My presentation is based on:

Liquidity Traps and Jobless Recoveries

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Recent Examples of the Joint Occurrence of a Jobless Growth Recovery and a Liquidity Trap.

1. United States: 2008-

2. Japan: 1991-2000

3. Euro Area: 2008-



Vertical lines: NBER recession dates, 2007Q4 and 2009Q2

Jobless Growth Recovery with Liquidity Trap Japan, 1989-2001



Vertical lines: Cabinet Office Recession dates, 1991Q1, 1993Q4, 1997Q2, 1999Q1.

Jobless Growth Recovery with Liquidity Trap Euro Area, 2005-2015



Vertical lines: CEPR business cycle dates, 2008Q1, 2009Q2, 2011Q3

Three Key Elements of a Model of the Joint Occurrence of a Liquidity Trap and a Jobless Growth Recovery

1. Downward Nominal Wage Rigidity.

2. A Taylor Rule.

3. A Downward Revision in Inflation Expectations.

Downward Nominal Wage Rigidity.

 $W_t \geq \gamma(u_t) W_{t-1,}$

where

- W_t denotes the nominal wage rate.
- u_t denotes the unemployment rate .

Assumption: $\gamma'(u) < 0$. Wages become more downwardly flexible as unemployment increases.

The Labor Market

Labor Demand: $\frac{W_t}{P_t} = X_t F'(h_t)$ Inelastic Labor Supply: $h_t \leq \overline{h}$ Downward Wage Rigidity: $W_t \geq \gamma(u_t) W_{t-1} \Rightarrow \frac{W_t}{P_t} \geq \frac{\gamma(\overline{h} - h_t) W_{t-1}}{\pi_t P_{t-1}}$



 $\begin{array}{ll} \frac{\gamma(\bar{h}-h_t)}{P_{t-1}} & \text{If } \pi_t = \pi^*, \text{ then the equilibrium is at} \\ \text{point } A. \to \textbf{full employment} \end{array}$

If $\pi_t = \pi_L < \pi^*$, then the equilibrium is at point *B*. \rightarrow **involuntary unemployment**

Two Steady States: The Liquidity Trap (π_L) and the Intended One (π^*)

The Taylor Rule: $R_t = \max\{1, R^* + \alpha_\pi (\pi_t - \pi^*)\}$ The Euler Equation: $U'(C_t) = \beta R_t E_t \frac{U'(C_{t+1})}{\pi_{t+1}}$

In the steady state they become, respectively,

$$R = \max\{1, R^* + \alpha_\pi (\pi - \pi^*)\}$$
 and $R = \beta^{-1}\pi$



Solid Line: $R = \max \{1, R^* + \alpha_\pi (\pi - \pi^*)\}$ Broken Line: Euler equation $R = \beta^{-1}\pi$

Conventional View of Liquidity Trap:

Inflationary expectations are well anchored (i.e., inflation is expected to return to target, π^*) and liquidity trap is the consequence of negative shocks to the <u>natural rate of interest</u>.

Exercise: Assume that the <u>natural rate</u> falls from its steadystate value of 4 percent per year to -2 percent per year for 10 quarters and then returns to 4 percent forever.

Result: Recovery is job creating, inflation is monotonically increasing during the recovery, and output growth is above average during the recovery. All three predictions are <u>counterfactual</u>.



Response to a Persistent Decline In The Natural Rate

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Conventional view requires that economy is continuously surprised by yet another negative natural rate shock:



Figure 10: DSGE model forecasts of the natural rate of interest

Source: Laubach and Williams, 2015; in turn taken from Curdia, 2015.

Alternative View: A Downward Revision in Inflation Expectations.

Agents stop believing that the central bank will be able to bring the economy back to π^* . Instead agents believe that inflation will settle at $\pi_L < \pi^*$.

"Mr. Draghi and his peers are afraid that consumers and investors will increasingly see low inflation as the new normal, creating a self-fulfilling prophecy." NYT, page B7, November 22, 2014.

Exercise: Assume that in period 0 agents start believing that in the long run inflation is below target.

Result: Recovery is job less, inflation is monotonically declining during the recovery, and output growth is below average during the recovery. All three predictions are <u>consistent</u> with the data.



Effects of A Downward Revision in Inflationary Expectations

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Evidence on Downward Revision of Long-Run Inflation Expectations in the U.S.



Source: FRB Minneapolis, https://www.minneapolisfed.org/banking/mpd#



Conclusion

- Japan in the 1990s, and the U.S. and the Eurozone post 2008 experienced a liquidity trap with a jobless growth recovery.
- When the liquidity trap as a consequence of negative shocks to the natural rate, then recovery is job creating, which is counterfactual.
- If liquidity trap is the consequence of a shock to inflation expectations, then recovery is jobless.
- In an economy that suffers a confidence shocks to inflation expectations, an increase in nominal rates can contribute to re-anchoring expectations around the intended target and lifting the economy out of a slump.