

Calibrated Consumer Finance Models as Tools for Policy Evaluation

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Genesis

“One of the functions of theoretical economics is to provide fully articulated artificial economic systems that can serve as laboratories in which policies that would be prohibitively costly to experiment with in actual economies can be tested out at much lower costs”

Robert E Lucas, Jr., “Methods and Problems in Business Cycle Theory,” *Journal of Money Credit and Banking*, 12, 1980

What is Calibration?

Methodology to simulate a market environment on a computer

- Individuals are specified by their endowments and preferences
- Businesses are specified by their technology
- The government is specified by its tax/transfer or regulatory policies
- Individuals and businesses act to maximize utility and profits, respectively, taking policy and current and expectations of future market prices as given
- Prices clear markets at each point in time
- Expectations of future prices are fulfilled

Why is it called Calibration?

- The “calibration step” is the fitting of the model to facts that are germane to the phenomenon under investigation *but not directly part of it*
- If a calibrated model fails to give a good account of the phenomenon, the modeler is encouraged to think more deeply about what is missing in the model
- A good account of the phenomenon in question and consistency with facts from different areas of economics give “calibrated” models credibility for policy evaluation purposes

Connections

Computable General Equilibrium Models

- Johansen, Lief, *A Multisector Model of Economic Growth*, Amsterdam: North Holland, 1960 (Second Edition, 1974)
- Fogel, Robert, *Railroads and American Economic Growth: Essays in Econometric History*, Baltimore: Johns Hopkins Press, 1964
- Auerbach, Alan and Lawrence Kotlikoff, *Dynamic Fiscal Policy*, Cambridge: Cambridge University Press, 1987.

Calibrated Models of Consumer Finance

Some Examples

- Chatterjee, S. Corbae, D., Nakajima, M., and Rios-Rull, J-V. “A Quantitative Theory of Unsecured Consumer Credit with Risk of Default,” *Econometrica*, 75(6), 2007
- Livshits, I., MacGee, J., and Tertilt, M. “Consumer Bankruptcy: A Fresh Start,” *American Economic Review*, 97(1), 2007
- Athreya, K. “Default, Insurance, and Debt Over the Life-Cycle,” *Journal of Monetary Economics*, 55, 2008

Key Features

- Households face uninsured idiosyncratic shocks to income, preferences and assets and sometimes borrow to smooth consumption
- Borrowers may default via a Chapter 7 bankruptcy filing
- Bankrupts lose some proportion of earnings and cannot borrow for some length of time
- Lenders are risk-neutral and competitive and charge an interest rate on each loan that just compensates for the risk of default (risk-based pricing)

An Example Policy Experiment

Effects of Means Testing for Chapter 7 Filing (Chatterjee et al. Table 9)

Economy	Baseline	Ch 7 for below-median income households only
Total assets as % of Total Output	308	305
Net unsecured debt as % of Total Output	0.68	1.28
% of Households that file	0.54	0.53
% of Households with impaired credit	4.23	4.13
% of Households in debt	4.99	8.17
Rate of return of capital	1.69%	1.80%
Avg. interest rate (persons-weighted)	30.96%	13.04%

Research Tools

What do Calibrationists Need to Do Their Job?

- Micro datasets that provide rich information on individual behavior
- Numerical techniques for dynamic programming and for solving large nonlinear equation systems
- Fast computers with lots of memory
- Talent!

Developments on the Horizon

Capability to analyze the effects of

- restricting lenders' access to information about borrower characteristics relevant for estimating default probabilities (non-discrimination laws; fair credit reporting act)
- restricting lenders' ability to change contract terms following new information (unfair and deceptive acts and practices act)
- innovation in mortgage financing on housing markets and consumer behavior