ACTUARIAL ASSOCIATION OF EUROPE

interest rate dynamics - Studying interest rates and the causes behind the changes in these

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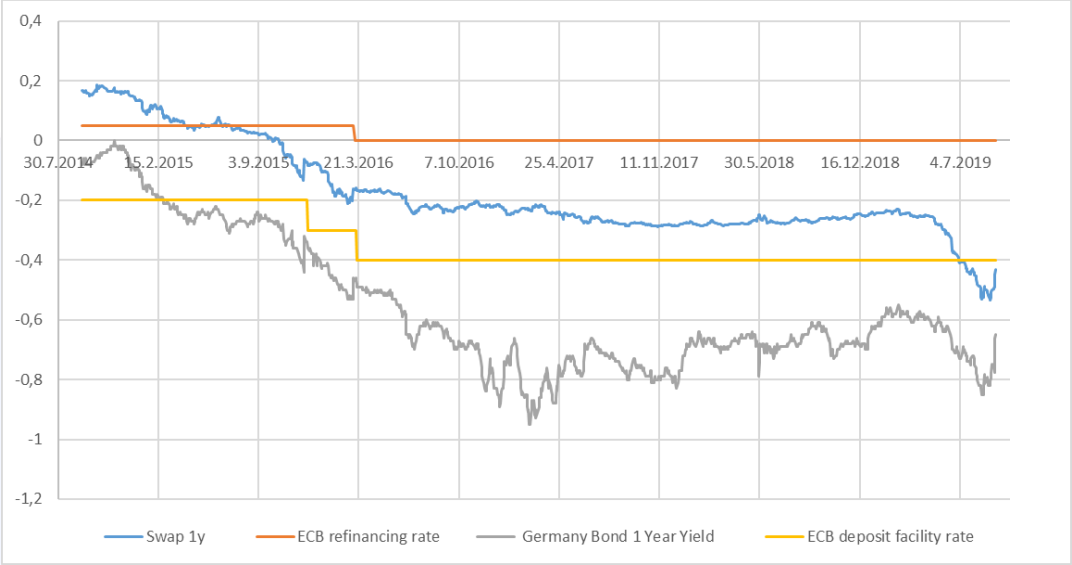
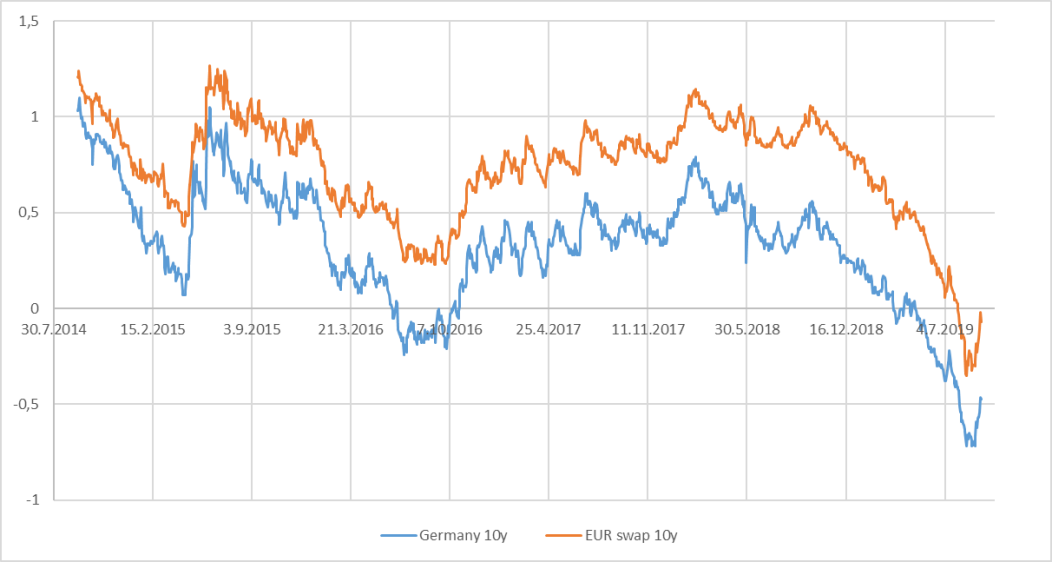
Background

- The AAE has been an **active stakeholder on building the understanding on Solvency II discount rate related matters** on several topics including valuation, Discount curve methodology, additional components as VA and CRA and on the interest rate risk.
- The most important single element behind the changes in the SII discount rate is **the Euro-swap curve**
- The idea is to study **what are the main triggers behind the euro-swap movements** and by this to build the better understanding on the risk profile
- Under investigation are **the dynamics** between the central bank key rates, government bond yields and swap curves
- By this **AAE hopes to bring wider understanding** and tools to the planning how discount rates and the risks they face could be better dealt with, as part of the Solvency II review process but also to help actuaries as they help insurers to review the existing business models in a low interest rate environment
- A paper about this is on progress and there's already interest from both EC and EIOPA to take a look on the findings

The ultra low interest rate environment

- What is causing the rates go this low?
- Can the different risk components be somehow separated to understand the issue better?
- How low the rates could go?





