Macroeconomic Research, Present and Past

P.J. Glandon, Ken Kuttner, Sandeep Mazumder and Caleb Stroup

Appendix A: Paper classification examples

The six tables in this appendix provides citations to and brief descriptions of papers falling into the categories defined in sections 2 and 3.

- Table A1 gives examples of papers in the epistemological and methodological categories defined in section 2.
- Table A2 gives examples of papers using the equilibrium concepts defined in section 3.1.1.
- Table A3 gives examples of papers featuring the frictions and market perfections described in section 3.1.2.
- Table A4 gives examples of papers classified by the DSGE genres enumerated in section 3.1.3.
- Table A5 gives examples of papers containing the unconventional features described in section 3.1.4.
- Table A6 gives examples of papers using the different types of methods and datasets described in section 3.2.

Table A1: Examples of Epistemologies and Methods

Description	Wulfsberg (2016)	Uses micro data to document the relationship between the size and frequency of price changes during high- and low-inflation periods.
Casual effects	Hansen and Ziebarth (2017)	Exploits a natural experiment to asses the effects of financial distress on non-financial firms.
Falsification		
Theory-centric	Khan and Reza (2017)	Shows that DSGEs cannot account for the observed response of house prices to government spending shocks.
Econometric	Fisher and Konieczny (2006)	Tests and corroborates the Sheshinski & Weiss model of monopoly price adjustment.
Model fitting		
Theory-centric	Gertler, Sala and Trigari (2008)	Shows that including wage rigidity helps a medium-scale macro model fit the data.
Econometric	Engel and West (2006)	Generates a model-based time series for German exchange rate based on uncovered interest rate parity and a VAR forecasting model and compares its properties with those of the observed exchange rate data.
Abduction		
Theory-centric	Sheedy (2010)	Modifies the Calvo staggered price setting model to explain inflation persistence.
Econometric	Bems and di Giovanni (2016)	Modifies a standard CES model to account for expenditure switching within product groups in the absence of relative price changes.
Quantification		
Theory-centric	Carlsson and Westermark (2016)	Uses a calibrated labor search/matching model to determine that the optimal inflation rate is 1.16%.
Econometric	Fair (2017)	Estimates a structural macro model and finds that the 2008–09 fall in wealth led to a 2.1% increase in the unemployment rate in 2009.
Non-quantitative	Woodford (2008)	Uses an NK model to evaluate the role of monetary aggregates in the conduct of monetary policy.
Methodology		
Theory-centric	Barthélemy and Marx (2017)	Develops a method for solving rational expectations models with endogenous regime switching.
Econometric	Lütkepohl and Netšunajev (2017)	Proposes an SVAR model with smooth transition in variances.
Other	Patinkin (1990)	Patinkin's views on Keynes's *General Theory*.

Table A2: Examples of Equilibrium Concepts

Roberts (1980)	Partial	Models investors' demand for bonds of different maturities to consider the effects of asset supplies on term premiums.
Pries (2016)	Partial	Builds a search and matching model of the labor market, shows how uncertainty shocks can give rise to the Beveridge Curve.
Gertler and Rogoff (1990)	General	Develops an open-economy model of intertemporal trade under asymmetric information to analyze North-South capital flows.
Karabarbounis (2016)	General	Develops a life-cycle model with an endogenous labor supply elasticity to determine optimal tax policy.
Cúrdia and Woodford (2016)	DSGE	Extends a standard New Keynesian model to allow for a spread in the interest rate earned by savers and paid by borrowers.
Ireland (2000)	DSGE	Characterizes the Fed's response to technology shocks, using a model with money in the utility function.

Table A3: Examples of Frictions

Lim (2018)	Financial	Uses collateral constraints to understand the relationship between the housing market and small businesses.
d'Aspremont, Ferreira and Gérard-Varet (1990)	Market power	Argues that imperfect price competition may be a cause of unemployment in their general equilibrium model.
Guerrieri (2008)	Search	Examines the efficiency properties of a competitive search model where there is asymmetric information between workers and employers.
Cesa-Bianchi and Fernandez-Corugedo (2018)	Nominal rigidity	Studies a financial accelerator DSGE model with sticky prices.

Table A4: Examples of DSGE Genres

Gu (2018)	RBC	Develops an RBC model to study the impact of a cyclical quasi-fixed labor cost on firms' employment decisions.
Correia, Nicolini and Teles (2008)	Monetary	Analyzes the optimal policy problem in a dynamic general equilibrium model with money and taxes.
Aruoba, Cuba-Borda and Schorfheide (2018)	New Keynesian	Solves a small-scale New Keynesian DSGE model while imposing the ZLB constraint and introducing a non-fundamental Markov sunspot shock.
Christiano, Eichenbaum and Trabandt (2016)	Search & Matching	Develops a general equilibrium search and matching model that accounts for key business cycle properties of macroeconomic aggregates without having to impose for wage inertia.
Storesletten (2000)	OLG	Uses a calibrated general equilibrium OLG model to examine whether immigration policy reform can resolve fiscal problems associated with an aging baby boom generation.
Dotsey (1990)	Stochastic Growth	Analyzes the effects of stochastic taxes on production in a stochastic growth model.
Lin, Shi and Ye (2018)	Trade	Builds a small open economy general equilibrium model to examine the role of credit constraints in determining the trade effects of exchange rate volatility.

Table A5: Examples of Unconventional Features

Karabarbounis (2016)	Heterogeneous Agents	Assesses optimal labor income taxes that depend on the differing characteristics of heterogeneous households.
Palczewski, Schenk-Hoppé and Wang (2016)	Agent-Based Model	Studies the effect of the size of investors' flow of funds in an agent-based model of the financial market.
Graham and Snower (2008)	Non-Rational Expectations	Shows that the interaction of staggered nominal contracts with hyperbolic discounting leads to inflation having significant long-run effects on real variables.
Matsuyama (1990)	Indeterminacy	Considers sunspot equilibria in a model with money in the utility function.

