OFFICE OF FINANCIAL RESEARCH

# Implications of Central Banks' Negative Policy Rates on Financial Stability

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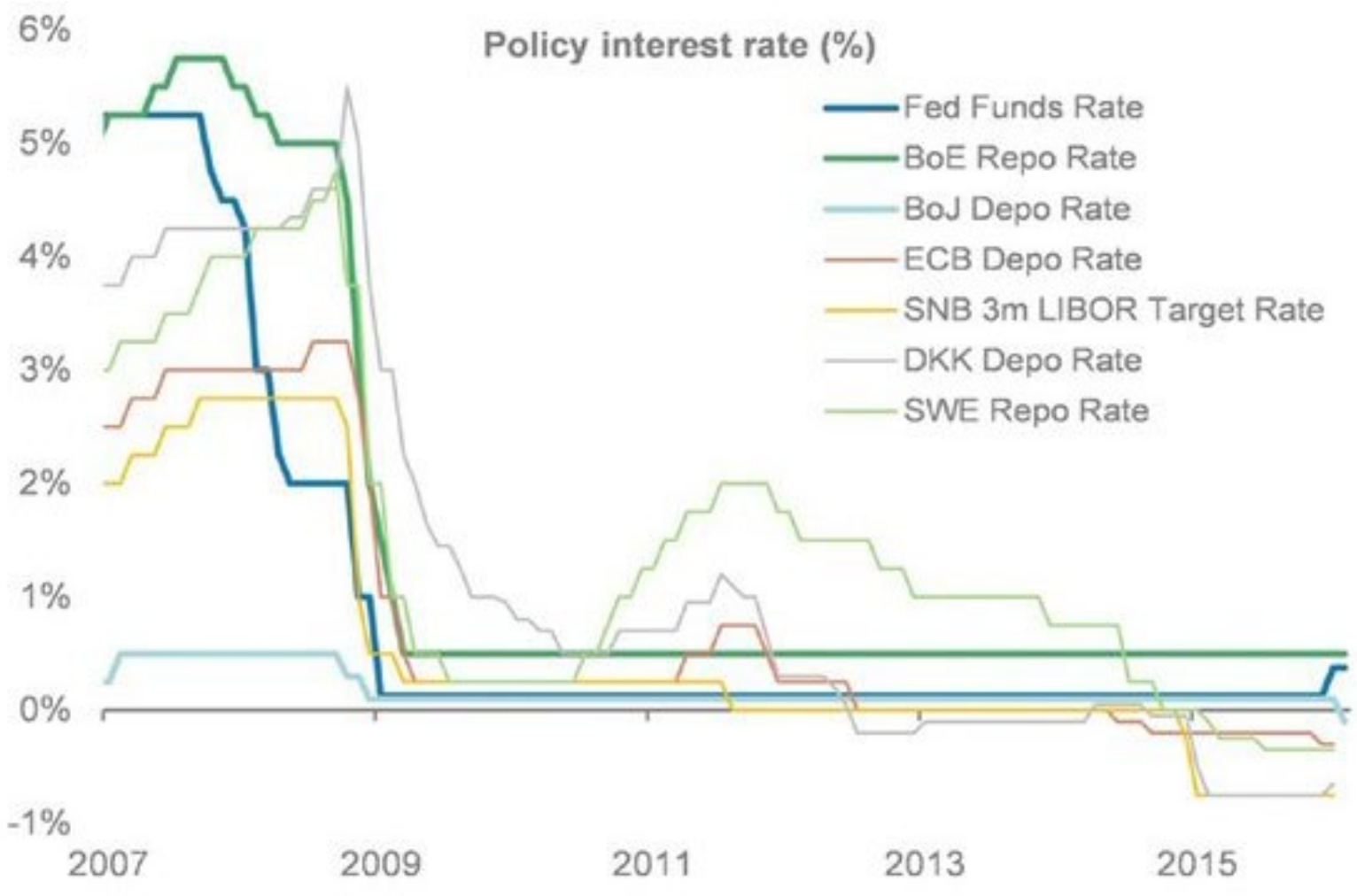
Nils Bjorksten was of great assistance in preparing this brief. I also benefited from discussions with other OFR staff. All remaining errors are my own.

