NEW MODELS FOR MACRO-FINANCIAL INTERACTIONS

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Central bank wish list for policy modelling

Understand likely effects of monetary, macroprudential, and prudential policies on key outcomes including:

- Cyclical and long-term growth
- Inflation
- Employment
- Supply of credit to the real economy
- Systemic risk
- Distributional effects

Understand interactions between policy tools

Example Policy Tests

- Bank capital ratios
- Counter-cyclical capital buffers
- Sectoral capital buffers
- Structural changes (e.g. Volker rule, ring-fence)
- Lending policies (e.g. LTV)
- Dynamic stress testing (e.g. Euro crisis)
- Interaction of monetary and macro-prudential
- Exit from QE

Haldane – rocking horse economics

Haldane – rocking horse economics versus wild horse economics

A model for 'wild horse' economics

- Banks raise funds (deposits, money mkts) and make loans
- Balance sheets (stocks) and interactions (flows)
- Network of interbank connections
- Households buy, save, borrow, supply labour
- Firms produce, employ, save, invest, borrow
- Regulatory framework
- Central bank
- Fiscal authority/sovereign debt

- Heterogeneity
- Realistic agent behaviour
- Realistic institutions
- Use micro "big data"

# CRISIS Model Schematic
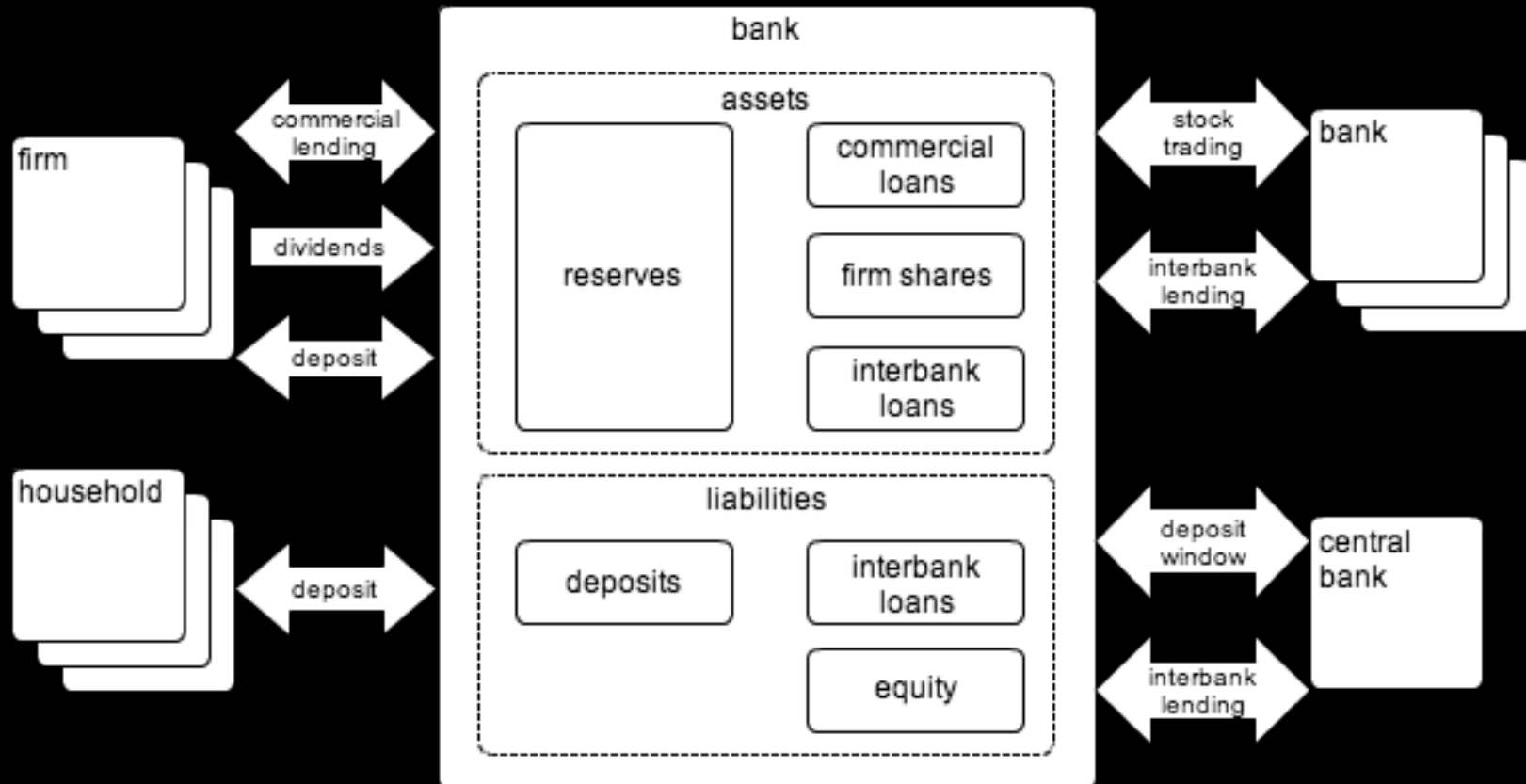
Production sector

- Input-output economy
  - Firms are myopic profit maximisers that use heuristics to set price and quantity of production
  - Variable labour supply
  - Produce capital and consumer goods
  - Finance production via mixture of credit and equity
  - Input-output structure mimicking real economy
- For comparison have simpler alternatives, e.g. fixed labor Cobb Douglas, exogenous dividends.

Financial sector

- Banks
  - take deposits from firms and households, lend to firms, buy and sell shares, participate in interbank market (future version will lend households mortgages).
  - Investment strategies: trend following, fundamental
- Central bank
  - conventional and unconventional policy operations
  - interest rate can be formed endogenously
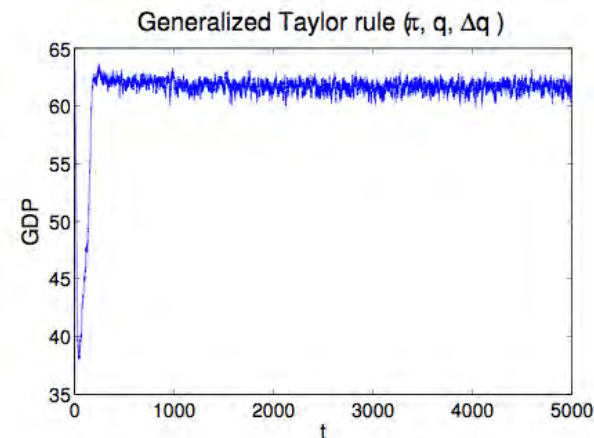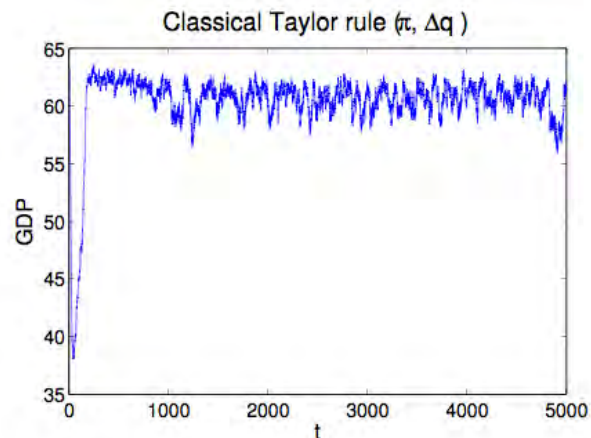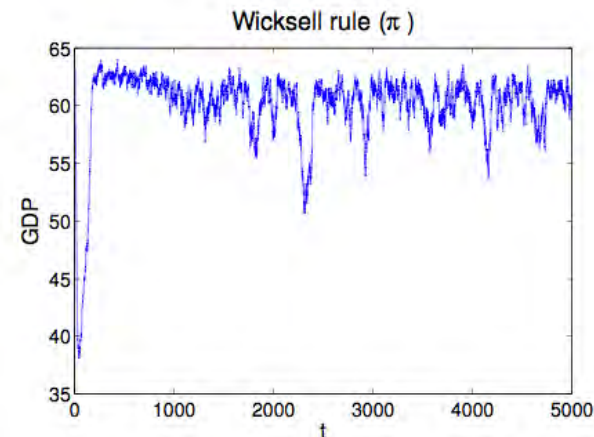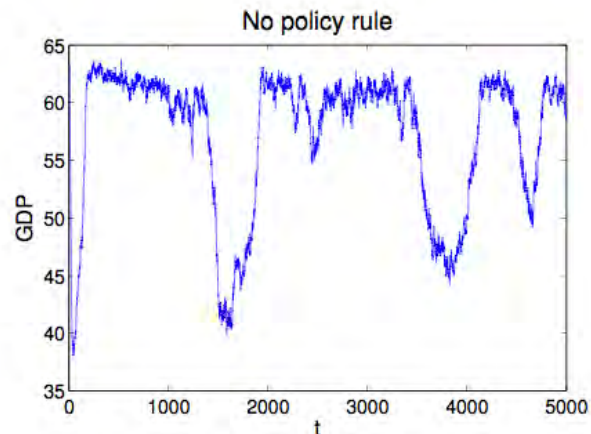- Firms
  - borrow from banks to fund production

