

Formulation, Estimation and Policy Analysis in DSGE Models with Financial Frictions

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Outline

- Why models?
 - *Dynamic, Stochastic, General Equilibrium* (DSGE) models
- Why did New Keynesian DSGE models become so popular in past decade?
- DSGE models after 2008.

Why Models?

- Policy questions:
 - What kind of monetary policy will stabilize inflation?
 - Should monetary policy respond to credit growth or stock prices and, if so, by how much?
 - Should government spending and tax policy be used to stabilize the business cycle? If yes, how?
 - How should monetary policy respond to changes in interest rate spreads?
 - Should the government ever purchase privately-issued assets or make loans or equity injections to banks? If yes, when and how much?
 - What should capital requirements be and how (if at all) should they vary over the business cycle?
- All these questions:
 - have a quantitative answer.
 - require contemplating the interaction of financial, labor, goods, currency markets, etc.
 - difficult to juggle all these things in your head.

Why Models?

- Models can be used to compute the quantitative answers that are required.
- They can ensure that the rationale for whatever decision is taken in the end is coherent.
- They are a discipline device: if the answer they give contradicts your intuition, you can fight it out with the model.
 - Either you discover your intuition was wrong.
 - Or, you realize you are right and that the model fails to properly capture some feature of reality.
 - In this case, you've gained a deeper understanding of your own initial intuition.
 - Either way, there is a deeper foundation for the policy action taken.

Why did New Keynesian (NK) DSGE models become so popular in the past decade?

- Two key findings before 2008:
 - They resolved an age-old puzzle.
 - They are useful for forecasting.
- They have been useful in placing structure on discussions about policy.

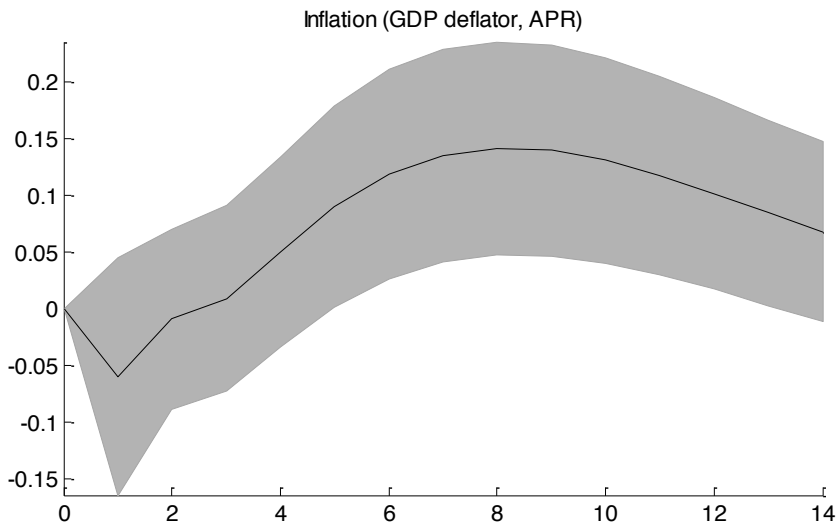
Hume essay, *Of Money* (1752)

- ...money... must first quicken the diligence of every individual, before it encrease the price of labour.
- The farmer and gardener, finding that all their commodities are taken off, apply themselves with alacrity to the raising more...

Early Monetary DSGE Models

- Generally inconsistent with Hume observation (also, Friedman's AEA Presidential address).
- In those models, monetary expansion produced an immediate rise in P and little rise in output.
 - Not surprisingly, early academic models little use to practical people.
- Can use VARs to quantify Hume observations...

