Unconventional Monetary Policies, Bank Lending and Sovereign Debt Holdings

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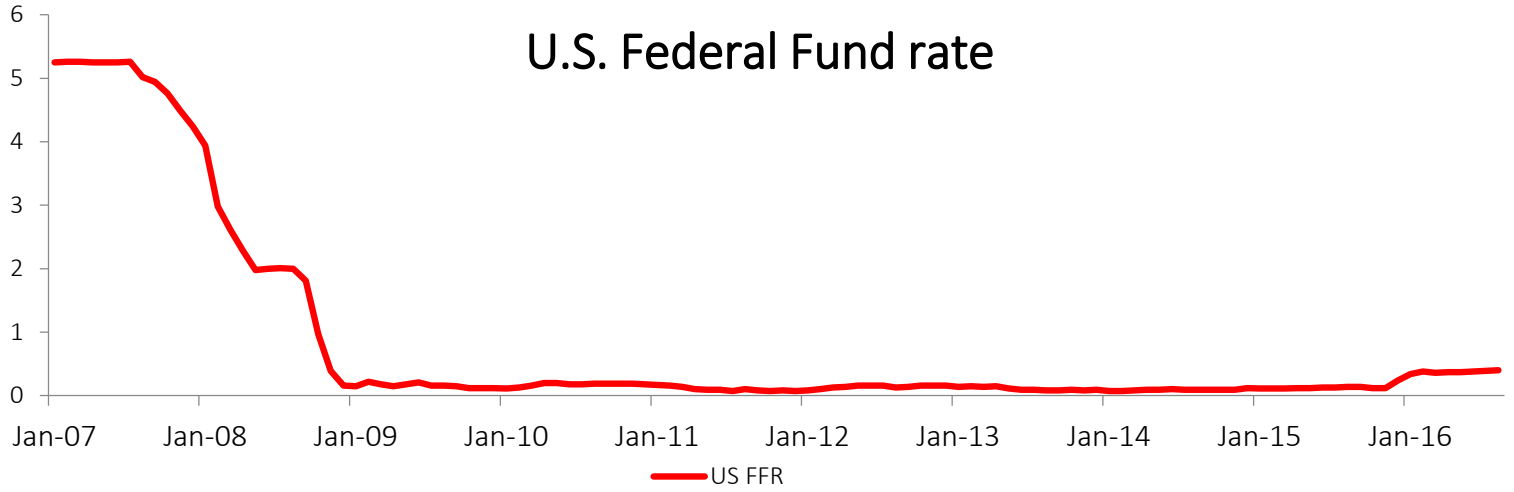
Outline

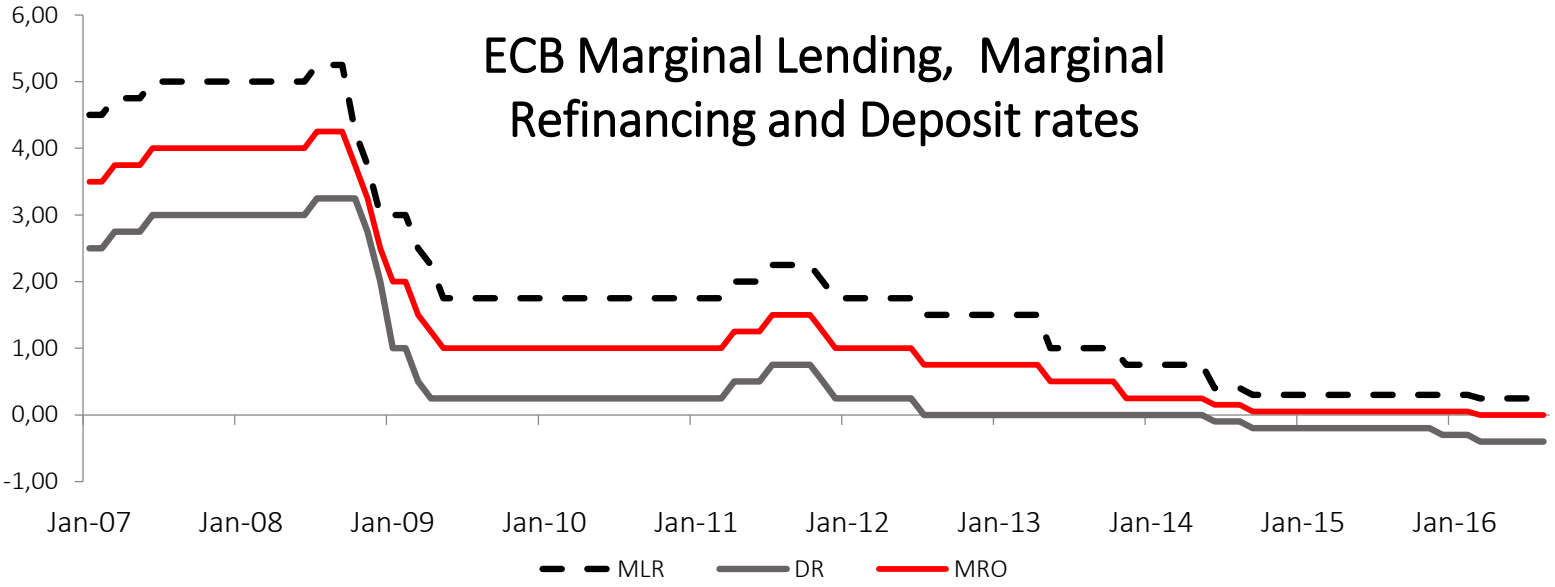
1. Unconventional monetary policies (UMP): US *vs.* EA
2. Do UMPs affect bank lending? Taxonomy and evidence so far
3. Novel contribution:
   - evaluate the impact of UMP on lending via a panel VAR, using bank-level data
   - assess the role of sovereign debt holdings in the transmission of UMP to bank lending
   - compare policies: LTRO vs. TLTRO & APP
4. Conclusions

1. Unconventional monetary policies

- Conventional monetary policies: conducted primarily by controlling short-term interest rates
- Unconventional monetary policies (UMP):
  1. Large-scale asset purchase programs: QE (US), SMP & APP (EA)
  2. Liquidity provision programs: LTRO, VLTRO, TLTRO (EA)
  3. Pure announcements: “whatever it takes” & OMT (EA)
- Rationale: ineffectiveness of conventional monetary policy
  - Policy transmission channels broken: MBS market freeze (US), interbank market freeze (EA), sovereign-bank diabolic loop (EA)
  - Interest rates close to (zero) lower bound

