Discussion of
Illut & Saijo: Learning, Confidence and Business Cycles

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Beliefs and Business Cycles

Exogenous belief changes as drivers of aggregate fluctuations

- Lorenzoni (2009), Angeletos and LaO (2013).....

Endogenous belief changes as a propagation mechanism

- van Niewerburgh and Veldkamp (2006), Senga (2018), this paper....

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Common theme: in the data, $(Y_t, H_t, I_t..)$ only loosely linked to $(A_t, r_t, ...)$

- Big role for 'wedges'

Here: The complete package !

- Microfounded, quantitative comparison to other rigidities, survey data

Main Ingredients

Each firm ℓ sees a noisy signal of its idiosyncratic productivity

$$s_{\ell,t} = z_{\ell,t} + \nu_{\ell,t} \qquad \nu_{\ell,t} \sim \mathcal{N}\left(0, \frac{\sigma_\nu^2}{K_{\ell,t}^\alpha H_{\ell,t}^{1-\alpha}}\right)$$

Noise is decreasing in $K_{\ell,t}^\alpha H_{\ell,t}^{1-\alpha}$

- A larger scale generates more information about the firm's demand/productivity

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Ambiguity-averse agents act as if their 1-period ahead forecasts were ▸ Details

$$\mathbb{E}_{\ell,t}^{\mu}(z_{\ell,t+1}) = \mathbb{E}_{\ell,t}(z_{\ell,t+1}) - \eta\rho_z\sqrt{\Sigma_{t|t}}$$

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$\Rightarrow$ Propagation mechanism

- $(K_{\ell,t}^\alpha H_{\ell,t}^{1-\alpha}) \downarrow \; \Rightarrow \Sigma_{t|t} \uparrow \; \Rightarrow \mathbb{E}^\mu_{\ell,t}(z_{\ell,t+1}) \; \Rightarrow K_{\ell,t+1}, H_{\ell,t+1} \downarrow$

Wedges

The labor wedge

$$\tau_t^H = 1 - \frac{\mathbb{E}^{\mu}(\lambda_t MPL_t)}{\lambda_t MPL_t}$$

- Substitution effect $>$ wealth effects $\Rightarrow$ countercyclical wedge labor 'tax'

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The risk premium wedge

$$1 + \tau_t^K = (1 + \tau_t^B)\frac{\mathbb{E}(\lambda_{t+1} R_{t+1}^K)}{\mathbb{E}^\mu(\lambda_{t+1} R_{t+1}^K)}$$

- Pessimism $\rightarrow$ capital less attractive $\rightarrow$ countercyclical 'tax' on risky assets

Quantitative Analysis

Strategy: embed mechanism in a standard DSGE model

- Bayesian estimation matching IRF of TFP, monetary and financial shocks

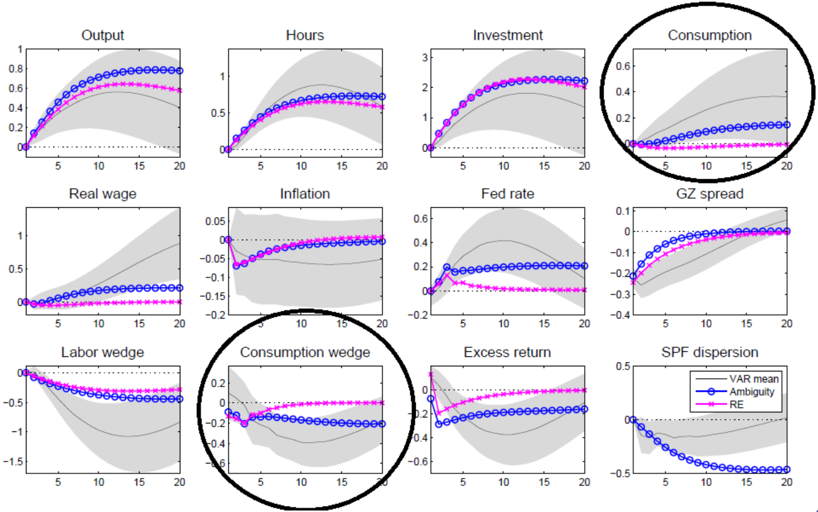
Survey evidence for external validation

- Both aggregate (from SPF) as well as firm-level (from I/B/E/S) forecasts

Quantitative Results

Learning improves fit of responses to financial shocks....