Table A6: Examples of Econometric Methods and Data Characteristics

Fama (1990)	Time series	Uses time series data on interest rates and inflation to estimate autoregressive models showing that the term structure has useful information for forecasting future interest rates at longer horizons as well as the business cycle.
Sack (2000)	Time series	Uses a structural VAR to show that uncertainty about the structure of the economy can explain the Fed's gradual adjustment of the interest rate.
Rupert, Rogerson and Wright (2000)	Applied micro	Estimates households' intertemporal elasticities of substitution. Household-level cross-sectional time use survey data.
Edwards and Magendzo (2006)	Applied micro	Estimates "treatment effects" of strict dollarization. Cross-section, country-level data.
Brueckner, Calem and Nakamura (2016)	Applied micro	Use a panel of loan level data to estimate whether the growth rate in housing prices explains changes in the market share of alternative mortgage products. Quarterly asset-level panel data, proprietary.

References

Aruoba, S Borağan, Pablo Cuba-Borda, and Frank Schorfheide. 2018. "Macroeconomic Dynamics Near the ZLB: A Tale of Two Countries." *Review of Economic Studies*, 85 (1): 87–118.

Barthélemy, Jean, and Magali Marx. 2017. "Solving endogenous regime switching models." *Journal of Economic Dynamics and Control*, 77: 1–25.

Bems, Rudolfs, and Julian di Giovanni. 2016. "Income-Induced Expenditure Switching." *American Economic Review*, 106 (12): 3898–3931.

Brueckner, Jan K., Paul S. Calem, and Leonard I. Nakamura. 2016. "House Price Expectations, Alternative Mortgage Products, and Default." *Journal of Money, Credit and Banking*, 48 (1): 81–112.

Carlsson, Mikael, and Andreas Westermark. 2016. "Labor market frictions and optimal steady-state inflation." *Journal of Monetary Economics*, 78: 67–79.

Cesa-Bianchi, Ambrogio, and Emilio Fernandez-Corugedo. 2018. "Uncertainty, Financial Frictions, and Nominal Rigidities: A Quantitative Investigation." *Journal of Money, Credit and Banking*, 50 (4): 603–636.

Christiano, Lawrence J., Martin S. Eichenbaum, and Mathias Trabandt. 2016. "Unemployment and Business Cycles." *Econometrica*, 84: 1523–1569.

Correia, Isabel, Juan Pablo Nicolini, and Pedro Teles. 2008. "Optimal Fiscal and Monetary Policy: Equivalence Results." *Journal of Political Economy*, 116 (1): 141–170.

Cúrdia, Vasco, and Michael Woodford. 2016. "Credit Frictions and Optimal Monetary Policy." *Journal of Monetary Economics*, 84: 30–65.

d'Aspremont, Claude, Rodolphe Dos Santos Ferreira, and Louis-André Gérard-Varet. 1990. "On Monopolistic Competition and Involuntary Unemployment." *The Quarterly Journal of Economics*, 105 (4): 895–919.

Dotsey, Michael. 1990. "The Economic Effects of Production Taxes in a Stochastic Growth Model." *American Economic Review*, 80 (5): 1168–1182.

Edwards, Sebastian, and I. Igal Magendzo. 2006. "Strict Dollarization and Economic Performance: An Empirical Investigation." *Journal of Money, Credit and Banking*, 38 (1): 269–282.

Engel, Charles, and Kenneth D. West. 2006. “Taylor Rules and the Deutschmark: Dollar Real Exchange Rate.” *Journal of Money, Credit and Banking*, 38 (5): 1175–1194.

Fair, Ray C. 2017. “Household Wealth and Macroeconomic Activity: 2008–2013.” *Journal of Money, Credit and Banking*, 49 (2-3): 495–523.

Fama, Eugene F. 1990. “Term-structure forecasts of interest rates, inflation and real returns.” *Journal of Monetary Economics*, 25 (1): 59–76.

Fisher, Timothy C. G., and Jerzy D. Konieczny. 2006. “Inflation and Costly Price Adjustment: A Study of Canadian Newspaper Prices.” *Journal of Money, Credit and Banking*, 38 (3): 615–633.

Gertler, Mark, and Kenneth Rogoff. 1990. “North-South lending and endogenous domestic capital market inefficiencies.” *Journal of Monetary Economics*, 26 (2): 245–266.

Gertler, Mark, Luca Sala, and Antonella Trigari. 2008. “An Estimated Monetary DSGE Model with Unemployment and Staggered Nominal Wage Bargaining.” *Journal of Money, Credit and Banking*, 40 (8): 1713–1764.

Graham, Liam, and Dennis J. Snower. 2008. “Hyperbolic Discounting and the Phillips Curve.” *Journal of Money, Credit and Banking*, 40 (2-3): 427–448.

Gu, Grace Weishi. 2018. “Employment and the Cyclical Cost of Worker Benefits.” *Review of Economic Dynamics*, 28: 96–120.

Guerrieri, Veronica. 2008. “Inefficient Unemployment Dynamics under Asymmetric Information.” *Journal of Political Economy*, 116 (4): 667–708.

Hansen, Mary Eschelbach, and Nicolas L. Ziebarth. 2017. “Credit Relationships and Business Bankruptcy during the Great Depression.” *American Economic Journal: Macroeconomics*, 9 (2): 228–55.

Ireland, Peter N. 2000. “Interest Rates, Inflation, and Federal Reserve Policy Since 1980.” *Journal of Money, Credit and Banking*, 32 (3): 417–434.

Karabarbounis, Marios. 2016. “A Road Map for Efficiently Taxing Heterogeneous Agents.” *American Economic Journal: Macroeconomics*, 8 (2): 182–214.

Khan, Hashmat, and Abeer Reza. 2017. “House Prices and Government Spending Shocks.” *Journal of Money, Credit and Banking*, 49 (6): 1247–1271.

Lim, Taejun. 2018. "Housing as Collateral, Financial Constraints, and Small Businesses." *Review of Economic Dynamics*, 30: 68–85.

Lin, Shu, Kang Shi, and Haichun Ye. 2018. "Exchange rate volatility and trade: The role of credit constraints." *Review of Economic Dynamics*, 30: 203–222.

