

Cash and Negative Interest Rates

Jens Ulbrich, Deutsche Bundesbank

Bank of Finland Conference on Going Cashless, 14 June 2016, Helsinki, Finland

Is cash putting a brake on monetary policy?

Abolishing paper currency

Arguments in **favour** of abolishing paper currency

- Electronic deposits cannot be converted into zero-interest paper currency anymore; i.e. hoarding of paper money is not possible. ZLB in monetary policy would disappear. Discussion about raising inflation targets would be superfluous
- May help to dampen tax-evading activity

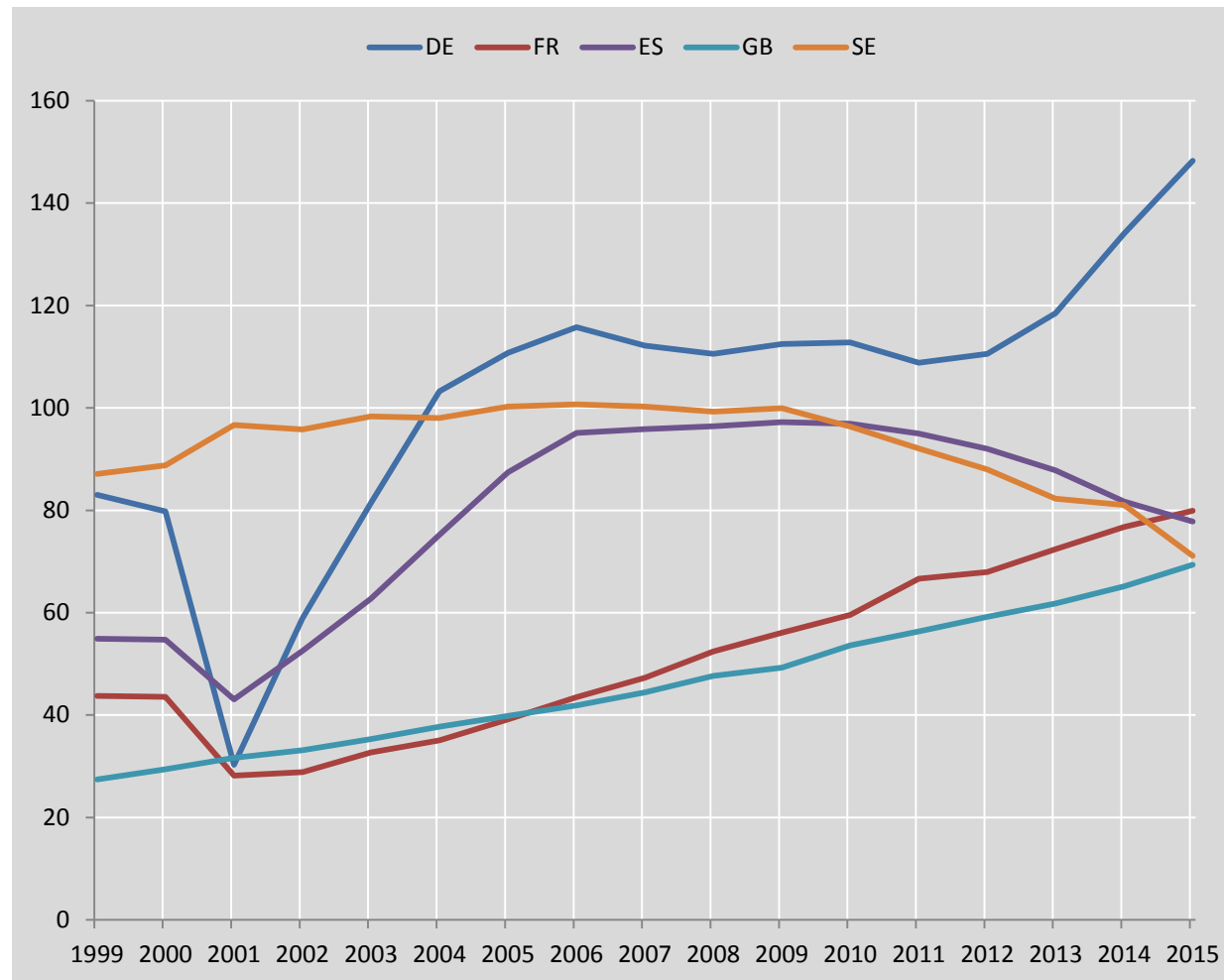
Arguments **against** abolishing paper currency

- civil liberty right, confidence in established monetary system, hurting elderly and less-educated citizens.