# Negative policy rates present new challenges to financial stability

- Since 2014, several central banks in Europe and Japan have followed a negative interest rate policy (NIRP)
  - NIRP is setting monetary policy rates at negative levels
- Experience suggests that modestly negative policy rates have succeeded in lowering short-term rates, weakened local currencies, and modestly increased inflation. Employment effects more ambiguous.
- There are new challenges induced by software, law, taxes, and behavior when interest rates fall below zero. Does negative interest rate policy directly or through these challenges obstruct achieving financial stability objectives?
- The financial stability consequences of NIRP remain poorly understood and under discussed.

# Prolonged low policy rates, limited experience with negative rates




Source: National central banks, Morgan Stanley Research

# The consequences of negative rates on financial stability not well understood

- This brief examines likely and possible financial stability consequences of a negative rates policy
- It focuses on banks, short-term funding markets, foreign exchange markets, asset managers, pension funds, and insurers
- It draws from international NIRP experience to identify financial stability threats posed to any economy by negative interest rates and it also highlights where the US experience is likely to differ
- It summarizes the difficulties of foreign institutions and markets to adapt to negative rates. We survey American markets and institutions for vulnerabilities similar to or exceeded by Japanese and European experience.

# What is the alternative to NIRP?

- Negative rates may become necessary despite heralding threats to financial stability because the alternatives are even worse
- Optimal monetary policy helps promote a healthy and growing economy
- If policy rates are zero, quantitative easing is ineffective, and central bankers would like to cut rates further, then ruling out negative interest rates means accepting a weakened economy where growth is lower and unemployment higher
- The weaker economy can directly harm financial stability by raising defaults directly
- It may be preferable to treat the side-effects of NIRP than pursue suboptimal monetary policy
- This project is not about the desirability or likelihood of negative rates. This is an exercise in threat identification and assessment to help prepare a country for negative rates should they ever become necessary.

# Threats to banks, government-sponsored enterprises, and Federal Home Loan Banks

# Regulators have been considering this problem

- U.S. bank supervisors and large bank managers are considering the effects of negative rates
  - 2016 Federal Reserve stress test measured what negative rates would do to large bank operations
- Japanese bank regulators have used tiered rates on reserves to implement NIRP and partially shield banks from the costs
- ECB has explored similar policies

# Fed Funds market

- Banks are currently paid interest on excess reserves Government-sponsored entities (GSEs) are not.
  - Result: the $10T fed funds market is now mostly GSEs and FHLBs loans to banks
  - If the Federal Reserve implemented negative interest rates, the fed funds market could reverse direction
  - Beyond the initial disruption no one knows what consequences this reversal would have on markets, banks loans, or real investment