- German bond yield have been a soft limit for the Euro-swap's
- Expectation on ECB actions seems to trigger for changes in the yield curve

ECB actions

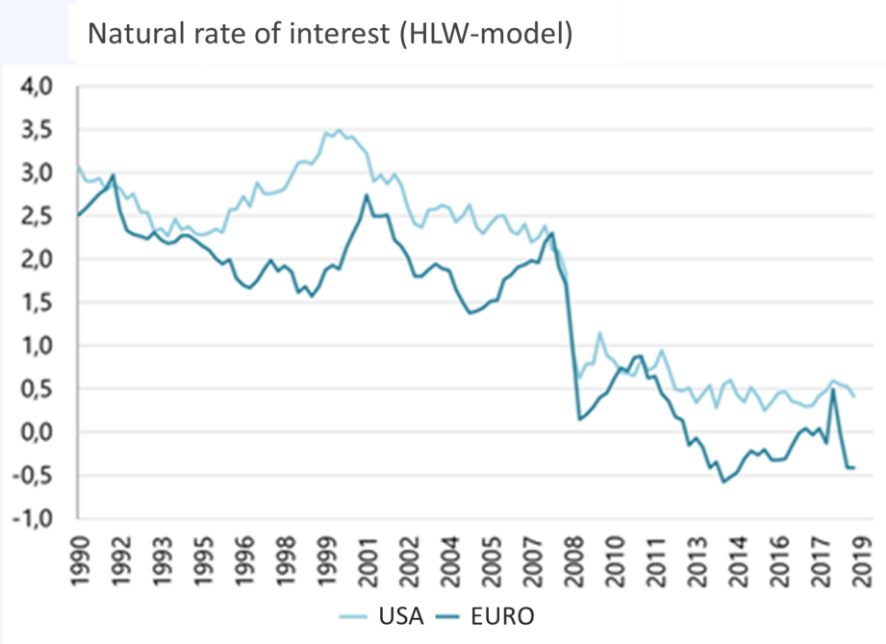
- **How much more** the ECB might be able to lower the ECB key rate? Some estimations being **-50 bps** from the current -0,4% and others **-75 bps**.
  - It seems that the September -10bps **lowering of the deposit facility** has already quite unanimous decision.
  - Also both **banks and insurers have been vocal** on the problems the ultra low yields brings for them

What could drive for negative yields?

- **‘Re-allocating into cash’** scenario has a wide range of estimations from -0,7% (the IMF study) as far as -2%. Anyway central banks do have ways to intervene if institutional investors are reaching for this possibility, like what we have already seen in Switzerland.
- If there was only just **digital currencies** the lower limit could be much lower? This might not be a near future scenario taking into account the process needed and the current political atmosphere about this issue for instance in Germany and Austria.
- Through a global currency and bond yield study to find **the arbitrage possibilities** of the different interest rates and currency exchange rates and derivatives on these. If one currency interest rates would be for instance very much negative this could start investors turning their assets into other currencies and possible hedging the currency risk.
- **Alternative investments**, when considered highly liquid, can bring alternative ways to invest and reduce the appetite to investing into negative yielding bonds, take gold as one example.

How to study this - natural rate of interest

- **HLW – model** (Holston-Laubach-Williams, 2017) brings one way to look this
- The idea is to find **the neutral real short-term rate** that makes the economy's output equal to natural output while keeping inflation constant→ By adding an inflation estimate to the neutral rate, we observe a proxy for the neutral nominal rate. Finding this **helps to understand the way monetary policy affects the interest rates** but also what might be the lower bound of the interest rate and how much lower can the central banks might still be able to go.
- The significant drop in the neutral rate of interest is explained by **higher demand for liquidity and risk free assets, lower economic productivity and by demographic changes and expectations**.
- The US neutral interest rate 2,4% (0,4% natural interest rate plus 2% inflation, 2018 YE) was quite near the FED key interest rate 2,25% → might indicate that the **monetary policy in US seems to far less supportive than in the Eurozone**