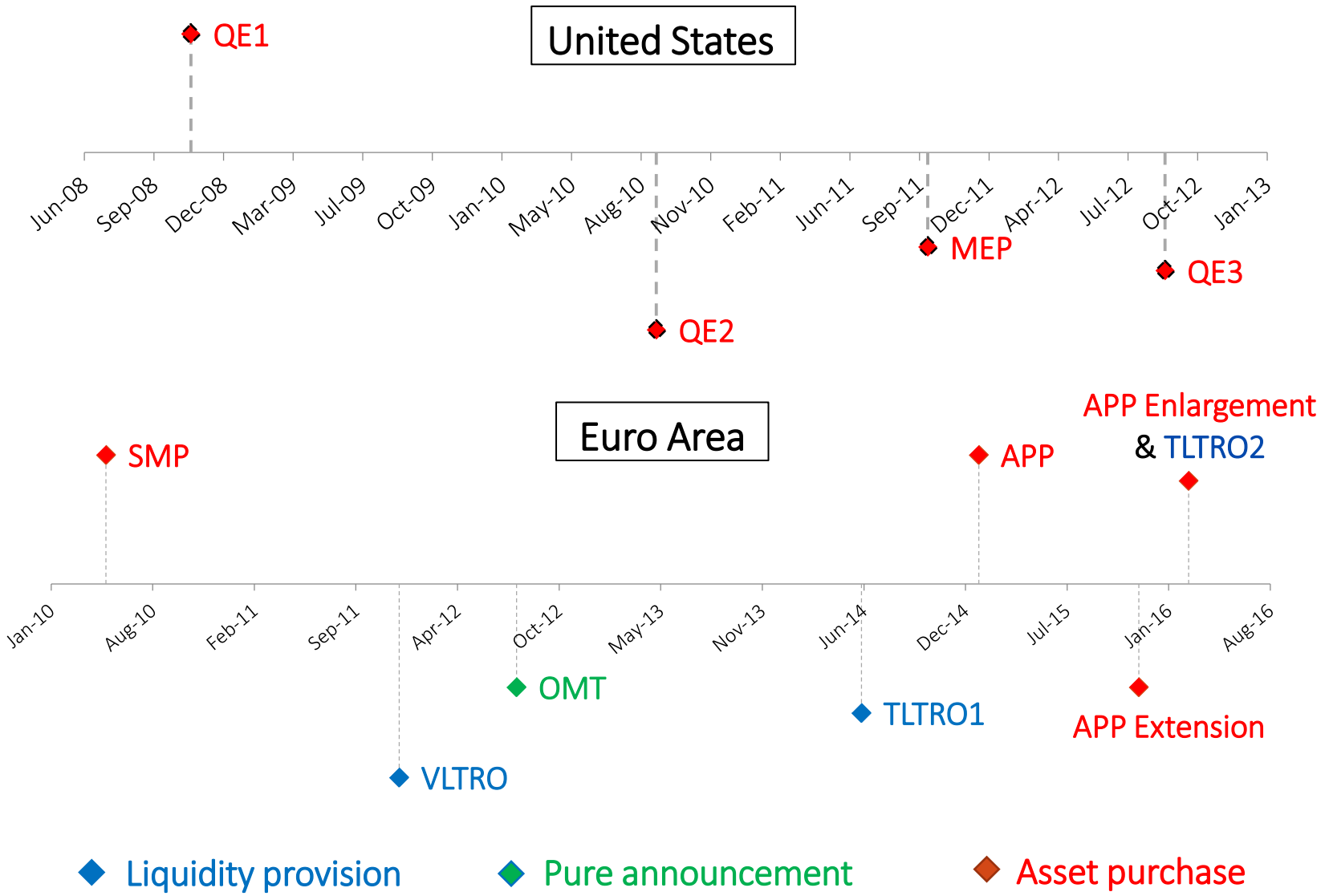
Official interest rates: a blunt weapon





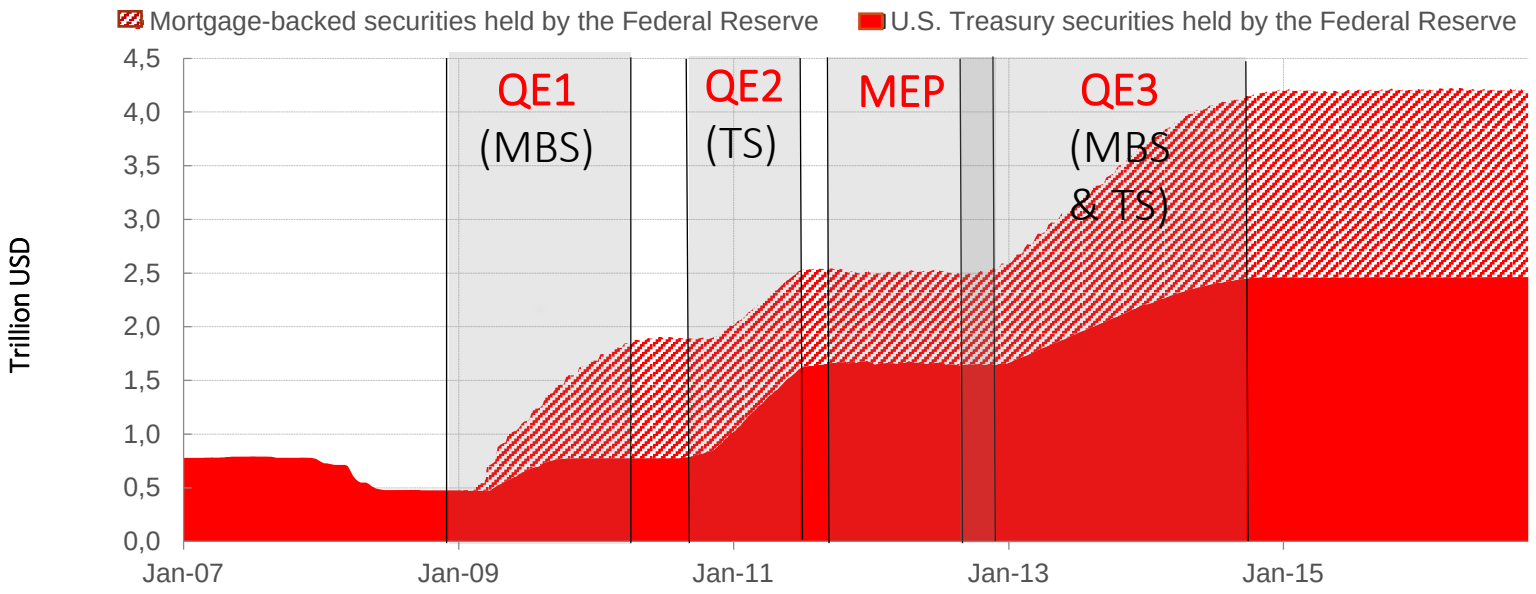
Unconventional Monetary Policy

UMP timeline: program inception dates

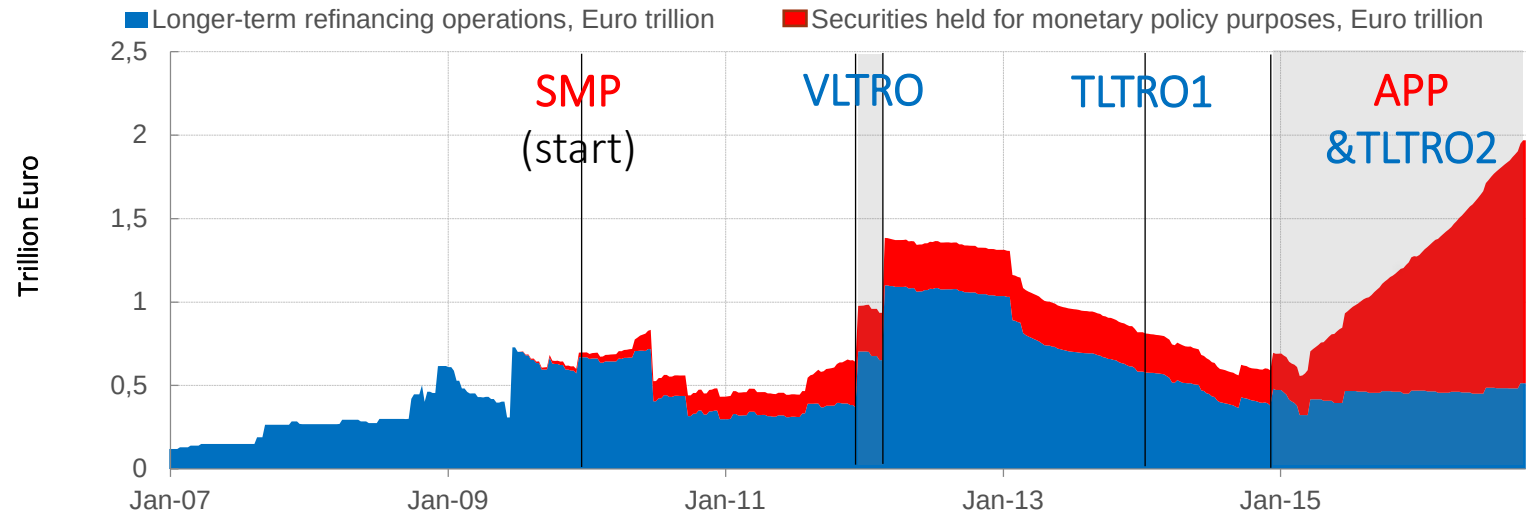


Unconventional Monetary Policy

Asset side of central bank balance sheet



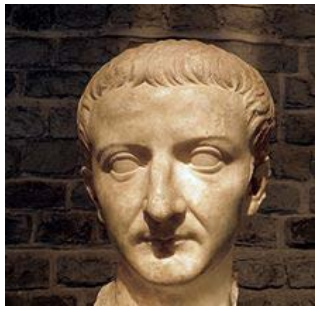
Fed



ECB

Unconventional Monetary Policy

Not just a thing of the 21st century



- UMPs date at least back to the **1st century AD**
- In 33 AD, the Roman empire – a highly integrated economic, monetary and financial area – faced a widespread panic, with massive deleveraging, real estate price deflation and bank closures
- Emperor Tiberius tapped the imperial treasury "distributing throughout the banks a hundred million sesterces, and
  - allowing freedom to borrow *without interest*
  - *for three years*,
  - provided the borrower gave *collateral* to the State in land *for twice the amount*.

