Not so Great Expectations – M. Sockin

Discussion – WFA 2015

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What is this paper about?

Dynamic AP Model with Imperfect Information

- Solution of truly dynamic model of private information
- Rich feedback of prices onto real investment

Moving towards dynamic predicion of NREE models?

- Conditional reaction of firm decisions to asset prices
  - ▶ Prices are more informative during recoveries
  - ▶ Distort firm investments at the bottom of recessions

Theoretical contribution

- Elegant model that has closed form with true dynamics
- Clear predictions of price information revelation

What are the main results?

Information revelation

- Time variation in information content embedded in prices
  - ▶ True dynamic in information extraction from prices
  - ▶ Signal-to-noise ratio varies over the "business cycle"
- Two-way play of information revelation with real quantities
  - ▶ Managers base their investment decision from household trading/prices
  - ▶ Household infer about the state of the economy from investment (robust?)

Macroeconomic implications

- "Slow recovery"
  - ▶ prices are most informative in intermediary stage of business cycle
- When does the "q-theory works"

Outline

Description of the model

- Demand side (households): Variation in information content of prices
- Supply side (firms): Impact and interplay with real investment

Discussion

- Empirical implications
- What do we learn from this exercise

Model

Supply side:

- AK model with IST shocks

$$\frac{dK_t}{K_t} = (I_t\theta_t - \delta)dt + \sigma_k dZ_t^k$$

- Firm managers have imperfect information about θ

Demand side:

- Households have some private information
  - Noisy signal on θ
  - Bet on their signal on financial markets
- Demand shocks on households ("Liquidity"/noise trade shocks)

Equilibrium:

- Firms learn from prices: shape their investment policy
- Households learn from firm behavior
- Lack of complete separation between control variables and signal extraction – firms investment do affects the signal extraction problem

Information Revelation - Households

Households trading:

- Trade on private information
- Trade on noise/demand/liquidity shocks (ξ)
- Prices imperfectly reveals state of the economy because of demand shocks

Strength of price signal:

- Informational content of prices in the risk-free rate

$$r = \frac{a}{a-I}\rho - \delta - \frac{\sigma_k^2}{1-\pi} + I\frac{\Sigma}{\Sigma + \sigma_s^2}\left(\theta - \hat{\theta}^c\right) - \frac{\pi\sigma_k^2}{1-\pi}\xi$$

- Households trade more aggressively (and reveal more information) with
- Σ is the variance of public information about the signal
- Signal-to-noise ratio: $\frac{\Sigma}{\Sigma + \sigma_s^2}$

Real impact of information revelation - Firms

Investment policy:

- Firms investment policy follows q-theory

$$\text{investment rate} \simeq \rho(q\hat{\theta}^c - 1)$$

Feedback of investment into information

- Signal-to-noise ratio also depends on investment

$$\frac{dK_t}{K_t} = (I_t\theta_t - \delta)dt + \sigma_k dZ_t^k$$

- High investment means large sensitivity of capital growth to underlying θ
- Low investment no informational content from capital growth: $I\theta \to 0$

When do we learn from prices

- Investment needs to be high
- Variance of public signal needs to be high
- First prediction: risk of getting "stuck" in low investment states

Discussion - Theory

Main result:

- Most information revelation happens in intermediary states
- Goldilock price revelation:
  - Σ cannot be too low
  - Investment rate cannot be too low
- Conditionnal "q": elasticity of investment to prices depends on strength of financial signal

Exposition:

- Most results are described in narrative way
- Get more traction by "simulating" the model
- Gain a better understanding of joint-dynamics of investment and Signal-to-noise
- For example: Why do slow recoveries happen? Do they actually happen within the model?
- Simulate path? Get better sense of how the model comes to life

Discussion - Theory

Assumptions:

- Unobservable is IST shock θ. Is the model robust to noise about fundamental TFP shocks?
- Essential for joint-dynamics of investment and information revelation
- With learning about productivity, impact of investment on learning would be dampened (or shut off)

Discussion - Empirical predictions

Conditional q-theory:

- Within the model: q-theory seems to be more salient in intermediary/goldilock states
- Empirical predictions: stock returns / investment predictability strongest in intermediary states

$$R_{t \to t+1} = a + - 6.5 \ (I/K)_t \times \text{(low-consumption)}$$
$$- 8.3 \ (I/K)_t \times \text{(mid-consumption)}$$
$$+ 2.4 \ (I/K)_t \times \text{(high-consumption)}$$

- Alternative explanations (see Li & Zhang): financial frictions
- Find a way to generate unique predictions

Conclusion

Wow theory:

- Closed form solution of hard dynamic GE model with dispersed information
- Important role of prices for real quantities (and vice-versa)
- Builds a common framework of analysis to ask such questions
  - Make sure finance and macro people talk to each other

Future work:

- Move away from narrative tale of the theory to something more formal: simulation
- Think harder about empirical implications and actually do it