Heterogeneous interacting firms produce endogenous credit cycle
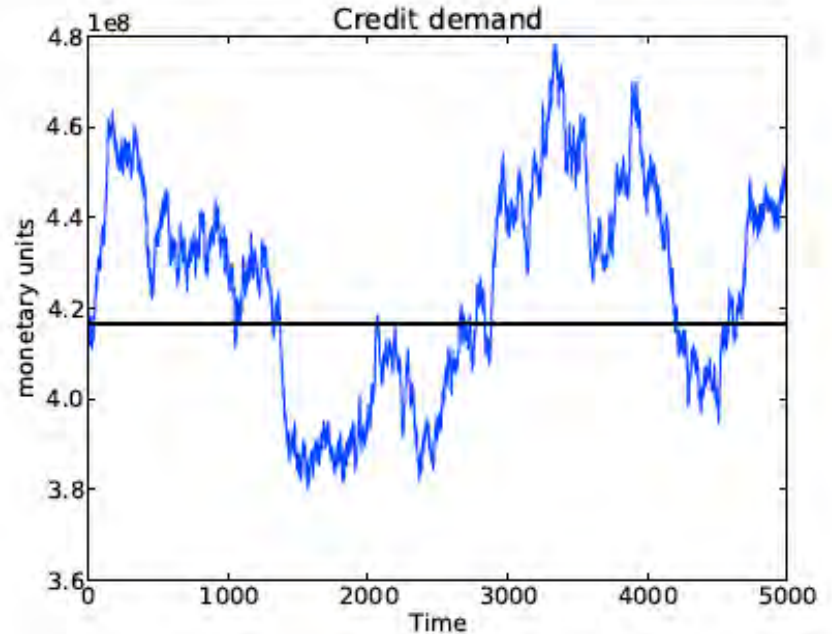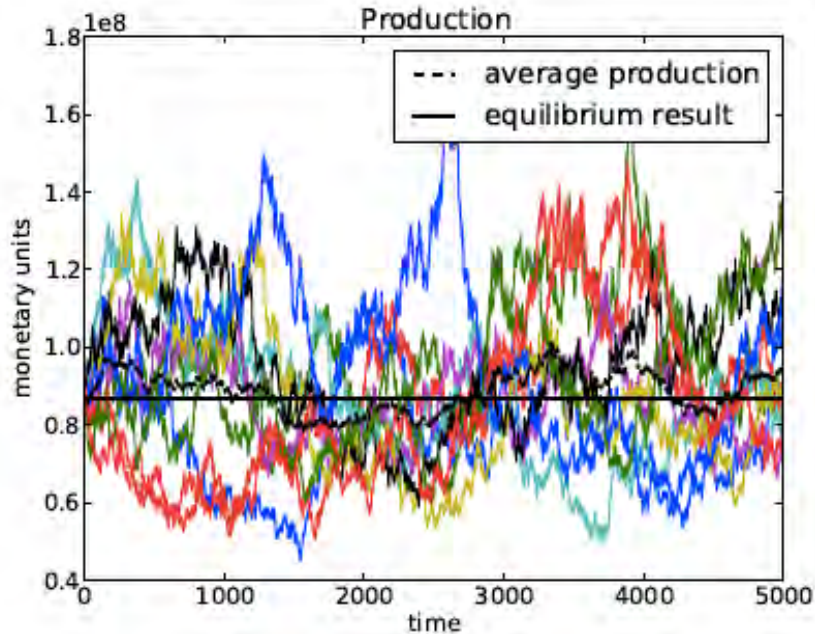