- Credit was thus restored, and gradually private lenders were found" (Tacitus, *Annales*, VI, 17, 1-3).

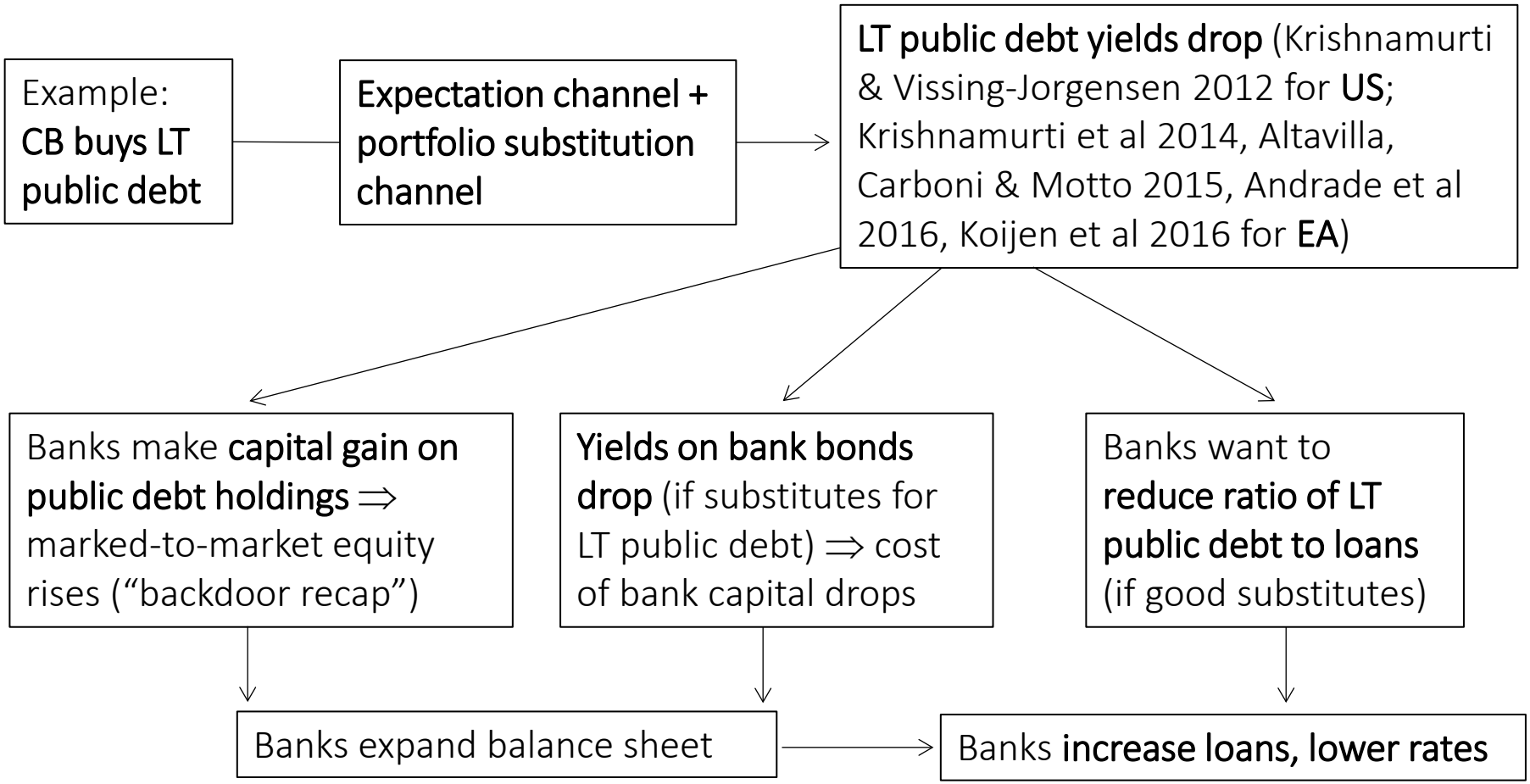
EA experience: natural testing ground

- Which ECB policies had a **larger effect on bank lending**?
- Which role have **banks' sovereign holdings** played in the transmission of UMPs to bank lending?
- Corollary: would early adoption of APP and TLTRO (instead of VLTRO) have made a difference?
- **Pro**: rich variety of ECB programs to be compared
- **Con**: not a clean experiment
  - Sequential adoption: response to later programs may partly be affected by adoption of prior ones
  - Programs adopted at different levels of stress & interest rates

2. UMPs: which effects on bank lending?

- **Benchmark**: irrelevance/neutrality of UMPs under complete and perfect markets (Wallace, 1981)
  - MM "homemade arbitrage" argument: the private sector can "undo" any public *financial* policy (= change in the public sector's liability structure, with no change in fiscal policy)
- With **frictions** and/or **incomplete markets**, UMPs can affect interest rates and lending via 3 channels:
  - **Expectation/signaling**: signal of future monetary policies, e.g. purchase of LT debt lowers CB's incentive to raise interest rates
  - **Portfolio substitution**: change relative asset supplies ⇒ may affect yields of assets, including bank bonds and loans
  - **Refinancing channel**: increase supply and/or lower cost of CB's liquidity for banks ⇒ if constrained, may expand lending

2.1 QE/APP: yield-mediated effects



Evidence for EA:

- Albertazzi, Becker & Boucinha (2016): APP-induced portfolio revaluation raises purchase of low-priced securities in stressed countries, lending in non-stressed ones.
- Altavilla, Canova & Ciccarelli (2016): in response to APP, banks lower lending rates.

2.2 QE/APP: refinancing effects

Case #1: **CB buys MBS or covered bond** from bank → **Direct** bank refinancing channel → **Bank uses fresh cash to issue more MBS or covered bonds**

But: (i) "flypaper effect" (Di Maggio, Kermani & Palmer, 2016) or crowding out of other loans (Chakraborti, Goldstein & MacKinlay, 2016)

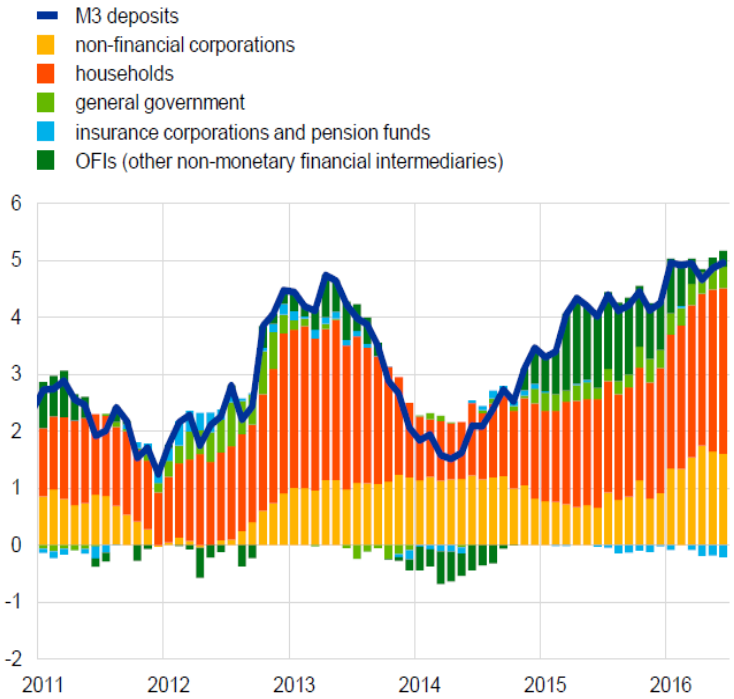
Case #2: **CB buys public debt** → **Indirect** bank refinancing: non-banks sell public debt to CB and **deposit** money at banks → **Bank expands balance sheet**: possibly increases loans, lowers lending rates

