

Some Lessons from the Great Recession

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Lessons from the quiet ZLB: Monetary and Fiscal Policy

- Model implications that rely critically on a strong form of rational expectations shouldn't be taken seriously.
 - This is especially true when dealing with rare events like the Financial Crisis and the Great Recession.
 - Private agents and policy makers were certainly forward looking.
 - But the idea that they had rational expectations is demonstrably wrong.
- A 'robustness' principle: only take seriously model implications that are robust to (at least) small deviations from rational expectations.

Applying the robustness principle to the NK model

- **Lesson 1**

- A transitory increase in the federal funds rate induced by a monetary policy shock is associated with a *decrease* in inflation.
 - A very persistent increase in the federal funds rate induced by a monetary policy shock is associated with an *increase* in inflation.
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- Arguments used to support the so called neo-Fisherian position violate the robustness principle.

Applying the robustness principle to the NK model

- **Lesson 2**

- Fiscal policy is powerful when the ZLB is binding.

- **Lesson 3:**

- The prediction that forward guidance is very powerful violates the robustness principle.

- I'll now discuss these lessons and some of their implications for policy in the new low R^* world.

- Raise inflation targets (which I'm not in favor of), or
- Re-design institutions so that fiscal policy can be used in a socially beneficial way to combat recessions.

A useful detour

- The Federal Funds rate has been nearly constant since early 2009.
- According to John we can think of this episode as a (sort of) interest rate peg.
- Standard NK model (active monetary/passive fiscal policy):
 - Under a peg, the REE is *indeterminate* and gives rise to the possibility of sunspot volatility.
- In fact inflation has been smooth in the 'quiet ZLB'.
- Hence the Michael Morley moment.

The world according to John

- Monetarism and the standard NK model have been discredited so we need a new standard model.
- That model should be the FTPL with nominal rigidities.
- I certainly agree with John about monetarism: they have been and continue to be *precisely* wrong about everything.
 - In that sense they play an extremely valuable role.
- But I fundamentally disagree with the premise of John's argument as it pertains to the NK model.

A Michael-Morely Moment ?

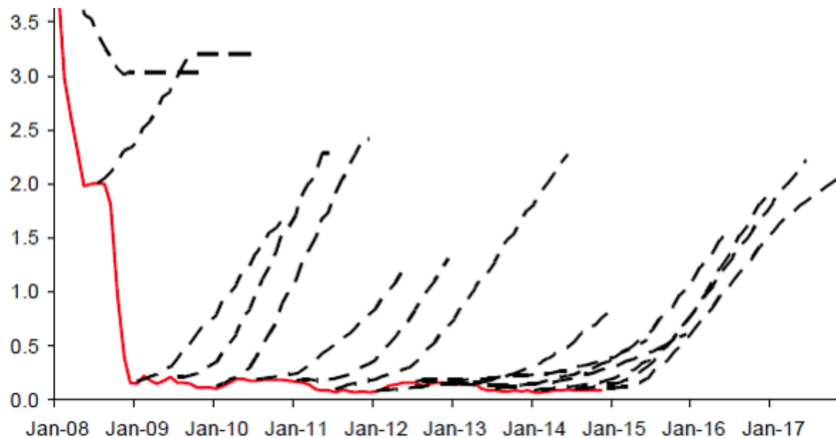
- The Fed was not on in any sense on an interest rate peg.
- Moreover no one expected the ZLB to last indefinitely.
- So determinacy was not an issue in the NK model given realistic assumptions about what people were expecting.
- There never was a Michael - Morely moment: the experiment that John appeals to never happened.
- Claiming that it did when it didn't amounts to a Michael Moore moment.
- And while we're at it: non-toy NK models have no problems explaining the behavior of inflation during the Great Recession.
 - See for example Christiano, Eichenbaum and Trabandt (2015).
 - You need to allow for the fact that the growth rate of TFP fell during the Great Recession and cost of working capital went up.

Expectations about the duration of the ZLB

- Swanson Williams (2014)
 - Estimate the time-varying sensitivity of yields on intermediate and long bonds to macroeconomic announcements using high-frequency data.
 - Compare that sensitivity to a benchmark period in which the ZLB wasn't an issue (1990–2000).
- Basic idea:
 - When a given yield is about as sensitive to news as in the benchmark period, SW say the yield is unconstrained.
 - Where a yield responds very little or not at all to news, SW say policy is largely or completely constrained.
- Key conclusion: until August 2011, market participants expected the ZLB to constraint policy for only a few quarters.

