

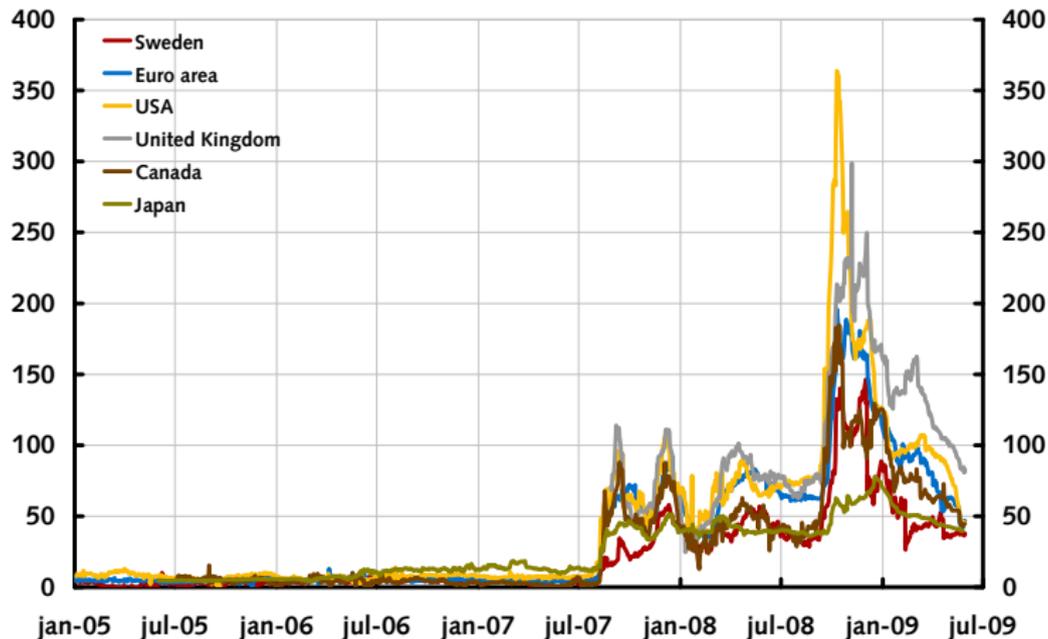
Monetary Policy and Financial Markets at the Effective Lower Bound

Lars E.O. Svensson,
Sveriges Riksbank

Federal Reserve Board, June 2009

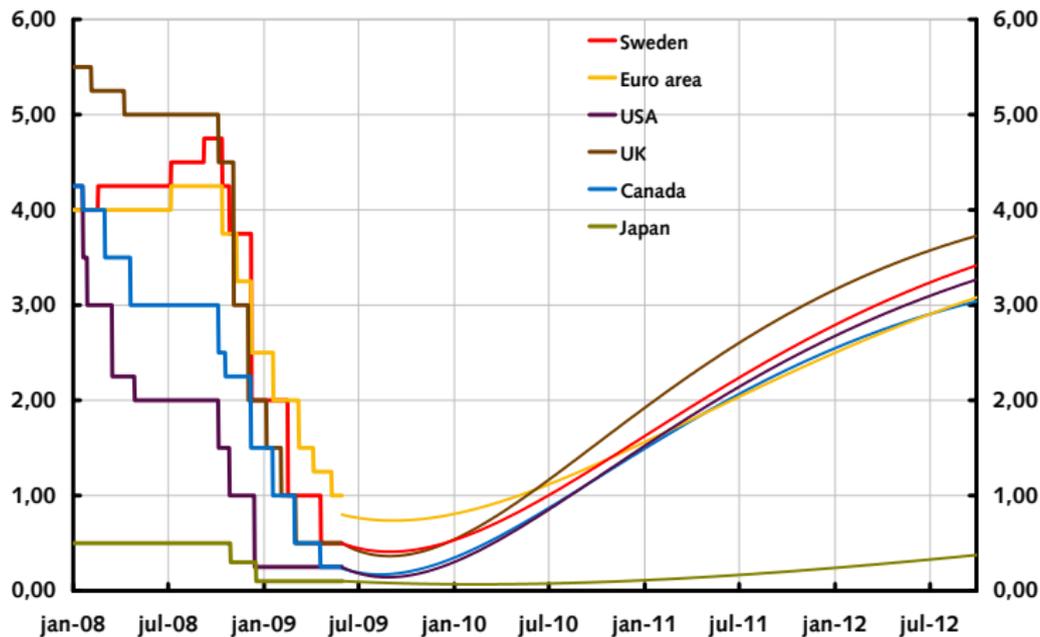
Financial crisis: Spreads are coming down

