



# THREE ISSUES IN LEARNING AND MONETARY POLICY

**James Bullard**  
*President and CEO*

13 September 2008  
Learning and Macroeconomic Policy  
University of Cambridge, UK

Views expressed do not necessarily reflect official positions of the FOMC or the Federal Reserve System.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.
  - The role for learning: filtering.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.
  - The role for learning: filtering.
- Issue two: systemic risk.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.
  - The role for learning: filtering.
- Issue two: systemic risk.
  - The role for learning: information revelation.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.
  - The role for learning: filtering.
- Issue two: systemic risk.
  - The role for learning: information revelation.
- Issue three: optimal policy in an economy with non-fundamental equilibria.



## LEARNING AND MONETARY POLICY

- Issue one: core versus headline inflation.
  - The role for learning: filtering.
- Issue two: systemic risk.
  - The role for learning: information revelation.
- Issue three: optimal policy in an economy with non-fundamental equilibria.
  - The role for learning: coordination on preferred equilibria.



## WHY THESE THREE ISSUES?

- Provide some focus.





## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.



## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.
- Each has a distinct conventional wisdom behind it.



## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.
- Each has a distinct conventional wisdom behind it.
  - The conventional wisdom is probably wrong.



## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.
- Each has a distinct conventional wisdom behind it.
  - The conventional wisdom is probably wrong.
  - But the conventional wisdom is driving policy.



## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.
- Each has a distinct conventional wisdom behind it.
  - The conventional wisdom is probably wrong.
  - But the conventional wisdom is driving policy.
- Welfare consequences in principle could be large.



## WHY THESE THREE ISSUES?

- Provide some focus.
- Timely in current monetary policy discussions.
- Each has a distinct conventional wisdom behind it.
  - The conventional wisdom is probably wrong.
  - But the conventional wisdom is driving policy.
- Welfare consequences in principle could be large.
- An opening for good research to impact economic outcomes.



## A CORE ISSUE

- The idea that oil prices are critical to understanding U.S. and possibly G-7 business cycles has wide appeal.



## A CORE ISSUE

- The idea that oil prices are critical to understanding U.S. and possibly G-7 business cycles has wide appeal.
  - Hamilton (1983); subsequent revamping.





## A CORE ISSUE

- The idea that oil prices are critical to understanding U.S. and possibly G-7 business cycles has wide appeal.
  - Hamilton (1983); subsequent revamping.
- The ad hoc approach since the 70s has been to ignore energy price movements and focus on "core" inflation.



## A CORE ISSUE

- The idea that oil prices are critical to understanding U.S. and possibly G-7 business cycles has wide appeal.
  - Hamilton (1983); subsequent revamping.
- The ad hoc approach since the 70s has been to ignore energy price movements and focus on "core" inflation.
- In the past I would have agreed that this practice has served us well.



## A CORE ISSUE

- The idea that oil prices are critical to understanding U.S. and possibly G-7 business cycles has wide appeal.
  - Hamilton (1983); subsequent revamping.
- The ad hoc approach since the 70s has been to ignore energy price movements and focus on "core" inflation.
- In the past I would have agreed that this practice has served us well.
- Now I think the tide has turned and we need to think harder.



## BLINDER'S DEFENSE OF CORE

- Buitter's paper at Jackson Hole 2008 included criticism of "core inflation."



## BLINDER'S DEFENSE OF CORE

- Buitter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.



## BLINDER'S DEFENSE OF CORE

- Buiter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.



## BLINDER'S DEFENSE OF CORE

- Buiter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.
  - If oil price movements are mainly noise then it shouldn't matter.



## BLINDER'S DEFENSE OF CORE

- Buitter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.
  - If oil price movements are mainly noise then it shouldn't matter.
  - A one-time shift in the level of oil prices should not have a big impact.





## BLINDER'S DEFENSE OF CORE

- Buiter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.
  - If oil price movements are mainly noise then it shouldn't matter.
  - A one-time shift in the level of oil prices should not have a big impact.
  - A longer term trend in energy prices would be more problematic.



## BLINDER'S DEFENSE OF CORE

- Buiter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.
  - If oil price movements are mainly noise then it shouldn't matter.
  - A one-time shift in the level of oil prices should not have a big impact.
  - A longer term trend in energy prices would be more problematic.
  - But, a "theorem" says that energy prices cannot continue to increase faster than other prices forever.