Evidence for EA:

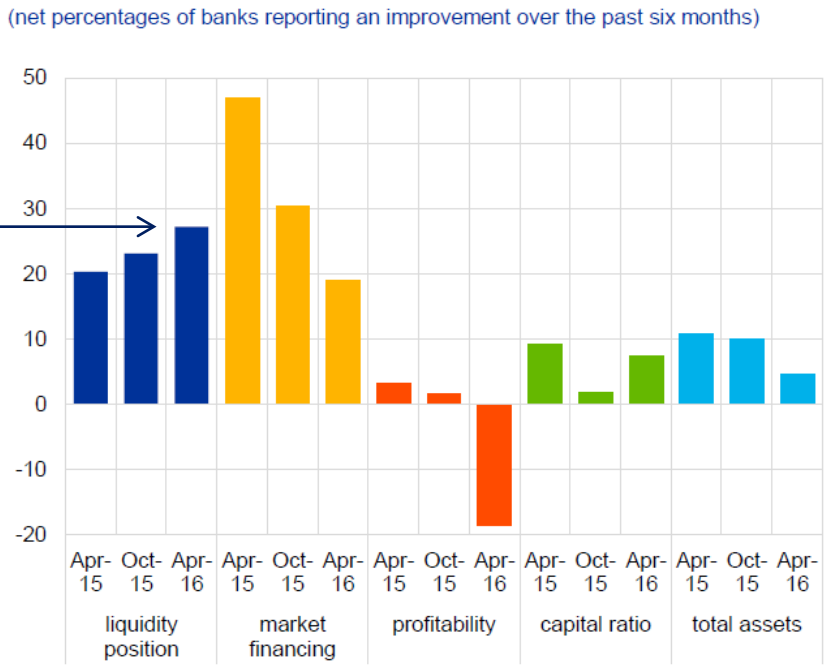
- Altavilla, Canova & Ciccarelli (2016): in respose to APP, banks lower lending rates.
- On indirect bank refinancing channel: self-reported evidence from Bank Lending Survey.

Bank deposit (indirect) channel

Sectoral contributions to M3 deposit growth (annual percentage changes, monthly)

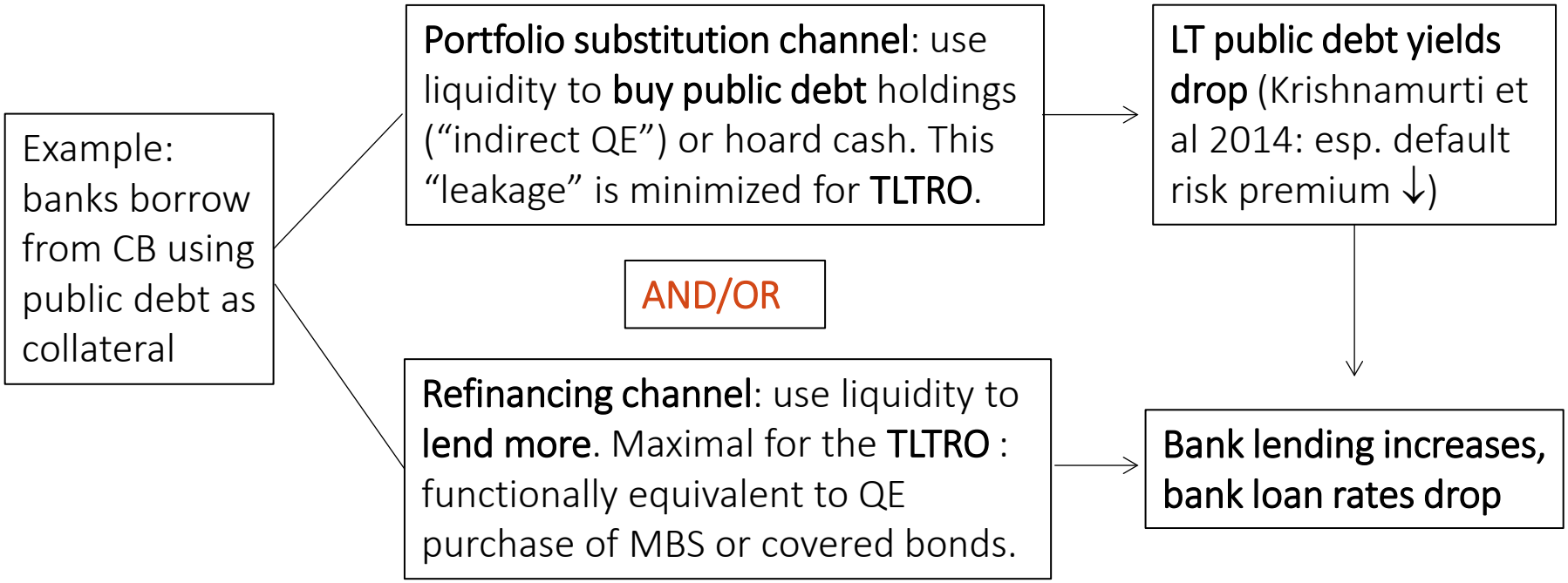


Self-reported impact of the expanded APP on banks' financial situation (BLS data)



- General equilibrium feedback: even if banks had not sold public debt to the ECB, the APP would have been effective…
- … but *in addition* banks *did* sell public debt to the ECB: portfolio rebalancing (Koijen et al., 2016) as well. More on this below…

2.3 LTRO: rebalancing and/or refinancing

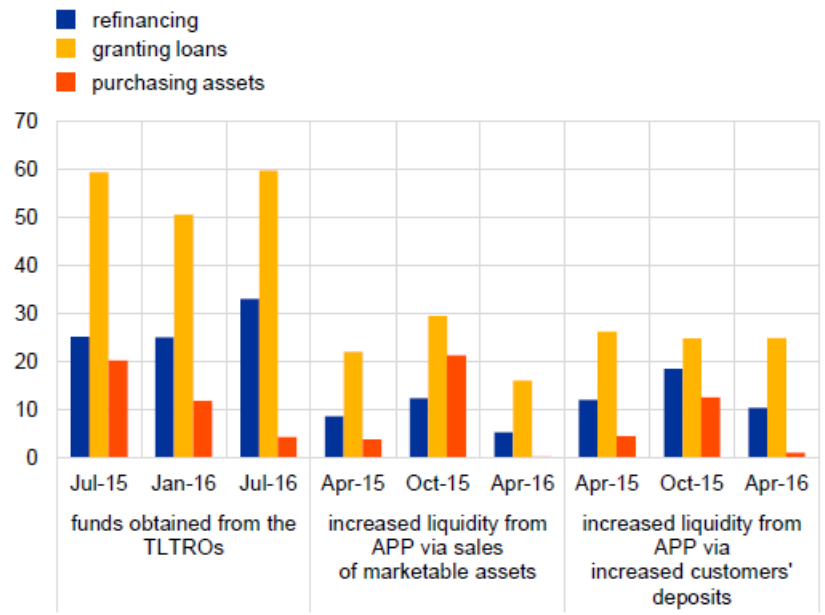


Evidence for EA:

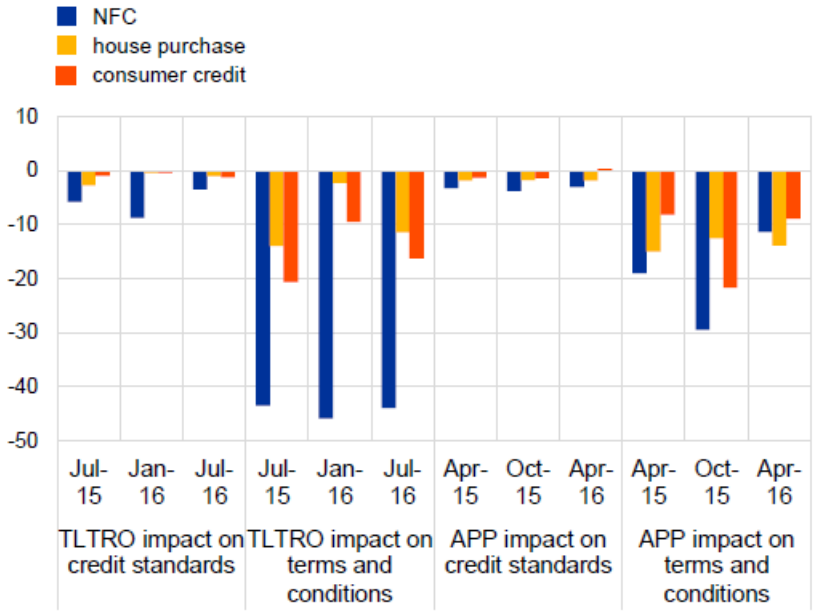
- Andrade et al. (2015), Garcia-Posada & Marchetti (2015) and Carpinelli & Crosignani (2016): French. Spanish and Italian banks increased lending in response to the VLTRO of 2011-12.
- Crosignani, Faria-e-Castro & Fonseca (2015) and Carpinelli & Crosignani (2016): Portuguese and Italian banks used some VLTRO financing to buy domestic sovereign bonds ("leakage"). On this, see also Drechsler et al. (2016) and Altavilla et al. (2015).