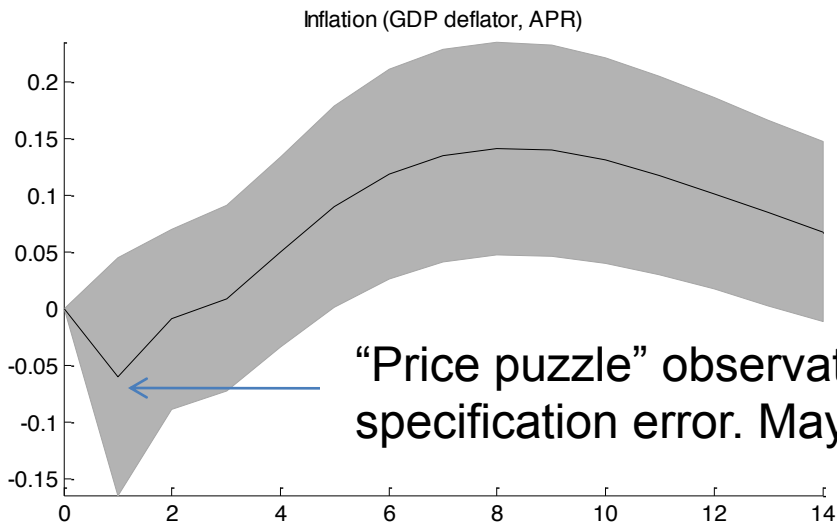
The Hume Problem



Responses to a one-standard deviation shock to monetary policy

source: Christiano, Traband and Walentin, 2010, DSGE Models for Monetary Policy Analysis, in Friedman and Woodford, editors, Handbook of Monetary Economics

The Hume Problem

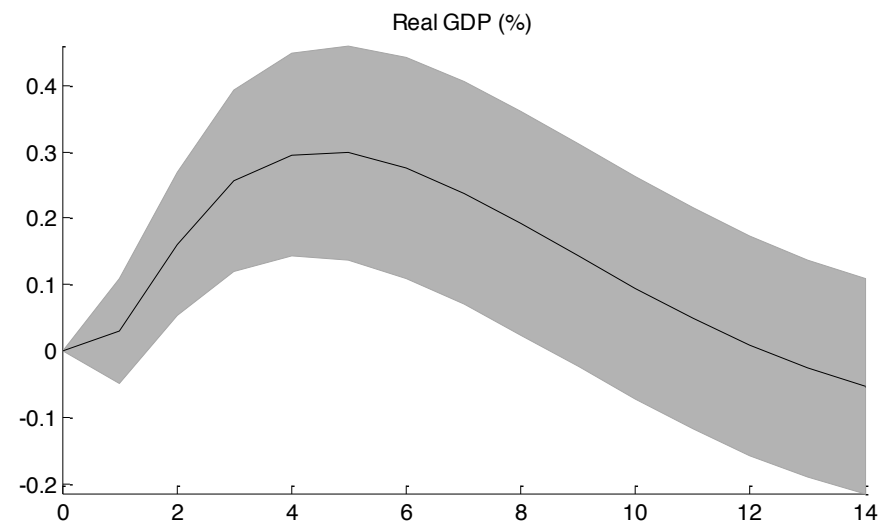
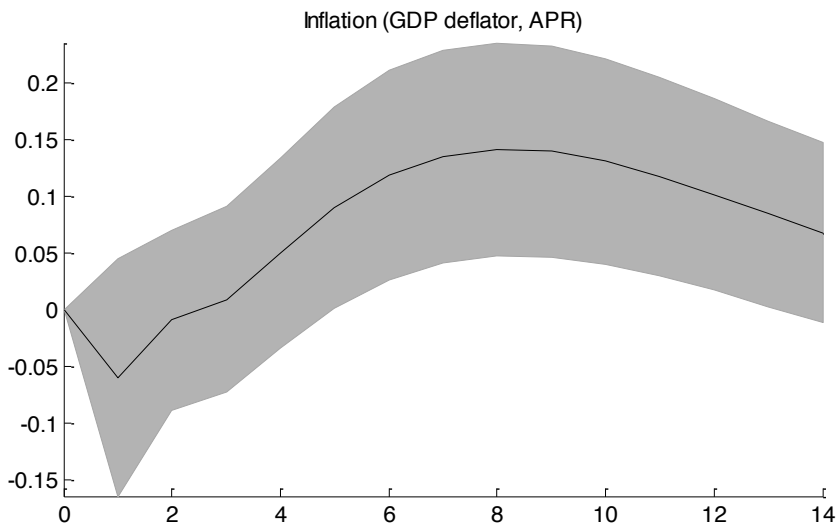


“Price puzzle” observation: initially thought to reflect econometric specification error. May actually reflect a real feature of the data.

