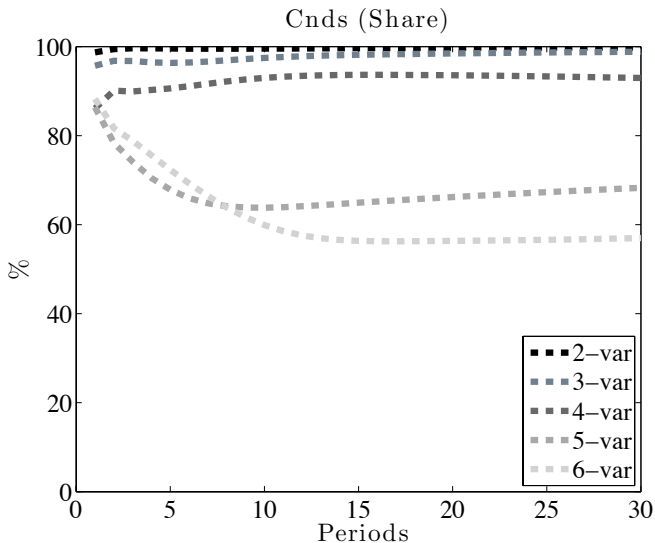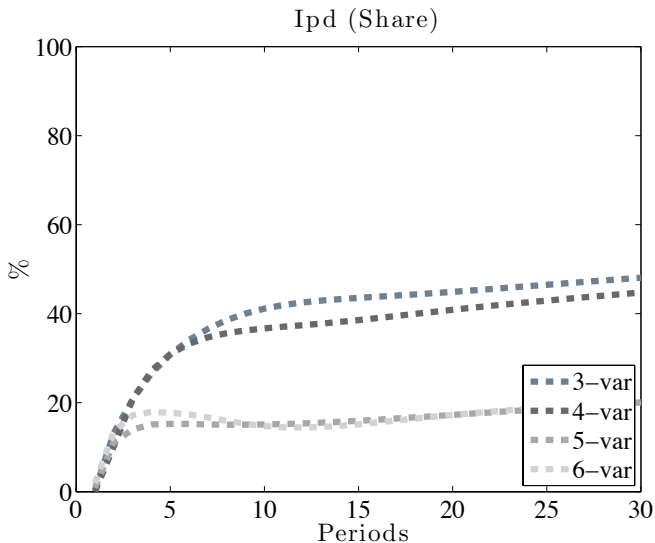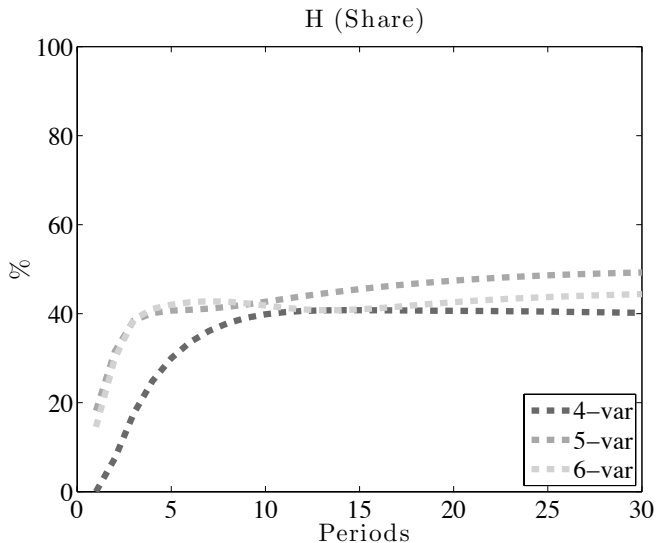
3. Imposing the news to be a news
Is the impulse technological?