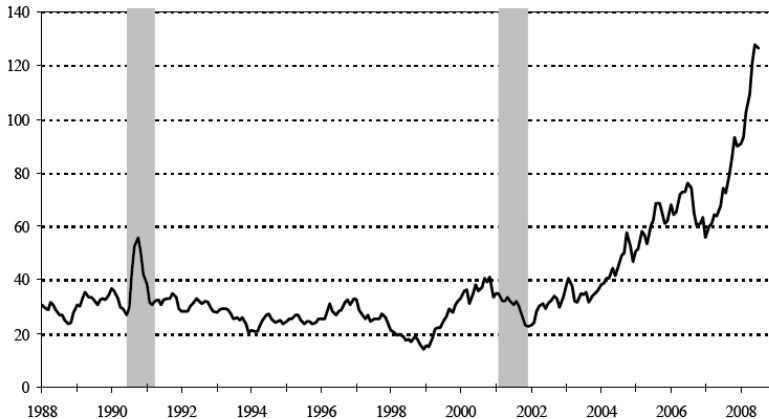


## BLINDER'S DEFENSE OF CORE

- Buiter's paper at Jackson Hole 2008 included criticism of "core inflation."
- Alan Blinder offered a defense.
  - U.S. monetary policy cannot have a meaningful impact on global oil markets.
  - If oil price movements are mainly noise then it shouldn't matter.
  - A one-time shift in the level of oil prices should not have a big impact.
  - A longer term trend in energy prices would be more problematic.
  - But, a "theorem" says that energy prices cannot continue to increase faster than other prices forever.
- This is the conventional wisdom echoed at the FOMC.



## Real Price of Oil



— West Texas Intermediate/Headline CPI (2007\$)



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.
  - (Although, why 2003?)



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.
  - (Although, why 2003?)
- Also plausible that this could go on for a long time. Decades. Think Solow model.





## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.
  - (Although, why 2003?)
- Also plausible that this could go on for a long time. Decades. Think Solow model.
  - The “theorem” may not have much bite.



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.
  - (Although, why 2003?)
- Also plausible that this could go on for a long time. Decades. Think Solow model.
  - The “theorem” may not have much bite.
- Empirical literature: what best predicts future headline inflation?



## SOME PROBLEMS WITH THE CONVENTIONAL WISDOM

- Oil price movements look more like a five-year trend.
- Very plausible that this is driven by increased demand from the developing world.
  - (Although, why 2003?)
- Also plausible that this could go on for a long time. Decades. Think Solow model.
  - The “theorem” may not have much bite.
- Empirical literature: what best predicts future headline inflation?
  - This may not work with the most recent data.

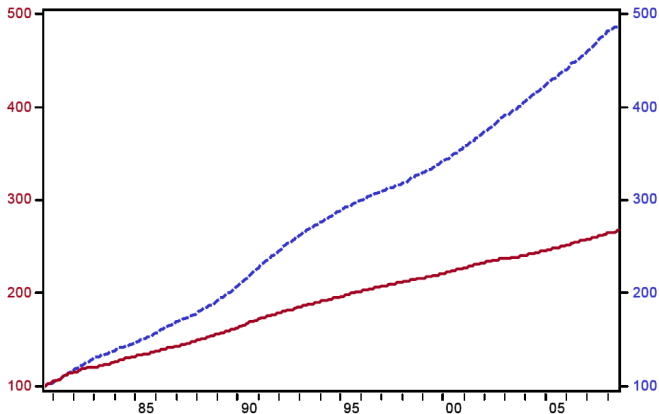


## CPI-U: All Items Less Food and Energy

1980=100

## CPI-U: Medical Care

1980=100



Source: Bureau of Labor Statistics /Haver Analytics



## NEEDED: SOME THEORY

- I would like to see more theory-oriented approaches to the subject, less statistics.



## NEEDED: SOME THEORY

- I would like to see more theory-oriented approaches to the subject, less statistics.
- My sense is that theory would always put some weight on each price.



## NEEDED: SOME THEORY

- I would like to see more theory-oriented approaches to the subject, less statistics.
- My sense is that theory would always put some weight on each price.
- The *ad hoc* aspect of the “core” idea would be removed.



## NEEDED: SOME THEORY

- I would like to see more theory-oriented approaches to the subject, less statistics.
- My sense is that theory would always put some weight on each price.
- The *ad hoc* aspect of the “core” idea would be removed.
- Households and policymakers would solve an optimal filtering problem.





