

Negative Interest Rates Currency Mechanism Design

Comment on Economic Scenario Generators
to the Life Annuity Task Force of
The National Association of Insurance Commissioners
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Mechanism Design Currency Choices

- Central Bank Digital Cash (CBDC)
- Pegged exchange rate from paper currency to bank accounts
- Floating exchange rate paper currency to bank accounts
- Above options with a floor of par

Central Bank Digital Cash

- Paper money is withdrawn or limited in supply. Possibly slowly going down in amount.
- Digital cash is simply credited the same rate as bank reserves at the central bank.
- This can be positive or negative.
- In this scheme, digital cash is always par.
- It is just like a bank account with the central bank.

Pegged Exchange Rate

- The exchange rate from paper currency to bank account dollars is multiplied by $1 +$ daily interest rate on bank reserves at central bank.
- If this is started out when rates are positive, the index will build above par.
- This helps low income people who use cash more. This stimulates the economy and helps reduce inequality.
- Inequality itself is one cause of low for long.

Peg Rate Floored at Par

- The pegged rate can't go below par.
- So one dollar of cash always gets at least one dollar of bank account dollars.
- If the exchange rate falls to par, the central bank can jump the exchange rate up to 1.10 to 1.25 to give it room to have negative rates.
- 1.25 Would give it 5 years of minus 5 percent.
- The jump is itself a stimulus that also helps the poor the most, which gives the most stimulus as well.

Floating exchange rate

- The bank does not have to give you any paper money if it doesn't want.
- No more runs on the bank.
- The bank will sell or buy paper money at whatever price it wants.
- The central bank adjusts the supply of both paper dollars and bank reserves at the central bank.
- No one else, not banks, not people can change the supply of paper dollars or of bank reserves at the central bank.

Determinants of Floating Exchange Rate

- Supply and demand for paper money.
- The interest rate credited on bank reserves at the central bank.
- There is no explicit interest on paper money.
- The central bank can adjust the supplies to maintain any level or trend of the exchange rate.

No arbitrage of negative rates

- If a hedge fund with a billion dollars at the bank asks for its money in paper, the bank just says no.
- Or the bank says, hold on, I have to ask the central bank if it will give me a billion dollars in paper for you.
- Sorry, the central bank said no.
- Paper dollars for lemon stands, yes, for billion dollar hedge funds, no.

Could the Fed start negative rates now?

- Always a tricky question.
- If it just stopped printing money when it wants negative rates, and told banks they don't have to give out paper money, the answer might be yes.

Could a judge stop it?

- A judge could possibly order a bank to give out paper dollars.
- But what if it ran out?
- Could a judge order the Federal Reserve to print paper dollars?
- Less likely.

Without new paper dollars, arbitrage difficult

- Without new paper dollars from the central bank, it is hard for a hedge fund to get rolling.
- Everyone will want to keep their paper dollars if bank accounts get negative rates but paper dollars don't.
- So the Fed could possibly start deep negative rates just by stop printing more paper dollars and charging negative rates or fees on bank reserves at the Fed.

Call it a fee

- The Federal Reserve can simply charge banks fees for reserves at the central bank.
- Banks can only sell or lend reserves at the central bank to each other. They can't change the total by themselves.
- So the Fed could charge fees on bank reserves at the Fed and stop printing money.
- It might be difficult for a judge to order the Fed to not reduce the balance of reserves of banks at the Fed by a fee.

Why negative rates?

- Bernanke says the Fed needs room of 5 percent (maybe 6) below the inflation target for nominal rates.
- If the inflation target were zero, that would mean 5 below zero or -5.
- This is to stimulate the economy.
- Bernanke AEA Presidential Address
- <https://www.brookings.edu/blog/ben-bernanke/2020/01/04/the-new-tools-of-monetary-policy/>

