Macroeconomic Research, Present and Past

Abstract: "We read nearly 2000 published macro articles, which allows us to systematically characterize (and gives us license to pontificate on) the state of macroeconomics."

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Motivation

- Why can't I successfully explain to my colleagues what it is that macroeconomics is all about? ("Why is everyone building their own model?" "Where is identification coming from?")

- Why does our hiring committee always struggle to determine which candidates qualify as "macro"?

- What should I advise my budding macro students to study?

- Why are people (even macroeconomists themselves) always beating up on macro?

The anguish of macroeconomics

- "The Scientific Illusion in Empirical Macroeconomics," (Summers, 1991)

- "The State of Macro" (Blanchard, 2009)

- "How to Rebuild a Shamed Subject" (Skidelsky, 2009)

- "Financial crash: what's wrong with economics?" (Coyle and Haldane, 2014)

- "The Trouble with Macroeconomics" (Romer, 2016)

- "How Modern Macroeconomics Went Wrong" (Stiglitz, 2018)

- "Is Something Really Wrong with Macroeconomics?" (Reis, 2018)

Our endeavor

- Our objectives are to say something about what macro currently "is," how it has evolved over time, and provide some perspective on common critiques of the field.

- We created a scheme for classifying research attributes.

- We read (or "read") 1,894 papers...

  - ...in the five leading macro and five top general-interest journals...

  - ...spanning 1980 through 2018.

- We cataloged a wide variety of characteristics.

- We documented trends and differences across journals.

Our dataset: field journals

	All Field	JME	JMCB	AEJ	JEDC	RED
2018	268	50	62	32	85	39
2017	252	33	51	32	102	34
2016	266	55	53	29	90	37
2010	116	62	54			
2008	124	68	56			
2006	182	95	87			
2000	80	52	28			
1990	69	40	29			
1980	71	34	37			
Total	1,428	489	457	93	279	110

Our dataset: general interest journals

	All GI	AER	ECMTA	JPE	QJE	ReStud	Total
2018	79	31	8	9	9	22	347
2017	71	26	9	10	15	11	323
2016	61	23	10	8	7	13	327
2010	30	13	2	4	4	7	146
2008	34	13	4	8	4	5	158
2006	34	13	4	3	4	10	216
2000	47	26	5	7	6	3	127
1990	47	11	5	14	13	4	116
1980	63	16	8	18	14	7	134
Total	466	172	55	81	76	82	1,894

Top-level taxonomy

- "**Epistemology**"
  - "What distinguishes justified belief from opinion."
  - Key: the relationship between theory and data.
  - Prescott: "feedback between theory and measurement is the way mature, quantitative sciences advance."

- "**Methodology**"
  - What methods (if any) are used to bring data to bear on the theory, and vice versa?
  - Theory-centric versus Econometrics-based.

How we define "model"

- Models are based on **behavioral** relationships involving economic actors.

- Nowadays, only those with microfoundations (utility/profit maximization, resource constraints, etc.) are viewed as legitimate.

- Once upon a time, the Keynesian consumption function was interpreted as "behavioral" or "structural."

- We defer to the authors on whether the relationships modeled are behavioral, and do not insist on microfoundations.

Our eight epistemological categories

1. Description
2. Causal effects
3. Falsification/corroboration
4. Abduction

5. Model fitting
6. Quantification
7. Non-quantitative theory
8. Techniques

9. "Other"

1. Description

- "Uncovering new facts or providing richer descriptions of old facts" (quoting Heckman & Singer).

- Example: Glandon (2011), temporary price reductions ("sales") account for a small fraction of price quotes and a large fraction of items sold.

2. Causal Effects

- "Does '**treatment X**' have a discernible effect on '**outcome Y**'?"
- The aim is not to quantify or test a "model" (as we define it).
- Identifying assumptions are (supposedly) *theory-free.*
- "Quasi" or "natural" experiments.
- Angrist-Pischke methods: diff-in-diff, RD, etc.
- Romer-Romer narrative identification, event studies.
- Arguably: SVARs. Advertised as causal effects, non-behavioral relationships.

Examples of causal effects

- Kuttner (2001), the effects of fed funds surprises on bond yields (event study).

- Hansen & Ziebarth (2017) the effects of financial distress on nonfinancial firms (natural experiment).

3. Falsification/Corroboration

- Confronts an economic (*behavioral*) model with data in such a way that potentially would allow the data to refute the theory.

- The model is **rejected** if theory-implied predictions are contradicted by data; if not, then the model is **corroborated**.

- Grounded in Popper's "critical rationalism," Friedman's "positive" economics.

Examples of falsification/corroboration

- Fisher & Konieczny (2006), tests the Sheshinski & Weiss model of monopoly price adjustment (econometric).

- Khan & Reza (2017), standard DSGE cannot account for response of house prices to government spending shocks (quantitative theory).