Lütkepohl, Helmut, and Aleksei Netšunajev. 2017. "Structural vector autoregressions with smooth transition in variances." *Journal of Economic Dynamics and Control*, 84: 43–57.

Matsuyama, Kiminori. 1990. "Sunspot equilibria (rational bubbles) in a model of money-in-the-utility-function." *Journal of Monetary Economics*, 25 (1): 137–144.

Palczewski, Jan, Klaus Reiner Schenk-Hoppé, and Tongya Wang. 2016. "Itchy feet vs cool heads: Flow of funds in an agent-based financial market." *Journal of Economic Dynamics and Control*, 63 (C): 53–68.

Patinkin, Don. 1990. "On different interpretations of the General Theory." *Journal of Monetary Economics*, 26 (2): 205–243.

Pries, Michael J. 2016. "Uncertainty-driven labor market fluctuations." *Journal of Economic Dynamics and Control*, 73: 181 – 199.

Roberts, Gordon S. 1980. "Term Premiums in the Term Structure of Interest Rates." *Journal of Money, Credit and Banking*, 12 (2): 184–197.

Rupert, Peter, Richard Rogerson, and Randall Wright. 2000. "Homework in labor economics: Household production and intertemporal substitution." *Journal of Monetary Economics*, 46 (3): 557–579.

Sack, Brian. 2000. "Does the Fed act gradually? A VAR analysis." *Journal of Monetary Economics*, 46 (1): 229–256.

Sheedy, Kevin D. 2010. "Intrinsic inflation persistence." *Journal of Monetary Economics*, 57 (8): 1049–1061.

Storesletten, Kjetil. 2000. "Sustaining Fiscal Policy through Immigration." *Journal of Political Economy*, 108 (2): 300–323.

Woodford, Michael. 2008. "How important is money in the conduct of monetary policy?" *Journal of Money, credit and Banking*, 40 (8): 1561–1598.

Wulfsberg, Fredrik. 2016. "Inflation and Price Adjustments: Micro Evidence from Norwegian Consumer Prices 1975–2004." *American Economic Journal: Macroeconomics*, 8 (3): 175–94.

Macroeconomic Research, Present and Past

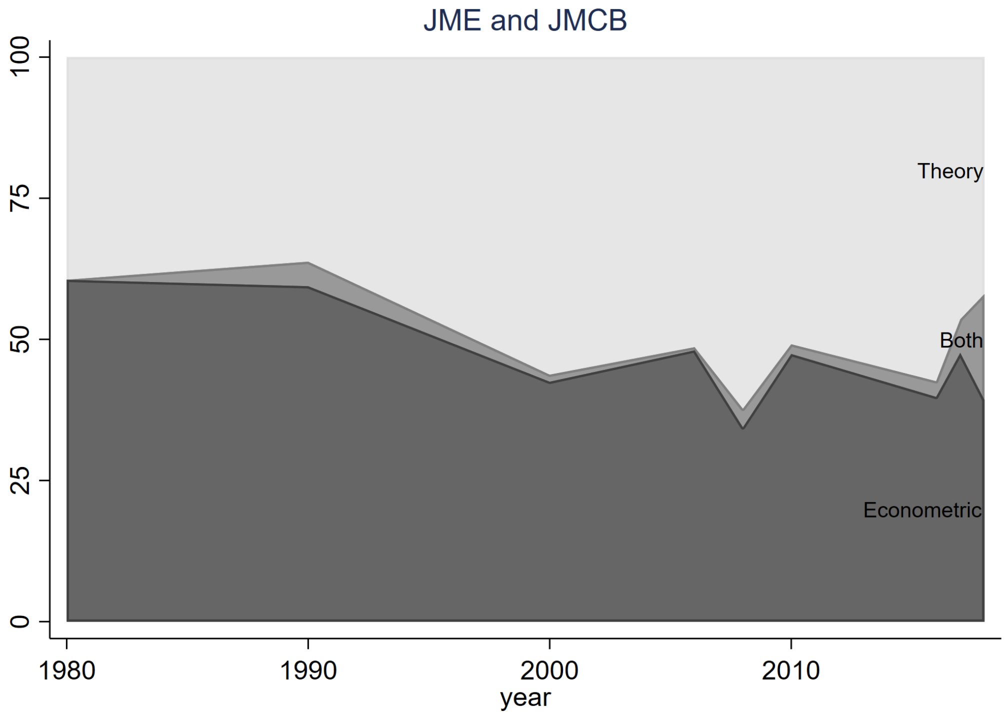
P.J. Glandon, Ken Kuttner, Sandeep Mazumder and Caleb Stroup

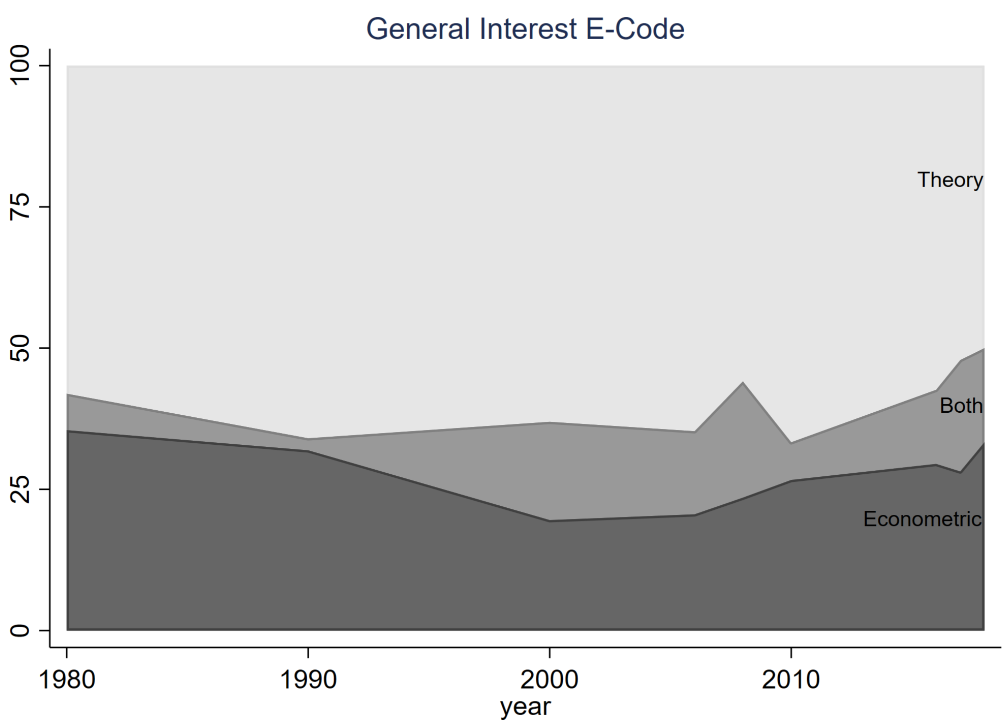
Appendix B: Additional tables and figures