Spreads of interbank and OIS rates, 3 month



Monetary Policy: Policy rates brought down

Policy rates and estimated market expectations



How low is the effective lower bound for policy rates?

Arguments for $ELB \gg 0$ (BoE February 2009)

- Limited pass-through on other rates
 - But then lower policy rate more!
- Some adverse effects
 - On some financial markets
 - On banks' interest-rate margins

How low is the effective lower bound for policy rates?

- At Riksbank's last policy meeting majority wanted to stop at 50 b.p. (this time) but extend low rate thru 2010:4
- I dissented and wanted to go to 25 b.p. (this time) and extend low rate thru 2011:2:
(Attributed minutes available at www.riksbank.se!)
- Any adverse effects minor compared to stimulative effects on the real economy of a further reduction
- Median expectation among market participants 25 b.p., without any warnings
- Not convinced that internal discussion and analysis justified a 50 b.p. ELB
- Other CBs have gone to 25 b.p. and below (Japan, US, Switzerland, Canada); any regrets?

How low is the effective lower bound for policy rates?

- Beware of the zero mystique!
- Nominal interest rates just a convention for intertemporal relative prices
- 12-month Treasury bill, nominal value 100 mn: What is the big difference between a current price of 99, 100 or 101 mn in the market's ability to trade the security?
- Also, recall that it is real interest rates that matter, not nominal ones: Sometimes negative!
- Now, imagine a cashless economy (no paper notes – only accounts)
 - Whole interest-rate structure can shift up or down
 - Nothing special with zero: Interest rates can be positive, zero or negative (“fees”)

How low is the effective lower bound for policy rates?

- Now, consider cash (currency): Pays a zero interest rate
- Depositors and investors may prefer to hold cash than pay negative interest rates
- But holding cash in large amounts implies costs: Storage, crime prevention, payment inconveniences
- Including those costs, cash effectively pay negative interest rates
- The crucial question is: At what (negative) alternative interest rates would depositors and investors start to hold sizeable amounts of cash?
- This would quickly show up on liability side of CBs' balance sheets: "Currency in circulation"

How low is the effective lower bound for policy rates?

- How shall we find out where the ELB is?
- Just bring the policy rate down and watch cash holdings, outstanding currency?
- Reverse if necessary?

Simple New Keynesian model: Output gap

$$\begin{aligned}x_t &= x_{t+1|t} - \sigma(i_t + \delta_t - \pi_{t+1|t} - \bar{r}_t) \\ &= \underbrace{x_{t+T|t}}_{\approx 0} - \sigma \sum_{\tau=0}^{T-1} i_{t+\tau|t} - \sigma \sum_{\tau=0}^{T-1} \delta_{t+\tau|t} + \sigma (p_{t+T|t} - p_t) + \sigma \sum_{\tau=0}^{T-1} \bar{r}_{t+\tau|t}\end{aligned}$$

x_t output gap, i_t policy rate, δ_t spread market-policy rate,
 $\pi_t \equiv p_t - p_{t-1}$ inflation, p_t price level, \bar{r}_t neutral market real rate

Monetary policy at a binding ELB

$$x_t \approx -\sigma \sum_{\tau=0}^{T-1} i_{t+\tau|t} - \sigma \sum_{\tau=0}^{T-1} \delta_{t+\tau|t} + \sigma (p_{t+T|t} - p_t) + \sigma \sum_{\tau=0}^{T-1} \bar{r}_{t+\tau|t}$$