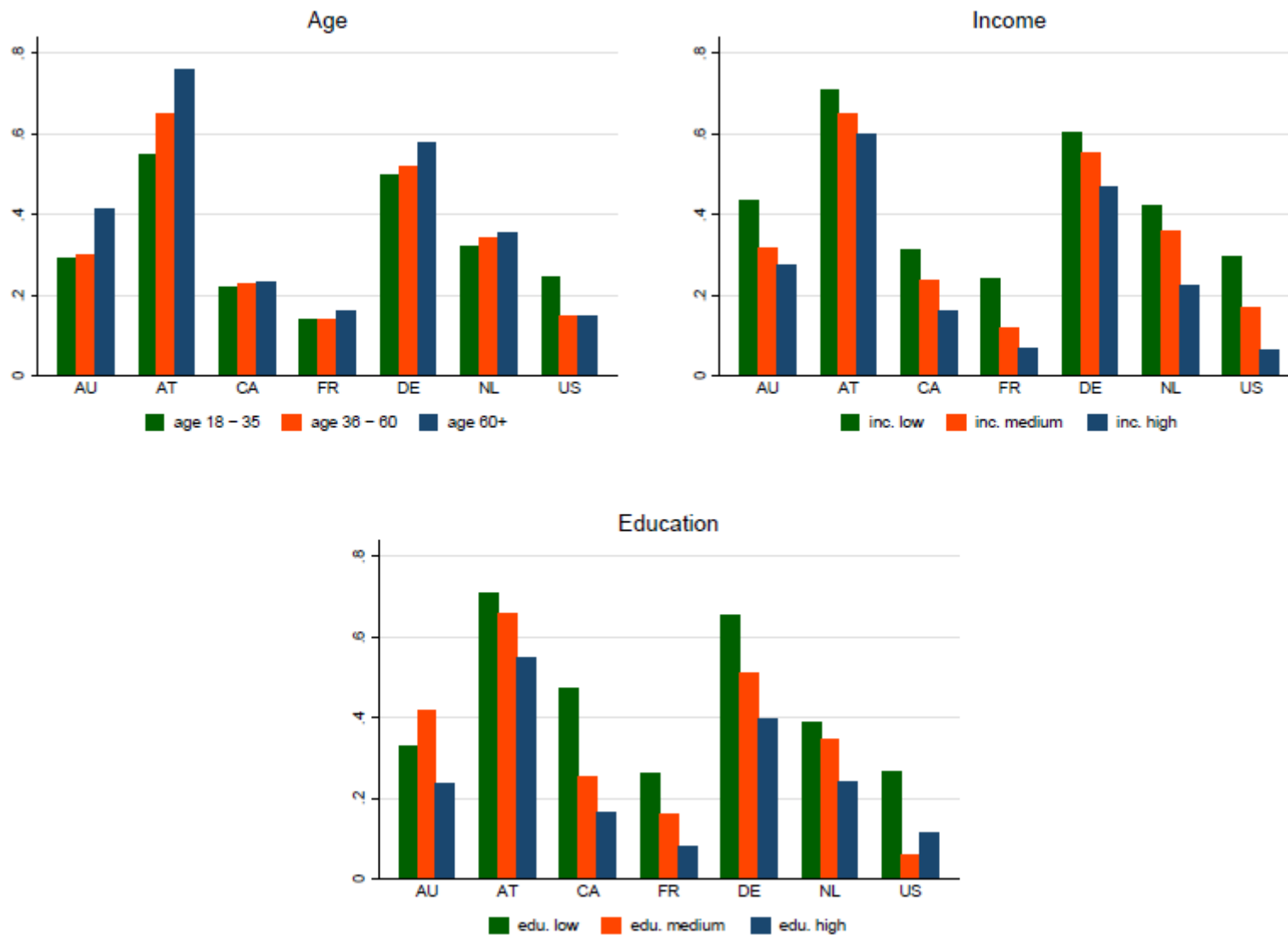
The defense of cash is strengthened if monetary policy would not be powerless at the ZLB.

Currency holdings of the non-financial private sector

Outstanding amounts, €billion



Value share of cash: Socio-demographic characteristics across selected countries



Is cash putting a brake on monetary policy?

