COMMENTS FOR

"CENTRAL BANK MODELS: THE NEXT GENERATION"

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Key Tradeoff

- Complex general-equilibrium models providing quantitative answers (DSGE):
  - "Core"
- Micro models covering specific phenomena, based on micro-foundation, often providing qualitative answers:
  - "Periphery "

"Macroeconomics after the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome" (Ricardo Caballero, *Journal of Economic Perspectives*, 2010)

Limitations of DSGE Models

- DSGE models provide general-equilibrium macroeconomic analysis
- However, models, by their nature, are only an abstraction and simplification of the real world
- Hence, compromises are required, and with DSGE models this often means
  - Reduced form models
  - Leaving out first principles of economic mechanisms, such as:
    - Moral hazard, asymmetric information, strategic complementarities and panics
  - Leaving out institutions and activities, e.g., the financial sector
- Calibration of deep parameters might be a "black box"

Example: Runs

- One of the basic phenomena in financial systems, driving crises and policies
- Traditional bank runs:
  - Banks finance illiquid asset with demandable liabilities
  - This generates strategic complementarities between agents: they want to run if other people run
  - Multiple equilibria arise
- Modern runs:
  - Runs happen more broadly than just in banks and characterize other financial institutions and markets
    - Repo markets, mutual funds, money market funds
  - Key in forecasting future developments, in monetary policy, and in financial-stability policy

Runs and Policy

- The understanding of runs and policy implications was developed in micro-oriented models
  - Deposit Insurance and Suspension of Convertibility
  - Probability of a run and its interaction with bank choices and policy; global-games analysis
  - Runs in institutions other than banks
- Such models are needed to evaluate runs and related policies:
  - Liquidity requirements, capital requirements, monetary policy, etc.
- Very hard to incorporate runs into DSGE macroeconomic models
  - Some progress recently by Gertler and Kiyotaki (2015)
- Progress forward must happen in both dimensions

Sufficient Statistic Approach

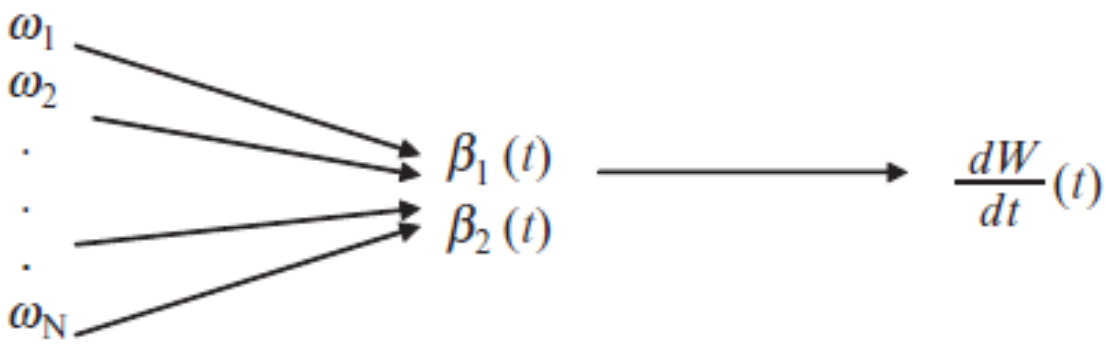
- The main drawback of models of the periphery is perhaps that they do not provide quantitative conclusions, which are so desired by policymakers
- But, this does not have to be the case
- The sufficient statistic approach developed and used mainly in public finance allows us to develop quantitative policy implications for specific questions
  - Optimal taxes, optimal insurance, etc.

Sufficient Statistic Approach – Cont'd

- The key advantage of this approach is its reliance on 'sufficient statistics' that can be estimated in the data
- These are endogenous high level variables and not the deep parameters that are targeted in a calibration exercise
- The idea is that it is sufficient to estimate these statistics to address the policy questions at hand
  - We need a different sufficient statistic estimated for different policy questions

"Sufficient Statistics for Welfare Analysis: A Bridge Between Structural and Reduced-Form Methods" (Raj Chetty, *Annual Review of Economics*, 2009)

Sufficient Statistic Approach – Illustration



ω = preferences, constraints

ω not uniquely identified

$\beta = f(\omega, t)$

$y = \beta_1 X_1 + \beta_2 X_2 + \varepsilon$

β identified using program evaluation

dW/dt used for policy analysis

Example: Optimal Deposit Insurance (Davila and Goldstein, 2016)

- Start from a standard microeconomic model a' la Diamond and Dybvig (1983)
- Tradeoff with deposit insurance:
  - Reduces the probability of a run lowering the expected damage from a run
  - But sometimes has to be paid causing fiscal costs
  - In addition, there are all the effects of deposit insurance on bank and investor behavior, e.g., the often mentioned moral hazard
- Presumably, a calibration approach would attempt to calibrate all the underlying parameters, e.g., preferences, technology, etc.
  - A daunting task

Optimal Deposit Insurance – Cont'd

- But, we develop a formula based on four elasticities that can be potentially estimated in the data:

Optimal level of DI $\qquad \delta^* = \dfrac{\boxed{A} \times \boxed{B}}{\boxed{C} \times \boxed{D}}$

- Marginal benefit
  - $\boxed{A}$ Sensitivity of bank failure probability to DI change
  - $\boxed{B}$ Drop in depositors consumption at failure threshold
- Marginal cost
  - $\boxed{C}$ Probability of bank failure
  - $\boxed{D}$ Expected marginal social cost of intervention in case of bank failure

Optimal Deposit Insurance – Cont'd

- Note, moral hazard and other effects on behavior disappear due to envelope condition
  - Banks maximize their objectives, and so the effect through bank behavior approaches zero (perfect competition benchmark)
  - Typical in the sufficient statistic approach
- Formula provides guidance as to what we should try to measure and estimate
- Approach can be applied to other policy questions:
  - Liquidity requirements, capital requirements, etc.

Conclusions

- DSGE is useful but limited in incorporating many important phenomena
- Progress in incorporating some phenomena into DSGE is welcome, e.g., runs
- But, one cannot avoid using micro models with frictions developed from first principles to address acute issues related to fragility and policy
- Effort should continue on both dimensions
- Sufficient Statistic approach can be useful in taking these models to provide quantitative implications
- It also provides guidance on what needs to be measured