4. Abduction

- Heckman & Singer: "[t]he process of generating and revising models, hypotheses and data analyzed in response to surprising findings."

- "Puzzle solving."

- Criteria:

  - There is a "null model."

  - A "surprising finding" is presented that contradicts the null model.

  - The null model is modified to account for the surprise.

Examples of abduction

- Sheedy (2010). Null model = Calvo staggered price setting. Puzzle = inflation persistence (quantitative theory).

- Bems & DiGiovanni (2016). Null model = CES model of consumption. Puzzle = expenditure switching between groups (econometric).

5. Model fitting

- Establish a set of "stylized facts."
    - Moments of the distribution of macro variables
    - Impulse response functions, e.g. monetary policy shocks
- "Write down a model."
- Fit the model to the data to replicate/approximate the stylized facts.
- No different from the approach taken with models like Klein-Goldberger in the 1950s and 1960s (e.g Adelman & Adelman **1959**).
- Kydland & Prescott: "**quantitative experiments**" for the purpose of "developing theory."

Examples of model fitting

- Gertler et al. (2008). Adding wage rigidity to a medium-scale macro model improves the fit.

- Engel & West (2006). Examines the fit of an exchange rate model with UIP and VAR-based forecasts.

6. Quantification

- Uses a behavioral model to provide a numerical answer to a specific (often policy-related) question.

- Kydland & Prescott: "**quantitative experiments**," "using theory" (as opposed to those for "developing theory").

- Forecasting and reduced-form exercises don't count.

Examples of quantification

- Carlsson & Westermark (2016): In a calibrated labor search model, the optimal rate of inflation is **1.16%**.

- Fair (2017): In an estimated structural macro model, the 2008–09 drop in wealth led to a **2.1%** increase in the unemployment rate.

7. Pure theory

- "Theorem/proof."
- Data are only used for:
  - "Motivation"
  - "Illustration"
  - "Plausibility check"

8. Techniques

- New estimators, algorithms (may contain an empirical application to illustrate).

9. "Other"

- History, history of thought, "big picture"—e.g. *this* paper.

Econometrics-based methodology

- Conventional econometric tools are used to estimate parameters, construct confidence intervals, perform hypothesis tests, etc.

- Learn it from Hamilton, Greene or Angrist & Pischke.

Theory-centric methodology

- Canova: ". . . a theoretical model is a tool to undertake "**computational experiments**" rather than a setup to estimate parameters and/or test hypotheses." DSGEs, for example.

- DeJong & Dave: "reduced-form models that provide flexible characterizations of the time-series behavior of the . . . observable variables. . . [and] summary statistics that frequently serve as targets for estimating the parameters of structural models, and as benchmarks for judging their empirical performance. . . "

- Learn it from DeJong & Dave.

Epistemology and methodology are linked

| | | Methodology | | |
| | | Shares of epistemology category | | |
Epistemology	Share of Total	Theory-centric	Econometric	Both
Description	7	0	97	3
Causal Effects	5	0	89	11
Falsification	7	3	65	32
Model Fitting	27	69	16	15
Abduction	7	79	7	13
Quantification	18	59	27	15
Non-quantitative Theory	21	100	0	0
Methodology	7	38	54	7
Other	0	25	75	0
All Approaches	100	59	29	11

- Theory-centric falsification/corroboration is very rare.
- Abduction, fitting & quantification are mostly theory-centric.