Some say yes and have formulated proposals to **overcome the ZLB**

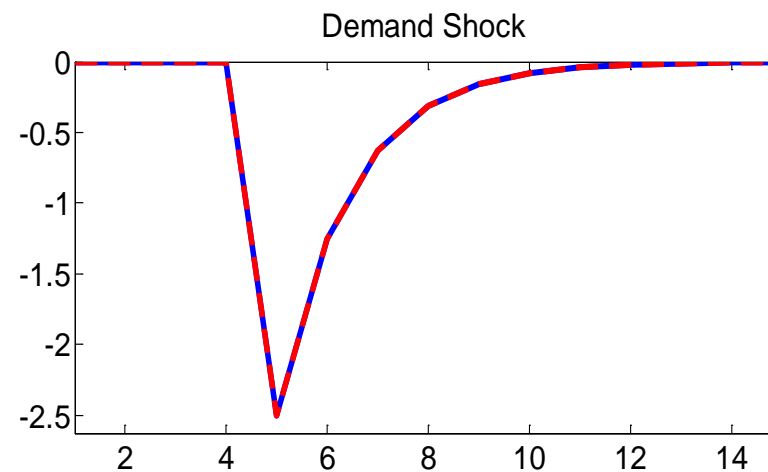
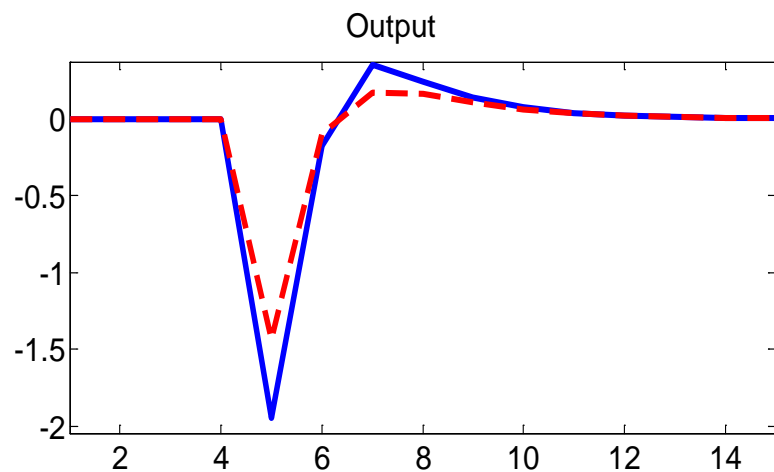
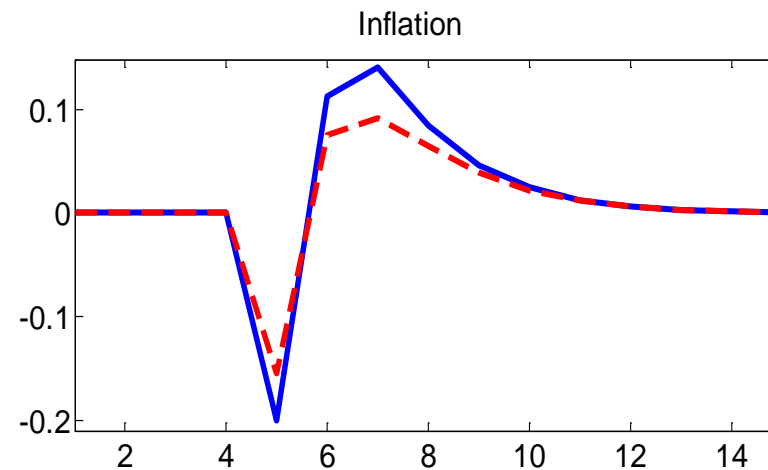
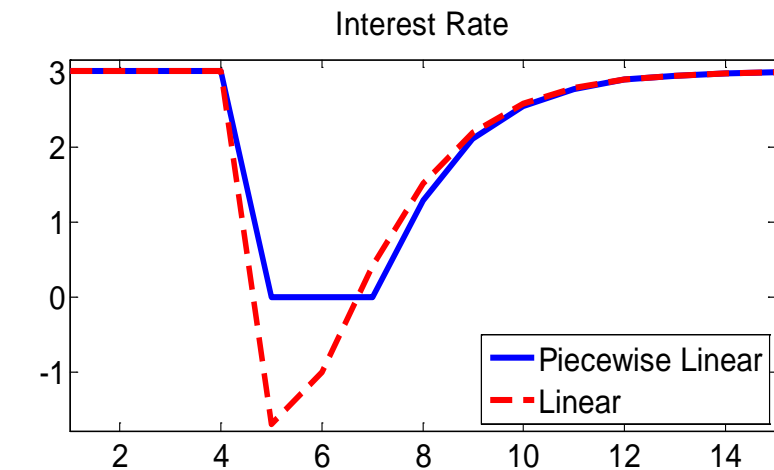
- Carry tax on money (*à la Gesell and later Goodfriend, 2000*)
- Set exchange rate between ‘electronic money’ (as new unit of account!) and paper currency (*à la Kimball*)
- Abolish paper currency (*à la Rogoff, 2014*)

These measures might be too drastic to be **democratically enforceable** today.
Might this change in the future?