## NEEDED: SOME THEORY

- I would like to see more theory-oriented approaches to the subject, less statistics.
- My sense is that theory would always put some weight on each price.
- The *ad hoc* aspect of the “core” idea would be removed.
- Households and policymakers would solve an optimal filtering problem.
- This would itself influence the equilibrium.



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.
- The equilibrium would involve ongoing learning about how much weight to put on various price movements in policymaking.



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.
- The equilibrium would involve ongoing learning about how much weight to put on various price movements in policymaking.
- Imponderables:



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.
- The equilibrium would involve ongoing learning about how much weight to put on various price movements in policymaking.
- Imponderables:
  - Intermediate goods.



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.
- The equilibrium would involve ongoing learning about how much weight to put on various price movements in policymaking.
- Imponderables:
  - Intermediate goods.
  - Open economies.



## NEEDED: SOME THEORY, CONTINUED

- Households and policymakers would have to track changing relative prices.
- The equilibrium would involve ongoing learning about how much weight to put on various price movements in policymaking.
- Imponderables:
  - Intermediate goods.
  - Open economies.
  - Price stickiness.



## ONE THEORY

- One example without any learning:





## ONE THEORY

- One example without any learning:
  - Martin Bodenstein, Chris Erceg, and Luca Guerrieri.  
“Optimal Monetary Policy in a Model with Distinct Core and Headline Inflation Rates.” *JME*, forthcoming.



## ONE THEORY

- One example without any learning:
  - Martin Bodenstein, Chris Erceg, and Luca Guerrieri.  
“Optimal Monetary Policy in a Model with Distinct Core and Headline Inflation Rates.” *JME*, forthcoming.
- Retail prices are Calvo-sticky, wages are Calvo-sticky, energy prices are flexible.



## ONE THEORY

- One example without any learning:
  - Martin Bodenstein, Chris Erceg, and Luca Guerrieri. “Optimal Monetary Policy in a Model with Distinct Core and Headline Inflation Rates.” *JME*, forthcoming.
- Retail prices are Calvo-sticky, wages are Calvo-sticky, energy prices are flexible.
- This means “core prices” are sticky. This makes core inflation the key to welfare maximization.



## ONE THEORY

- One example without any learning:
  - Martin Bodenstein, Chris Erceg, and Luca Guerrieri.  
“Optimal Monetary Policy in a Model with Distinct Core and Headline Inflation Rates.” *JME*, forthcoming.
- Retail prices are Calvo-sticky, wages are Calvo-sticky, energy prices are flexible.
- This means “core prices” are sticky. This makes core inflation the key to welfare maximization.
- This gives the main result.



## REMARKS

- A trend in the relative price of energy is not part of the analysis.



## REMARKS

- A trend in the relative price of energy is not part of the analysis.
- This theory would put a lot of emphasis on “what’s sticky?”



## REMARKS

- A trend in the relative price of energy is not part of the analysis.
- This theory would put a lot of emphasis on “what’s sticky?”
- The view of policymakers would be, “what prices do consumers actually face?”



## REMARKS

- A trend in the relative price of energy is not part of the analysis.
- This theory would put a lot of emphasis on “what’s sticky?”
- The view of policymakers would be, “what prices do consumers actually face?”
- “Degrees of price stickiness” would suggest optimal filtering in this setting.





## REMARKS

- A trend in the relative price of energy is not part of the analysis.
- This theory would put a lot of emphasis on “what’s sticky?”
- The view of policymakers would be, “what prices do consumers actually face?”
- “Degrees of price stickiness” would suggest optimal filtering in this setting.
- Also, the final goods price contains the weighted energy input price.



## THE SYSTEMIC RISK STORY

- Monetary policy has been heavily influenced by ideas concerning *systemic risk* in the last year or so.



## THE SYSTEMIC RISK STORY

- Monetary policy has been heavily influenced by ideas concerning *systemic risk* in the last year or so.
- The basic idea is that the sudden failure of a single firm may cause other, healthy, firms to fail at the same time.



## THE SYSTEMIC RISK STORY

- Monetary policy has been heavily influenced by ideas concerning *systemic risk* in the last year or so.
- The basic idea is that the sudden failure of a single firm may cause other, healthy, firms to fail at the same time.
- This would damage the intermediation sector, and it would take a long time to recover.



## THE SYSTEMIC RISK STORY

- Monetary policy has been heavily influenced by ideas concerning *systemic risk* in the last year or so.
- The basic idea is that the sudden failure of a single firm may cause other, healthy, firms to fail at the same time.
- This would damage the intermediation sector, and it would take a long time to recover.
- Macroeconomic models do not typically address this topic.