TLTRO: EA bank survey responses

Use of liquidity from TLTRO and expanded APP
(% of BLS respondents, referring to previous 6 months)

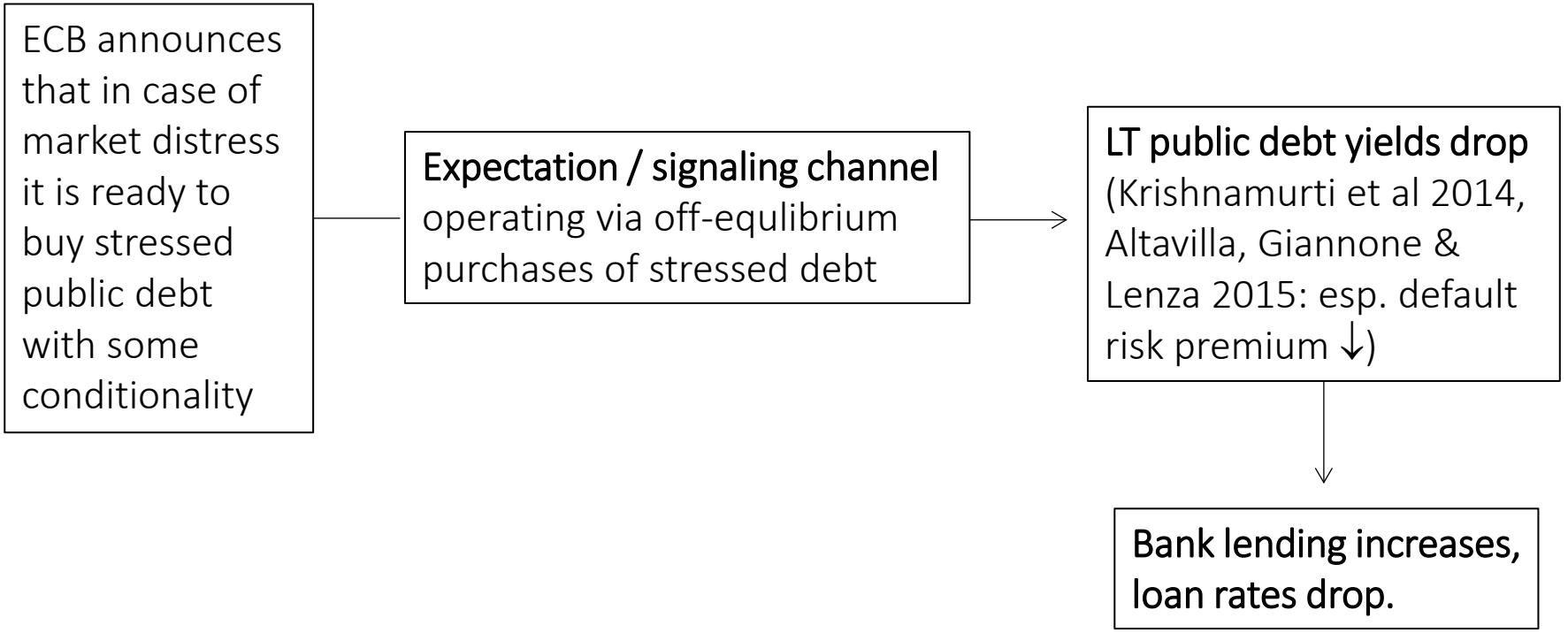


Impact of TLTRO and expanded APP on loan rates
(% of BLS respondents, referring to previous 6 months)



- **Functionally equivalent to APP**: both TLTRO and APP have contributed to (i) bank lending and (ii) reduction of loan rates, especially to firms
- But **TLTRO** has **affected a larger number of banks**: more widespread and direct refinancing effect than the APP, which consists mainly of public debt purchases

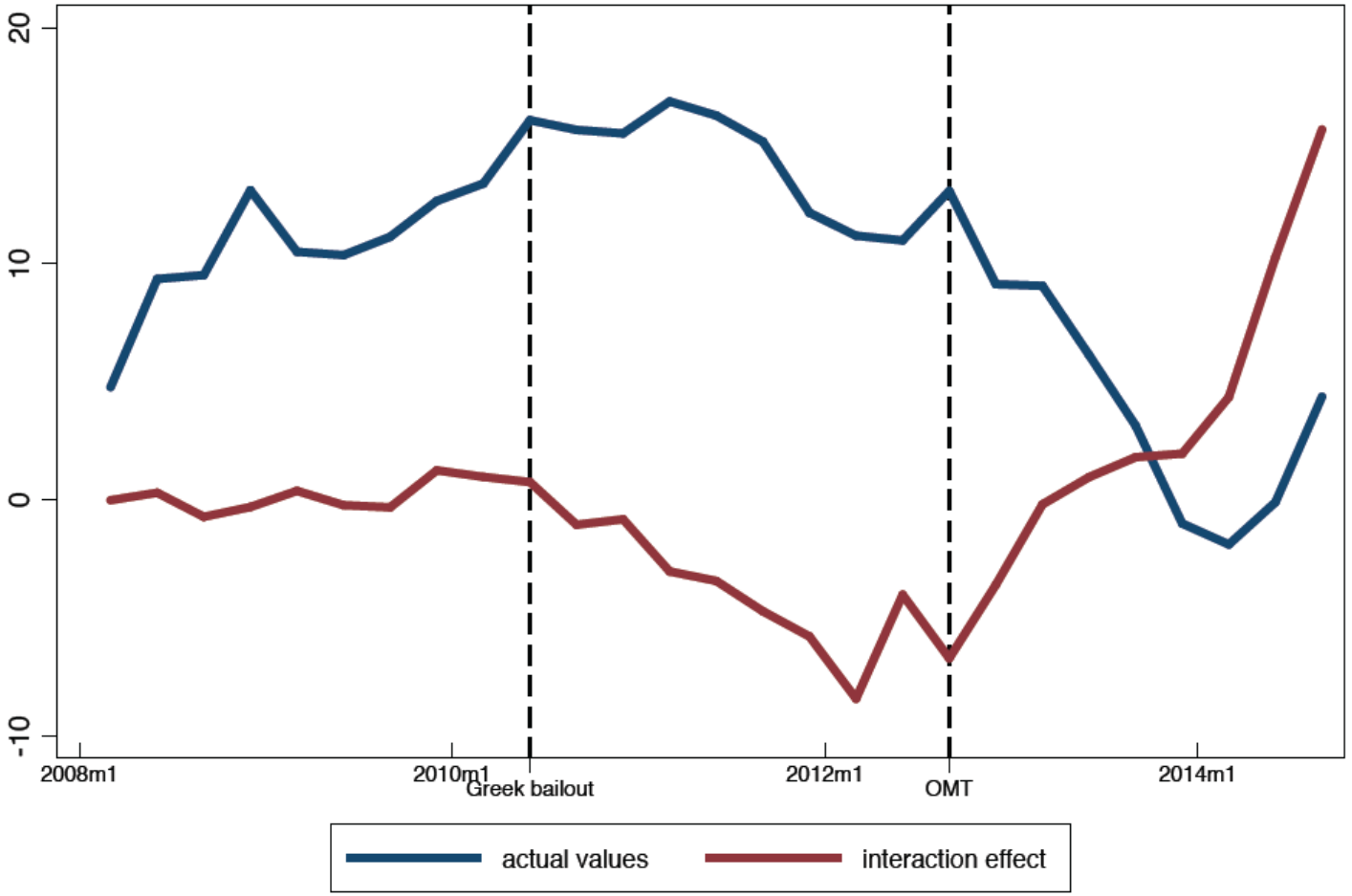
2.4 OMT: pure announcement effect



Evidence for EA:

- Acharya et al. (2015): due to their large domestic sovereign holdings, the OMT announcement led to a "backdoor recapitalization" of stressed-country banks , which led to an increased supply of bank loans
- Altavilla, Pagano & Simonelli (2015): this backdoor recapitalization is just the "other side of the coin" of the previous amplification due to the drop in the value of banks' sovereign holdings, which had amplified the drop in lending in stressed countries.

