6 Problems in Macro

- Excess Volatility of Asset Prices
- Excess Smoothness of Consumption
- Equity Premium Puzzle
- Productivity Growth and Unemployment
- Dynamics of Technological Progress
- Dynamics of Inflation and Unemployment
Claim: ‘Rational Expectations’ Assumption Is To Blame

• The structure of the entire economic system is understood, *ab initio*, by all agents
• All agents have access to the same information
• There are no costs of processing information
• Expectations are not merely rational, but identical
Second Claim:
Problems Might All Be Solved
By Better Models of Spread of Information or Beliefs in a Population
Excess Volatility of Asset Prices

• Only puzzle for which a satisfying explanation exists (though not yet universally accepted)
  – “Santa Fe Stock Market” models
  – Create environment with both ‘chartists’ who buy and sell based on price patterns, and ‘fundamentalists’ who buy on fundamentals
  – Result: excess volatility can persist forever

• Abandons identical expectations assumption
  – Different ‘mutual funds’ offer different investment strategies; spread depending on past success
  – Think of different strategies as ‘beliefs’
Excess Smoothness of Consumption

• Standard model:
  – Consumption responds instantly to news

• Data:
  – Lagged information has a powerful effect on current consumption growth

• Explanations:
  – Habit formation in consumption?
  – ‘Sticky expectations’: It takes a little while for consumers to catch on (belief spread again)
Equity Premium Puzzle

• If people had known what a great investment stocks would be, everybody should have bought stocks a long time ago

• Solution: Everyone didn’t know
  – Economists didn’t until Mehra and Prescott (1985)

• Need better model of expectations than “Everyone has the same, correct, expectation.”

• Unprecedented bull market may reflect learning
Productivity Growth and the Natural Rate of Unemployment

• U* is low when pty growth is high
  – Europe (esp. Italy and Germany) 1945-73

• U* is high when pty growth is low
  – Europe 1974-2000
  – Japan 1990-2000
Standard Labor Market Model

• \( W_{age_t} = E_{t-1} \) [Marginal Productivity\(_t\)]

• “Search” or “natural rate” unemployment caused by mismatch between employees’ characteristics and employers’ needs

• If anything, periods of high pty growth are probably periods of greater mismatch
Alternative Labor Market Model

• People don’t pay much attention to (or know about) aggregate productivity growth
• Accept a job if wage increase meets or exceeds an ‘aspiration’ growth rate based on past experience, otherwise search
• Need a model for where the aspiration levels come from, and their relation to past and future productivity growth
• Again, a model of beliefs
Dynamics of Technological Progress

- Macroeconomists were among the last to realize that there was a New Economy
- Now that we’ve caught on, it’s over!
- Fundamental driver of macroeconomic growth is technological progress
- Standard current applied model is ‘manna’
Is This Economics?

- Structure of the universe determines the pool of possible technologies
- Nonetheless, a substantial literature tries to model tech progress and creation of new ideas
- Not likely to produce models that are good at predicting major technological advances
But Main Macro Effects Come From the *Spread* of Technologies

- Computers, Internet not invented in 1996
- Spread Like a Disease?
  - Susceptible, Infected, Recovered (or finished)
- Word of mouth/personal contacts?
  - ‘Small world’ networks
  - Learning from academic learning
- Social Learning?
  - Websites, Magazines, Books, etc.
- ‘Learning By Doing’
Dynamics Of Inflation and Unemployment

• Rational Expectations models imply central bank can achieve costless disinflation by announcing it far enough in advance

• Empirical evidence: Inflation only goes down if unemployment goes up
Replace ‘Rational Expectations’ with ‘Epidemiological Expectations’

- ‘Common source’ disease model
- ‘Infection’ corresponds to encountering a news report that updates your views
- Main parameter in model is probability of encountering a news report
  - How much do you pay attention
  - Not everybody is CNBC junkies
Results

- Very simple disease model does a remarkably good job explaining actual inflation expectations data from households
- May be able to explain demographic differences in inflation expectations
- Implies that some people will not learn about a change in policy for a long time
- Explains inflation/unemployment tradeoff
In Sum

• Most of the big problems in macro come from naïve models of learning processes
  – Agents are much too smart
  – The economy is much too simple
• Social learning, individual learning, ‘small world’ learning, genetic algorithm learning, agent-based learning by doing, and other ideas pioneered at SFI could provide powerful tools
• Time to get busy!