## THE SYSTEMIC RISK STORY

- Monetary policy has been heavily influenced by ideas concerning *systemic risk* in the last year or so.
- The basic idea is that the sudden failure of a single firm may cause other, healthy, firms to fail at the same time.
- This would damage the intermediation sector, and it would take a long time to recover.
- Macroeconomic models do not typically address this topic.
- Rising or falling systemic risk is pushed into the stochastic terms.



## A SLIPPERY CONCEPT

- The systemic risk story is difficult to cope with in the policy world.



## A SLIPPERY CONCEPT

- The systemic risk story is difficult to cope with in the policy world.
- The aire of “collapse of the financial system” is worrisome.





## A SLIPPERY CONCEPT

- The systemic risk story is difficult to cope with in the policy world.
- The aire of “collapse of the financial system” is worrisome.
- At the same time, all financial firms have incentives to tell this story when necessary in order to avoid losing money.



## A SLIPPERY CONCEPT

- The systemic risk story is difficult to cope with in the policy world.
- The aire of “collapse of the financial system” is worrisome.
- At the same time, all financial firms have incentives to tell this story when necessary in order to avoid losing money.
- Many genuinely believe it.



## HISTORY

- Recent history includes large failures without large repercussions: Drexel Burnham Lambert in 1990, Barings Bank in 1995, Long Term Capital Management in 1998, Enron in 2001, and Amaranth Advisors in 2006.



## HISTORY

- Recent history includes large failures without large repercussions: Drexel Burnham Lambert in 1990, Barings Bank in 1995, Long Term Capital Management in 1998, Enron in 2001, and Amaranth Advisors in 2006.
- There were periodic panics in the 19th century U.S. between the Civil War and the founding of the Federal Reserve.



## HISTORY

- Recent history includes large failures without large repercussions: Drexel Burnham Lambert in 1990, Barings Bank in 1995, Long Term Capital Management in 1998, Enron in 2001, and Amaranth Advisors in 2006.
- There were periodic panics in the 19th century U.S. between the Civil War and the founding of the Federal Reserve.
  - There was an equilibrium, but policymakers and consumers did not like that equilibrium.



## HISTORY

- Recent history includes large failures without large repercussions: Drexel Burnham Lambert in 1990, Barings Bank in 1995, Long Term Capital Management in 1998, Enron in 2001, and Amaranth Advisors in 2006.
- There were periodic panics in the 19th century U.S. between the Civil War and the founding of the Federal Reserve.
  - There was an equilibrium, but policymakers and consumers did not like that equilibrium.
- Of course, there is the Great Depression.



## HISTORY

- Recent history includes large failures without large repercussions: Drexel Burnham Lambert in 1990, Barings Bank in 1995, Long Term Capital Management in 1998, Enron in 2001, and Amaranth Advisors in 2006.
- There were periodic panics in the 19th century U.S. between the Civil War and the founding of the Federal Reserve.
  - There was an equilibrium, but policymakers and consumers did not like that equilibrium.
- Of course, there is the Great Depression.
  - Interested listeners might consult Gary Richardson and William Troost, "Monetary Intervention Mitigated Banking Panics During the Depression."



## MULTIPLE STEADY STATES?

- Jackson Hole question: How much weight should policymakers put on an implicit “financial stability” objective, relative to price stability and maximum sustainable employment?





## MULTIPLE STEADY STATES?

- Jackson Hole question: How much weight should policymakers put on an implicit “financial stability” objective, relative to price stability and maximum sustainable employment?
- To this group:



## MULTIPLE STEADY STATES?

- Jackson Hole question: How much weight should policymakers put on an implicit “financial stability” objective, relative to price stability and maximum sustainable employment?
- To this group:
  - This sounds like multiple steady states.



## MULTIPLE STEADY STATES?

- Jackson Hole question: How much weight should policymakers put on an implicit “financial stability” objective, relative to price stability and maximum sustainable employment?
- To this group:
  - This sounds like multiple steady states.
  - Requires a notion of what drives the dynamics around each steady state.



## ONE THEORY

- One paper at this conference, George Evans and Seppo Honkapohja, “Robust Learning Stability with Operational Monetary Policy Rules,” takes steps in this direction.



## ONE THEORY

- One paper at this conference, George Evans and Seppo Honkapohja, “Robust Learning Stability with Operational Monetary Policy Rules,” takes steps in this direction.
  - Certain policy rules, if adopted, would generate an unstable target equilibrium.



