Policy Experiments
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OECD – New Approaches to Economic Challenges
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Two “Quotes”

Einstein:

“Problems cannot be solved by the same level of thinking that created them.”

Keynes:

“When the facts change, I change my mind”
The Facts Changed…

UK GDP growth

Latest vintage of GDP data

November 2007 IR

Year on year growth

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

World GDP growth

Year on year growth


November 2007 IR

Latest vintage of GDP data
The Facts Changed…

World GDP growth (UK, US, Germany, Japan):
1871-2015, Annual

Equity prices: 1709-2016, Monthly

- Non-normality is normal
...but have we changed our minds?


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...but have we changed our minds?

Source: YouGov, February 2017
Note: Question asked ‘Of the following, whose opinions do you tend to trust when they talk about their fields of expertise?'
Changing our Minds – Old (New) Methods

- Stories
- Facts
- Models
- Experiments
Evolutionary Arc of Economics

- An evolving “hierarchy” of approaches
- Karl Popper and the “deductive” approach of the 1950s
Stories

- Adam Smith’s “pin factory”
- David Ricardo’s “cloth and wine”
- Thomas Malthus’s “Malthusian trap”
- John Maynard Keynes’s “animal spirits”
- Knut Wicksell’s “rocking horse”
Facts

• Nicholas Kaldor’s “Great Ratios”

• A W Phillips’s “Phillips curve”

• \[ Y = C + I + G + X - M \]

• \[ MV = PT \]
Models

• Classical

• Keynesian (IS/LM)

• Monetarist

• Neo-classical (DSGE)

• New Keynesian (DSGE)
Experiments?

• Path less followed in macro-economics…

• …but not other disciplines (natural sciences, many social sciences)

• Counter-factual policy simulations used instead:
  – Take a model…
  – …hopefully immune to Lucas Critique…
  – …simulate consequences of alternative policy…
  – …assess counter-factual impact

• E.g. monetary or fiscal policy rules

• Not a Randomised Control Trial (RCT) – not randomised, or fully controlled, or a trial.
Problems, Problems

- **Stories** – subjective, simple, “non-rational”
- **Facts** – non-identified, data-mining
- **Models** – unrealistic axioms, fragile
- **Experiments** – feasible? realistic?

- Do we want a hierarchy of approaches?
Solutions, Solutions

• All four approaches can bring complementary insights

• “Plural” approach

• Combining deductive and inductive approaches

• Borrowing models/technologies from natural/social sciences

• No hierarchy of approach
Stories

- How humans make sense of an uncertain world
- How humans make decisions – rules of thumb / simple heuristics
- Herbert Simon and uncertainty
- Simple heuristics offer a “robust” response to uncertainty
- E.g. “1/N rule” in portfolio choice – Harry Markowitz
Narrative Economics

- Applies at **macro** as well as micro level – “animal spirits”

- Stories as a driver of
  - Financial markets (Bloom *et al* )
  - Firms’ investment (Tuckett *et al* )
  - Booms and slumps (Akerlof, Shiller)
  - Regulatory actions (Bholat *et al* )

- Using semantic-algorithm techniques to track macro behaviour

- Using anthropological techniques to extract “folk wisdom” – Citizens’ Panels

- Policymakers as “narrative entrepreneurs”?
Brexit

Words linked to ‘uncertainty’ in Agents’ visits

Mentions in Agents’ reports

Share of paragraphs in Agency visit write-ups referencing term (per cent)

Source: Bank calculations.
“The Insight Curve”

- Deliberation
- Diversity
- ‘Oracle’
- ‘Wisdom of crowds’
- ‘Madness of crowds’

Number of people
Facts

• What does “data-mining” mean to you?

• Francis Bacon and 16\textsuperscript{th} century inductive approaches

• 21\textsuperscript{st} century data-mining

• New data – 90% of all data created in past 2 years

• New techniques – machine learning, algorithms
Examples

• MIT’s “billion prices project”

• Administrative data to inform National Accounts

• Setting macro-prudential policy using granular mortgage date

• Tracking the effects of QE on households

• Machine learning about “last resort” lending in the 19th century
UK Mortgages

Loan-to-income multiple ≥ 4.5

2014 Q2
Models

- Agent-based models
- DSGE models
- Structural econometric models
- Statistical models (VARs, machine learning, etc)

- Heterogeneous agents
- Internally consistent
- Externally consistent
- Representative agent

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Models
Models

- **Applications**: atom bombs, military planning, astrophysics, logistics, transportation, ecological patterns, biomedical sciences, pharmacology, sociology etc.
Network Models of Financial System

Visualisation of EUR-CHF forwards market

Red = inner core; blue = outer core; green = periphery. Diagram includes dealers, banks, real money, hedge funds, retail FX trading and corporates.

- Robust-yet-fragile networks
Agent-Based Model of Housing Market

- Endogenous cycles

Source: Baptista et al. (2016).
Experiments

- Standard practice in many disciplines
  - E.g. clinical trials

- Use in micro-environments
  - E.g. Randomised-Control Trials (RCTs)

- Less used in macro-economics. Why?
  - Technology – scale problem
  - Sociology – behaviour problem

- Experiments remove reliance on historical data and restrictive axioms

- Are experiments any more prone to the Lucas critique (than models)?
Policy Experiments in Practice

- Designing a bankers’ bonus system
  - RCT on risk-taking, effort and avoidance effects of different bonus rules

- Communicating with the public on monetary policy
  - RCT on understanding and trust implications of different styles of communication

- “Try before you buy” approach to public policy
Communicating Stories

In a nutshell

- Interest rates raised to 0.75%
- Inflation is above our target
- The squeeze on pay is easing
- Growth is around its speed limit
- Interest rate rises should be gradual and limited

Inflation is above our target

The prices of the things you buy have been going up by more than our 2% target on average over the past year.

That’s been mainly due to the big fall in the pound following the Brexit vote.

The lower pound has meant that things businesses get from abroad cost more. Businesses have been passing these rising costs on to their customers. So that has meant higher prices in the shops. Most of the increase in prices due to the fall in the pound has now happened through.

The price of oil on world markets has also risen over the past year, pushing up prices at the pumps. Because of that, we think inflation picked up a bit in July.

But unless oil prices keep on rising, inflation should continue to fall back towards our 2% target.

Prices have been rising by more than our 2% target over the past year.
Communicating Stories

Comprehension scores for different texts

- Monetary Policy Summary: 2.02
- Visual Summary: 2.53
- Reduced Text Summary: 2.63
- Relatable Summary: 2.85

N=2,275
** p<0.01, * p<0.05, + p<0.1

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The Next Frontier

• Using gaming technology to understand macro-economic behaviour/interactions, without history/axioms

• Multi-person, ‘interactive games’ – EVE Online, World of Warcraft

• The “game design dilemma” – realism and escapism

• Using “reinforcement learning” to understand complex adaptive systems.
Conclusion

Facts       Models
Stories    Experiments