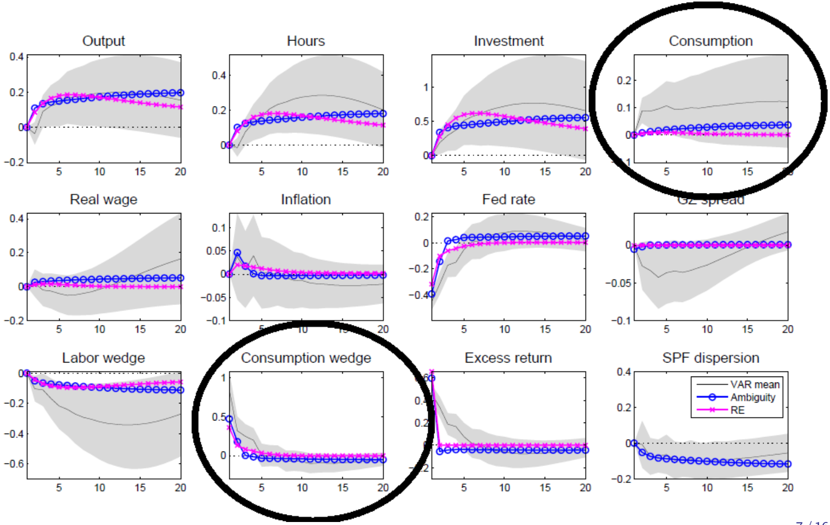
Figure 4: Responses to a financial shock (three shock estimation)



Quantitative Results

...less so for monetary policy shocks

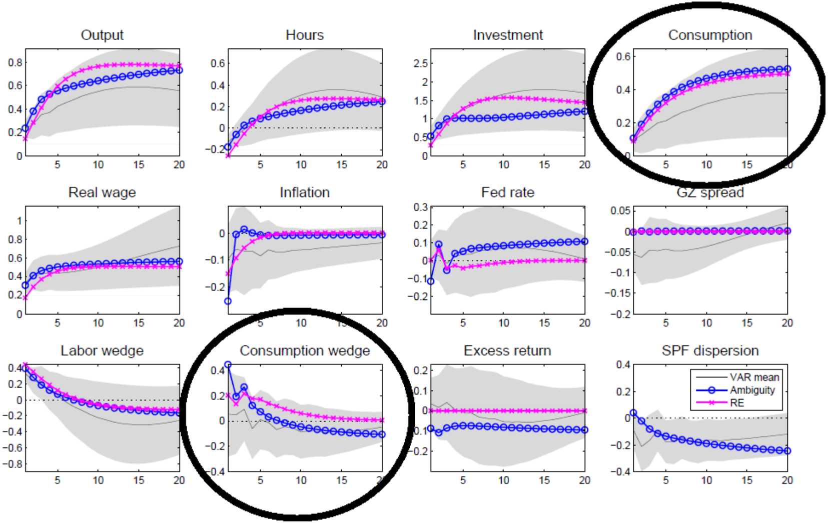
Figure 5: Responses to a monetary policy shock



Quantitative Results

...and TFP shocks

Figure 10: Responses to a technology shock



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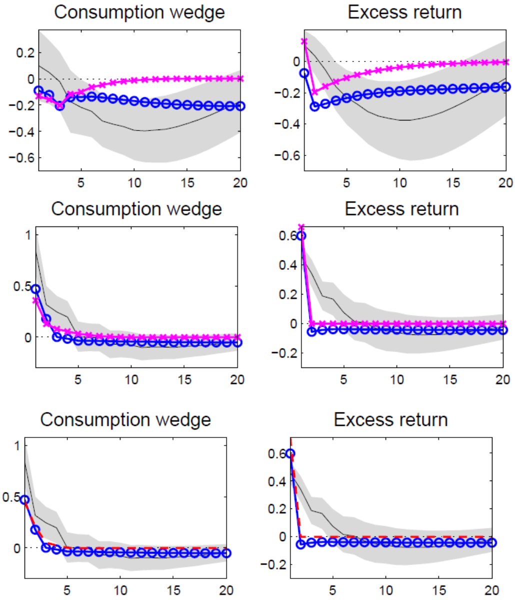

Financial Shocks

MoPo shocks

TFP shocks

Discussion

Financial shocks are more than just changes in lending spreads

- Likely to be associated with changes in risk aversion and/or beliefs

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More broadly, this battle is unlikely to be decided by aggregate data alone

