



CENTRAL BANK MODELS
THE NEXT GENERATION

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CHALLENGES TO THE BUSINESS CYCLE PARADIGM IN CENTRAL BANK MODELS

- Should we use DSGE models to think about and guide monetary policy?
- If so, what should these models look like?
- Are there other types of models we should consider?

SHOULD CENTRAL BANKS USE DSGE MODELS?

- Yes

SHOULD CENTRAL BANKS USE DSGE MODELS?

- DYNAMIC
- STOCHASTIC
- GENERAL EQUILIBRIUM

GENERAL EQUILIBRIUM?

- What are the ingredients of a general equilibrium model?
- Individual agents who do the best they can subject to constraints
- Assumptions about preferences, technology, etc.
- Description of how markets clear
- Assumptions about the information agents have and how they process it



"It was what it was: glorious and wonderful and all that, but it doesn't mean anything"

WHY OBJECT TO DSGE MODELS?

- Cannot do sensible policy analysis without models
- Economics is a *social* science that studies human behavior: Models without agents lack an essential ingredient
- Assumptions about preferences, technology, and various frictions may be false but they may be useful simplifications of reality: We can build confidence in our models
- DSGE models such as TOTEM already include any number of generalizations of perfect market clearing in their descriptions of “equilibrium”



PROBLEMS WITH CENTRAL BANK DSGE MODELS

- Overfitting? Are model parameters convincingly and robustly identified.
- Accuracy of quantitative predictions from policy experiment, and forecasts
- Centrality of the consumption Euler equation
- Inadequate financial sector
 - Interaction between asset prices and real activity is mostly missing
 - Role of regulation in affecting behavior of financial sector is minimal
- Existing models may be far from suitable for some questions.

MULTIPLE STEADY STATES AND STRUCTURAL CHANGE

- Conventional CB models have stable dynamics around a unique steady state
- Models are typically calibrated or estimated to fit behavior over long periods of time
- For the purposes of central banks it may be adequate to model some structural change using slow time variation in parameters
 - E.g. evolving demographics
- For other questions, modeling the shocks/breaks may be central
 - E.g. changes in beliefs, hysteresis in labor markets
- For some questions the theory in place is not ready to be incorporated into a large DSGE model

FINANCIAL AND COMMODITY CYCLES


- The description and role of the financial sector in CB models seems quite crude even after the experience of the last 10 years
- Current models don't seem well set up to capture the effects of changing bank regulation on transmission mechanisms
- Asset prices, most especially, the value of housing seem to be important in real activity, as does the heterogeneity of the participants in asset markets
- Commodities: crucial to Canada and the US but in different ways



"Scientists believe no experiment is a failure, that even a mistake advances the evolution of understanding."



THINGS WORTH EXPLORING

- Departures from rational expectations
 - Ambiguity aversion
 - Overconfidence
 - Learning
 - Social dynamics
 - Adaptive expectations
 - These are all potentially *disciplined* departures from rational expectations
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The background features a dark blue gradient with a starry space pattern. On the right side, there are several technical diagrams, including a large circular gauge with numerical markings from 80 to 210 and a smaller circular diagram below it. In the top left corner, there is a small orange speech bubble icon.

THINGS WORTH EXPLORING

- Broader description of the financial sector
- Heterogeneous agents
 - Consumption Euler equation
 - Differences in beliefs
 - Welfare costs of business cycles / connection to asset prices as well

CONCLUDING THOUGHTS

- Keep faith in using models to address important policy questions
- Avoid the hubris of believing you've solved a puzzle, be open to new ideas
- The truth will be revealed but only as $T \rightarrow \infty$

"There is a way out of every box, a solution to every puzzle; it's just a matter of finding it."

"We burn away irrelevancies until we are left with a pure product, the truth for all time"