## ONE THEORY

- One paper at this conference, George Evans and Seppo Honkapohja, “Robust Learning Stability with Operational Monetary Policy Rules,” takes steps in this direction.
  - Certain policy rules, if adopted, would generate an unstable target equilibrium.
  - The policymaker community does not usually talk in these terms.



## ONE THEORY

- One paper at this conference, George Evans and Seppo Honkapohja, “Robust Learning Stability with Operational Monetary Policy Rules,” takes steps in this direction.
  - Certain policy rules, if adopted, would generate an unstable target equilibrium.
  - The policymaker community does not usually talk in these terms.
- No financial intermediation component.



## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.





## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.
- One interpretation of financial markets is that information is being revealed every day.



## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.
- One interpretation of financial markets is that information is being revealed every day.
- All players understand the incentives to withhold information.



## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.
- One interpretation of financial markets is that information is being revealed every day.
- All players understand the incentives to withhold information.
- Therefore, they are Bayesian learners with respect to the announcements made by other firms.



## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.
- One interpretation of financial markets is that information is being revealed every day.
- All players understand the incentives to withhold information.
- Therefore, they are Bayesian learners with respect to the announcements made by other firms.
- They also understand the sequence of events if there is a default.



## NEEDED: SOME THEORY

- To get closer to the financial instability story a theory needs to incorporate private information held by interlinked financial firms.
- One interpretation of financial markets is that information is being revealed every day.
- All players understand the incentives to withhold information.
- Therefore, they are Bayesian learners with respect to the announcements made by other firms.
- They also understand the sequence of events if there is a default.
  - The endogenous debt constraints literature emphasizes that the penalty for default influences the equilibrium level of credit.



## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?



## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?
- Would it break down in response to certain shocks and cause Evans-Honkapohja-style instability?



## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?
- Would it break down in response to certain shocks and cause Evans-Honkapohja-style instability?
- My sense is no, because the players would understand the risk of failure of a partner firm. But the conventional wisdom is yes.





## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?
- Would it break down in response to certain shocks and cause Evans-Honkapohja-style instability?
- My sense is no, because the players would understand the risk of failure of a partner firm. But the conventional wisdom is yes.
  - In other industries, the failure of a large rival is good for business.



## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?
- Would it break down in response to certain shocks and cause Evans-Honkapohja-style instability?
- My sense is no, because the players would understand the risk of failure of a partner firm. But the conventional wisdom is yes.
  - In other industries, the failure of a large rival is good for business.
- It is important that we get an idea of the fundamental problem we are trying to address when it comes to financial stability.



## EQUILIBRIUM

- Would the Bayesian equilibrium somehow be “fragile”?
- Would it break down in response to certain shocks and cause Evans-Honkapohja-style instability?
- My sense is no, because the players would understand the risk of failure of a partner firm. But the conventional wisdom is yes.
  - In other industries, the failure of a large rival is good for business.
- It is important that we get an idea of the fundamental problem we are trying to address when it comes to financial stability.
- Interested listeners might check Franklin Allen’s overview at Jackson Hole, “Understanding Financial Crises.”



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.
- In the policy and financial markets worlds, “bubbles” are taken as self-evident.





## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.
- In the policy and financial markets worlds, “bubbles” are taken as self-evident.
  - Story: Oil at \$145 a barrel.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.
- In the policy and financial markets worlds, “bubbles” are taken as self-evident.
  - Story: Oil at \$145 a barrel.
  - Market insiders told me it was wildly high and turned out to be right.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.
- In the policy and financial markets worlds, “bubbles” are taken as self-evident.
  - Story: Oil at \$145 a barrel.
  - Market insiders told me it was wildly high and turned out to be right.
  - If you think it is persistent fundamentals, you might predict based on a random walk, otherwise you predict a crash.



## ECONOMISTS VERSUS THE WORLD

- I have worked a fair amount on non-fundamental equilibria.
  - In the literature it has been an *uphill climb*.
  - Many economists remain skeptical of multiple equilibria.
  - But, to be fair, much more widely accepted today than it once was.
- In the policy and financial markets worlds, “bubbles” are taken as self-evident.
  - Story: Oil at \$145 a barrel.
  - Market insiders told me it was wildly high and turned out to be right.
  - If you think it is persistent fundamentals, you might predict based on a random walk, otherwise you predict a crash.
- What should policymakers do?