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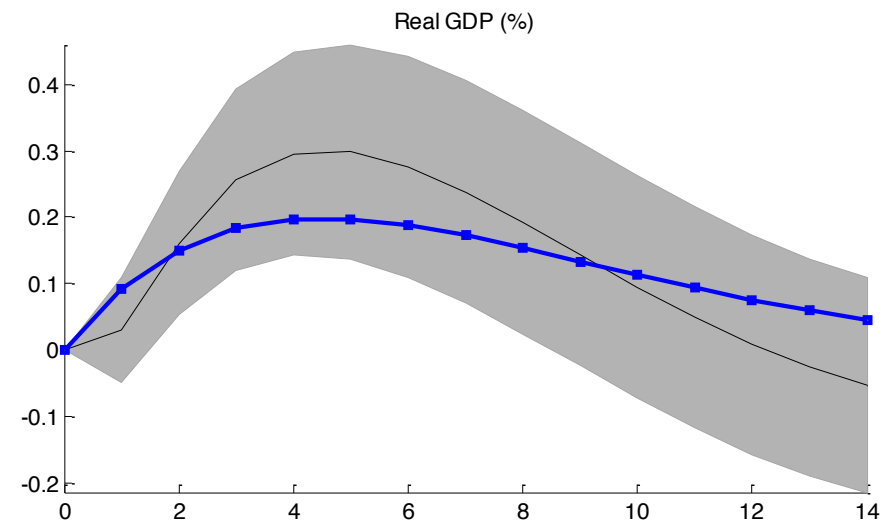
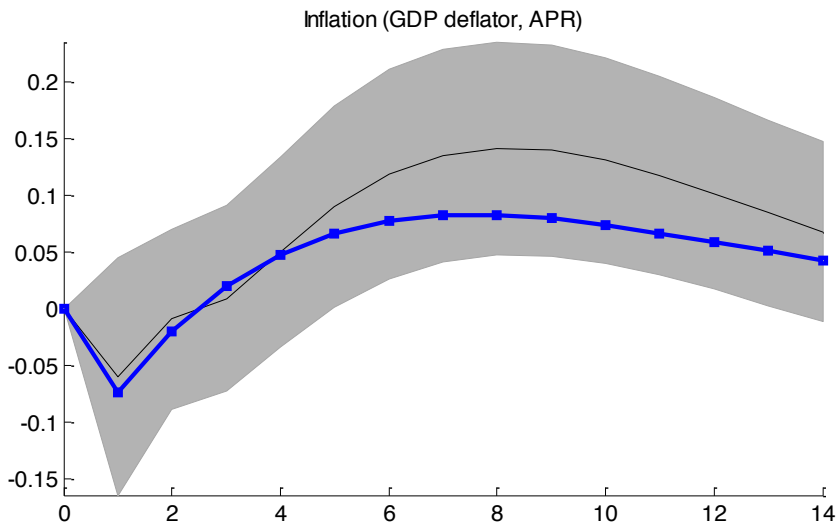
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Position in late 1990s

- Mankiw (Economic Journal, 2001) argued that no plausibly parameterized model would soon come to terms with the Hume observation.
 - A quantitative account would require assuming prices stuck for two years...inconsistent with micro evidence.
- The discovery was then made that New Keynesian models give a plausible account for the Hume observation.
- New Keynesian DSGE models elevated from 'toy model' status.