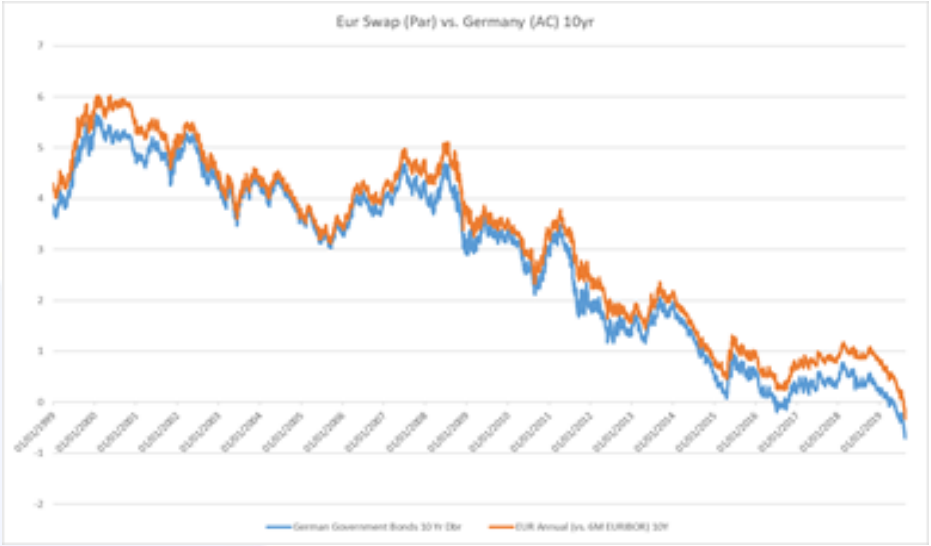


natural rate of interest

- When **comparing this to EU**, the natural rate of interest is much lower, -0,4%. Adding the EU YE2018 inflation 1,5% into this, would make a 1,1% neutral nominal interest rate, which is well above the ECB's main refinancing operations rate of zero.
- The **market interest rates can be a lot different than the neutral interest rate** but by the economic theory this should not last indefinitely.
- It could be speculated **how far away can central banks actually still go from this rate?** The HLW, as one possible way to look this, helps to identify how supportive the current interest rates in the Eurozone are respective to the theoretical neutral interest rate.
- using the HLW or a similar model, one can estimate **the development and volatility of the natural rate of interest over time** and, consequently, compare the monetary policy and political actions against the neutral level of rate.
- With the HLW model, a special accuracy needs to be kept on the parameter estimation and model calibration, as **the error margin can get high** (https://www.frbsf.org/economic-research/files/wp2016-11.pdf).

Gov. bond rates as a lower limit for swap rates?

- Looking the history one can find that the **German bond 10Y yield has been a soft lower limit** for the euro-swap 10y rate.



- How long this lasts?
- **The swap rates have gone below the treasury yields in US.** Similar observation can also be made from Switzerland.

What are the triggers for changes in long maturity swap rates?

- The **estimated development of the money market rates**; namely (in Euro area), ECB key rate, ECB liquidity and the risk premium on banks
- **Maturity premium**, which is the compensation investors want from the inflation uncertainty and usually make the yield curve going higher in longer maturities. This is usually same in swap rates and in the AAA government rates as the components affecting the supply and demand is basically the same here.
- **Convexity bias**, the longer the maturity, the higher the delta (interest rate volatility) and that makes the long forward rates folding down.

What are the triggers for changes in long maturity swap rates?

- The **differences in Euro swap rates and Euro AA government bond rates** comes mainly from on for which purposes investors are using these assets:
  - Euro AAA government bonds are used mainly as a **highly liquid asset** and this increases the appetite for investors to buy these.
  - The government rate interest rate future market is liquid and **used a lot for risk management purposes by those institutions operating in the swap market**.
  - The **Euro swap market** is mainly used three purposes;
    - Individual citizens **mortgage payment cap/floor hedges**
    - For **institutional investors ALM purposes**
    - For **option pricing** (e.g. on futures) → This market is also substantially bigger that the option market for government bonds (like interest rate futures market).
  - This need has created a **liquid market until 20 year maturity** and then a liquid point at least for the **30 year euro swap** and, depending on the way interpreting the liquidity also few other more distant maturity points.

What can we learn about this?

- The **central bank monetary policy** tries to achieve their goals safeguarding the EU stability and actions to meet the inflation targets with the tools they have.
- Looking **government yield** where we have seen investors estimating the ECB future actions but also parking some of their asset looking for **safe harbour, liquidity or opportunities for return** if yields decrease even more.
- The swap rate movements is affected by the **derivatives market**, **household mortgage hedging** needs and by the **institutional investors needs to protect their balance sheets** from the swap rate movements.
- If there's changes to some of these components an impact for those who are the end users of the euro swap can be assumed. And what causes this can obviously be divided into **different drivers** like political, increased demand for government bonds, increased hedging needs etc.
- The interest rate down risk **should allow for a number of decreasing yield scenarios**. But the components that cause the risk needs to be thought carefully.
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What can we learn about this?

- **The way monetary policy affects the interest rates** can obviously be part of the interest rate down risk but this might challenge the ultimate purpose of the SII directive. If insurers needs to capitalize also against political risks, some of the insurers would not anymore meet the targets nor they could make investment decisions which are in line with EU's CMU plans. This might bring a difficult challenge for the policymakers.
- **The HLW-model**, could give tools to find out what would be the neutral interest rate volatility and what is the remaining volatility caused by other factors. This could then be used on measuring and calibrating part of the interest rate risk.
- It seems clear that any substantial change in the way interest rate risk will be calibrated might cause a **market impact** that needs also to be taken into account in advance. If for some reason insurers would be forced to hedge their interest rate risk with euro swaps or swaptions, this would **increase the demand for those euro swap's**, which would push the euro swap rate even more down amplifying the actual risk. And this vicious circle could even continue. If the purpose for reviewing the discount rate components or the interpretation of interest risk is ensure better stability into insurance prudential regulation then this impact can't be neglected.

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