However, some central banks have **already entered negative territory (NIRP)**

- Cash is obviously not restricting monetary policy to enforce negative rates
- NIRP has helped – in tandem with QE – to flatten the term structure ...

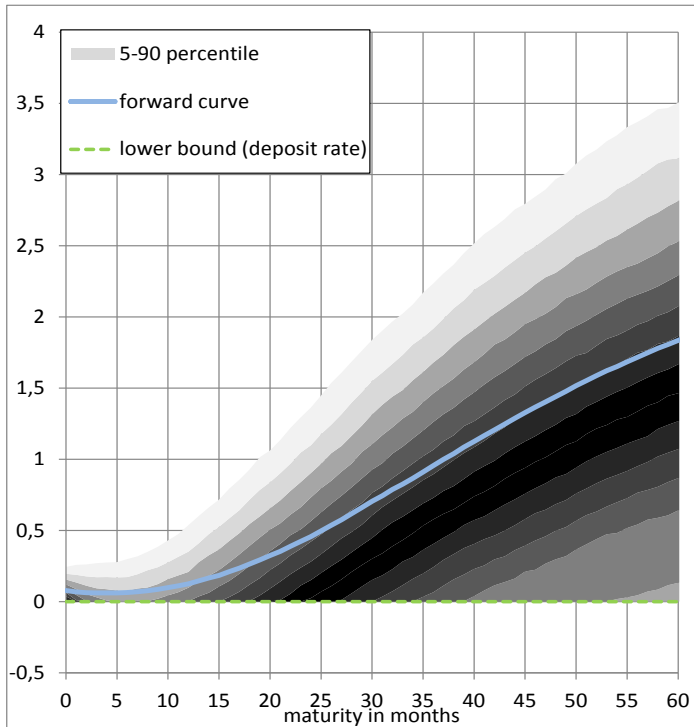
Can monetary policy fulfill its mandate at the effective lower bound? An illustration



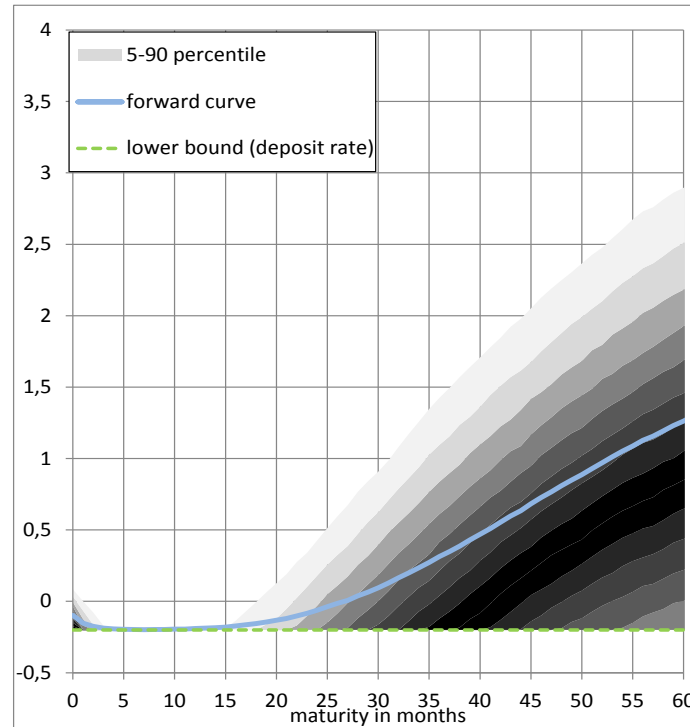
Negative rates and its effect on the yield curve