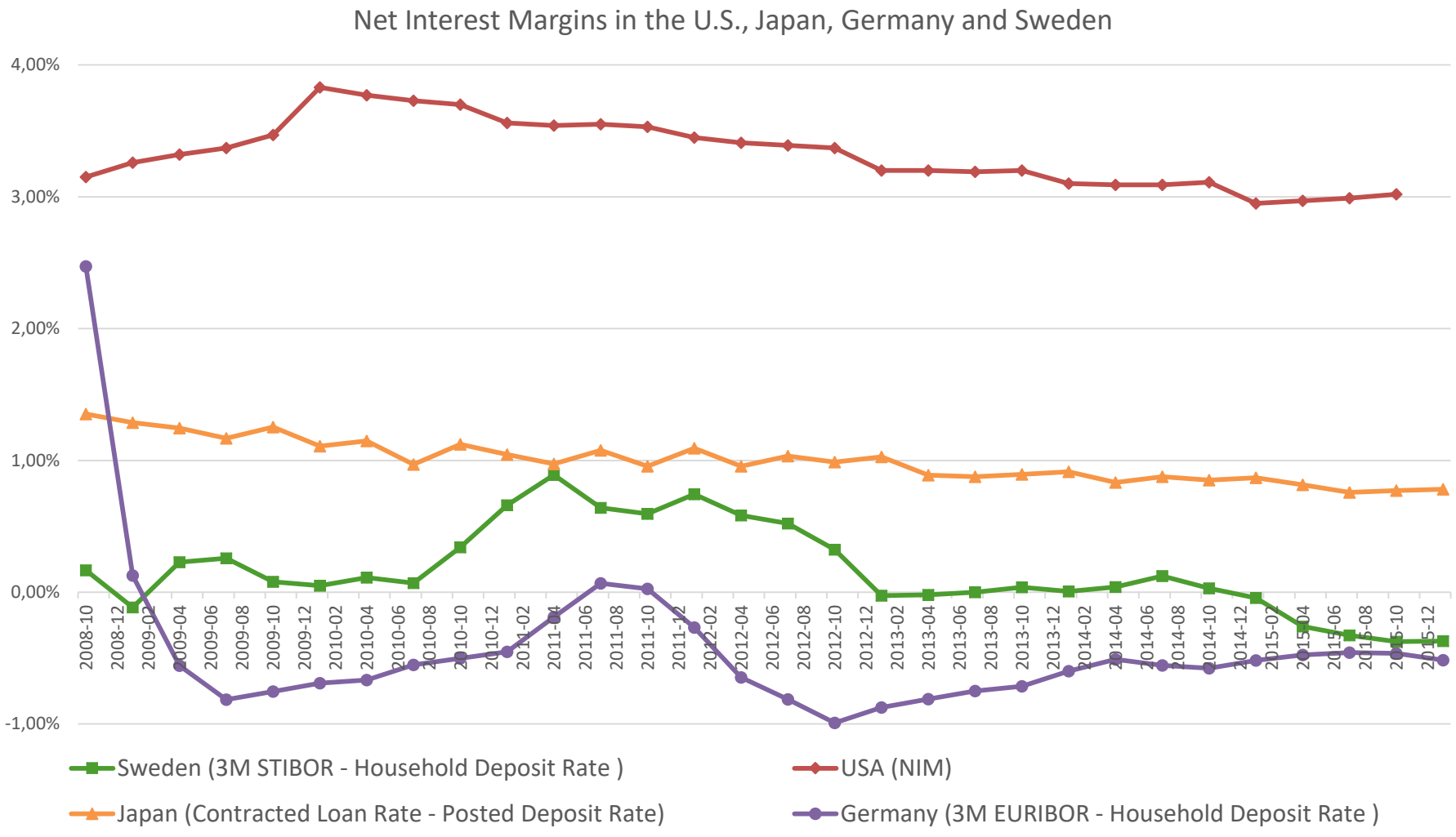
# Retail Depositors Switching to Cash

- Pass through of negative rates to depositors can induce depositors to substitute cash holdings for demand accounts
  - The more negative deposit rates go the stronger this substitution effect will be (real rates are the opportunity cost of holding cash)
  - If this effect is large then there may not be bills to satisfy demands for cash
  - Could undermine confidence in financial institutions, which, though solvent, are unable to meet demands for cash withdrawals
  - Central banks must choose between accommodating cash demand (which would undermine negative rates policy) and supporting confidence in the banking system
  - The SNB and Bank of Japan have begun to accommodate retail demands for additional large denomination bills
- Limited pass through to retail constrains the ability of central bankers to make policy rates sharply negative and may be why, thus far, policy rates have only been modestly negative in Europe and Japan despite weak inflation and growth.
- Pass through problems can be managed by eliminating cash or an electronic money standard where paper currency would float in value against paper currency. Are we ready for this?

## Banks must pass-through negative rates, net interest margins must decline, or banks must take on more risk

- Because cash substitutes for many demand deposits and historically, deposit acquisition has been expensive, banks are reluctant to alienate retail accounts by paying depositors negative rates
- Even if it is cost effective to retain these accounts under negative rates it can be harmful to bank profitability and retained capital
- Banks can respond by shifting into riskier assets (reaching for yield), adding credit and duration risk
  - Smaller community banks, thrifts, and credit unions have fewer substitute asset classes to increase interest income. Also have little wholesale funding.
  - Large banks have more products and businesses to adjust in response to negative rates which weakens their motive to take excess risk taking in any one product. Also have better access to wholesale funding.

# Low net interest margins compress profits from bank lending



# Threats to short-term debt markets

# Negative rates could disrupt overnight reverse repurchase (repo) agreement markets

- Federal Reserve uses overnight reverse repurchase (repo) agreements for open market operations
- Money market mutual funds (MMMF) are heavy users of these overnight reverse repos
- MMMF usually have capital preservation objectives that make adapting to negative rates difficult
- Will investors rapidly withdraw funds if funds break the buck due to negative rates?
- Negative rates provide a steady and known rate of fund net asset value (NAV) decline that provides little reason to rush for redemption
- MMMF-like entities in Japan responded to negative rates by returning capital to investors
- Users of short-term money markets don't have much choice but to be in these markets for liquidity needs