Epistemological trends
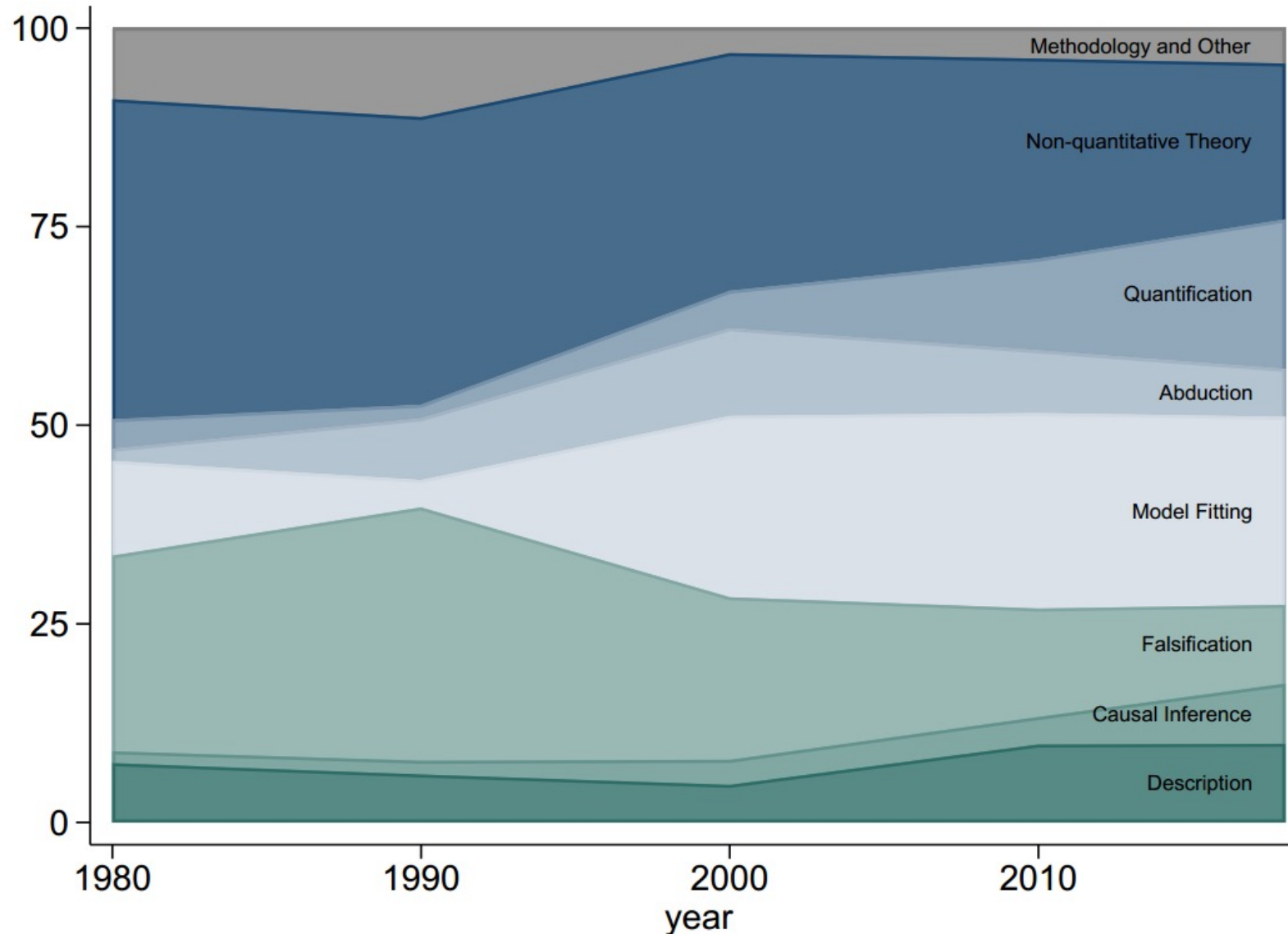
- Quantitative theory is ascendant.
- Falsification has waned...
- ...as has non-quantitative theory.
- Not much abduction.

Based on theory-centric articles in the JME and JMCB, plus the E-designated articles from the five GI journals.

Epistemology in field journals, 2016–18

	All Field	JME	JMCB	AEJ	JEDC	RED
Shares, %						
Description	7	9	16	5	4	2
Causal Effects	3	4	8	3	1	0
Falsification	7	7	15	11	3	4
Model Fitting	28	28	20	30	25	46
Abduction	7	6	5	8	9	5
Quantification	19	25	16	25	13	26
Non-quantative Theory	21	15	17	15	30	14
Methodology	7	4	2	3	15	3
Other	0	0	1	0	1	0
Number of articles	786	138	166	93	279	110

Epistemology in GI journals*, 2016–18

	All Field	All GI	AER	ECMTA	JPE	QJE	ReStud
Shares, %							
Description	7	6	8	0	0	19	0
Causal Effects	3	9	10	4	7	16	9
Falsification	8	8	5	4	11	16	7
Model Fitting	32	23	26	11	37	26	15
Abduction	6	7	14	0	0	0	9
Quantification	20	17	19	15	30	10	13
Non-quantitative Theory	18	24	15	41	15	13	43
Methodology	6	5	1	26	0	0	4
Other	0	1	3	0	0	0	0
Number of articles	427	211	80	27	27	31	46

*Articles designated as JEL code "E".