Conditional distributions of 1-month OIS rate

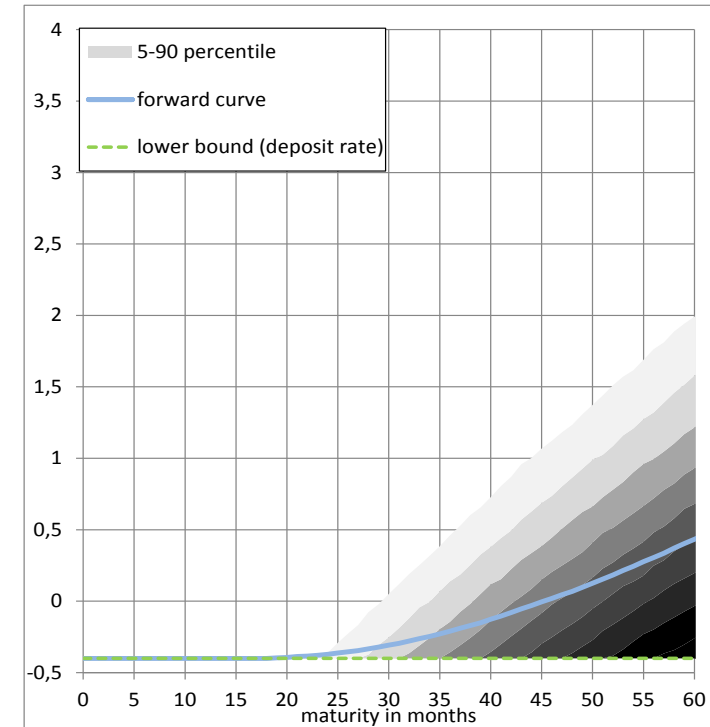
July 2012, in %



September 2014, in %



April 2016, in %



Source: Bbk calculations, based on a lower bound term structure model (Geiger/Schupp, 2016, mimeo).

Lower bound: 0 bps

Lower bound: -20 bps

Lower bound: -40 bps

Where is the lower bound?

Without abolishing cash or other 'drastic' measures

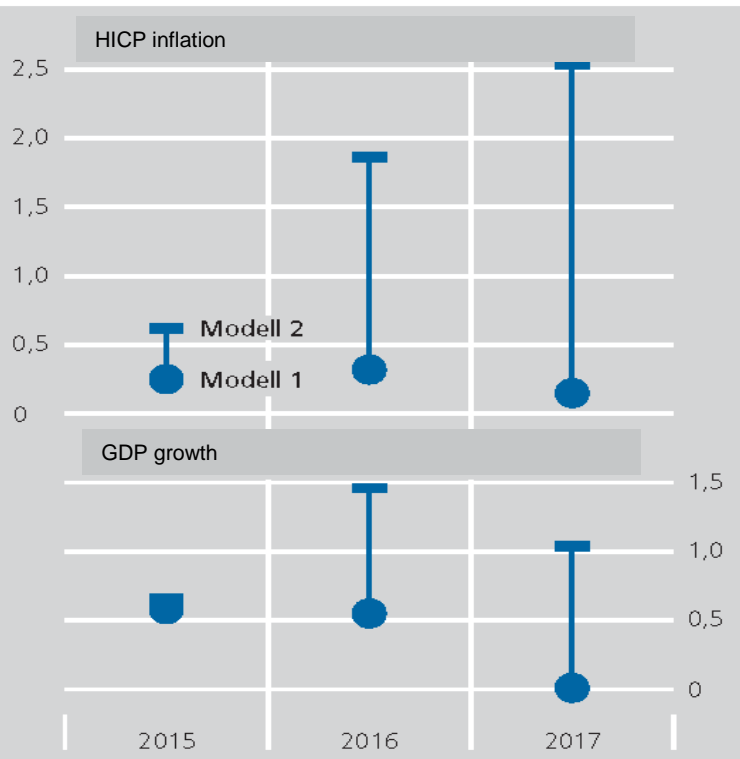
The possibility of large scale shifts into cash will almost surely set a lower bound

- So far there is no clear evidence – too early to give a sharp number
- Estimates of storage costs of massive amounts of cash suggest room for negative rates of up to -50 bps
- But Switzerland is with -75 bps already lower (*J.-P. Danthine, 2016, presentation at Brookings Conference, hints, however, that this might be the lower limit in the Swiss case*)
- Can we expect cross-country differences?

Is this low enough to give necessary monetary stimulus given other measures like forward guidance and quantitative easing? Some observers remain skeptical ...

Effectiveness of QE and NIRP

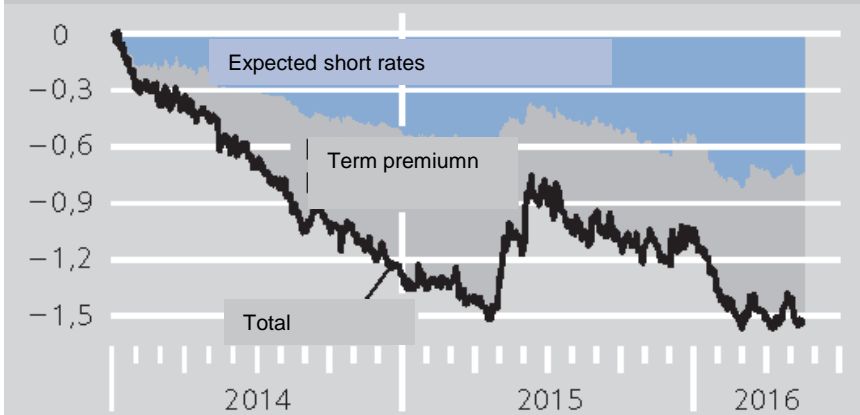
Economic effects of APP



Quelle: Eigene Berechnungen. Modell 1 bezieht sich auf M. Kühl, The Effects of Government Bond Purchases on Leverage Constraints of Banks and Non-Financial Firms, Deutsche Bundesbank Discussion Paper, im Erscheinen. Ergebnisse für Modell 2 beruhen auf R. Gerke, S. Giesen und D. Kienzler (2015), On the Effects of the APP in a Model with Segmented Markets, Mimeo.