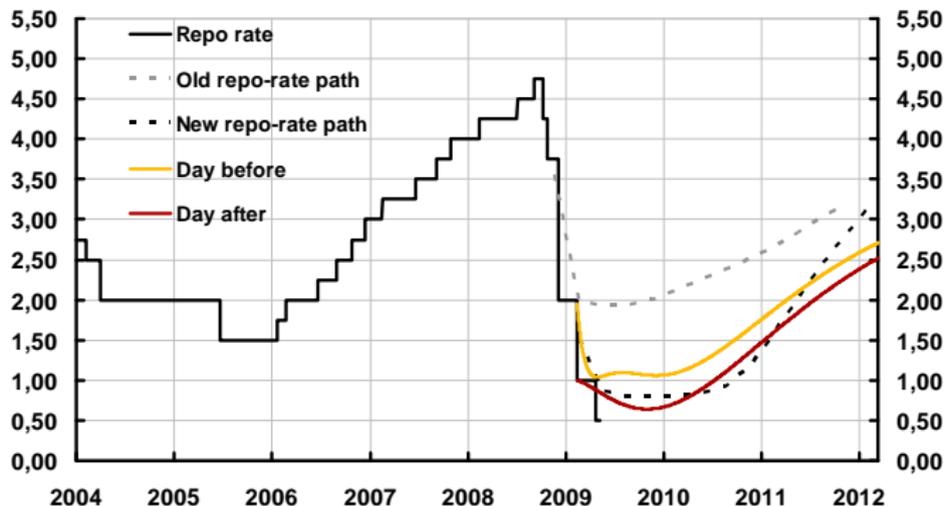
- Recession, $x_t < 0$. Binding ELB, $i_t = \bar{i} \leq 0$.
 - How to stimulate the economy?
- 1 Announce low policy-rate path further into the future,
 $\sum_{\tau=0}^{T-1} i_{t+\tau|t} \downarrow$
 - 2 Keep spreads down, $\sum_{\tau=0}^{T-1} \delta_{t+\tau|t} \downarrow$
 - 3 Keep inflation expectations up, $p_{t+T,t} \uparrow$
 - 4 Keep neutral rate up, $\sum_{\tau=0}^{T-1} \bar{r}_{t+\tau|t} \uparrow$

1. Low policy rate further into the future

- Fed, Sweden, Canada
- Repo-rate path good thing
- Credibility?

1. Low policy rate further into the future

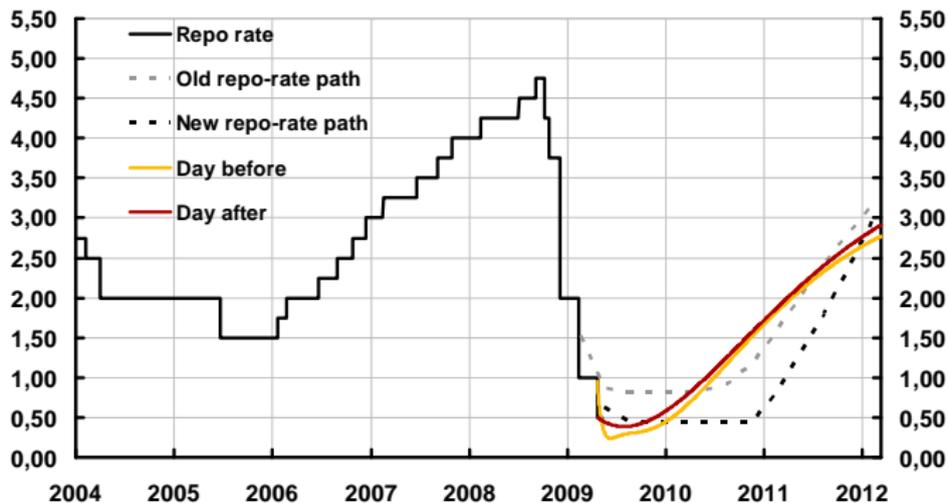
Repo rate and market expectations, February 11, 2009