Estimated amplification effect in stressed countries

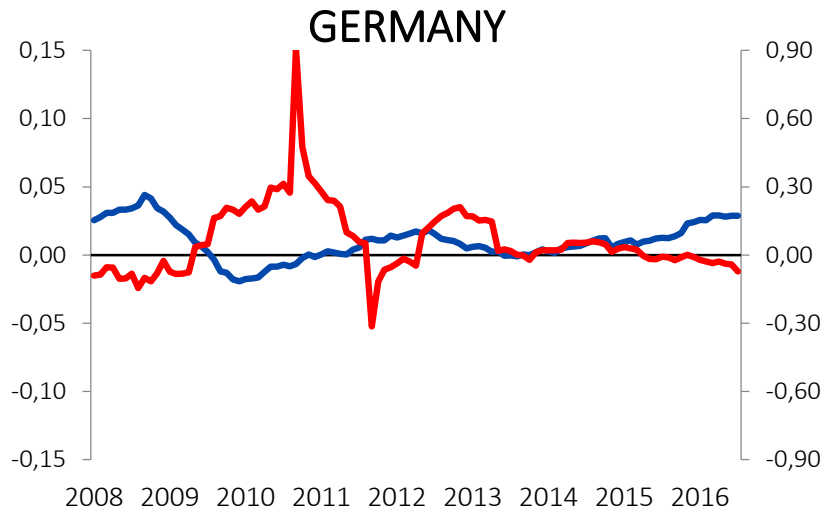


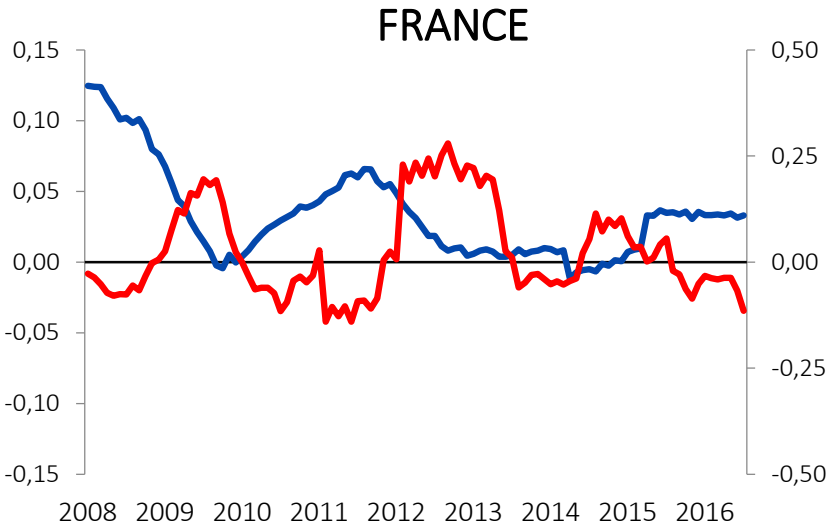
Source: Altavilla, Pagano & Simonelli, 2015.

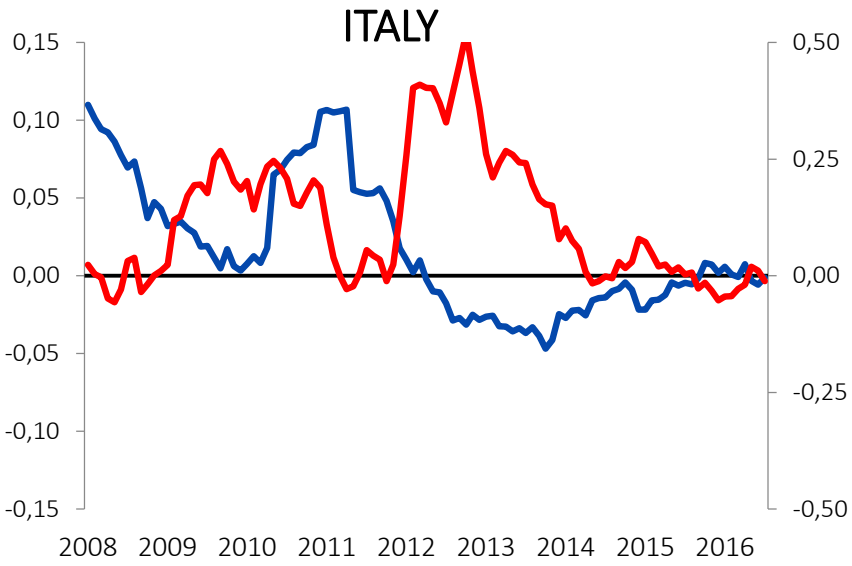
3. Estimating lending responses to UMPs

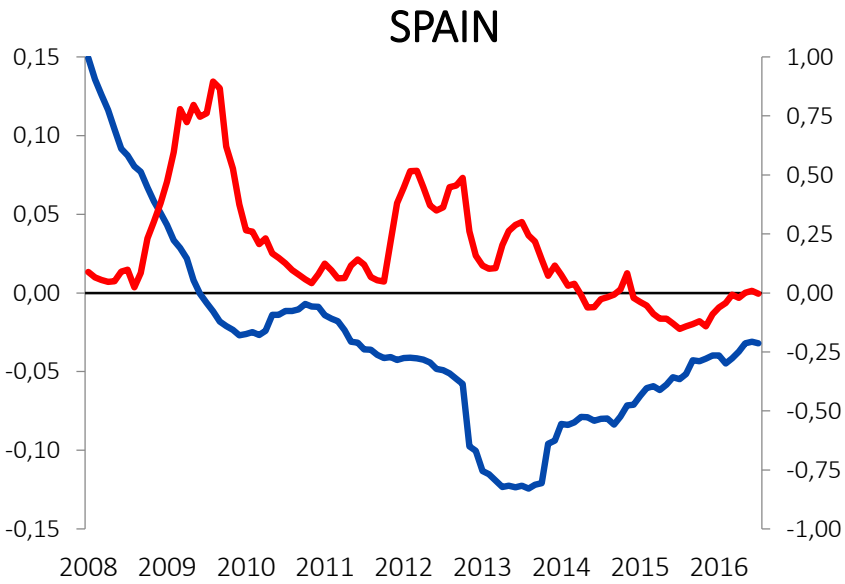
- Identification of UMP shocks: high-frequency event study approach
- Monthly EA bank-level data for (i) loans to non-financial firms and households and (ii) sovereign holdings:
  - 144 (head) banks, from 2007 to 2016
- Panel VAR specification: allows us to compute impulse response to shocks by different **subsets of banks**:
  - based in different countries
  - with different characteristics or initial conditions (public/private, well/poorly capitalized): to be done!
- Compare responses to different ***types*** of UMP shocks