Deutsche Bundesbank

Cumulative changes of 10y yield in euro area and decomposition into expected future rates and term premium



Quelle: Bloomberg und eigene Berechnungen basierend auf dem Schätzansatz von Joslin, Singleton und Zhu (2011). Das Modell wurde auf Monatsbasis geschätzt und in einem nächsten Schritt an Tagesdaten der Overnight-Index-Swap (OIS)-Kurve angepasst.

Deutsche Bundesbank

Risks for macroeconomic and financial stability

Stimulus and reflation are the main goals in the EMU, but if reflation is further on hold some risks may materialize ...

- Long periods of low rates may lay the seed for **asset price bubbles**
- Declining **interest rate margins** of banks and further disintermediation. **What are the effects of negative interest rates, QE, ... on banks' profitability?**
- Some **governments** do not use the time of low interest rates to implement economics reforms and to reduce public debt levels

Of course, the faster inflation returns the less we need to worry about these risks

What do we know about the trade-off between “short-term stabilization” issues and “long-term” risks?

APPENDIX

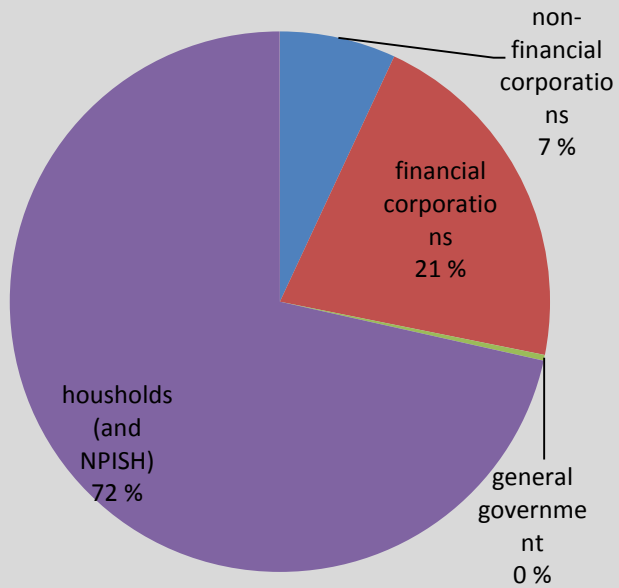
Going cashless?

Cash in hands of non-financial private sector in Germany

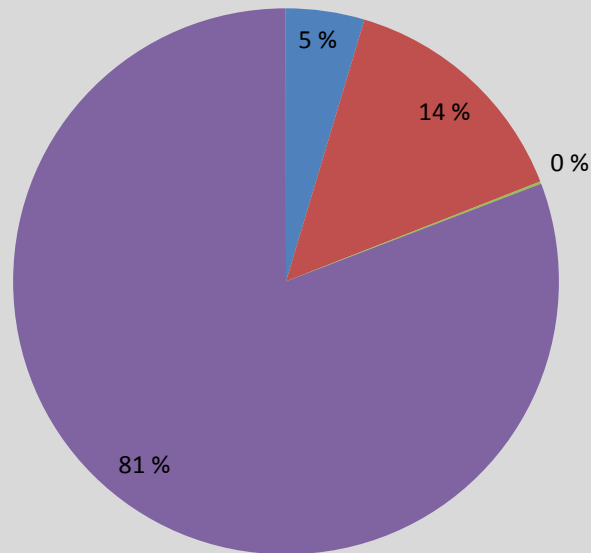


Sectoral distribution of cash in Germany

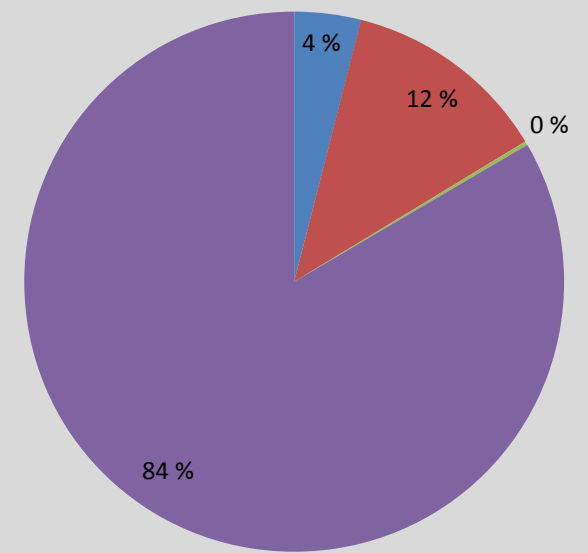
1999 (total: €99.1 billion)



