

Optimal Tiered Reserve Remuneration

Philipp Ulbing

Vienna Graduate School of Economics

philipp.ulbing@univie.ac.at

FWF

Der Wissenschaftsfonds.

VGSE

Vienna Graduate School of Economics

Introduction/Research Question

- Introduction of negative interest rate policy (NIRP) in various countries/financial systems
 - To ensure accommodative stance of monetary policy
 - NIRP brings along detrimental side effects that are absent with rate cuts in positive territory
 - "...at some point the level of rates can become low to the extent that the detrimental effects on the banking sector outweigh the benefits of lower rates." (Benoît Coeuré, 2016)
- Implementation of tiered reserve remuneration systems
 - In the Euro Area, Switzerland, Japan...
 - With vastly different rules

Research Questions

- What is the design of an optimal tiered reserve remuneration system?
- How successful can a tiered remuneration system be in restoring the efficiency of MP under negative interest rates?
- Which factors should a tiered remuneration system target, macro variables (e.g. output gap) or financial variables (e.g. excess liquidity, equity ratios)?

Literature

Empirical:

- Ampudia and Van Heuvel (2018), Basten and Mariathasan (2018, 2020), Molyneux et al. (2019)

Theoretical:

- Brunnermeier and Koby (2019), Eggertson et al. (2019), Ulate(2021)

Distinct Features

- (1) Monopolistic competition in the banking sector (CES framework)

$$L_j = \left(\frac{1 + i_j^l}{1 + i^l} \right)^{-\epsilon^l} L, \quad \gamma_j = \left(\frac{m_j}{m} \right)^{-\epsilon^l} D_j = \left(\frac{1 + i_j^d}{1 + i^d} \right)^{-\epsilon^d} D \quad \text{if } i_j^d \geq 0; \quad 0 \quad \text{if } i_j^d < 0$$

- allows for expansionary negative interest rate policy

- (2) Deviation cost from loan-to-equity ratio

$$\Psi(L_t(j)/F_t(j); \kappa, \nu) = \kappa \nu \frac{L_t(j)}{F_t(j)} \left(\ln \left(\frac{L_t(j)}{F_t(j)} \right) - \ln \nu - 1 \right) + \kappa \nu^2$$

- (3) Non-immediate adjustment to optimal level of equity

- no negative dividend payments after shocks
- fraction ς of bank net worth is used up each period

- Frictions (2) and (3) ensure the existence of the bank net worth channel

$$\mathbb{E}_t(1 + i_{t+1}^l) = \frac{\epsilon^l}{\epsilon^l - 1} (1 + i_t + \mu_t^l) + \kappa \nu \frac{\epsilon^l}{\epsilon^l - 1} \left(\ln \left(\frac{L_t}{F_t} \right) - \ln(\nu) \right)$$

Motivation and Stylized Facts

- Setup of tiered reserve systems is very different
 - Rule in the Euro Area is of an ad-hoc fashion \Rightarrow 6 times the minimum reserve requirements (MRR)
- Impact of negative reserve remuneration has become more significant over the past few years
 - Interest payments on excess liquidity in the Euro Area rose by 257% from €5 to €18.1 billion since December 2019 (as of June 2022)
- Highly relevant for policy, illustrated by the following quote:
 - "...assess the appropriate calibration of its two-tier system for reserve remuneration so that negative interest rate policy does not limit banks' intermediation capacity..." (Press Release on Monetary Policy Decisions by the ECB, 16 December 2021)
- Several findings point to low (or even negative) interest rates becoming the norm in the future (e.g. Schmelzing, 2020)

Area	Tiers and Rem.	Add. Info
EU	Two-Tier System MRR & allow: 0% Excess Res.: -0.5%	Allowance: 6 times MRR
Switzerl.	Two-Tier System Exemption: 0% Excess Res.: -0.75%	Exemption: Moving average of MRR over last 36 reference periods times a threshold factor minus cash holdings in last RP
Japan	Three-Tier System Basic B.: 0.1% Macro-AddOn B.: 0% Policy-Rate B.: -0.1%	Basic B.: ess. fixed Macro-Add-On-B.: adjusted according to agg. changes Policy-Rate B.: applies negative rate to marginal reserves

Table 1: Tiered Reserve Remuneration Systems (State: 16.06.2022)