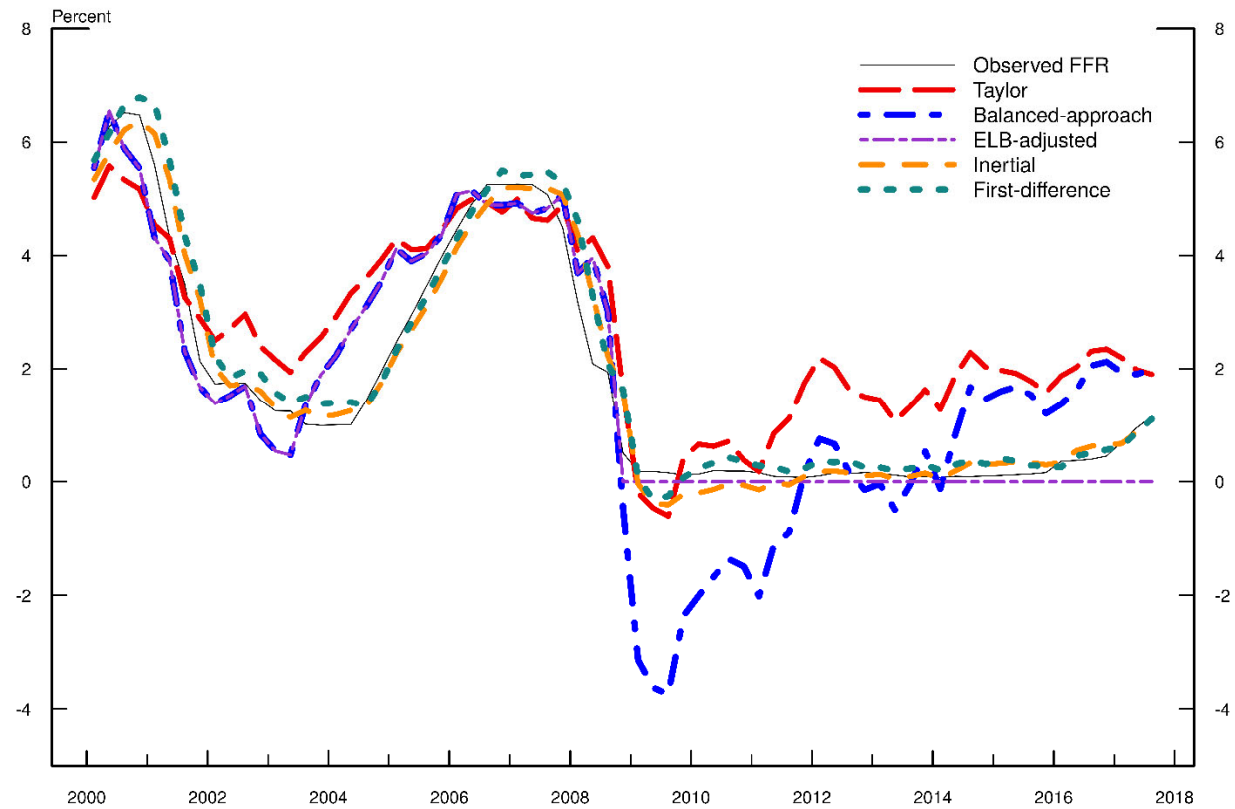
Zero Lower Bound

- Nominal rates are at zero.
- But actual output is below potential output.
- Even if inflation is only zero, the Balanced Rule and sometimes the original Taylor Rule require negative rates.
- The balanced rule moves rates down one for one with each percentage point actual GDP is below potential GDP.

Policy Rules

- The central bank rate on bank reserves is one point lower for each percentage point actual GDP is below potential GDP. (Balanced Rule)
- The central bank rate is 1.5 points lower for each point inflation is below its target.
- If inflation is at zero and the target is 2 percent, $2 - 3$ gives -1 percent.
- If the output gap is -5, the total is -6 percent as the nominal rate the Fed charges bank reserves at the Fed.

Federal Reserve Policy Rules 2000s



Assumptions for Federal Reserve Chart

- Rstar is 2 percent.
- Inflation Target is 2 percent.
- <https://www.federalreserve.gov/monetarypolicy/policy-rules-and-how-policymakers-use-them.htm>
- Assumptions in detail here.
- <https://www.federalreserve.gov/monetarypolicy/principles-for-the-conduct-of-monetary-policy.htm>

Current Assumptions

- What about now?
- Current Estimates of Rstar range from 1 to -2.
- <https://thehill.com/opinion/finance/560710-near-zero-interest-rates-can-go-lower-the-question-is-should-they/>
- At rstar of -1, the Taylor and Balance rule shift down by -3.
- This would produce a negative rate for the 2009 to 2018 period for both the Taylor Rule and Balanced Rule.
- The Balanced Rule would have had an extreme negative rate of -7.
- The Taylor Rule minimum would be -3.5.