- ▶ Nothing excludes that this shock is a demand shock
- ▶ But it must cause long run increase on TFP.
- ▶ In an environment in which TFP is endogenous (say Learning-by-Doing), this is possible
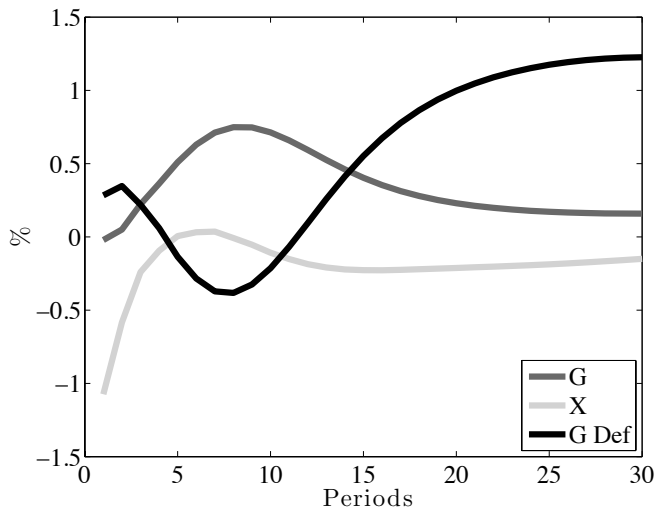- ▶ Let's see if that shock can be a G or monetary or world demand shock.

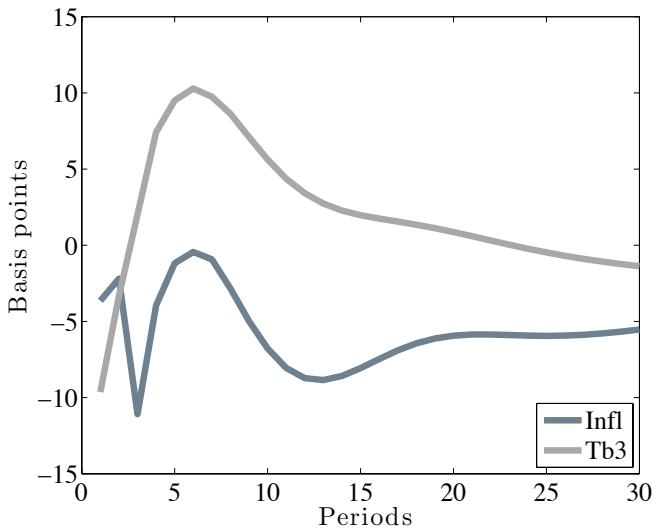# 3. Imposing the news to be a news
Is the impulse technological?
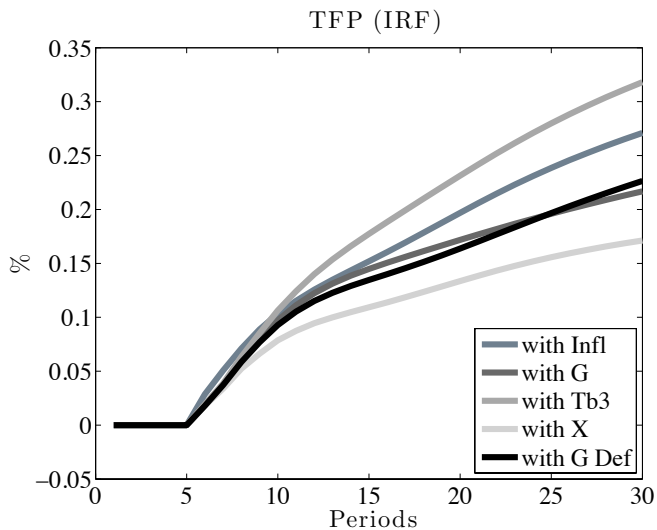
TFP (IRF)

with Infl
with G
with Tb3
with X
with G Def

3. Imposing the news to be a news
Is the impulse technological?

3. Imposing the news to be a news
Is the impulse technological?

3. Imposing the news to be a news
Summary

▶ When one obtains a slow diffusion of TFP, one observes
business cycles fluctuations