We limited the number of tables and figures in the body of this article to those we judged most important. To satisfy the interested reader's curiosity, we provide several more tables and figures in this appendix. Most of these figures and tables drill down a bit and show trends within sub-groups (e.g. field journals vs general interest).

All of the figures and all of the tables showing time series data use the sample of publications from the *JME* and *JMCB* plus E-coded articles published in the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*. The tables with cross-sectional data from 2016-2018 include publications from all five field journals (*JME*, *JMCB*, *AEJ*, *RED*, and *JEDC*) plus the E-coded articles from general interest journals listed above.

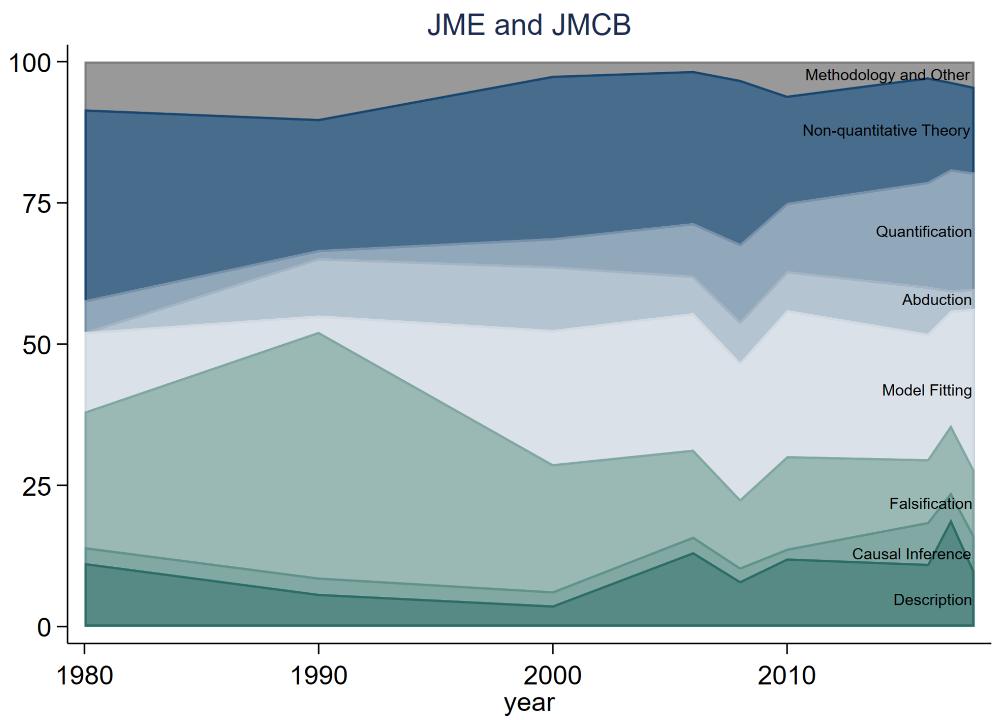
Figure B1: Evolution of Methods

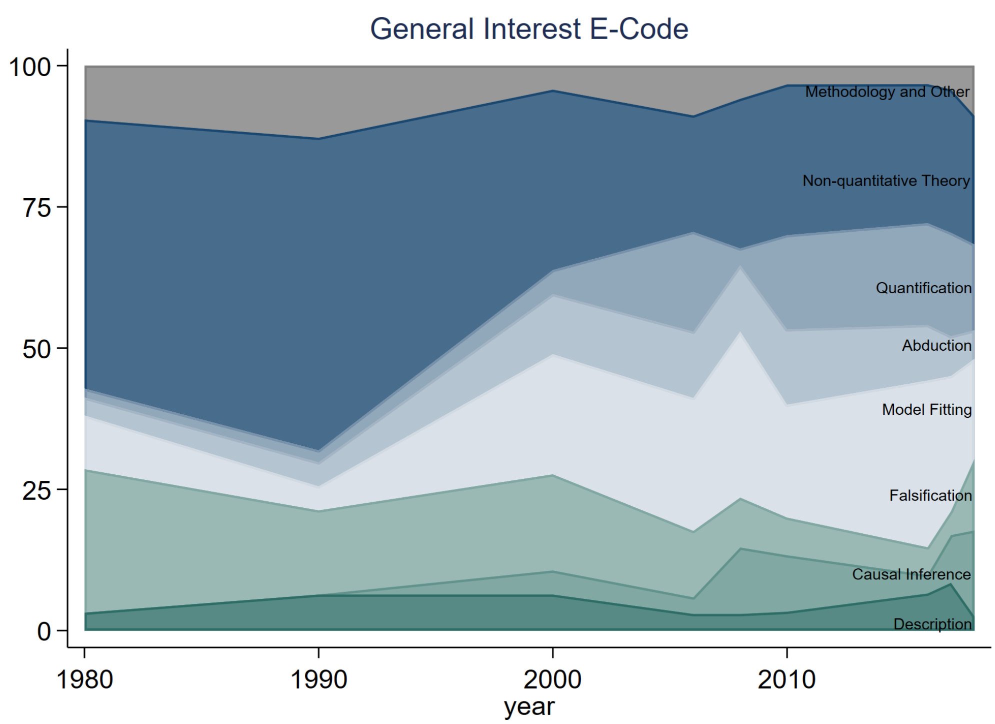




Note: Areas represent the shares of articles using econometric, theory-centric, or both methods. The top figure includes the *JME* and *JMCB* while the bottom figure includes E-designated articles in *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*.