FF rate futures at different points in time

Source: a well known blog (the Grumpy Economist)

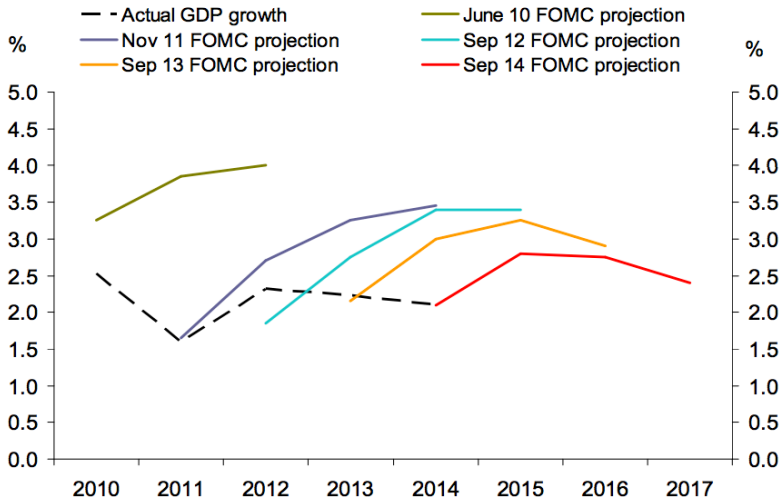


Source: FRB, Bloomberg Finance LP, DB Global Markets Research

What about policy makers themselves?

GDP forecasts versus outcomes

The FOMC has been too optimistic about the recovery



Note: Actual GDP is annual data and the observation for 2014 is the latest consensus estimate.

Pegs and the ZLB

- There was nothing like an interest rate peg in the U.S. even though the ZLB was binding for an extended period.
 - Private market participants and policy makers systematically under-estimated how long the ZLB would last.
 - They also expected the Fed to return to a Taylor-rule type regime after the ZLB ended.
- Conclusion 1:
 - The experiment that John appeals to didn't happen. So conclusions based on an appeal that experiment aren't warranted.
- Conclusion 2:
 - During the crisis and its aftermath, people were making serially correlated errors about output and interest rates.
 - We shouldn't trust model implications that depend on a strict version of rational expectations, certainly not for rare episodes like the Great Recession.

What are the robust implications of the NK model?

- As a general proposition the NK model does have multiple equilibria.
- Are these multiplicities a *substantive* issue?
- Can we appeal to an interesting selection criterion to rule out alternative equilibria as *empirically* uninteresting?
- That depends on why you think rational expectations is an interesting hypothesis to begin with.

Is multiplicity in the NK model a substantive problem?

- Before rational expectations ossified into a religion, it was widely understood that you should take it seriously only if it was the outcome of *some* plausible learning process.
- In his seminal 1978 paper on asset pricing, Lucas writes

'The model described above "assumes" that agents know a great deal about the structure of the economy, and perform some non-routine computations. It is in order to ask, then: will an economy with agents armed with "sensible" rules of thumb, revising these rules from time to time so as to claim observed rents, tend as time passes tend to behave as described in the rational expectations equilibrium' Lucas, 1978.

- Lucas took this claim so seriously that he devoted a section of that paper to show that the REE would emerge as the limiting outcome of a learning equilibrium.

The robustness principle

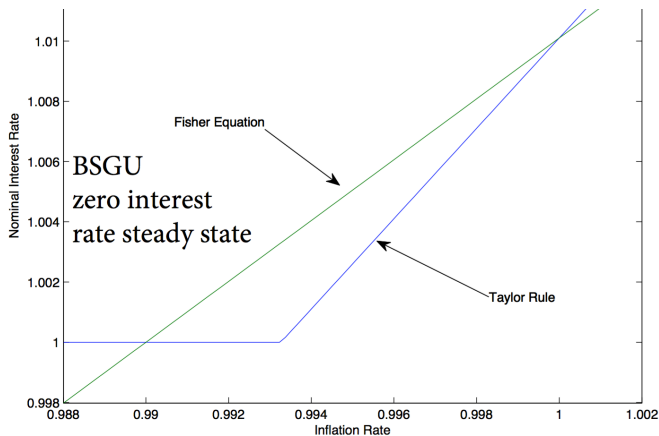
- Given his views about the rationale for rational expectations, it's not surprising that Lucas suggested using stability-under-learning as an equilibrium selection criterion.
- In his 1986 paper, "Adaptive Behavior and Economic Theory, he writes

"Recent theoretical work is making it increasingly clear that multiplicity of equilibria [...] can arise in a wide variety of situations involving sequential trading, in competitive as well as finite-agent games. All but a few of these equilibria are, I believe, behaviorally uninteresting: They do not describe behavior that collections of adoptively behaving people would ever hit on. I think an appropriate stability theory can be useful in wedding out these uninteresting equilibria. . . . Lucas, 1986.

