

# Quantitative Easing and Local Banking Systems in the Euro Area

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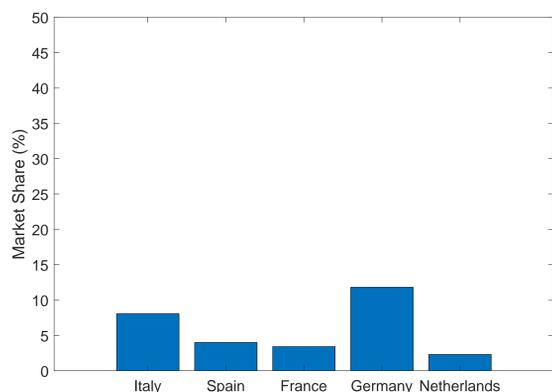
## Motivation

- **Asset purchases** become key ECB monetary policy tool in recent years
- Direct effect on balance sheet of Euro Area banking sector
  - changes composition of bank assets held (more central bank reserves)
- This paper: focus on **liquidity services** offered by banks through deposits issued
  - Existing literature: instead focuses more on bank lending activities
- **Question** What is the impact of asset purchases on the real economy through liquidity services offered by banks?
  - **segmented deposit markets**: source of heterogeneity?

## Stylized Facts: Banks

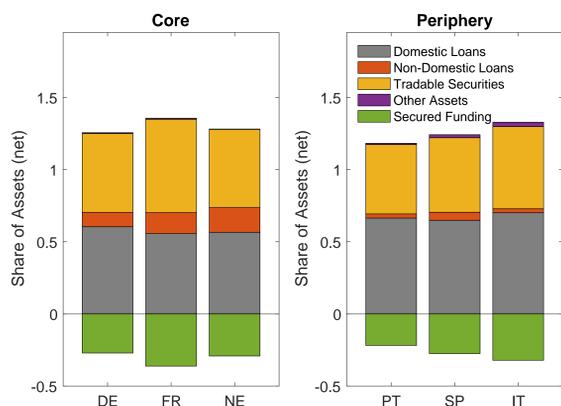
### Fact 1: Deposit markets are fragmented across countries

- Local deposit markets: foreign presence mostly **subsidiaries**, not branches
- Market share foreign-owned subsidiaries for five select countries: small



### Fact 2: Assets backing deposits are more integrated

- Banks use a wide set of assets to back the deposit liabilities issued
  - **Tradable securities**: assets readily exchangeable across Euro Area banks
  - **Secured Funding**: act to leverage up gross asset positions



→ **deposit markets fragmented, but many tradable assets held**

## Model: Household + Banks Setup

Two-region open economy New Keynesian model of Eurozone

### Households

- non-separable utility over consumption ( $C_t$ ), local deposits ( $D_t$ )

$$\frac{1}{1 - 1/\sigma} \left( C_t^{1-1/\eta} + \omega (D_t/P_t)^{1-1/\eta} \right)^{\frac{1-1/\sigma}{1-1/\eta}}$$

- $\eta < \sigma$  i.e. **complementarity**; estimated separately for each region
- supply labour to intermediate goods firms (Calvo friction)
- can save in one-period bonds or deposits, at respective interest rates  $i_t^S, i_t^D$

### Banks

Assets		Liabilities	
$R_t$	Reserves	Deposits	$D_t$
$A_t$	Other assets	Equity	$E_t$

- Assets: one-period nominal risk-free assets
- Equity: receives proceeds from bank investments
- Shareholders maximize equity value s.t. **leverage constraint**

$$D_t \leq \ell_t (R_t + \rho_{A,t} A_t)$$

– Assets valuable as collateral to back **cheap** deposit funding

## Model: Optimality Conditions

- Market power: Bank  $i$  faces demand  $\epsilon, \eta_b$ , for own deposit supply

$$D_t^i = \left( (i_t^S - i_t^{D,i}) / (i_t^S - i_t^D) \right)^{-\eta_b} D_t$$

- **Optimal Deposits**: price  $(i_t^S - i_t^D)$  mark-up over marginal cost (collateral)

$$\frac{i_t^S - i_t^D}{\text{liquidity premium}} = \frac{\left( \frac{\eta_b}{\eta_b - 1} \right) \left( \frac{1}{\ell_t} \right) (i_t^S - i_t^R)}{\text{mark-up} \quad \text{marginal cost}}$$