2007 (total: €131.3 billion)



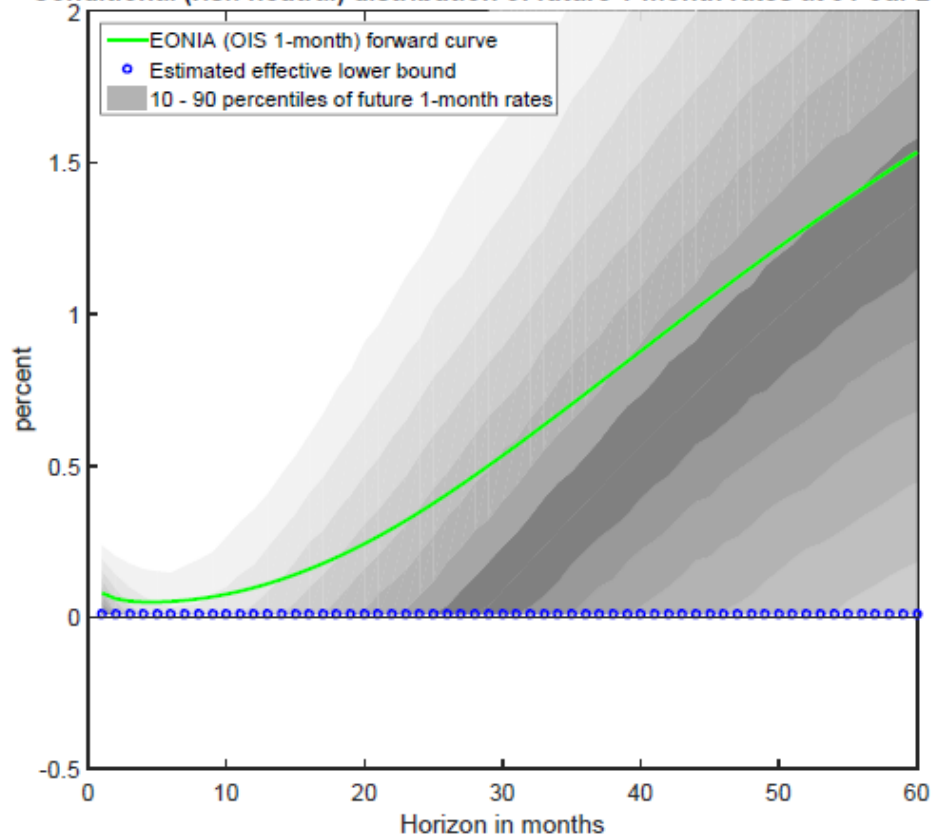
2015 (total: €169.6 billion)



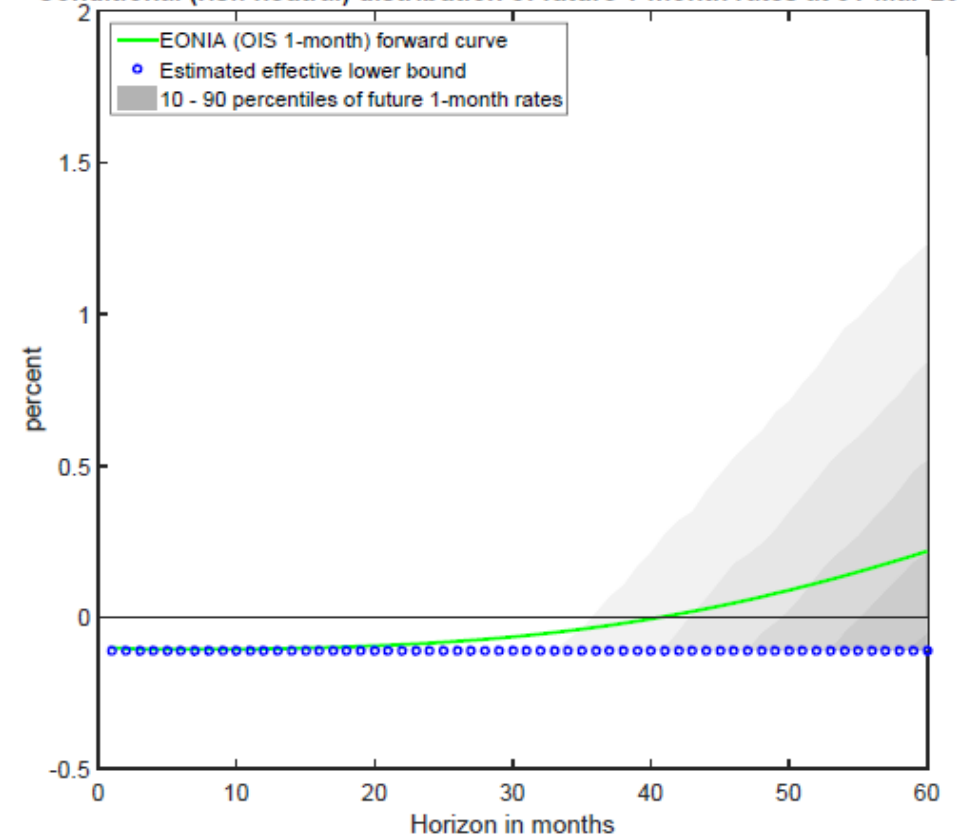
Short-term interest rate expectations when the effective lower bound is zero (percent p.a.)