Unfloored CIR

- The unfloored CIR model would give negative rate scenarios that are reflective of 2008 to 2018 and even later.
- It is calibrated closer to the current view of Rstar as negative.

Recommend include unfloored CIR in tests

- Unfloored CIR would help to see what the post 2008 episode would be like with a more recent value of r_{star} .
- The Total Factor Productivity (TFP) growth rate adjusted for capacity utilization is also lower and is estimated to about zero currently.
- This is consistent with the lower R_{star} .

Blanchard AEA Presidential Address

- The Blanchard American Economics Association should be a source of calibrating the model.
- The Blanchard Rule is that the median maturity government bond yield is less than the nominal growth rate of GDP.
- If the population growth rate is zero, and R^* and TFP have zero to negative growth rates, and the inflation rate is below 2 percent, then the nominal GDP growth rate will be below 2 percent.
- So the nominal GDP growth rate could be 1 or even 0 percent.
- So the nominal interest rate at 7 years might be -1 as its target.
- <https://www.piie.com/commentary/speeches-papers/public-debt-and-low-interest-rates>

Life companies could borrow at negative rates

- Borrow directly from the Fed at the prevailing negative rate.
- Borrow from the Fed through a bank subsidiary.
- Borrow from an arms length bank at negative rates using corporate bonds as collateral.

Possible problems

- Fed unwilling or unable to lend directly to insurance companies.
- Bank liquidity coverage ratio might require work arounds for using corporate bonds as collateral. Or the Fed could adjust the rule.
- Treasury bond funds might be able to swap with insurance companies. But this might require an SEC rule change.

Field Test borrowing at negative rates

- The field test should include one model with deeper negative rates like the unfloored CIR.
- This should test the results with borrowing at the negative rate for all cash needs of the companies during the negative rate period.
- They would not sell any bonds to fund cash needs while rates were negative.
- The results could be presented to the Fed, FDIC, SEC, Treasury FSOC, and Congress to get any needed rule changes in advance.

Appendix

- Glossary
- References
- Further reading

Glossary

- Rstar
- “Their approach defines r-star as the real short-term interest rate expected to prevail when an economy is at full strength and inflation is stable.”
- <https://www.newyorkfed.org/research/policy/rstar>

Total Factor Productivity

- Y = output
- K = Capital
- L = Labor
- A = TFP
- $Y = A K^{\{1/3\}} L^{\{2/3\}}$
- $W = \text{wage} = Y_K = A/3 (L/K)^{\{2/3\}}$
- <https://www.cbo.gov/publication/19992>

IMF Staff Papers on Currency Design

- [Ux fkl u#Djduz dodqg Vhgh#Nurjvwxs](#)
- <https://blogs.imf.org/2019/02/05/cashing-in-how-to-make-negative-interest-rates-work/>
- [Katrin Assenmacher ; Signe Krogstrup](#)
- <https://www.imf.org/en/Publications/WP/Issues/2018/08/27/Monetary-Policy-with-Negative-Interest-Rates-Decoupling-Cash-from-Electronic-Money-46076>

IMF Staff Papers low for long

- <https://www.imf.org/en/Publications/WP/Issues/2017/03/22/Lower-Bound-Beliefs-and-Long-Term-Interest-Rates-44755>

IMF Negative Rates

- <https://blogs.imf.org/tag/negative-interest-rates/>

William Buiter

- <https://willembuiter.com/zlb.pdf>
- NEGATIVE NOMINAL INTEREST RATES: THREE WAYS TO OVERCOME THE ZERO LOWER BOUND
- <https://willembuiter.com/>

ECB Dual Interest Rates

- Another approach to negative rates is being tried by the European Central Bank, ECB.
- <https://voxeu.org/article/dual-interest-rates-give-central-banks-limitless-fire-power>

George Selgin Target Negative Inflation

- <https://www.cato.org/policy-report/may/june-1999/plea-mild-deflation>
- If negative inflation is targeted, even lower negative rates are needed to keep it at its target.
- If the negative target is -1, and it slips to -3, nominal rates need to be below -3 to push it up.
- If the inflation target is -1 and R^* is -1, the nominal rate target is -2.
- Also Milton Friedman's 1967 AEA Presidential Address. (no equations)