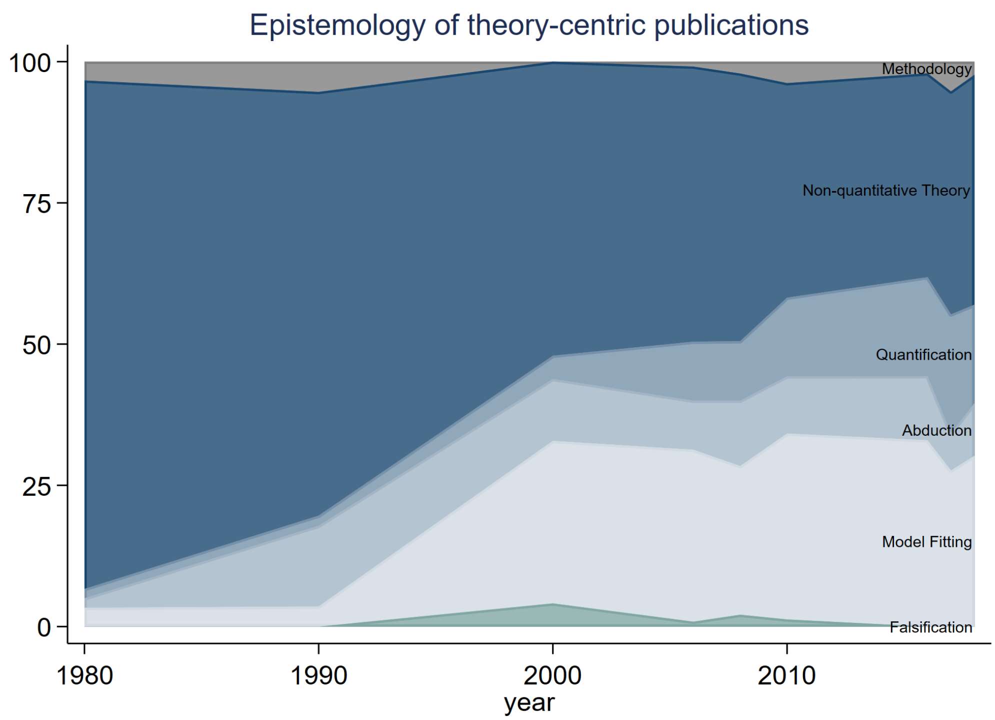
Figure B2: Evolution of Epistemological Approaches

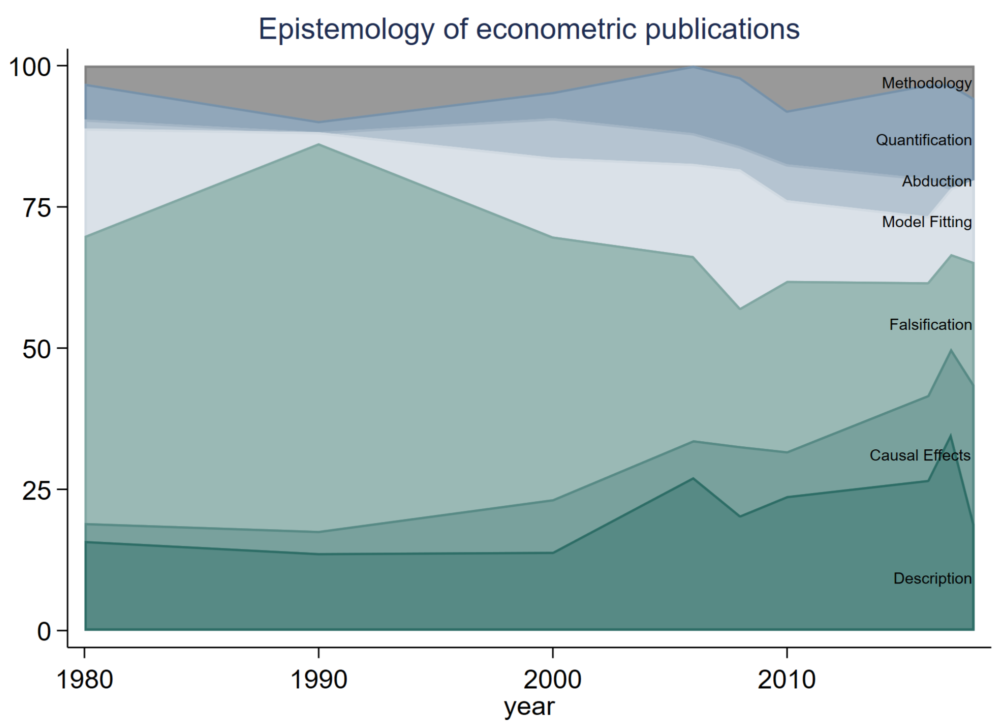




Note: Areas represent the shares of articles published in each epistemology category. The top figure includes the *JME* and *JMCB* while the bottom figure includes E-designated articles from the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*.