Trends in methodology
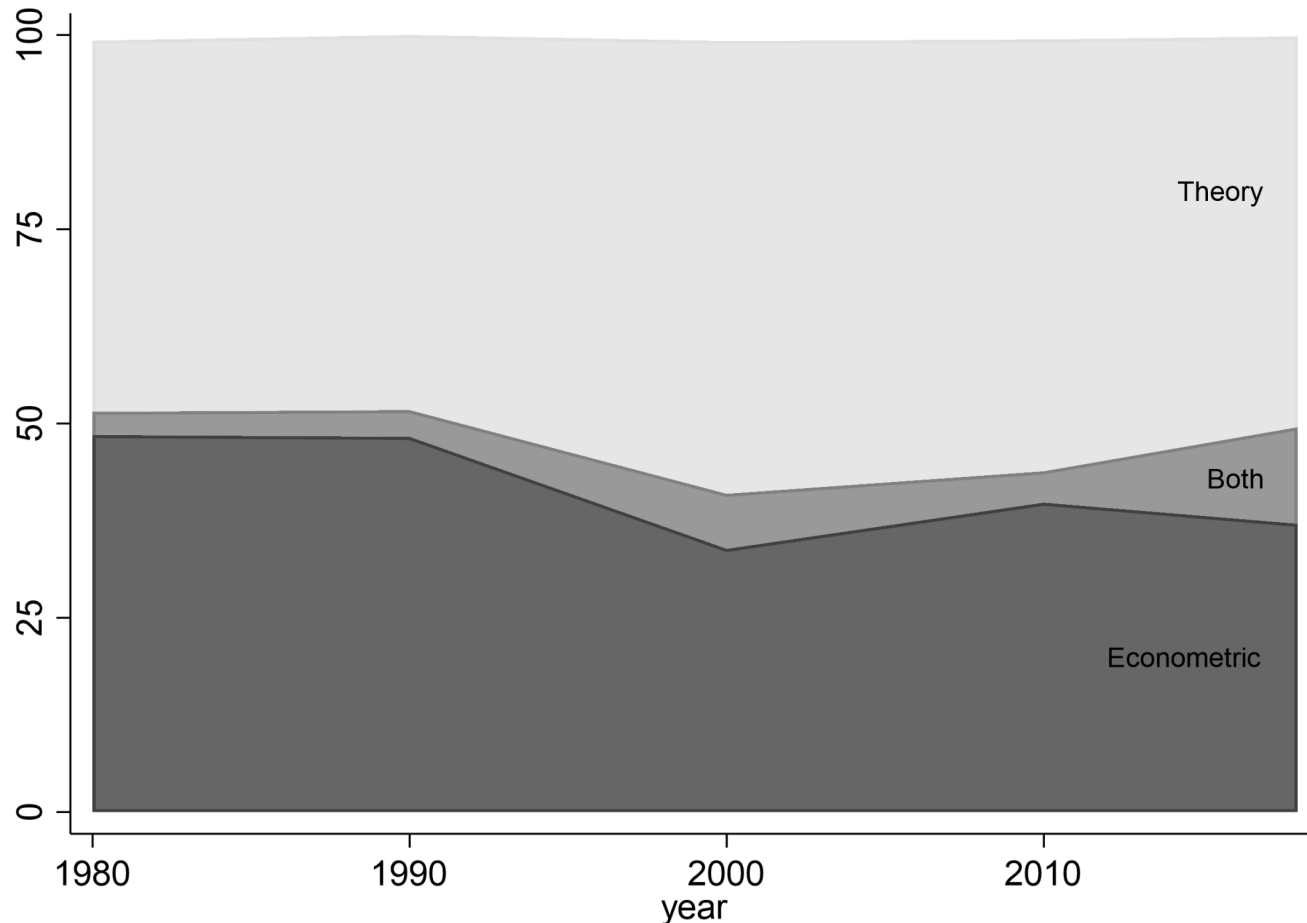
- Econometrics-based research has receded, along with falsification.

- A small but increasing share uses econometric methods *and* quantitative theory.

Based on theory-centric articles in the JME and JMCB, plus the E-designated articles from the five GI journals.

Attributes of theory-centric papers

- **Scope of equilibrium**: Partial, General, DSGE.

- **Frictions**: wage/price, financial market, market power, search.

- **Financial market imperfections**: information costs, intermediation.

- **DSGE genres**: RBC, NK, monetary, search, OLG, asset pricing, trade.

- **Unconventional** features: continuous time, indeterminacy, non-standard preferences, heterogeneous agent.

- Approach to **fitting**: calibration vs. "optimization," Bayesian methods.

