FOUR (FIVE) MISTAKES IN THE USE OF MEASURES OF EXPECTED INFLATION

Ricardo Reis
LSE

What is expected inflation?

- Right answer: there are <u>many</u> expected inflations.

- Common answer:
    1. argue that the weight should rise with some characteristic,
    2. observe that one series is much better in this dimension, and
    3. appeal to simplicity to set its weight to 100%.

- This paper: there is no "right measure" of expected inflation

- Monetary policy gains in reacting to even very imperfect measures of inflation

I Focus on firm surveys because they set prices

- Firms choose prices

- Their expectations are the ones that matter

- The Phillips curve says:

$$\pi = \pi^f + rmc$$

- Only firm expectations appear!

- Ignore other surveys, focus on firms, right?

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- Don't forget about expected real marginal costs…

- If firms take as given nominal marginal cost, and form expectations of inflation, then firm expectations will cancel out!

$$\pi = \pi^f + i^l - \pi^f$$

- To maximize real profits, want a markup of nominal price over nominal costs.

- How firm expectations of inflation enter really depends and may well be irrelevant.

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- Don't forget about general equilibrium . Say firm uses labor and capital

$$rmc = \alpha(i^l - \pi^f) + (1 - \alpha)(w - \pi)$$

- And that banks and workers set their prices according to:

$$i^l = i + \gamma(\pi^m - i)$$

  - If markets expect higher inflation, they raise the interest rates charged on loans, which raises the financial costs of firms, leading them to raise prices

$$w = \pi^w + \theta y$$

  - If workers expect higher inflation, they ask for higher nominal wages, this raises the real real marginal costs, firms respond by raising their prices

I Focus on firm surveys because they set prices

- In economic equilibrium, choices depend on <u>other's</u> actions, and a priori any of the beliefs could be more or less important for the decisions that are made.

- It may well be that firms' expectations are the least important

  - Firms just respond to costs they face

  - Expectations of financial markets quickly affect financial conditions, have a fast and powerful impact on inflation.

  - Expectations of wages are hard to re-anchor, and can start wage-price spirals

- Conclusion: firm expectations are very important, but this argument is wrong

2 Focus on big players that drive aggregates

- Large firms and unions are large setters of input and output prices

- Especially large banks.

- Blue Chip survey

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- A priori argument: marginal is what matters for lending rate, not average,

- In practice measures of expected inflation from market prices differ systematically from the survey measures of bankers or of dealers in bonds and swaps

- Also in practice: Blue Chip mirrors central bank forecast, little information in big turns in inflation …

2 Focus on big players that drive aggregates

- Simple model of expectations

$$\pi^f = (1 - \lambda^f)\pi + \lambda^f \hat{\pi}^f$$

- Leads to the <u>actual</u> Phillips curve:

$$\pi = \pi^e + \kappa y + \xi(i - \pi)$$

$$\pi^e = \frac{\alpha\gamma\lambda^m\hat{\pi}^m + (1 - \alpha)(\lambda^w\hat{\pi}^w - \lambda^f\hat{\pi}^f)}{\alpha\gamma\lambda^m + (1 - \alpha)(\lambda^w - \lambda^f)}$$

- It is how autonomous (exogenous?) they are that matters.

- Conclusion: Blue Chip expectations are very important, but argument is wrong

3 Focus on more accurate forecasts

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- Use the best, discard the rest, right?

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3 Focus on more accurate forecasts

• Not even statistically sound, if all you want is forecasting performance

(1) The forecast published by the central bank wins the horse race

(2) Combination forecasting would almost always be better.

(3) Surveys of professional forecasts do well within regimes, not in regime changes.

(4) Confuse measurement with concept: can improve surveys, de-bias means, careful model would combine moments of data, not take a simple mean

• But let's turn to economics…

3 Focus on more accurate forecasts

- Close the model in standard way

$$y = -\omega(i^l - \pi) + \sigma(\pi^c - \pi)$$

$$\Rightarrow \quad \frac{\partial \pi}{\partial \hat{\pi}^c} \text{ rises with } \sigma$$

$$i = \phi\pi + \phi_y y + \varepsilon$$

- Key is the *transmission from expectations to actions*.

- A similar conclusion applies to the other expectation shocks

- In practice: that transmission is small for survey of professional forecasters.

- Conclusion: Professional expectations are very important, but argument wrong

4 Focus on expectations that policy can move

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- Households barely know who Jay Powell is.

- Asset prices and interest rates are the main vehicle of transmission for monetary policy,

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4 Focus on expectations that policy can move

- Financial markets respond to news and noise.

- More responsive expectations make the Phillips curve steeper:

$$\frac{\partial \pi}{\partial \varepsilon} \ \text{rises with} \ \lambda^m \qquad\qquad \frac{\partial y}{\partial \varepsilon} \ \text{falls with} \ \lambda^m$$

- Trade-offs change, not the importance (unless you are an inflation nutter)

- Actually, it is the inattentiveness of households that gives the central bank the power to affect output

4 Focus on expectations that policy can move

- The responsiveness of expectations to policy is endogenous to policy,

- Across regimes, this affects trade-offs facing monetary policy

- Financial markets responsiveness: unchanged between low and stable inflation and high and volatile one

- Households were unresponsive before, paying more attention now.