Central bank can dampen cycle
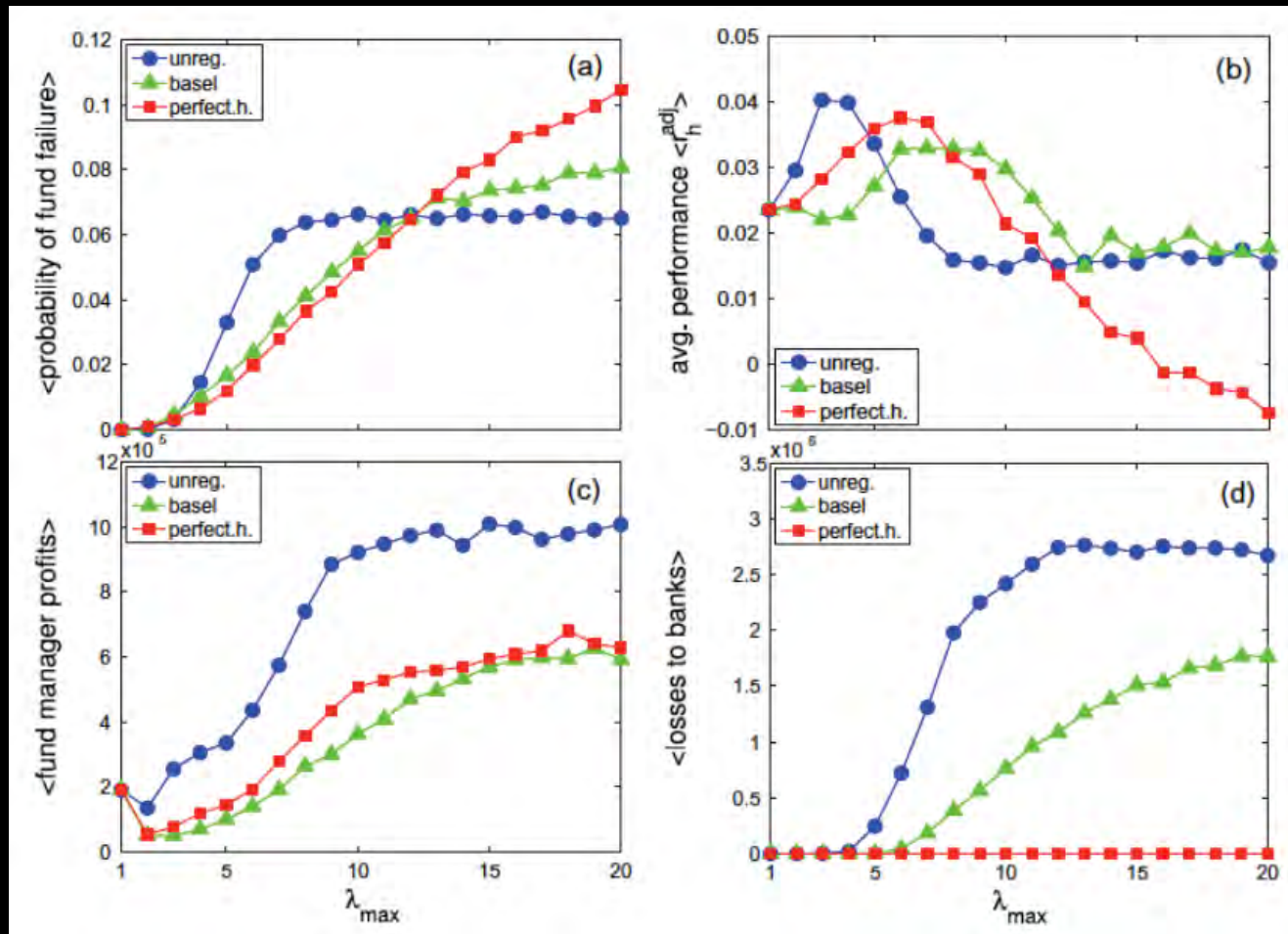
Liquidation vs. bail-out vs. bail-in