Trends in equilibrium scope
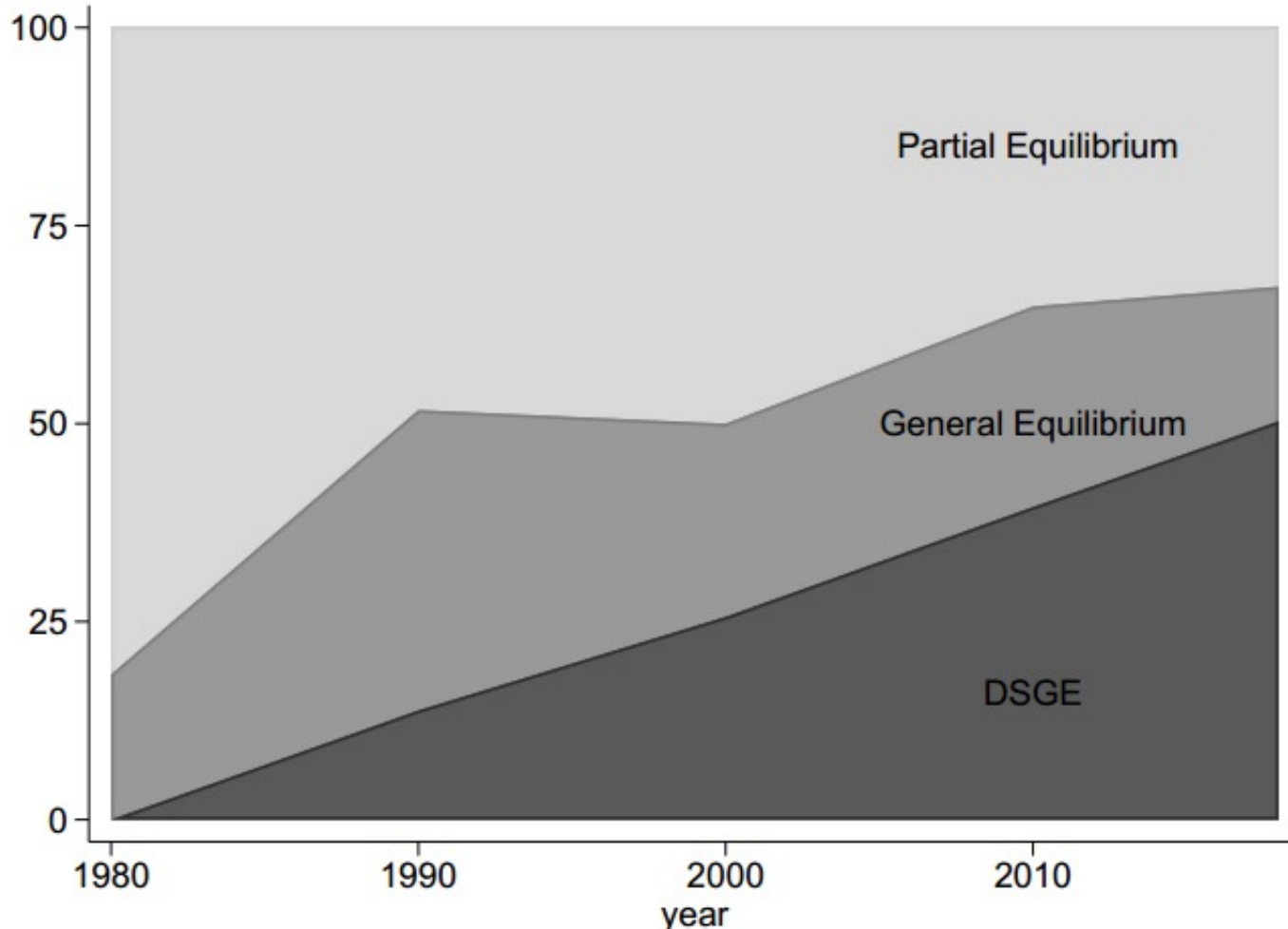
- DSGEs: "zero to 50" in 40 years.
- Mostly at the expense of partial equilibrium analysis.

Based on theory-centric articles in the JME and JMCB, plus the E-designated articles from the five GI journals.

Financial market imperfections

- Interest waned, reached nadir of 20% in 1990.
- The share has doubled since then, especially after 2010.

Based on theory-centric articles in the JME and JMCB, plus the E-designated articles from the five GI journals.

Frictions

Year	Nominal Rigidities	Market Power	Search/Info. Friction	At least one Friction
1980	36	9	18	55
1990	17	20	17	50
2000	17	32	15	68
2006–10	37	49	25	79
2016–18	42	57	32	82

- **All** types of frictions have become more common in the past 20 years, especially nominal rigidities and market power.

DSGE genres, 2016–18

	All Field	All General	AER	ECMTA	JPE	QJE	ReStud
Shares, %							
New Keynesian	46	44	60	33	0	50	43
Real business cycle	19	10	7	11	13	50	7
Asset pricing	3	11	7	22	25	0	7
Growth	6	8	3	11	13	0	14
Monetary	6	2	0	0	0	0	7
OLG/life cycle	6	6	3	0	13	0	14
Search/matching	5	8	10	11	13	0	0
Trade	4	6	7	0	25	0	0
Other	6	5	3	11	0	0	7
Number of articles	178	63	30	9	8	2	14

- Mostly NK—but still a fair amount of RBC.
- Significant variation across journals.

Unconventional features

Year	Heterogeneous agents	Finite horizon	Unconventional expectations / preferences	Indeterminacy	Continuous Time
1980	0		18	0	
1990	10	38	30	10	13
2000	10	10	27	0	5
2006–10	15	6	19	6	3
2016–18	29	4	25	9	9

- Heterogeneous agent models have taken off.
- Finite horizon (mainly OLG) have all but disappeared.
- There's never been a lot of indeterminacy/sunspots, etc.
- Very few agent-based papers (we looked).

Trends in fitting method

Year	All articles: numerical methods	——— Of DSGE: ——— Calibration	Optimization	Of optimized DSGE: Bayesian methods
1980	9	0	0	0
1990	33	0	0	0
2000	71	89	11	0
2006–10	78	73	27	15
2016–18	81	63	37	23

- Optimization is displacing calibration.
- Bayesian methods are becoming popular.