Robustness, stability, and uniqueness

- Suppose agents made 'small' errors in forming expectations about variables relative to their values in a particular RE equilibrium.
- Does the economy converge to that RE equilibrium?
 - If yes, the RE equilibrium is stable, i.e. it's learnable.
 - If no, the RE equilibrium isn't stable, i.e. it's not learnable.
- If an REE isn't learnable it's empirically uninteresting (Lucas 1978, 1986)
 - It should be dismissed as a theoretical curiosum.
- If an REE is learnable, it is empirically interesting.
- The last conclusion has particular force if explicit, behaviorally sensible near alternatives to the rational expectations model have a unique equilibrium that looks like the learnable REE.

Example: BSGU two steady state problem



- Suppose that starting from one of the steady states, agents make a mistake about expected inflation.
 - Agents set new expectations as linear combinations of current data and past expectations (constant-gain filter).
 - They don't need to know that policy is being guided by a Taylor rule or the parameters of that rule.
- The economy *always* diverges away from the deflationary steady state, even if agents' initial mistake was arbitrarily small.
- If there's an interior equilibrium, the economy always converges to the zero inflation equilibrium.
- Conclude: deflation SS isn't learnable, zero-inflation SS is learnable.

- You would *never* want to use the deflation SS as a description of data.
- Example
 - Japan has low interest rates.
 - But the idea that the cause is a non-learnable REE where, for 20 years, no one has had mistaken expectations is wildly implausible.

Stability and multiplicity in NK and near-NK Models

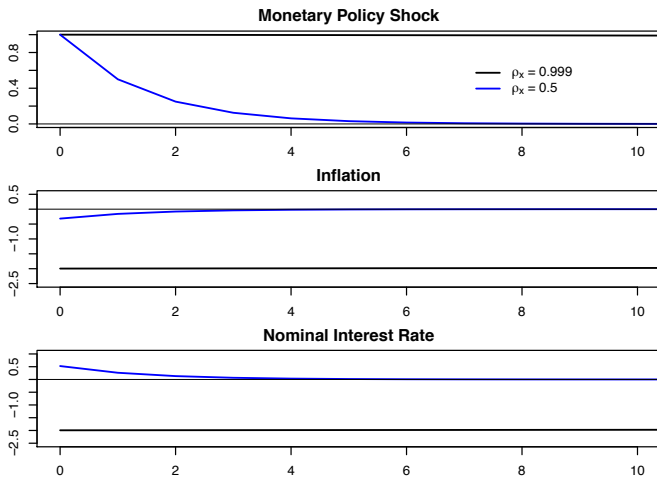
- CEJ (2017) study a fully non-linear NK model.
 - Based on a global analysis, they find the model has a unique learnable rational expectations equilibrium.
- Gabaix (2017) - behavioral model in which agents are partially myopic to unusual events and don't anticipate the future perfectly.
 - There's one main new parameter relative to the standard NK model
 - Quantifies how poorly agents understand future policy and its impact on them.
 - The Taylor principle is strongly modified.
 - Equilibrium selection issues vanish in many cases.
 - Even with an interest rate peg there's just one (bounded) equilibrium.

The robustness principle: lesson 1

- Consider the response of inflation and the nominal interest in three models
 - the uniquely learnable equilibrium of the NK model, the Gabaix model and a model where agents learn with a constant gain filter.
- The qualitative responses are the same and have modified Fisherian properties.
 - A transitory *increase* in the federal funds rate induced by a monetary policy shock is associated with a *decrease* in inflation.
 - A very persistent *decrease* in the federal funds rate induced by a monetary policy shock is associated with a *decrease* in inflation.

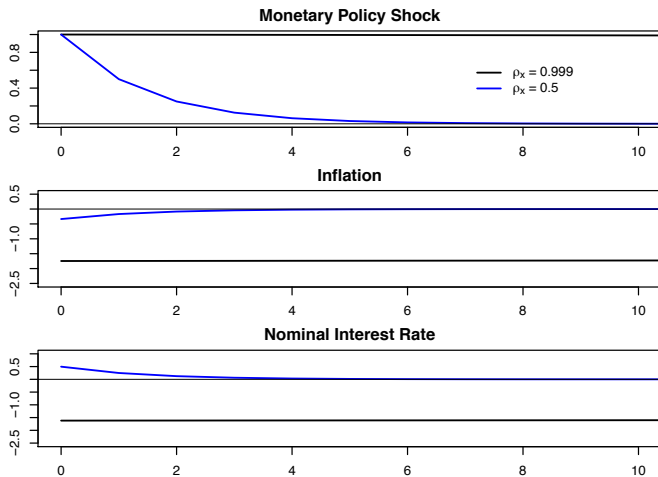
The unique learnable equilibrium of the NK model and its 'Fisherian' properties

Fisherian in the classic sense but allows for transitory rate hikes to reduce inflation