Preliminary result

- Liquidation (healthy banks buy assets) – best when economy is healthy, failures aren't systemic
- Bail-in (debt-equity conversion) – best in recession, when failures systemic
- Bailout (funded by taxes on households) – no conditions where best

Liquidate
Bailout
Bail-in
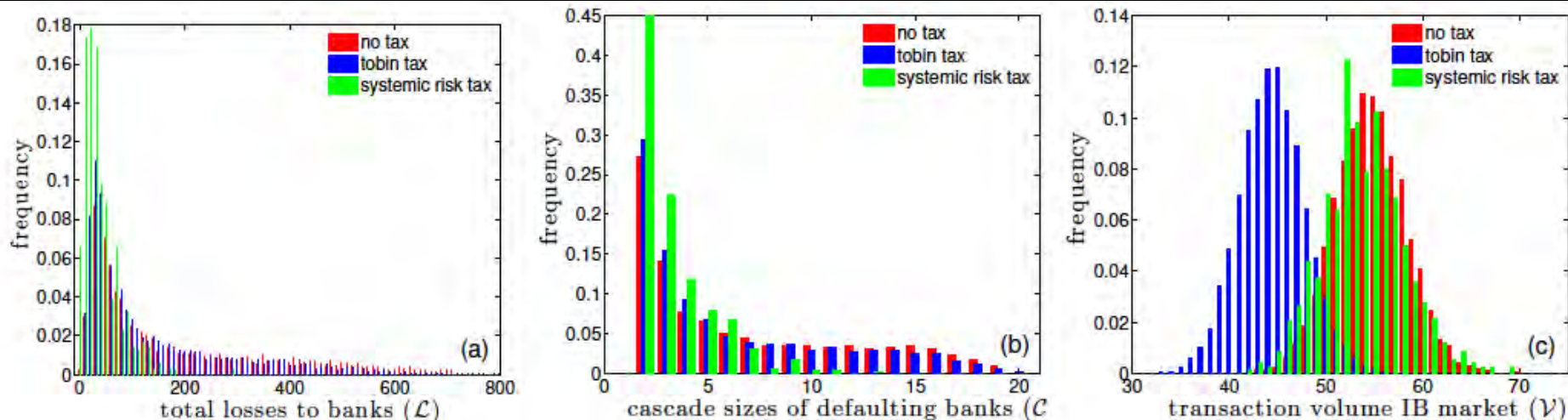
Impact of Basel III regulation