3.1 Growth of loans & sovereign holdings







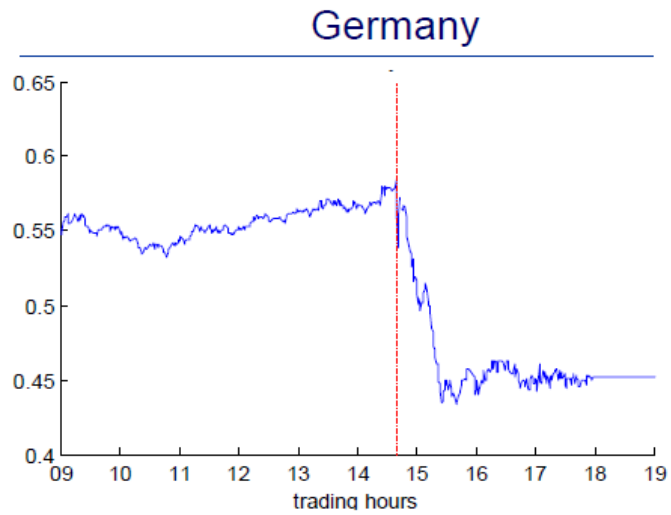


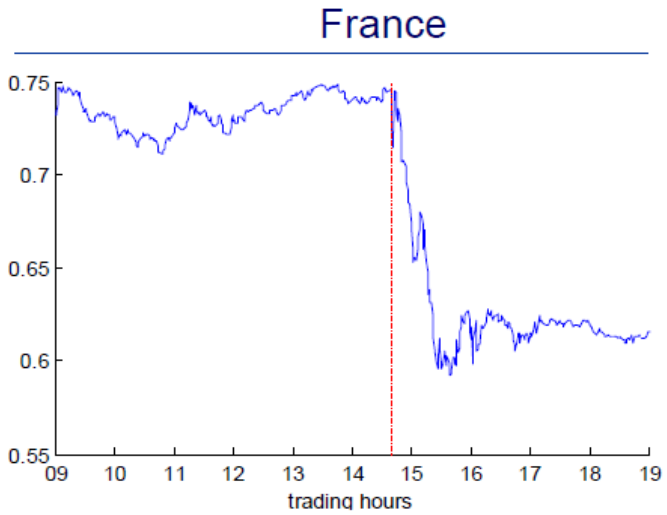
Sovereign holdings (RHS scale)

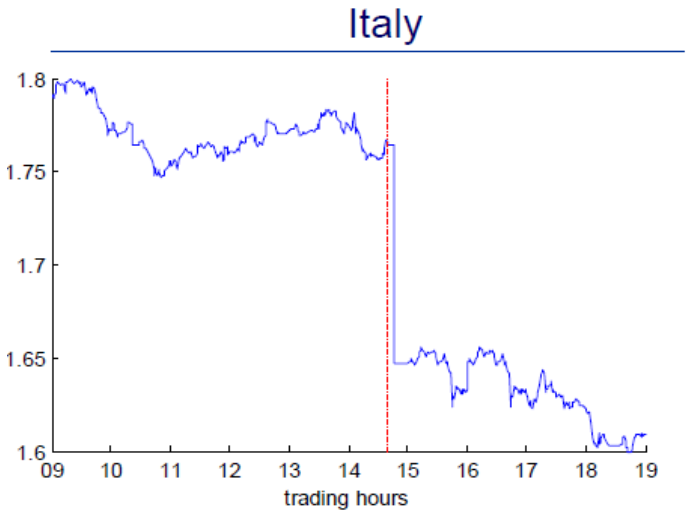
Total loans (LHS scale)

3.2 Identification of UMP shocks

Example: 22 January 2015, announcement of APP







Event study methodology

$$\Delta y_{c,t}^{sov} = \sum_{j=1}^{k} \alpha_{j,c} D_{j,t} + \sum_{s=1}^{m} \gamma_s News_{s,t} + \varepsilon_{c,t}$$

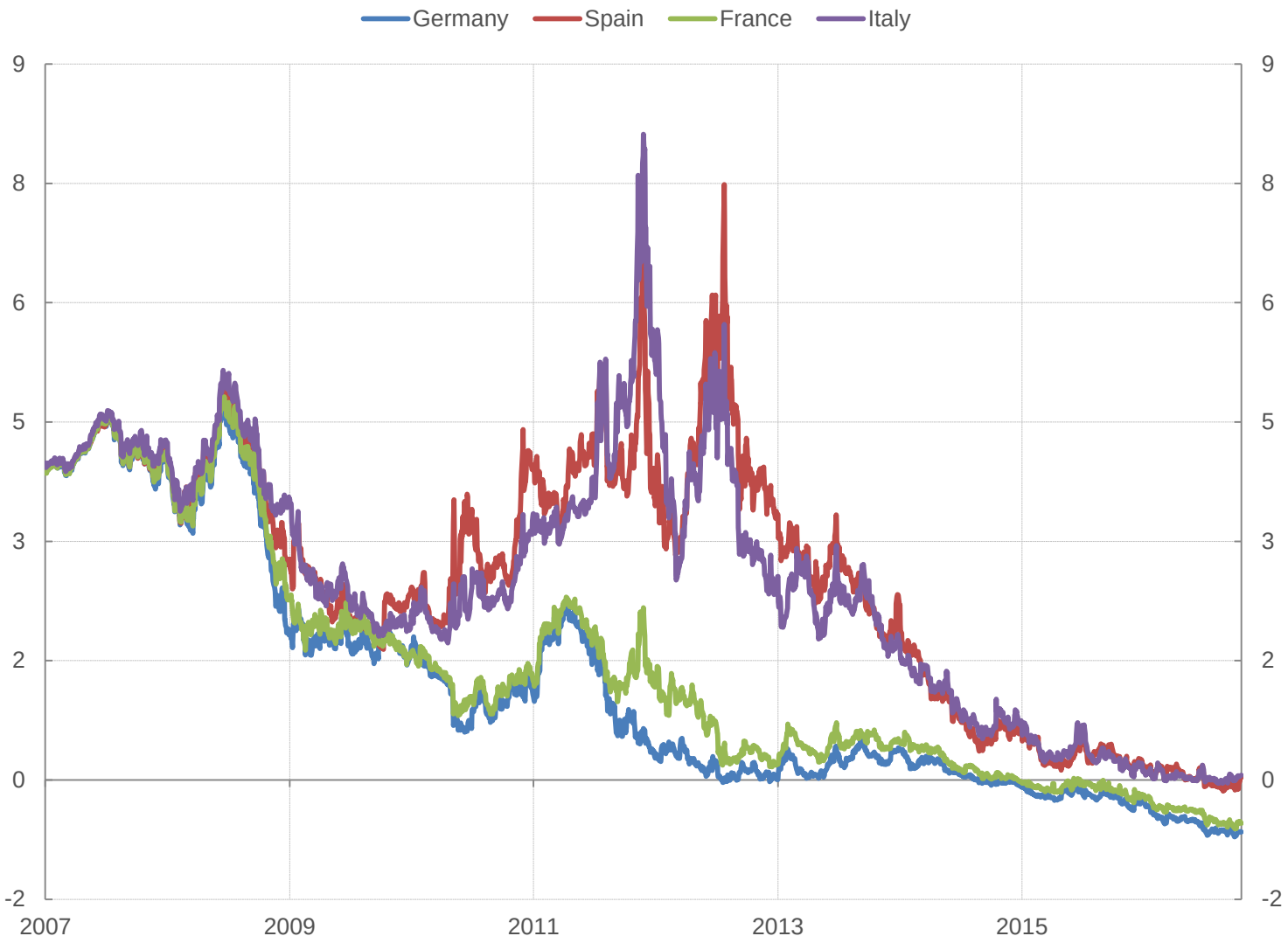
$\Delta y_{c,t}^{sov}$ = daily change in country *c*'s 3-year sovereign yield

$$D_{j,t} = \begin{cases} 1 & \text{if } t \in \text{event set (with } k = 25\text{)} \\ 0 & \text{otherwise} \end{cases}$$

$News_{s,t}$ = surprise component of macro release (with $m = 40$)

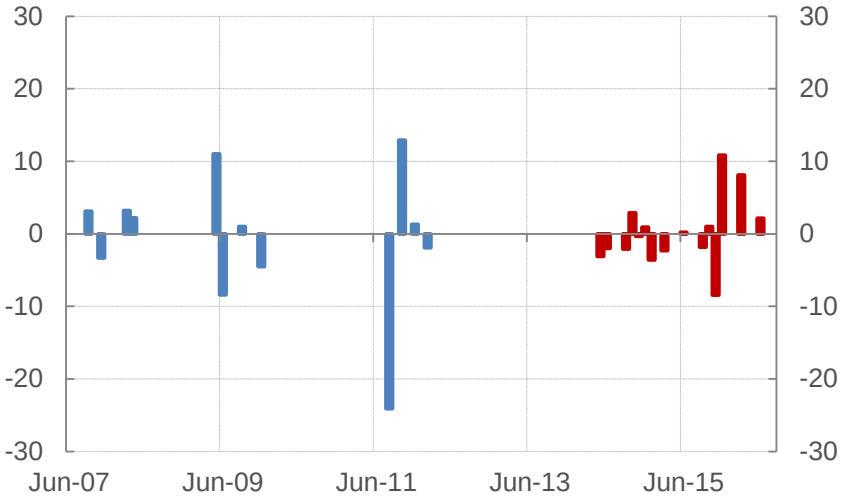
See Altavilla & Giannone (2016), "The Effectiveness of Non-standard Monetary Policy Measures: Evidence from Survey Data," *Journal of Applied Econometrics.*