The unique equilibrium of Gabaix's model and its 'Fisherian' properties

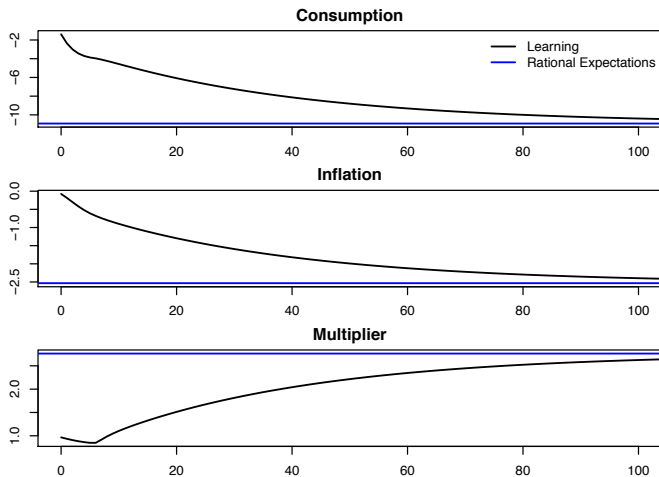
Qualitatively the same as the NK model



The robustness principle: lesson 2

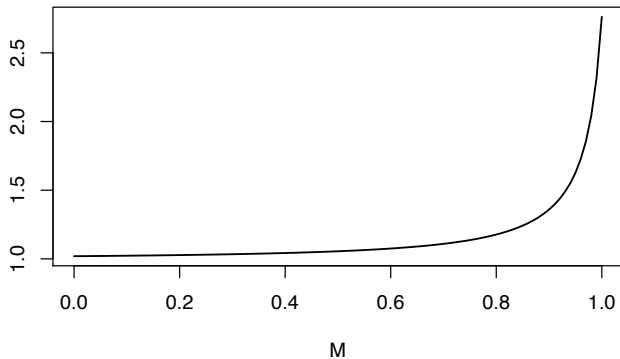
- Let's compare three models in terms of their predictions for fiscal policy in the ZLB.
 - A learning model where agents update their expectations using a constant gain filter
 - The uniquely learnable REE studied in Christiano, Eichenbaum and Rebelo (2011)
 - The equilibrium in Gabaix's behavioral NK model
- Key result: government purchases multiplier is large in all of these models.

ZLB Multiplier in the learning and RE model



ZLB multiplier in the Gabaix model

M equal to one corresponds to RE, smaller means more myopia



Fiscal policy in the ZLB

- The robust prediction of the NK model is that fiscal policy is powerful when the ZLB is binding.
 - It holds in the uniquely learnable REE of both the linear and non-linear versions of the model.
- This property also holds in explicit versions of the NK which depart from strict RE.
- Important and fun fact:
 - Leeper, Traum and Walker (2017) show in an estimated DSGE model embodying the FTPL that the multiplier in the ZLB is around 1.5.

The robustness principle: lesson 3

- In standard simple NK model, news about shocks to future interest rates have very powerful effects.
- Suppose the central bank promises a 1 percentage point lower real interest rate for a single quarter at some point in the future.
 - This promise has a *much* larger impact on inflation when the promise pertains to future interest rates than the current interest rate.
- Problem: this result is very sensitive to deviations from rational expectations.

Non-robustness

- Forward guidance is much less powerful in Gabaix (2017)
 - Agents more heavily discount future interest when making consumption decisions.
- A related form of non-robustness: forward guidance is much less powerful in the NK model if markets aren't complete.
- MacKay, Nakamura and Steinsson (2016)
 - GE model where agents face uninsurable, idiosyncratic income risk and borrowing constraints.
 - Because of precautionary saving motives, the effect of forward guidance about future interest rates on current output falls the further out in the future the interest rate change is and is generally much less powerful than in complete market models.
- Conclusion: be skeptical about the power of forward guidance.

Some implications for policy

- Conduct monetary policy in normal ways that respect the modified Fisherian principle.
 - That principle is robust and supported by both theory and data.
- But don't expect the *new* normal to be like the *old* normal.
- The natural rate has fallen and the ZLB is likely to bind much more than it did in the past (Kiley and Roberds (2017)).
- Unconventional monetary policy may help.
 - The robustness principle suggests that forward guidance is much less powerful than suggested by simple NK models.

Challenges

- When the next recession hits, fiscal policy will be the primary weapon at our disposal if the ZLB is binding.
 - The robustness principle (and the data) suggests that fiscal policy can be very powerful in the ZLB.
- Challenge 1: can we get our fiscal house in order so that it's feasible to use fiscal policy in bad times?
- Challenge 2: can we design institutions so that we increase government spending in socially useful ways that don't create entitlements?