Econometric methods

- **Method:** "Applied micro" vs. time series methods.

- **Data structure**: cross-section, time series, panel.

- **Microdata**: households, firms, etc.

- **Proprietary**: costly, confidential, etc.

Methods and data types over time

	Methods		Data				
Year Year	Time series	Applied micro	Micro data	Time series	Cross section	Panel	Proprietary
1980	75	25	22	89	8	3	13
1990	62	38	28	70	14	16	32
2000	58	42	28	54	8	38	30
2006–10	46	54	41	42	13	45	41
2016–18	35	65	56	34	10	56	52

- Applied micro has displaced time series.
- Panel has become very common.
- *Over half* uses proprietary data.

Does macro "play nice" with other fields?

- Is macro "insular," or is there a lot of overlap?

- We tabulated JEL codes for the articles in our 2016–18 inventory.

- Do "macro" journals publish non-macro articles?

- How many E-designated (traditionally macro) articles list other fields?

Macro journals publish lots of non-macro articles

	All	JME	JMCB	AEJ	JEDC	RED
Shares, %						
Macro and Monetary (E)	61	67	79	67	46	55
Financial (G)	41	38	51	25	46	27
Microeconomics (D)	38	31	39	40	36	49
Mathematical Methods (C)	14	4	14	5	25	5
International Economics (F)	8	6	11	12	7	7
Development (O)	13	13	7	27	10	18
Labor Economics (J)	18	24	5	33	10	35
Public Economics (H)	14	20	11	15	11	19
Industrial Organization (L)	14	7	14	24	14	17
All other JEL codes	19	12	22	32	16	21
Articles with JEL codes	785	138	166	93	278	110
Average # codes per article	2.4	2.2	2.6	2.8	2.2	2.5

- Only 67% of AEJ:Macro and JME articles list JEL code "E."

Lots of macro papers list micro & financial codes

	All Articles	JME	JMCB	AEJ	JEDC	RED	All Field
Shares, %							
Any JEL code other than E	87	80	83	90	78	87	82
Financial (G)	33	30	40	26	30	28	32
Microeconomics (D)	38	25	37	35	31	41	33
Mathematical Methods (C)	12	3	15	6	21	5	12
Labor Economics (J)	15	22	5	18	10	25	14
Development Economics (O)	12	15	6	21	9	15	12
International Economics (F)	10	2	9	18	9	8	9

	AER	ECMTA	JPE	QJE	ReStud	All GI
Shares, %						
Any JEL code other than E	98	100	100	90	95	97
Financial (G)	40	33	33	38	21	34
Microeconomics (D)	44	52	41	52	61	49
Mathematical Methods (C)	5	33	0	3	18	10
Labor Economics (J)	21	19	19	7	16	17
Development Economics (O)	13	15	7	14	8	11
International Economics (F)	19	11	26	14	3	15

- The vast majority list codes *other than "E."*
- Finance ("G") and Micro ("D") are common.
- International ("F") is rare.

# How do influential ideas/papers "diffuse"?

- We selected ten seminal papers published 13+ years ago:

  - Calvo (1983)
  - King et al. (1988)
  - Blanchard & Quah (1988)
  - Romer & Romer (1989)
  - Bernanke & Gertler (1989)

  - Taylor (1993)
  - Kiyotaki & Moore (1997)
  - Rotemberg & Woodford (1997)
  - Christiano et al. (2005)
  - Smets & Wouters (2007)

- Journal-specific "cumulative citation count ratio" = number of articles citing the paper, relative to total number of papers in the journal.

- We also aggregate across papers for each journal, and for all journals collectively.