- Good credibility

1. Low policy rate further into the future

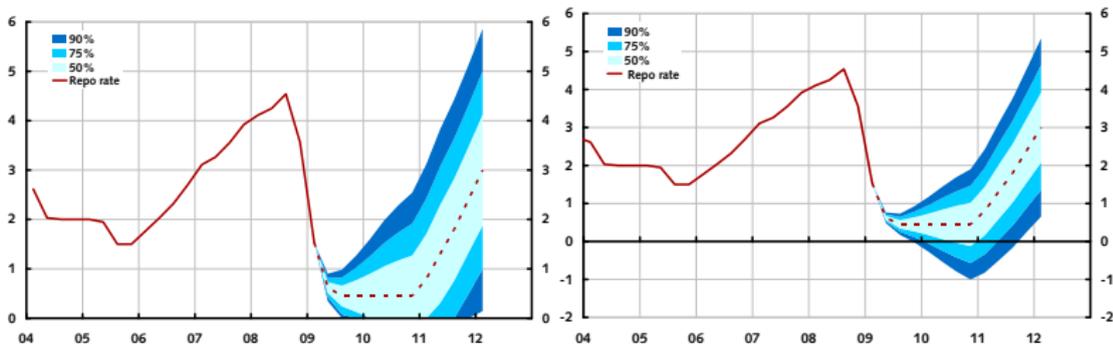
Repo rate and market expectations, April 21, 2009



- Bad credibility
- Effective monetary policy more contractionary than published and intended policy

1. Low policy rate further into the future

- Why bad credibility this time?
- Inconsistent communication?
- “Policy rate at possible minimum”
- “Policy rate may be increased sooner”
- Probability distribution must be consistent with mean path



Published graph w/
inconsistent distribution

Graph w/ consistent
distribution

- Better with ambiguity about the ELB?

1. Low policy rate further into the future

- Fed, Sweden, Canada
- Published repo-rate path good thing
- Credibility?

- How to make a low policy-rate path credible?
- Buy government bonds?
- Better? Lend at policy rate (fixed) at longer maturity

2. Keep spreads down

- Spreads depend on credit risk, liquidity, policy-rate uncertainty...
- Credit easing
- Improve the working of financial markets
- Financial-stability policy
- Also, reduce policy-rate uncertainty

3. Keep inflation expectations up

- Promise high inflation in the future (low policy rate in the future)
- Credible? (Krugman 98)
- Credible positive inflation target good
- But what if we need inflation above target?
- Price-level target (average-inflation target)
- Quantitative easing, expand monetary base/money supply?
(Works only if believed to be permanent, otherwise probably pretty useless?)

4. Keep the neutral real rate up

- Fiscal policy
- Simple NK model with public consumption: Neutral rate

$$\bar{r}_t = \rho_t + \frac{1}{\sigma C/Y} E_t \Delta \bar{y}_{t+1} - \frac{1 - C/Y}{\sigma C/Y} E_t \Delta g_{t+1}$$

\bar{r}_t real neutral rate, ρ_t rate of time preference, \bar{y}_t potential output, g_t government consumption

$$\sum_{\tau=0}^{T-1} \bar{r}_{t+\tau|t} = \sum_{\tau=0}^{T-1} \rho_{t+\tau|t} + \frac{1}{\sigma\alpha} (\bar{y}_{t+T|t} - \bar{y}_t) - \frac{1-\alpha}{\sigma\alpha} (g_{t+T|t} - g_t)$$

- Expansionary fiscal policy: $g_t \uparrow$, $g_{t+T|t} \downarrow$, $(g_t - g_{t+T|t}) \uparrow$,
increases the neutral rate, $\sum_{\tau=0}^{T-1} \bar{r}_{t+\tau|t} \uparrow$
- Neutral rate may also depend on financial frictions (Cúrdia and Woodford 09)

- The ELB: The (negative) policy rate at which depositors and investors start to hold large amounts of cash
- Monetary policy at the ELB: Extend low policy rate longer, keep spreads down, keep inflation expectations up, keep the neutral rate up with expansionary fiscal policy
- How to make a low policy rate credible?
- How to make expansionary future monetary policy credible? (Low future policy rate, high future inflation, low future real interest rate, weak currency)
- In a small open economy, a crucial role for the exchange rate at the ELB, but I haven't gotten into that here (for instance, why a weak currency is not beggar-thy-neighbor policy, and why small countries can all depreciate their currencies against the rest of the world)