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- Paper money is withdrawn or limited in supply.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 rstar.
• 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 Rstar.
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 Rstar 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.

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 = wage = Y/K = A/3 (L/K)^{2/3}
• https://www.cbo.gov/publication/19992
IMF Staff Papers on Currency Design

- UxfkluDjduz dodqg Vljqh#Nurjvwuxs

- https://blogs.imf.org/2019/02/05/cashing-in-how-to-make-negative-interest-rates-work/

- Katrin Assenmacher ; Signe Krogstrup

IMF Staff Papers: low for long

IMF Negative Rates

• [https://blogs.imf.org/tag/negative-interest-rates/](https://blogs.imf.org/tag/negative-interest-rates/)
William Buiter

- NEGATIVE NOMINAL INTEREST RATES: THREE WAYS TO OVERCOME THE ZERO LOWER BOUND
- [https://willembuiter.com/](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


• 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 below -3 to push it up.

• If the inflation target is -1 and Rstar is -1, the nominal rate target is -2.

• Also Milton Friedeman’s 1967 AEA Presidential Address. (no equations)