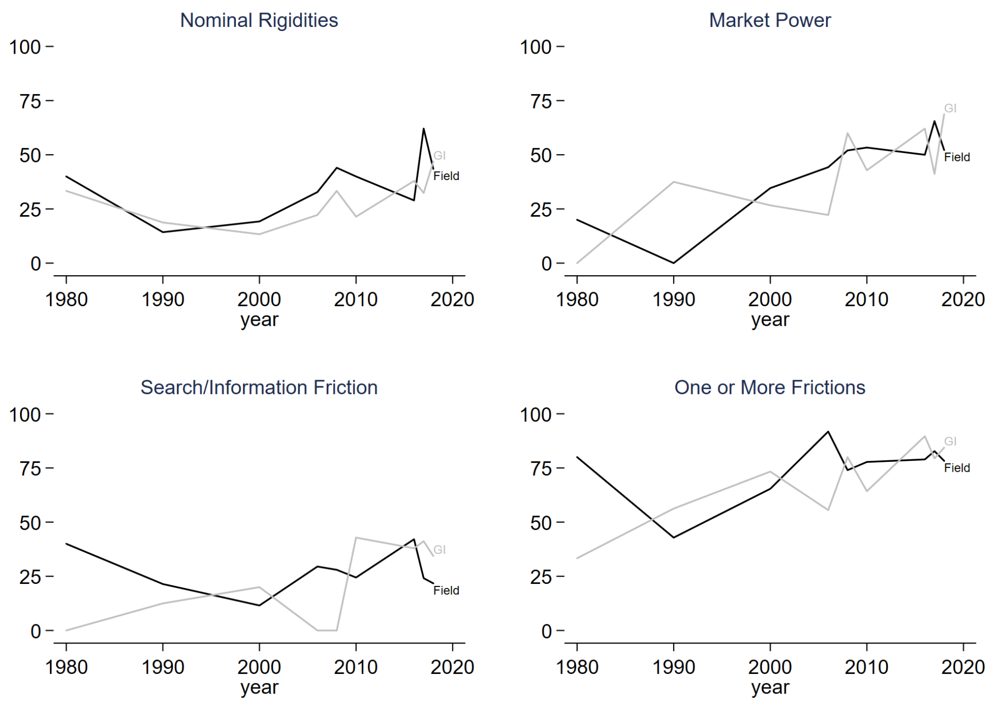
Figure B3: Epistemology by Method





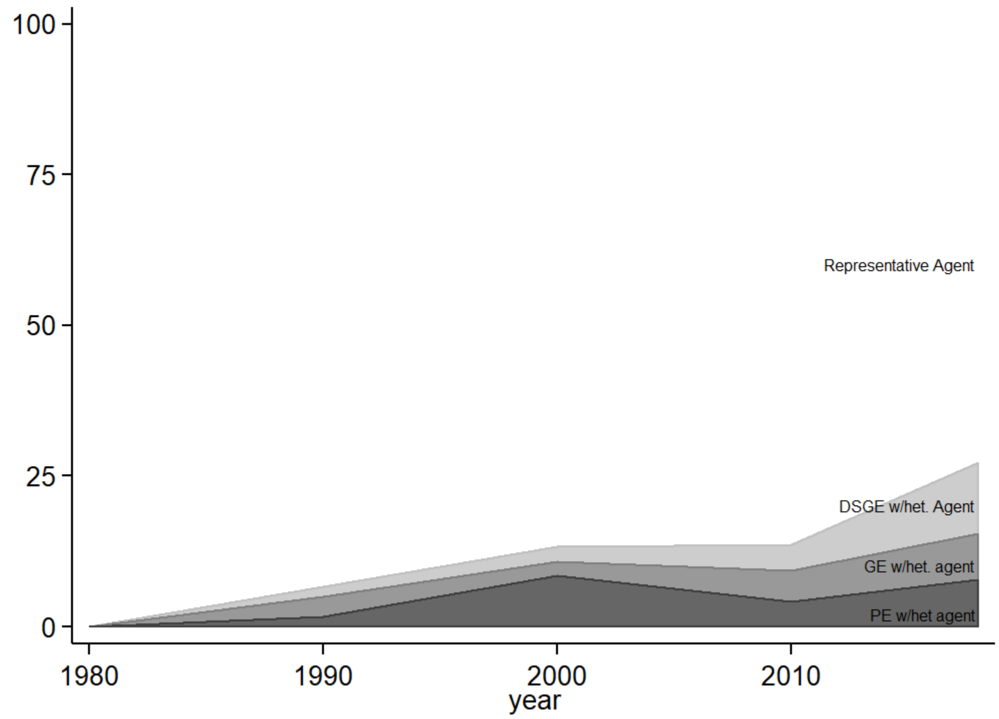
Note: Areas represent the shares of articles published in each epistemology category. The top figure includes only theory-centric articles while the bottom figure includes only econometric articles.

Figure B4: Frictions in GE and DSGE Models



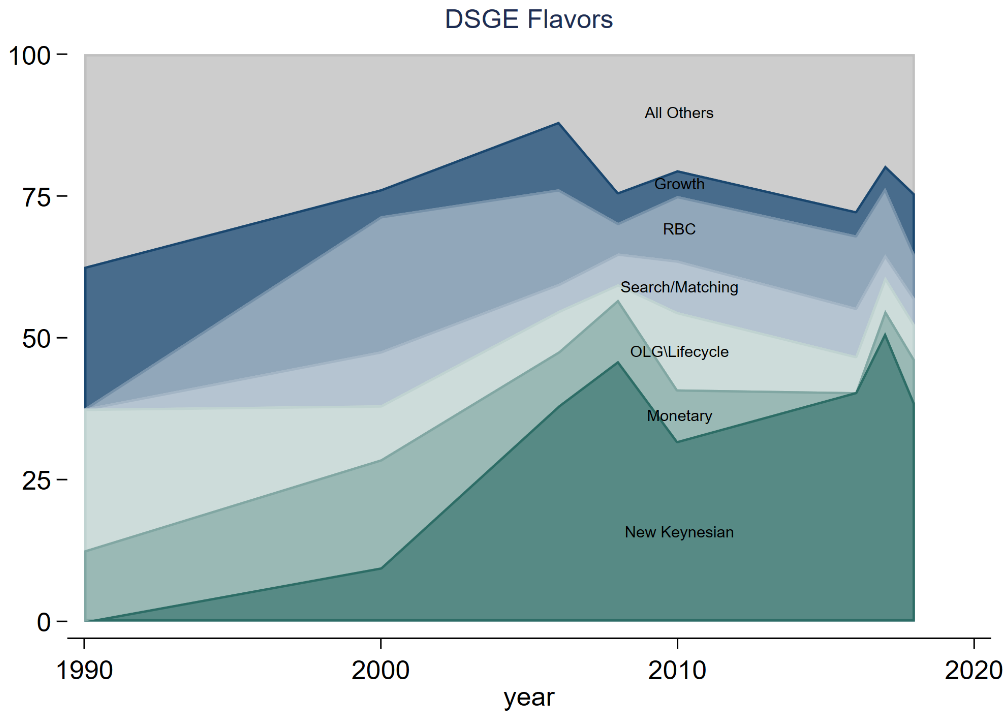
Note: Shares are expressed as a percent of theory-centric articles with static general equilibrium and DSGE models. The dark line represents shares among articles published in the *JME* and *JMCB*. The grey lines show the shares among E-designated articles from the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*.