## CONVENTIONAL WISDOM

- The conventional wisdom is to first of all admit ignorance.



## CONVENTIONAL WISDOM

- The conventional wisdom is to first of all admit ignorance.
- Plan to react to a crash if one should occur.



## CONVENTIONAL WISDOM

- The conventional wisdom is to first of all admit ignorance.
- Plan to react to a crash if one should occur.
- It is not clear that this is the best policy.



## SOMETHING SENSIBLE

- The theory literature has done something sensible on this question.





## SOMETHING SENSIBLE

- The theory literature has done something sensible on this question.
- It has focused on finding conditions under which non-fundamental equilibria may exist.



## SOMETHING SENSIBLE

- The theory literature has done something sensible on this question.
- It has focused on finding conditions under which non-fundamental equilibria may exist.
- The literature has then suggested policies that might eliminate the non-fundamental equilibria.



## SOMETHING SENSIBLE

- The theory literature has done something sensible on this question.
- It has focused on finding conditions under which non-fundamental equilibria may exist.
- The literature has then suggested policies that might eliminate the non-fundamental equilibria.
- This is reasonable, but very specialized to particular models.



## SOMETHING SENSIBLE

- The theory literature has done something sensible on this question.
- It has focused on finding conditions under which non-fundamental equilibria may exist.
- The literature has then suggested policies that might eliminate the non-fundamental equilibria.
- This is reasonable, but very specialized to particular models.
- And, actual policymakers may be more circumscribed in what can be done.



## NEEDED: SOME THEORY

- Suppose that for reasons exogenous to the model, equilibrium is indeterminate and so susceptible to non-fundamental shocks.



## NEEDED: SOME THEORY

- Suppose that for reasons exogenous to the model, equilibrium is indeterminate and so susceptible to non-fundamental shocks.
- Let's not take the route of adopting a policy to eliminate the indeterminacy.



## NEEDED: SOME THEORY

- Suppose that for reasons exogenous to the model, equilibrium is indeterminate and so susceptible to non-fundamental shocks.
- Let's not take the route of adopting a policy to eliminate the indeterminacy.
- Instead, is there a way to respond to an observed non-fundamental shock to improve on the equilibrium?



## NEEDED: SOME THEORY

- Suppose that for reasons exogenous to the model, equilibrium is indeterminate and so susceptible to non-fundamental shocks.
- Let's not take the route of adopting a policy to eliminate the indeterminacy.
- Instead, is there a way to respond to an observed non-fundamental shock to improve on the equilibrium?
  - In principle, there may be welfare superior equilibria available in the indeterminate region.





## NEEDED: SOME THEORY

- Suppose that for reasons exogenous to the model, equilibrium is indeterminate and so susceptible to non-fundamental shocks.
- Let's not take the route of adopting a policy to eliminate the indeterminacy.
- Instead, is there a way to respond to an observed non-fundamental shock to improve on the equilibrium?
  - In principle, there may be welfare superior equilibria available in the indeterminate region.
- Commentators were talking about housing bubbles for years before prices began falling. Similarly with recent commodity price increases.



## SOME COMMENTS

- I have outlined some thoughts on research topics related to learning and monetary policy.



## SOME COMMENTS

- I have outlined some thoughts on research topics related to learning and monetary policy.
- One idea concerns ways to get rid of the ad hoc filtering done in the core inflation measures.



## SOME COMMENTS

- I have outlined some thoughts on research topics related to learning and monetary policy.
- One idea concerns ways to get rid of the ad hoc filtering done in the core inflation measures.
- Another suggested ways to get a better handle on the concept of systemic risk.



## SOME COMMENTS

- I have outlined some thoughts on research topics related to learning and monetary policy.
- One idea concerns ways to get rid of the ad hoc filtering done in the core inflation measures.
- Another suggested ways to get a better handle on the concept of systemic risk.
- And a third was an appeal to provide advice from existing models on how to react to a non-fundamental shock, if policymakers were willing to bet that an observed price movement was not driven by fundamentals.



## SOME COMMENTS

- I have outlined some thoughts on research topics related to learning and monetary policy.
- One idea concerns ways to get rid of the ad hoc filtering done in the core inflation measures.
- Another suggested ways to get a better handle on the concept of systemic risk.
- And a third was an appeal to provide advice from existing models on how to react to a non-fundamental shock, if policymakers were willing to bet that an observed price movement was not driven by fundamentals.
- All of these topics are part of the current policy debate.