The typical life cycle
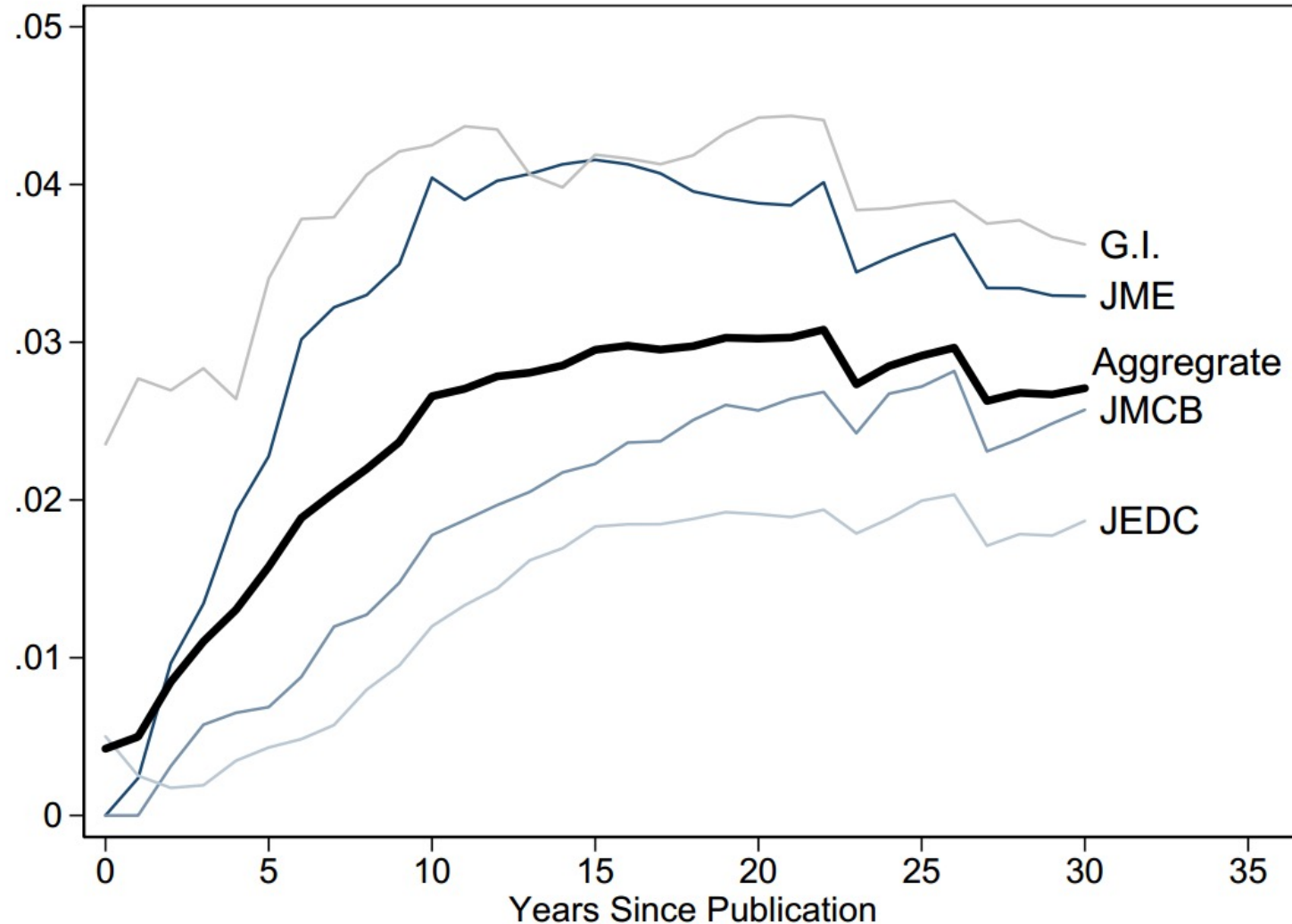
- Cumulative citations typically increase for roughly 10 years, and then level off.

- Articles in GI journals appear to get a head start—more likely to appear as NBER working papers?