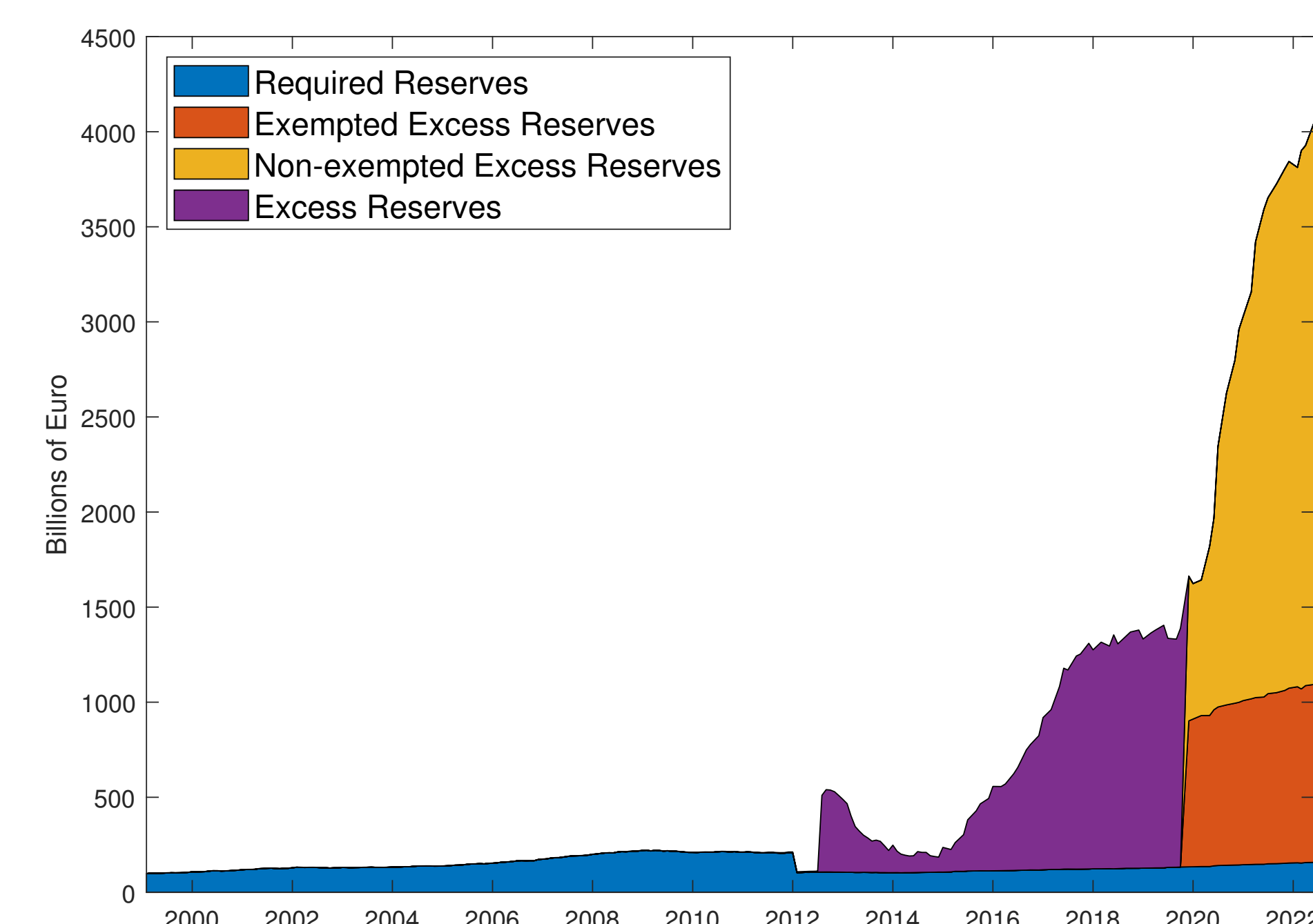


Figure 1: Reserve Dynamics in the Euro Area

Methodology

- The aim of the project is to study the effects of a tiered reserve remuneration system, which
 - prevents the erosion of bank capital/equity
 - while preserving the expansionary effect of monetary policy,
 on the efficiency of monetary policy under low/ negative interest rate policy.
- Advantage of Ulate's(2021) framework opposed to others
 - Both beneficial and detrimental effects of NIRP on the economy
 - Positive effect via bank lending channel, negative effect via the bank net worth channel
- Model structure
 - Five types of agents: households, intermediate good producers, capital producers, retailers and banks
 - Rich model is necessary to match quantitatively the behaviour of real-world economies

Hypotheses / Potential Results

- (1) If the policy rate i is above the threshold \tilde{i} , i.e., $i > \tilde{i}$,
 - changes in the policy rate translate directly into changes in the loan and deposit rate (loan and deposit spread stay constant)
 - tiered reserve system does not have any effect here
- (2) If the policy rate i is below the threshold \tilde{i} but above a lower threshold \underline{i} , i.e., $\underline{i} < i < \tilde{i}$,
 - changes in the policy rate compress the deposit spread due to the zero lower bound on deposits
 - tiered reserve system eases pressure on bank equity, thereby increasing the efficiency of monetary policy