Figure B5: Share of models incorporating heterogeneous agents



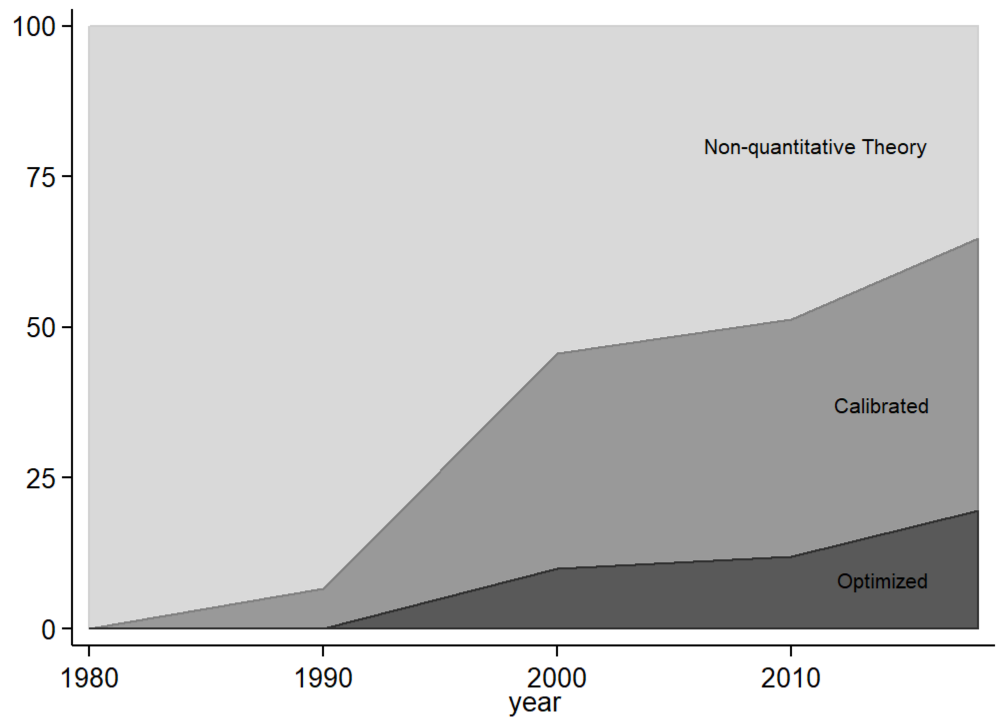
Note: Shares are expressed as a percent of theory-centric articles. Shaded areas represent the contribution of each equilibrium concept to the total share of models with heterogeneous agents.

Figure B6: Evolution of DSGE Styles



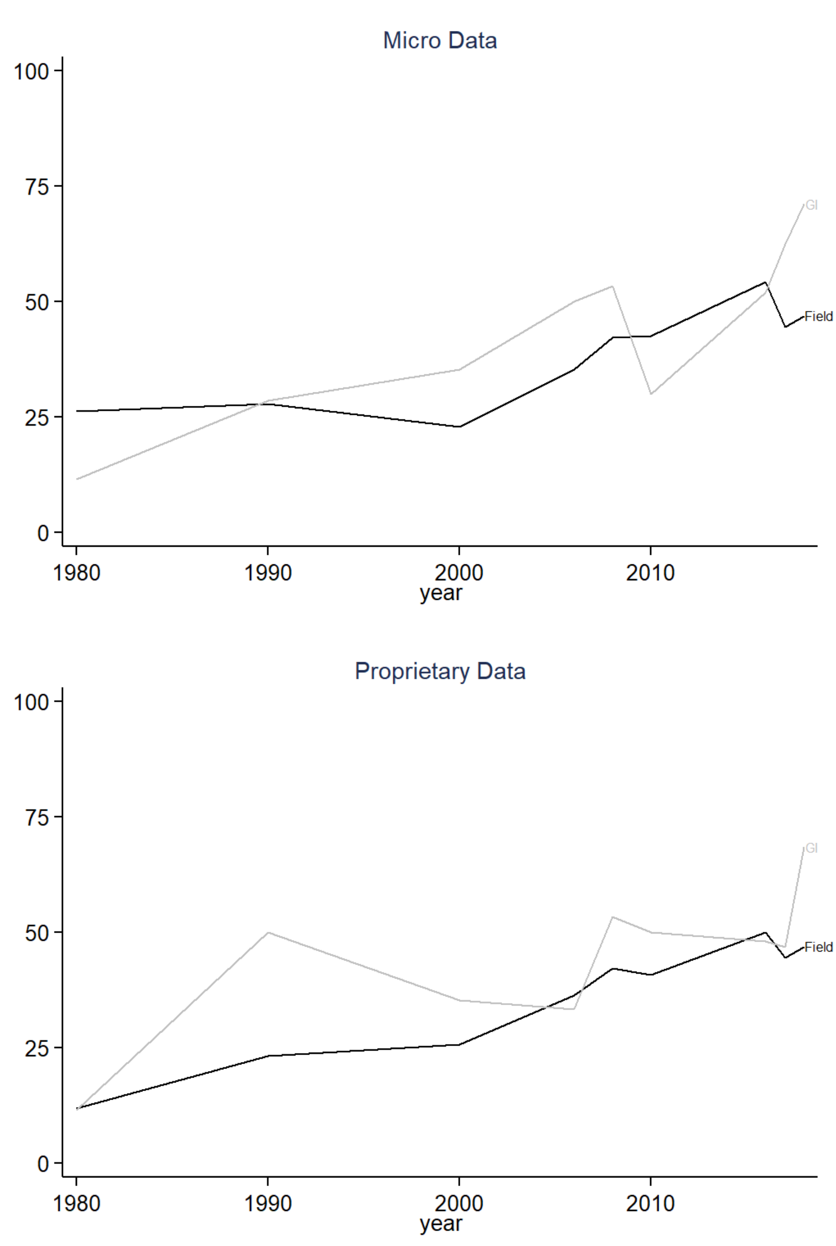
Note: Areas represent the shares of articles with DSGE models. The sample is articles from the *JME* and *JMCB*, plus E-designated articles from the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*.

