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# How much progress has the mainstream made?

## Evaluating modern DSGE models from a Post-Keynesian Perspective

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# Outline

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4. Post-Keynesian criticism against DSGE
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# WHY TALK ABOUT DSGE?

# DSGE in the mainstream

- DSGE is predominant approach in academic macroeconomics (dubbed “the new consensus“)
- A large share of papers in the “top 5“ macroeconomic journals are now about DSGE
- Many mainstream economists believe that “if you have an interesting story to tell, you can tell it in a DSGE model. If you cannot, your story is incoherent” (Chari 2010)
- DSGE models seem to have Teflon-like qualities: failure to be helpful in Great Recession has left them broadly unscathed

# DSGE and the Post-Keynesian debate

- Question: How much interaction with the mainstream?
  - Colander (2010) urges heterodox economists to present ideas in models and methods of mainstream
  - Fontana and Gerrard (2006) call for mathematically rigorous methods
  - Lee (2012) and Vernengo (2010) take opposite position, caution against waste of time and energy
  - Stockhammer/Ramskogler (2009) also recommend running independent research agenda

# CORE ELEMENTS OF DSGE

# DSGE: The acronym

- Dynamic Stochastic General Equilibrium model
  - **Dynamic:** Individual actors optimize over infinite horizon
  - **Stochastic:** We look what happens if there are stochastic shocks
  - **General Equilibrium:** Microeconomic foundations with a number of markets which are in equilibrium

# DSGE modelling: The process

- Modern DSGE modeling for policy evaluation is a multi-stage process:
  - Appropriate (microeconomic) optimization conditions are chosen
  - Model is “log-linearized“ around steady-state
  - ”Deep“ parameters (i.e. for the utility function) are chosen so that impulse response fits well with empirical data (”calibration“ of the model)
  - Model is then used to simulate the response to an exogenous shock

# DSGE: Elements

- Household optimization stems from real business cycle models
  - Infinite horizon
  - Rational expectations
  - Variation of labour supply to intertemporal changes in real wages (representative agent)
- Some (New) Keynesian elements are added
  - Price-stickiness
  - Monopolistic competition

# DSGE elements:

- Households maximise utility under budget constraint

$$E_t\left\{\sum_{t=0}^{\infty}\beta^t\left[u(C_t)+v\left(\frac{M_t^n}{P}\right)-\gamma(N_t)\right]\right\}\Rightarrow \max$$

- Utility is a CES utility function, which leads to monopolistic competition in goods‘ markets
- Firms do mark-up price setting, with staggered price adjustment (Calvo 1983)

# DSGE reduced equations

- New Keynesian IS-curve

$$y_t = E_t y_{t+1} - \frac{1}{\sigma}\left(i_t - E_t \pi_{t+1} - r_t^n\right)$$

- New Keynesian Philips curve

$$\pi_t = \beta E_t \pi_{t+1} + \kappa y_t$$

- Central banks‘ reaction function

$$i_t = r_t^* + \varphi_\pi \pi_t + \varphi_y y_t$$

# Advances of DSGE over New Classical and Monetarist approaches models

- IS-curve looks familiar: $y_t = E_t y_{t+1} - \frac{1}{\sigma}\left(i_t - E_t \pi_{t+1} - r_t^n\right)$

- Central banks conducts interest-rate policy (no exogenous money!)
- Central bank needs to be active to stabilize system

# POST-KEYNESIAN CRITICISM AGAINST DSGE

# Post-Keynesian criticism of DSGE models

- A number of Post-Keynesians have not been happy with the DSGE approach
  - Dullien (2011)
  - King (2012)
  - Lavoie (2014, 2016)

# Criticism I: Absence of involuntary unemployment

- Fluctuations in employment stem from households‘ decision to change labour supply in reaction to changing real wages
  - Household enjoy more leisure when wages are low
- **All unemployment hence is voluntary!**
- Linked to this: Assumed intertemporal elasticity of labour supply in DSGE models is about 10 times as high as (micro-)empirically observed elasticity (Chetty et al. 2011)