Basel type rules dampen but do not eliminate systemic risk

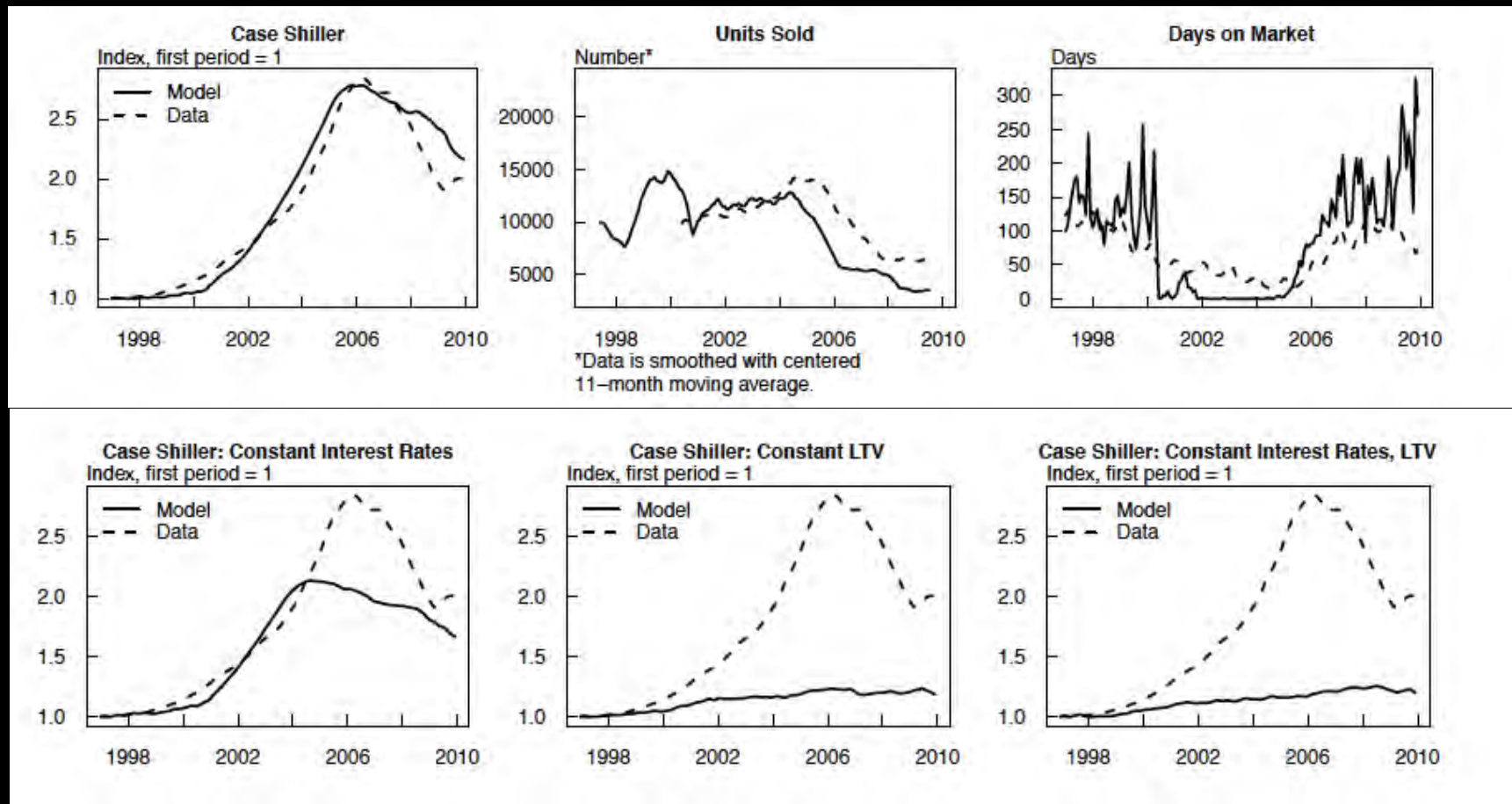# Impact of a systemic risk tax

- Tobin tax reduces transaction volume but little impact on systemic risk
  - Reduction in liquidity may increase volatility

- Systemic risk tax significantly reduces risk, contains contagion, little impact on volume
  - Challenges in implementation

Lending policy – housing bubble model

Tentative conclusion: Lending policy is dominant cause of housing bubble in Washington DC.

Challenges for using ABMs in policy

- Mainstream validation
  - Econometric 30,000 person years
  - DSGE 20,000 person years
  - ABM 500 person years
- Black box (though less than DSGE), model complexity
- Parameterising and validating with data
- How much behavioural and institutional realism is enough?
- "Non-equilibrium thinking"

Project CRISIS leadership

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- Jean-Philippe Bouchaud, Commission on Atomic and Alternative Energy (CEA), France, and Capital Fund Management

- Cars Hommes, University of Amsterdam, Netherlands

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- Fabrizio Lillo, University of Palermo (UNIPA), Italy

- Giulia Iori, City University, UK

- László Gulyás, AITIA, Hungary

THANK YOU

For more information please see:

www.inet.ox.ac.uk

www.ineteconomics.org

www.crisis-economics.eu