# Threats to the asset management industry

# Negative rates increase the cost of holding cash

- Negative rates discourage asset managers from holding cash, leading to more volatile and less liquid asset markets
- Actively managed funds hold money-like assets to invest opportunistically with changing market conditions
- Negative rates raise the costs to managers of holding this cash
- If they respond with lower cash holdings this reduces cash available for opportunistic buying, making for more volatile and less liquid markets

# Negative rates threaten to disrupt the securities lending (sec lending) business

- Many securities lenders do so only for the interest they receive on their securities
  - Others for collateral improvement
- These participants will not generally accept negative rates
  - Instead they will hold the security
- Participants wanting to borrow their securities will pay higher “on special fees” making it more costly to short securities and make for more failed trades
- Liquid markets in which to short securities are generally believed to discourage bubbles and establish better connection to fundamentals

# Threats to pension and insurance industries

# Insurance companies are sensitive to low and negative rates

- Business model is investing upfront premiums to make longer run payouts
- Unexpectedly low or and especially negative rates make it difficult to honor commitments
- If values of liabilities rise more than assets, the solvency of an insurer or pension fund can rapidly deteriorate.
- Low rates led to eight Japanese life insurance companies liquidated or taken over between 1997 and 2003
    - Policyholders lost an of 10 percent loss and the rest was borne by the industry-funded Policyholder Protection Fund
- In Europe, insurers responded to low rates by diversifying into non-life and asset management businesses, increasing prices, lowering, and increasing the use of interest rate derivatives
- Private and public pensions have made similar guarantees that rely on certain positive rates of return on invested funds.

# Threats to foreign exchange and interest rate derivatives markets

# NIRP is also used to control exchange rates

- One common goal of NIRP is to prevent local currency appreciation by reducing relative local interest rates
- Uncovered interest rate parity (UIP) predicts the equilibration of expected returns across currencies and therefore relatively high interest rate currencies will depreciate relative to currencies with low interest rates
- UIP does not seem to hold, and the academic literature has identified monetary policy as a key reason why
- Thus NIRP encourages carry trade activity. Large unmatched currency exposures can be a serious threat to financial stability if the divergent currencies suddenly converge
- Given higher U.S. rates than Europe and Japan market sentiment is that European banks have taken on significant carry trade risk and are earning large profits

# US experience likely would be different

- Many currencies only have liquid markets against the dollar
- Since two-leg trades are more complex and costly than one leg trades this discourages emerging market carry trades
- Under US NIRP, it will be possible to fund such positions at a negative rate with only a single currency leg trade
    - Carry trade risks would likely be larger under US NIRP

# Negative interest and interest rate derivatives

- NIRP has complicated the pricing and risk management of interest rate derivatives
- Many common interest rate derivative pricing models, models all conventionally assume strictly positive rates
    - E.g. Black's, local volatility, constant elasticity of variance, and stochastic alpha-beta-rho models
- NIRP has pushed the market to adapt alternative models like shifted-lognormal and normal volatility which allow rates to be negative
- New models have less accurate pricing and Greeks, lack of analytic solutions, and necessitate calibrating new parameters

# Disruption of monetary policy efficacy from financial innovation and adaption

# Risks of financial innovation and adaption

- NIRP can induce prepayment of taxes, suppliers, and other obligations, particularly to those with good credit
  - Denmark and Switzerland have had this problem
- Special-purpose cash warehousing banks could emerge
  - large cash holdings sitting in guarded vaults
  - Fee for service
  - Could reduce NIRP efficacy
- Certified checks are cash-like asset issued by banks but not paying negative interest
  - An obligation of the bank, not the depositor and large denomination

# It could happen in the United States

# The possibility of NIRP in the US

- Rates are positive in the US and projected to rise over the next year
- Yellen and Bernanke both considered NIRP and refused to rule it out if needed
  - Both highlighted that QE and traditional monetary policy were enough thus far in US
- But what about the next recession?
  - Fed funds rate was cut an average of 5.5 percentage points in last 5 recessions
  - Long run fed funds rate forecast is 3.0 percent so NIRP could be used in next recession

# Conclusion

- Financial market threats and other logistical issues of a negative interest rate policy can be managed or overcome
- These threats are likely small as long as rates remain only modestly negative
- If rates remain negative for long periods or they become more sharply negative, the rewards of avoiding negative rates increases
- There is then a greater potential for serious risks to emerge from this avoidance in market disruption and reduced efficacy of monetary policy
- Proposals exist to mitigate even the risk of sharply negative policy rates, but they depend on restricting the use of cash, an untested and potentially deeply unpopular change in policy.