Roadmap

1. Where did we stand before BBL?
2. Understanding BBL results
3. Imposing the news to be a news (ZR)
4. Feeding models with BBL or ZR "news"
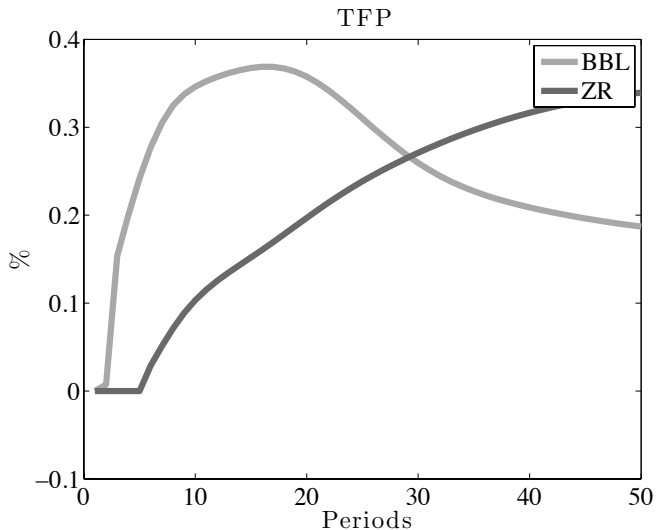
4. Feeding models with BBL or ZR "news"
Models

- ▶ I consider two models
  - ✕ Optimal growth model with variable labor supply ("RBC")
  - ✕ Jaimovitch & Rebelo model
    - ▶ variable capacity utilization
    - ▶ low short run intertemporal labor supply elasticity
    - ▶ adjustment costs to changes in investment
  - ✕ (I did not find an easy-to-adapt code for the Beaudry & Portier "Pigou" model - I will do it later)
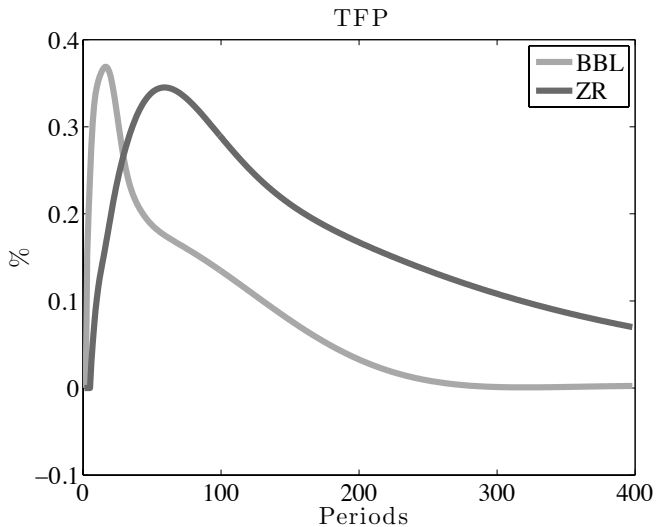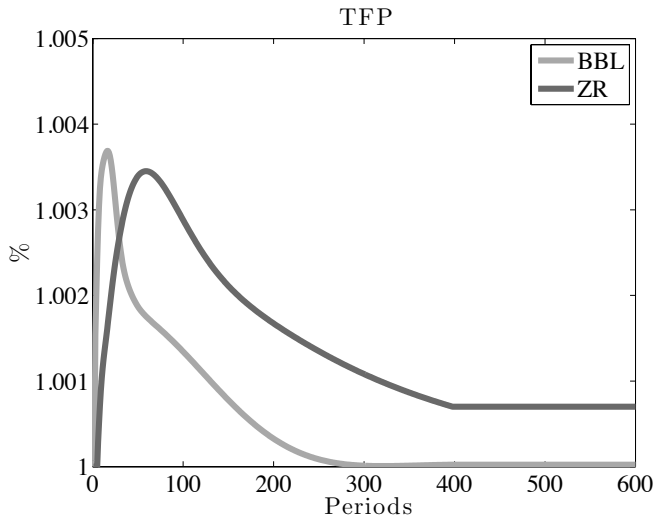
4. Feeding models with BBL or ZR "news"
TFP Impulse estimated by BBL or ZR identification (fully predicted by the model agents)