- In practice this matters, and why the major task of a central bank in an inflation disaster is to convince agents to become inattentive again.

- Conclusion: asset price expectations are very important, but argument wrong

5 Ignore expectations, they are too noisy

- Decades of research on expectations shows many flaws in their measurements

- Don't want to introduce noise into policy

- Maybe use expectations as inputs to understand what is the output gap or current inflation, but not as separate arguments in a policy rule

- People are idiots, why would you respond to their idiotic views, right?
    - Wrong

Expected inflation in the euro area: measurement and policy responses

By Ricardo Reis[1]

Bak to model

$$\pi_t = \mathbb{E}_t \pi_{t+1} + \kappa y_t + z_t$$

$$y_t = \omega_y \mathbb{E}_t y_{t+1} - \omega(i_t - \mathbb{E}_t \pi_{t+1} - a_t)$$

$$i_t = \bar{\pi} + \phi(\pi_t - \bar{\pi}) + \phi_y y_t + \textcolor{red}{\theta \pi^e}$$

- Supply shocks: z and a, both iid

- All parameters in Greek letters are positive

- With rational expectations, noise does not reflect any choices

$$\frac{\partial \pi}{\partial \pi^e} = -\frac{\kappa \textcolor{red}{\theta}}{\phi_y + 1/\omega + \kappa \phi}$$

- Excessively tighten policy when inflation expectations rise

- It would have been better to have $\theta{=}0$

But even if they are wrong, they act on it…

$$\pi_t = \bar{\pi} + \pi^e + \kappa y_t + z_t$$

$$y_t = \omega_y \mathbb{E}_t y_{t+1} - \omega(i_t - \bar{\pi} - \pi^e - a_t)$$

$$i_t = \bar{\pi} + \phi(\pi_t - \bar{\pi}) + \phi_y y_t + \theta \pi^e$$

- Expect higher inflation: demand higher wages, set higher prices.

- Expect higher inflation: perceive lower returns to savings, spend more, multiplier

- Both push inflation up, want positive θ to offset it.

$$\frac{\partial \pi}{\partial \pi^e} = \frac{\kappa(1 - \theta) + 1/\omega + \phi_y - \kappa\theta}{\phi_y + 1/\omega + \kappa\phi}$$

What if they are over-reacting to supply shock?

$$\pi^e = \beta z$$

$$\frac{\partial \pi}{\partial z} = \frac{(1/\omega + \phi_y)(1 + \beta) + \kappa(1 - \theta)\beta}{\phi_y + 1/\omega + \kappa\phi}$$

- Extra push up of inflation through the expectations channel

- In dove-ish limit, to keep y unchanged want to have $\theta \geq \beta$ at least.

- Otherwise, always higher. If people over-react in expectations data, then the central banks wants to over-react more in its policy

What if long-run credibility?

$$\kappa = 0, \quad \phi_y = 0, \quad z_t = a_t = 0$$

$$i_t = \bar{\pi} + \phi(\pi_t - \bar{\pi}) + \color{red}{\theta(\pi_t^e - \bar{\pi})}$$

$$\mathbb{E}_t(\pi_{t+1}) = (1 - \delta)\pi_{t+1} + \color{red}{\delta\pi_t^e}$$

$$\lim_{j \to \infty} \pi_{t+j}^e = \bar{\pi}$$

- Want to respond to expectations in full force to regain credibility.

- Otherwise, end up with prolonged period of inflation, as expectations drift

$$\pi_t - \bar{\pi} = \left(\frac{\delta - \theta}{\phi}\right) \sum_{j=0}^{\infty} \left(\frac{1 - \delta}{\theta}\right)^j (\pi_{t+j}^e - \bar{\pi})$$

Reactions to expected inflation shock

Case	Policy
just noise	ignore
noise driving actions	tighten
noise arising from markup shocks	tighten beyond over-reaction
doubts on credibility	tighten aggressively immediately

Conclusions

- **Should you put more weight on surveys of who sets prices?**

  - Not for that reason, they react to prices and actions of others and so to their expectations, this is not 2nd order.

- **Should you put more weight on surveys of big players?**

  - Not for that reason, if they are more sophisticated they bring less autonomous push to inflation.

- **Should you put more weight on surveys of those who forecast better?**

  - Not for that reason, statistics argument is weak, and more important is the strength of link actions to beliefs.

- **Should you put more weight on financial prices because transmit policy right away?**

  - Not for that reason, as they create fewer policy trade-offs, and they are the ones in less need of anchoring

- **Should policy put no weight on noisy upside risk in measured expected inflation?**

  - Not for that reason, people act on their noise. Tighten with differing vigor depending on what drives noise

Need models to extract as much signal as possible from different measures and to combine