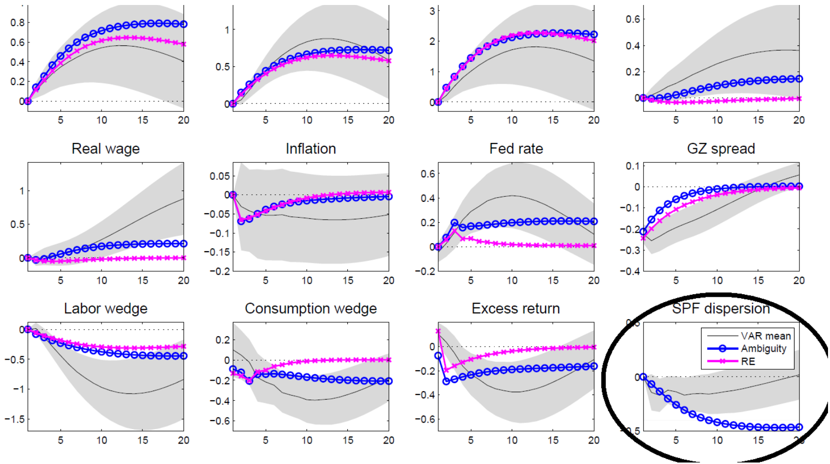
- Need *quantitative* validation from micro data

Our best bet: Survey data

- But, what kind of surveys – moments – should we use?

The paper's approach

Use Survey of Professional Forecasters: Dispersion in aggregate GDP forecasts



Comments

More sophisticated information processes?

- E.g. substitution between endogenous and exogenous signals?

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Aggregate vs idiosyncratic uncertainty?

- Maybe do more with firm-level **forecast errors**

Firm-level Evidence

Broadly support the predictions of the theory

	Corr(range,rgdp)	Std. range	(Std. range)/(Std. rgdp)
Data	-0.49	15.2	3.5
Model	-0.98	11.5	2.0

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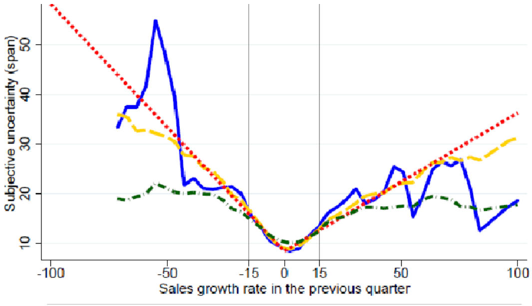
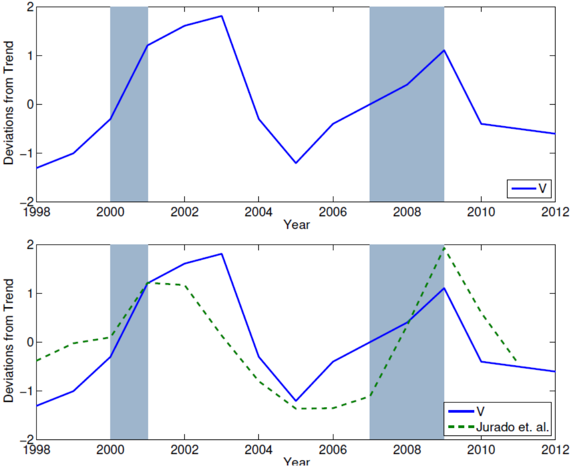
Source: Table 4 of the paper. Range is dispersion in analyst forecasts for a given firm



Source: Bachmann et. al. (2018).

Firm-level Evidence



Source: Blue - David et. al. (2016), Green dashed - Jurado et. al. (2017)

Final Comments

Interesting, important paper

- Part of a nice research agenda

Intuitive, tractable way to embed beliefs into DSGE models

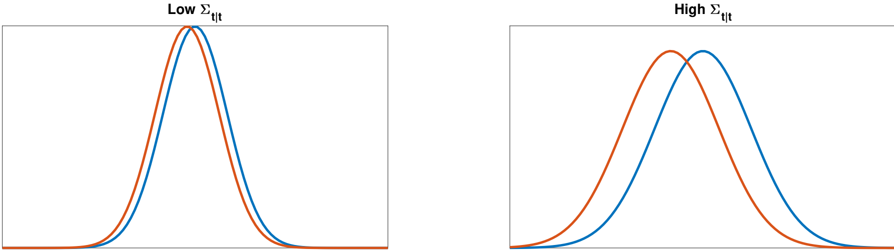
- Makes it easy for others to build on

Use of micro data is a very nice addition

- Lot more papers to be written !

How does variance affect the worst-case belief?

The worst possible distribution within a neighborhood of the Bayesian one



Blue: Bayesian, Orange: The one chosen under ambiguity

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