Short-term interest rate expectations under negative rates and APP (percent p.a.)

Conditional (risk-neutral) distribution of future 1-month rates at 31-Jul-2012



Conditional (risk-neutral) distribution of future 1-month rates at 31-Mar-2015



Source: ECB calculations, based on Lemke/Vladu (2016).

Notes: The chart presents the sequence of risk-neutral predictive distributions of the one-month OIS rate, conditional on term structure information on the indicated date, together with the model-implied one-month forward curve. The results are from a 3-factor arbitrage-free shadow rate term structure model for the euro area EONIA swap curve. The model allows for a shift in the lower bound. Note that for short-term horizons, the model can imply that the risk-neutral probability of the short rate sticking to the lower bound is close to one, so that only high percentiles (or none at all) of the predictive distribution are visible.

Source: ECB calculations, based on Lemke/Vladu (2016).

Notes: The chart presents the sequence of risk-neutral predictive distributions of the one-month OIS rate, conditional on term structure information on the indicated date, together with the model-implied one-month forward curve. The results are from a 3-factor arbitrage-free shadow rate term structure model for the euro area EONIA swap curve. The model allows for a shift in the lower bound. Note that for short-term horizons, the model can imply that the risk-neutral probability of the short rate sticking to the lower bound is close to one, so that only high percentiles (or none at all) of the predictive distribution are visible.

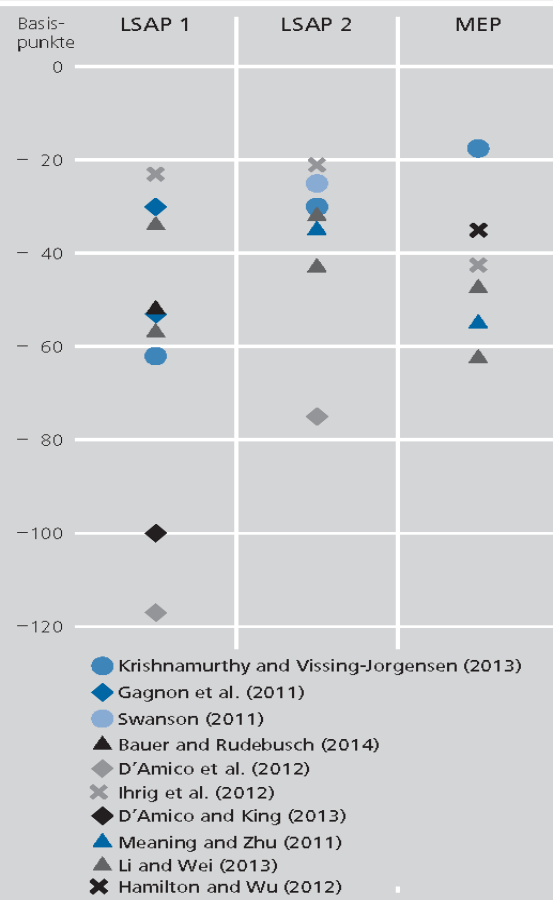
Where is the lower bound?

Without abolishing cash or other 'drastic' measures

The effectiveness of QE

Effekte der Quantitativen Lockerungsprogramme (LSAP 1, LSAP 2 und MEP) auf die Rendite 10-jähriger US-Staatsanleihen

Skalierung: Ankaufvolumen von 1 Billion US-Dollar



Deutsche Bundesbank