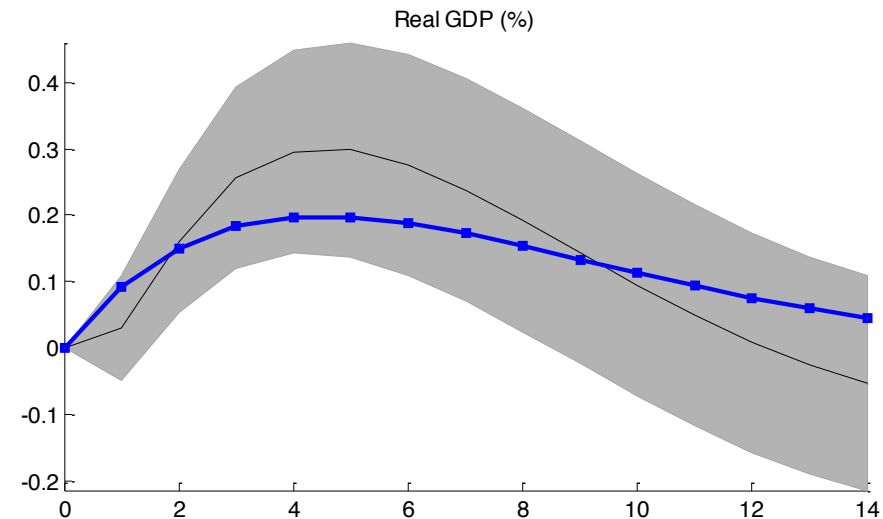
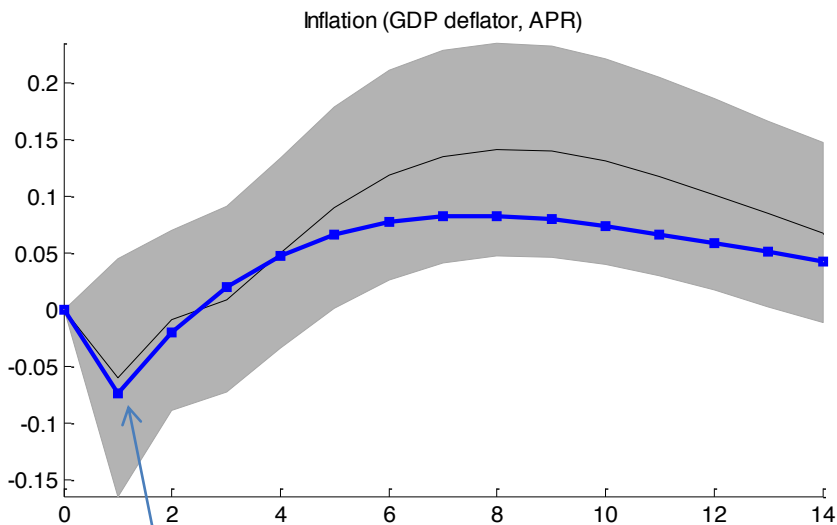
The Hume Problem and DSGE Models



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Assumption that firms must borrow to finance variable inputs (the “working capital channel”) implies that an expansionary monetary policy shock (which drives down the interest rate) reduces inflation for a while.

Significance of Preceding Observation

- Earlier models, which were not compatible with Hume observation seemed to miss key aspects of the monetary transmission mechanism.
 - Lacked the credibility needed to be useful in the analysis of monetary policy.

Another Key Finding

- Smets and Wouters' demonstration that New Keynesian DSGE models forecast about as well as sophisticated atheoretical models.
- This also helped to elevate DSGE models from status of 'toys' to serious tools.

Contribution of New Keynesian DSGE Models to Analysis of Policy

- Much discussion of inflation targeting and the Taylor Principle:
 - If inflation rises 1%, raise nominal interest rate by more than 1%.
- DSGE models helped quantify the wisdom in the Taylor Principle.
- As we shall see, they also articulate some possible pitfalls.
 - If working capital channel is strong enough, Taylor Principle may destabilize.
 - Taylor Principle may inadvertently trigger a 'rational asset price bubble'.
- Contributed to discussions about how to use fiscal/tax policy to stabilize business cycles.
- It is possible to integrate rich financial structures into NK DSGE models, to address questions that involve finance:
 - Implications of central bank purchases of assets.
 - How to respond to interest rate spreads, credit growth, stock market?
- NK framework can be adapted to capture labor market analysis.

Recent Years Have Witnessed in Increase in Popularity of NK Models

- NK model used to make sense of the events of recent years, and to formulate a policy response:
 - zero lower bound interacting with weak aggregate demand due to various factors, including collapse in housing prices.
 - ‘forward guidance’, ‘fear of deflation’ comes straight from NK model.
 - alternative hypotheses (skills mismatch, uncertainty) have lost their appeal over time.
- Model correctly predicted that inflation would be weak, despite massive increase in money supply.
- Model rationalizes apparent evidence that fiscal austerity reduces economic activity.

Objective of Course

- Introduction to the basic New Keynesian model.
 - Foundations and concepts.
- Policy implications of the New Keynesian model
 - Case for and against ‘inflation targeting’.
 - Risks to the economy if the interest rate is at its zero lower bound.
 - Monetary policy and asset market fluctuations.
 - Other issues.
- Financial frictions.
- Open economy, zero bound (?).
- Computer exercises to learn Dynare.