# Criticism II: Assumptions about wages and prices

- First generation DSGE models assume sticky prices, but flexible wages
  - Necessary to have labour market always clearing
- This turns usual assumption on its head
  - In the neoclassical synthesis, prices are flexible while wages are sticky
- This also contradicts empirical observations

# Criticism III: Fiscal policy

- In first-generation DSGE models, deficit spending increases GDP…
- …but: leads to a drop in private consumption
- Mechanism:
  - Because of Ricardian equivalence, deficit spending lowers future disposable income
  - Households now reduce leisure time (offering more labour) and private consumption
  - Result: More output, but less private consumption

# Criticism IV: Endogenous Money

- DSGE models often have endogenous money in the form of

$$m_t^S = -\frac{1}{\nu}\left(i_t - E_t\pi_t + 1\right)$$

- Money supply automatically adjust to households‘ wishes to hold real balances
- Problem: Complications of credit process (Lavoie 2014) is neglected

# Criticism V: No proper financial sector

- Early DSGE models did not include a financial sector
- Hence, they were real economy models with an interest rate set by the central bank
- All shocks eminating from the financial sector were absent

# Criticism VI: No Asset Price Bubbles

- DSGE models do not include the possibility of asset price bubbles
- Fundamental issue: DSGE mdels feature *one* unique deterministic steady state (Miao 2016)
  - Under this assumption, together with rational expectations, asset price bubbles are difficult, if not impossible to model

# PROGRESS MADE BY DSGE MODELLERS

# Making fiscal policy reaction more plausible

- Following Galí et al. (2007), new DSGE models include rule-of-thumb consumers
  - These consumers can neither save nor borrow
  - They always consume all their income
  - Large share (about 50 percent) of those consumers are necessary to get plausible results
- Reaction now more plausible
  - Deficit spending leads to more output and more private consumption

# Involuntary unemployment

- Galí et al. (2012) tries to model involuntary unemployment
  - Heterogenous labour
  - Households have different labour types
  - Monopoly unions for each labour type set wages
  - Assumption: Labour supply can only be varied at the extensive margin
  - Result: Some individuals are now unemployed even though their household would want them to work
- Problem: Utility of unemployed is *higher* than of employed persons!

# Financial sector modelling

- Bernanke et al. (1999)
  - Financial accelerator based on information asymmetry between financial intermediaries and borrowers
- Gertler and Karadi (2011)
  - Information asymmetry between depositors and intermediaries
- Gertler and Kiyotaki (2011)
  - Sudden changes in liquidity of certain assets

# EVALUATION OF PROGRESS IN DSGE MODELS

# Evaluation: Reaction to fiscal policy

- Very large share of households without access to financial markets (50 percent) necessary to get decent results
- Question: Why should households behave according to rules-of-thumb in their consumption decision, yet not their labour supply decisions?

# Evaluation of involuntary unemployment

- As mentioned before, in Galí et al. (2012) formulation, the unemployed have a higher utility than the employed
- Even the DSGE community itself does not buy the story in these model elements (Christiano 2012)

# Evaluation of financial sector modelling

- Information asymmetries included are certainly sensible
- But: Are we sure that these mechanisms are really the underlying forces of the financial sector‘s impact on the economy?
- And: Still, no reasonable inclusion of asset price bubbles exists!