TFP

4. Feeding models with BBL or ZR "news"
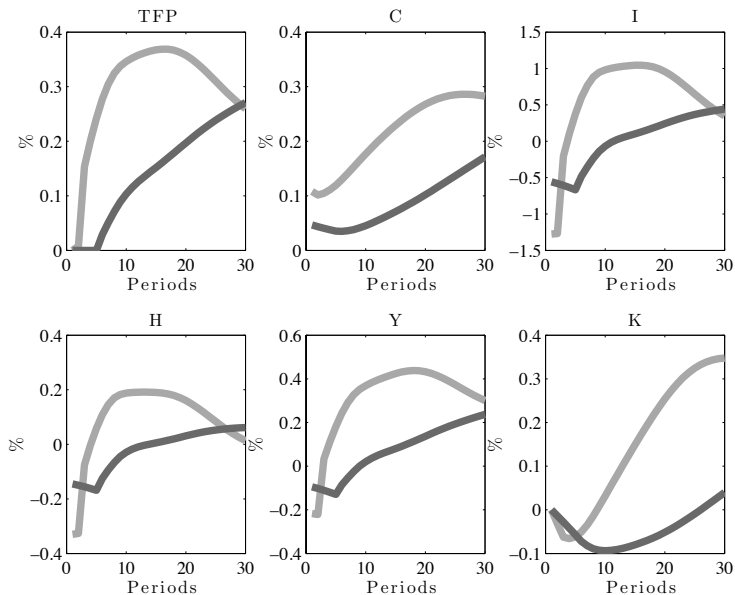Impulse (fully predicted)

4. Feeding models with BBL or ZR "news"
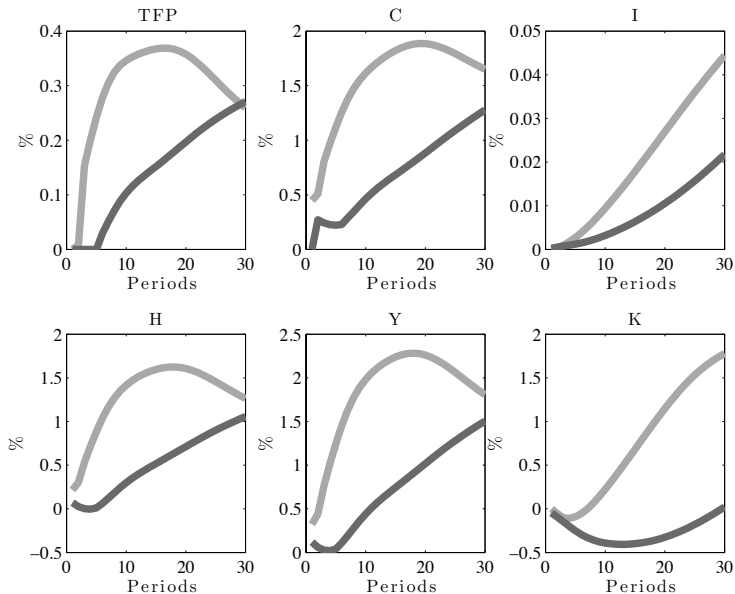Impulse (fully predicted)

TFP

4. Feeding models with BBL or ZR "news"
The RBC model

4. Feeding models with BBL or ZR "news"
The JR model

5. Conclusion

▶ Stimulating paper
▶ Robust results:
  × When one obtains a slow diffusion of TFP, one observes business cycles fluctuations
  × That shock explains a lot ($>40\%$) of business cycle fluctuations.