Life cycles for individual papers
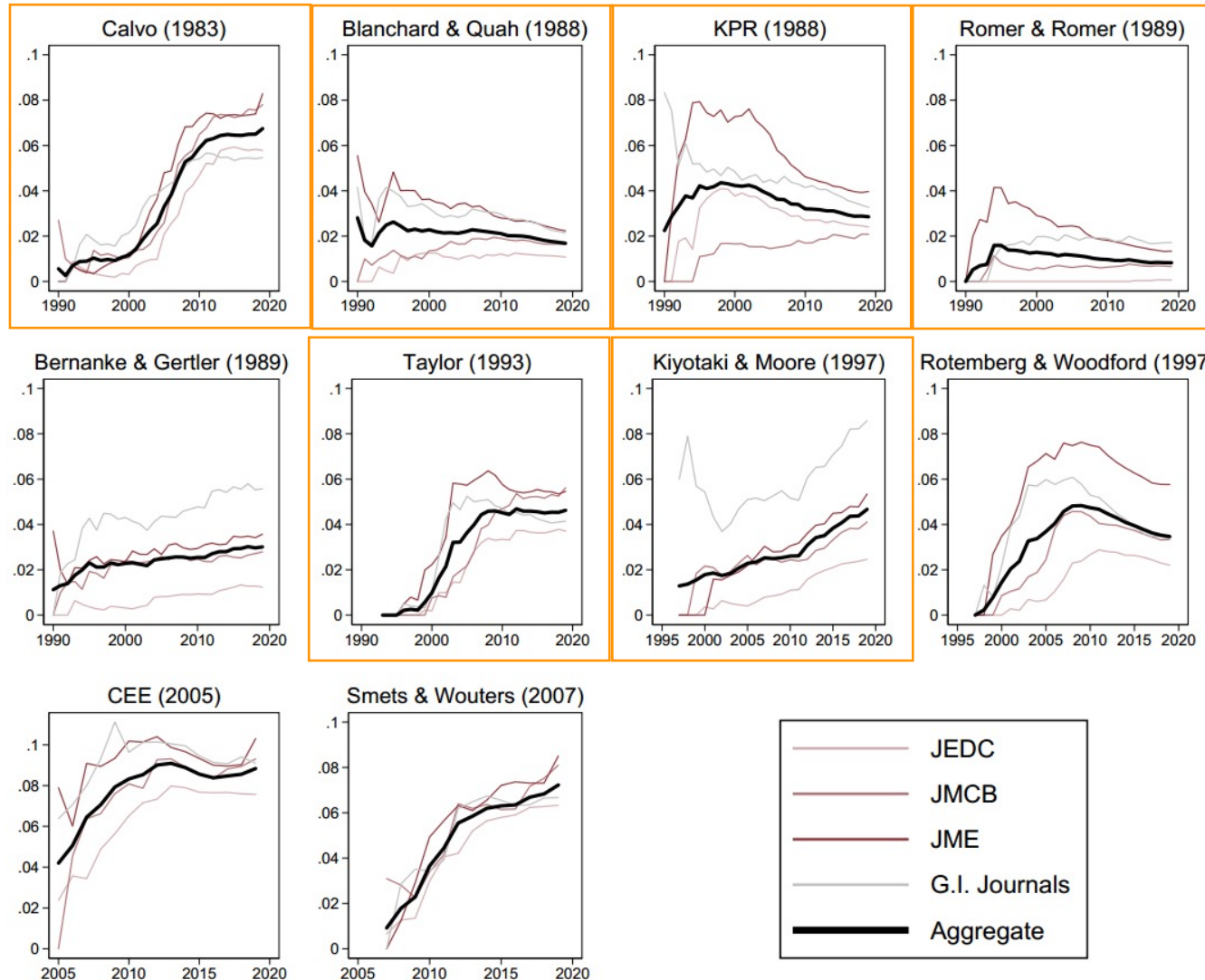
- Patterns vary.
- Some take a long time to catch on, e.g. Calvo (1983), Taylor (1993).
- Others build gradually, e.g. Kiyotaki & Moore (1997).
- Others catch on quickly but remain stable or fade, e.g. KPR (1988), Blanchard & Quah (1988), Romer & Romer (1989).

Takeaways

- It is "...more than mindless DSGE modelling." (Reis)

- There has been a convergence towards a common quantitative theory-based approach, encompassing DSGEs and more.

- Dominant epistemologies are model fitting and quantification.

- Falsification/corroboration and abduction are relatively uncommon.

- Traditional time series econometrics is fading, being displaced by applied micro methods. Panel data, causal effects, proprietary data.

The shift from testing to fitting

Lucas & Sargent (**1979**): "This research line being pursued by a number of us involves the attempt to discover a particular, econometrically testable equilibrium theory of the business cycle, one that can serve as the foundation for quantitative analysis of macroeconomic policy."

Sims (**1996**): "It was once common for economists to think of the scientific enterprise as formulating testable hypotheses and confronting them with data. True hypotheses would survive the tests, while false ones would be eliminated. The science-as-data-compression view lets us see the limits of this hypothesis testing view. The latter is dependent on the idea that there are true and false theories, when in fact the degree to which theories succeed in reducing data can be a continuum."

Good fit = valid model?

- **Adelman & Adelman** (**1959**): ". . . while we have shown that the shocked Klein-Goldberger model offers excellent agreement with economic fact, we have not proved either that the Klein-Goldberger model itself is a good representation of the basic interactions among the several sectors of our economy or that random shocks are the prime cause of business cycles."

- **Taylor & Wieland** (**2009**): Although the CEE, Taylor & Smets-Wouters models differ in terms of structure, "we find surprisingly similar economic impacts of unanticipated changes in the federal funds rate."

Should we be inspecting the mechanisms?

Deaton's (**2010**) "hypothetico-deductive" approach to a "progressive empirical research strategy": "mechanisms are proposed, key predictions are derived and tested, and if falsified, the mechanisms are rejected or modified."

Deaton's critique pertains to the "experimentalist" Angrist-Pischke approach, which tests hypotheses about whether "treatment X has an effect on outcome Y," but doesn't spell out the mechanisms.

In *macro*, the mechanisms are explicit—but not tested.

Over beers: Is macro even a *science*?

- Summers' (1991) "scientific illusion": econometric methods have not been able to settle the most basic issues.

- Romer (perpetually forthcoming): "facts with unknown truth values," "phlogiston."

- Farmer (2010): conventional (NK) DSGE modeling is an example of Lakatos's "degenerative research agenda."

Fun things to do in the future

- Distribution of citations. Which "flavors" of articles are more influential?

- Author affiliation. Do central bankers (for example) write different kinds of articles than academics?

- Ditto for gender.

- The extent of "non-convergent abduction." Lots of papers modify the CAPM to "explain" the equity premium puzzle. Have we learned which is the "best" explanation?

Thanks for listening!