# Why not include Farmer in my „progress of DSGE“ overview? (I)

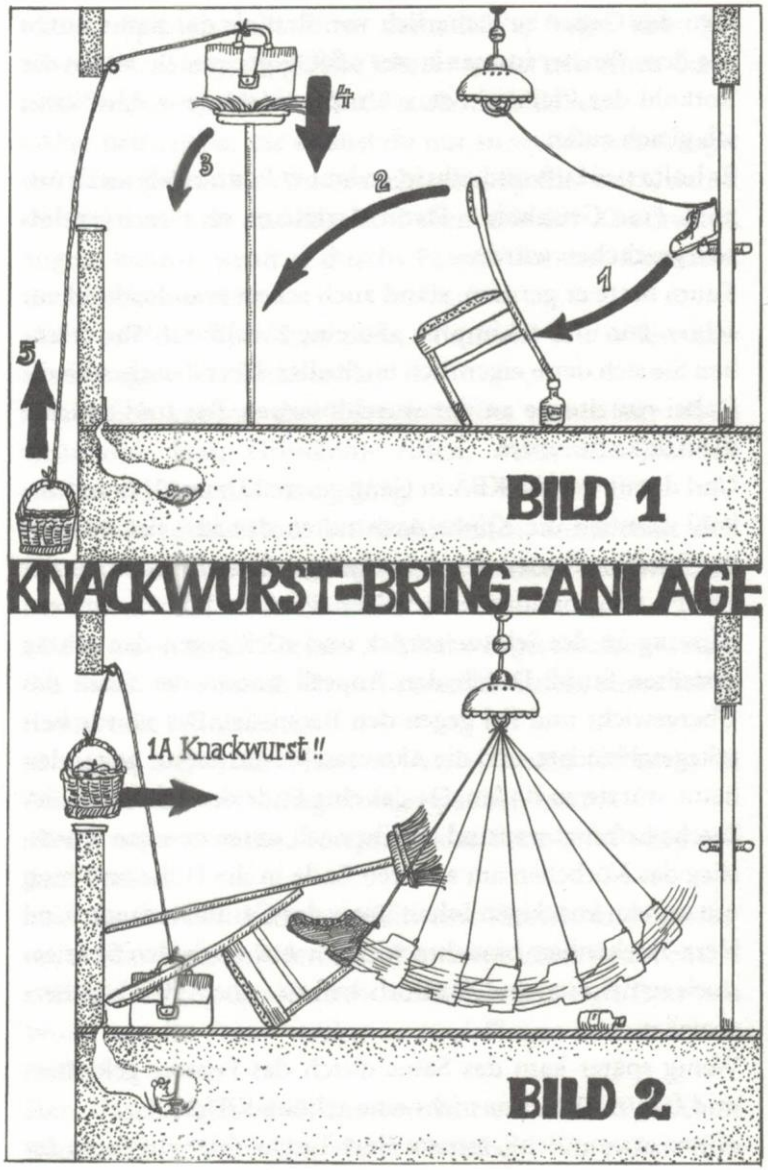
- Farmer (2014) presents a microfounded model which cleverly introduces path dependence into the macroeconomy
  - Firms might not devote enough resources to match workers and jobs
  - Unemployment might occur
  - Based on current unemployment, households form expectations about life time income
  - A small shock can have permanent consequences

# Why not include Farmer in my „progress of DSGE“ overview? (II)

- Households do not vary labour supply as a reaction to wages anymore (is this still DSGE?)
- DSGE mainstream does not seem to have (yet) accepted this modelling approach
- Is the modelling really plausible that unemployment arises if firms devote their resources to production rather than hiring?