## Asset Purchases (QE)

**QE Shock**: ECB issues new reserves ( $\Delta R_t$ ) to finance asset purchases

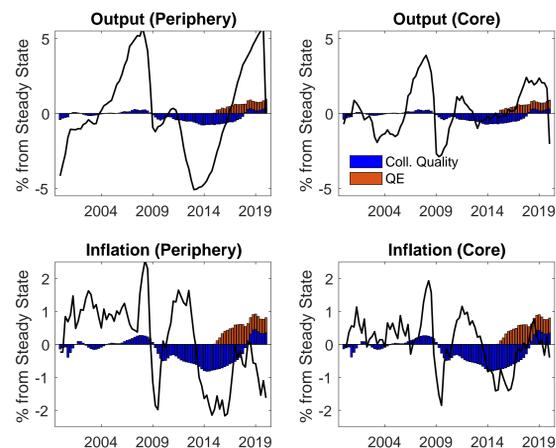
- **Financing**: issuance of reserves, all held by private banks
- **Purchases**: majority (80%) against **non-bank counterparties**
  - → outright new collateral supply for banks, not just collateral swap

### QE Mechanism

- ↑ QE → ↑ collateral supply (for banks)
- ↓ collateral premium
- ↓ liquidity premium
- ↑ deposits → ↑ **consumption** (complementary)

## Impact of QE

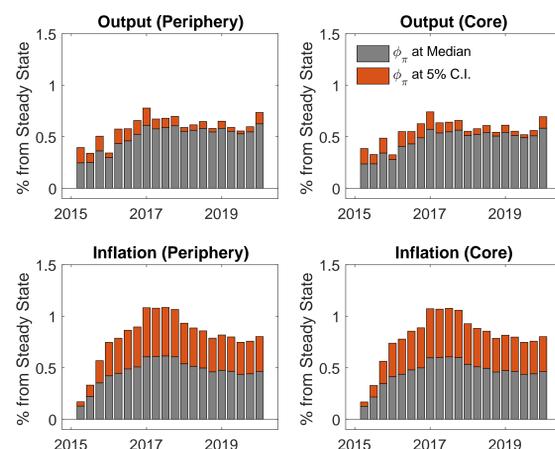
- **Bayesian Estimation**: full information approach - sufficient shocks to fully explain variation of key macro, financial variables
- Effects of QE, shocks to collateral quality ( $\rho_A$ ) of other assets ( $A_t$ )



- **Result 1: QE raises output, inflation** by 60bps, 62bps, respectively
  - Similar effect across regions DESPITE segmented deposit market - integrated collateral market implies all banks face same fall in collateral scarcity
- **Result 2: Negative collateral quality shocks** potent effect mid-2010s
  - sovereign debt crisis hit perceived safety, collateral value bank loans
  - strong spillovers from integrated bank asset market despite local nature of shock

## Counterfactual: Lower $\partial i_t^R / \partial \pi_t \equiv \phi_\pi$

- Baseline Calibration:  $\phi_\pi$  **estimated pre-APP period**
  - BUT QE coincided with ZLB i.e. lower  $\phi_\pi$  to first-order
- **Question**: Additional impact of QE when  $\phi_\pi$  **lowered** from 1.85 to 1.35?



- **Result**: Impact of QE on inflation **rises from 60bps to 110bps**
  - Inflation itself replaces Taylor rule as stabilization tool
  - QE  $\equiv$  shock to nominal reserves →  $\pi$  dilutes effect on real reserve supply