Figure B7: Model Fitting Methods



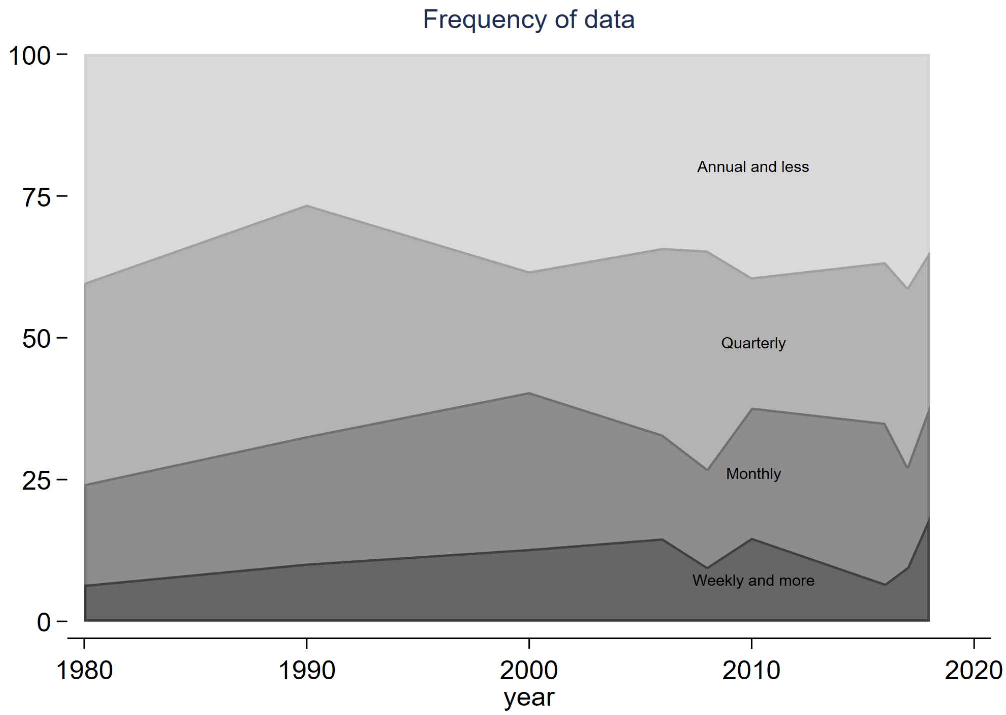
Note: Areas represent shares of theory-centric articles published in the *JME* and *JMCB*, plus the E-designated articles in *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*, that use optimization, calibration or neither (in the case of non-quantitative theory).

Figure B8: Use of Micro-data and Proprietary Data



Note: This figure reports the share of econometrics-based articles using microdata (top panel, defined in Section 3) and proprietary data (bottom panel) among articles in our sample and published in the *JME* and *JMCB* (together labeled ”Field”), plus the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica* (collectively labeled “GI”).

Figure B9: Data frequency over time



Note: The sample is consists of econometric articles using time-series or panel data published in the the *JME* and *JMCB* plus E-designated articles from the *AER*, *QJE*, *JPE*, *ReStud*, and *Econometrica*. "Annual and less" consists of articles using data sets with annual frequency or less (eg biennial and decennial). "Weekly and more" consists of data observed weekly, daily, and sub-daily.

Table B1: Unconventional model features

Year	Heterogeneous agents		Unconventional expectations / preferences		Indeterminacy	
	Field	GI	Field	GI	Field	GI
1980	0	0	13	0	9	19
1990	4	9	12	9	19	34
2000	4	24	4	3	13	30
2006	11	16	6	12	17	16
2008	16	8	4	12	18	20
2010	17	14	7	9	23	18
2016	18	26	8	5	26	23
2017	23	39	7	14	30	25
2018	26	35	8	20	20	37

Note: The figures are percentages of all theory-centric articles published in the *JME* and *JMCB* (labeled Field) and E-designated articles in the five general-interest (GI) journals.

Table B2: Applied Micro Methods

A: Articles in field journals

	All Field	*JME*	*JMCB*	*AEJ*	*JEDC*	*RED*
Shares, %						
Descriptive	11	13	5	11	21	13
Reduced form	63	68	76	59	25	69
Experimentalist	14	10	15	11	29	0
Structural	12	10	5	15	25	19
Number of articles	160	31	62	27	24	16

B: E-classified articles in field and general interest journals

	All Field	All GI	*AER*	*ECMTA*	*JPE*	*QJE*	*ReStud*
Shares, %							
Descriptive	9	20	28	0	18	20	0
Reduced form	64	42	48	67	27	47	17
Experimentalist	16	20	17	0	27	27	17
Structural	11	17	7	33	27	7	67
Number of articles	80	64	29	3	11	15	6

Note: We categorized articles using applied micro econometric methods into four mutually exclusive categories: *Descriptive* articles limit the empirical analysis to a description of the data, often through descriptive statistics and time series figures. *Reduced-form* articles use empirical specifications that do not deliver explicit estimates of structural parameters (e.g. the frequency of price setting in a sticky-price model or the intertemporal elasticity of substitution). A paper is classified as *structural* if it claims to estimate a structural model or to directly estimate structural parameters. Papers using *experimentalist* methods frame the exercise as a quasi- or natural experiment, and use techniques (e.g. diff-in-diff and regression discontinuity) that have been developed to compare differences between “treatment” and “control” groups. (The shares may not sum to 100 due to rounding.)