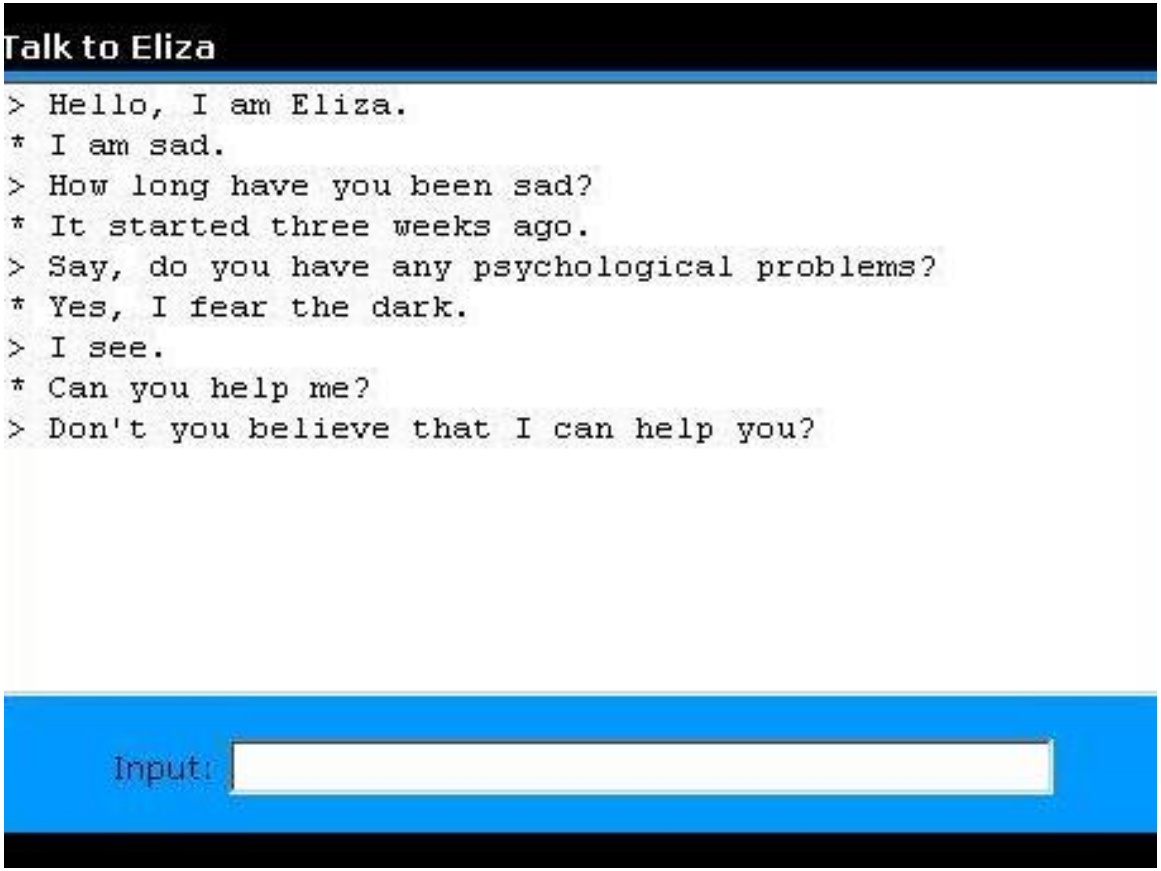
# What are modern DSGE models doing?

- They replace (arbitrarily) parts of the utility-maximising microfoundation by non-maximising elements
- They sometimes need to use completely implausible parameters
- In the end, they get more plausible reactions of time series, but at the costs of increasingly dodgy
- In a way this seems a bit like saying: „Look, I can somehow get certain features even into a DSGE model“



# A more philosophical question: What do we want from macroeconomic models?

- Padagogy: Explaining economic mechanisms found in the real world
  - Assumptions in new DSGE models are getting increasingly ad hoc and implausible
  - Value of overall model to explain working of an economy is highly questionable
- Forecasting and policy evaluation: Try to predict economic variables
  - Out-of-sample prediction ability of DSGE models is highly questionable
  - Do you really trust a model with provenly wrong microfoundations to forecast better than a model without microfoundations?




**Would you use Eliza to predict the reaction of fellow human beings?**

**Is this a good model to simulate the behaviour of birds?**

# One remark on the Lucas (1977) critique

- Lucas cautioned against using empirically observed relationships to forecast impact of changes in economic policies
- However, there is nothing that indicates that using incorrect micro-foundations is any better than having no micro-foundations at all
  - Research shows that deep parameters in DSGE models have a drift (Hurtado 2013) – exactly what Lucas used as criticism against traditional macromodels

# Conclusions

- Modern DSGE models get some more plausible reactions of their time series than old models
- Yet, this comes at the expense of more implausible elements and ad-hoc deviation from microfoundations
- Problematic issues remain
- It is still not clear where the value-added lies relative to macroeconomic model without microfoundations

# THANK YOU VERY MUCH FOR YOUR ATTENTION!