3-year sovereign yield ($\Delta y_{c,t}^{sov}$)

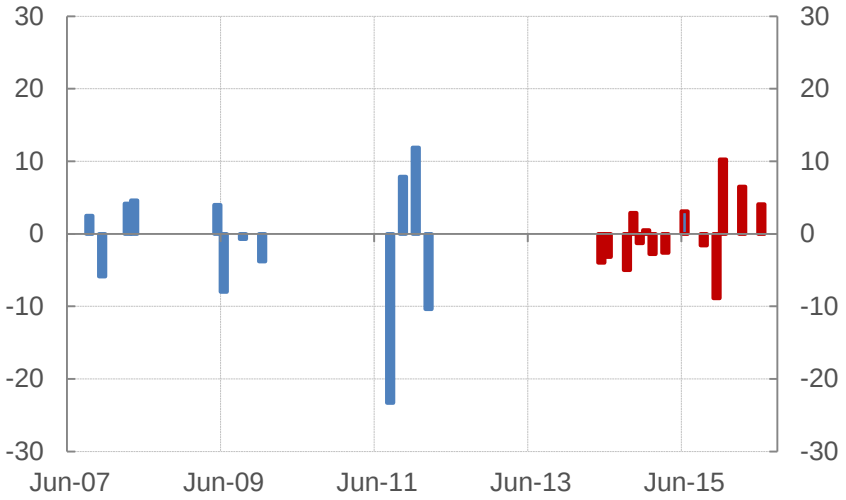


UMP shocks ($\hat{\alpha}_j D_{j,t}$)

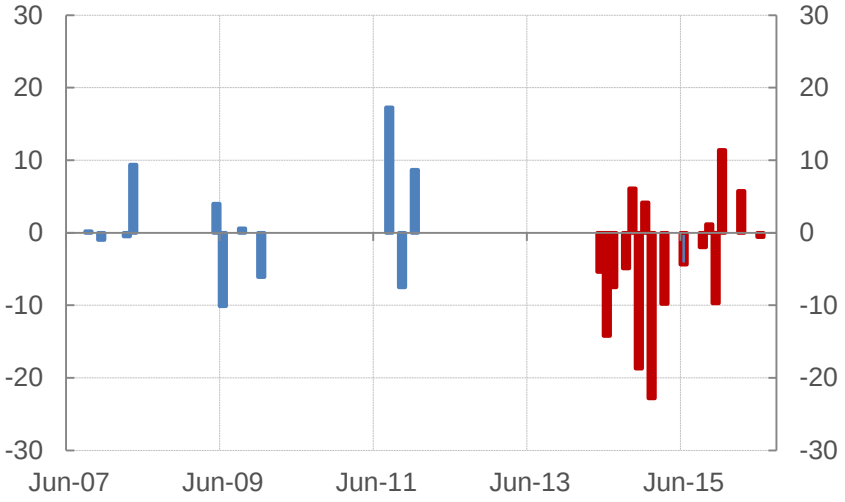
Germany



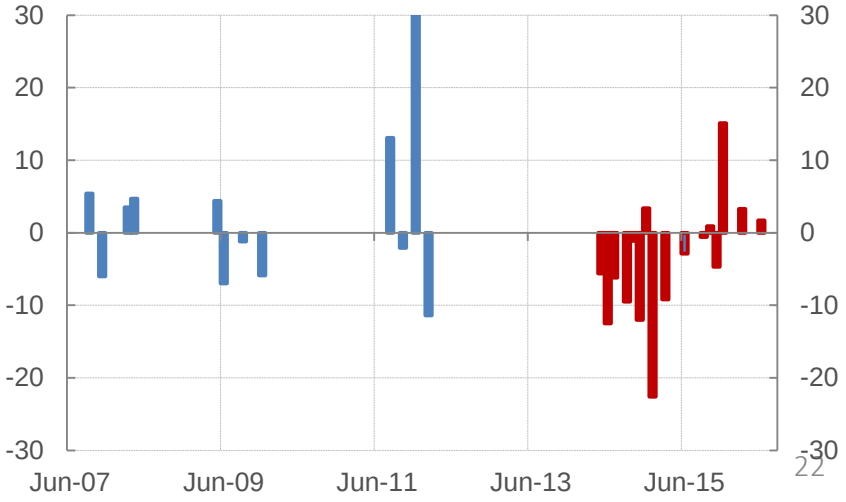
France



Italy



Spain



3.3 Panel VAR specification

$$Y_{ict} = A_{ic0} + A_{ic1}(L)Y_{ict-1} + B_{ci}(L)X_{ct-1} + \varepsilon_{ict}$$
$$X_{ct} = \rho_c(L)X_{ct-1} + \eta_{ct}$$

$i = 1,\ldots,144$ banks $\quad c = 1,\ldots,8$ countries $\quad t = \text{July 2007},\ldots,\text{August 2016}$ months

$Y_{ict} =$
- yearly growth of bank i's domestic sovereign holdings
- yearly growth of bank i's loans to non-financial firms and households in country c and month t

$X_{ct} =$
- monetary policy shock in country c and month t (from event study)
- unemployment rate in country c and month t

Assumptions

- For each bank, the dynamic interactions among endogenous variables follow an unrestricted VAR
- Block-recursive structure:
  - country-level variables are affected only by their own lags
  - bank-level variables are affected *both* by their own lags *and* by country-level variables
- We want to ensure that differences in bank lending responses do not reflect differences in the country-level dynamics of sovereign yields

  $\Rightarrow$ constrain ρ_c to be equal to the median for all banks irrespective of country

3.4 Estimated impact of UMP shocks

- **Question #1:** How did UMPs affect bank lending and domestic sovereign holdings?
  - Estimate VAR for each bank with Bayesian technique
  - Compute the IRFs for each bank
  - Group banks' IRFs by stressed / non-stressed countries

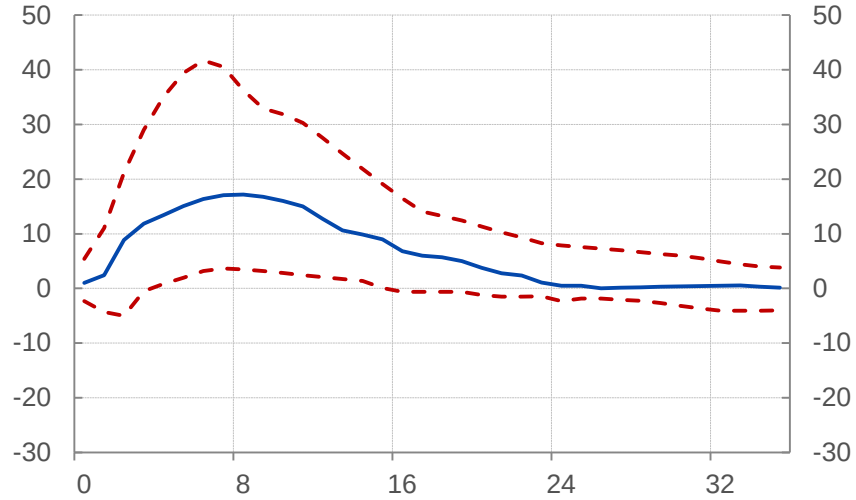
- **Question #2:** How would the lending of bank *i* have reacted to the UMP if it had not changed its holdings of domestic sovereign debt?
  - *Constrain* to zero the response of its sovereign debt holdings
  - Compute the IRFs for each bank
  - Group banks' IRFs by stressed / non-stressed countries

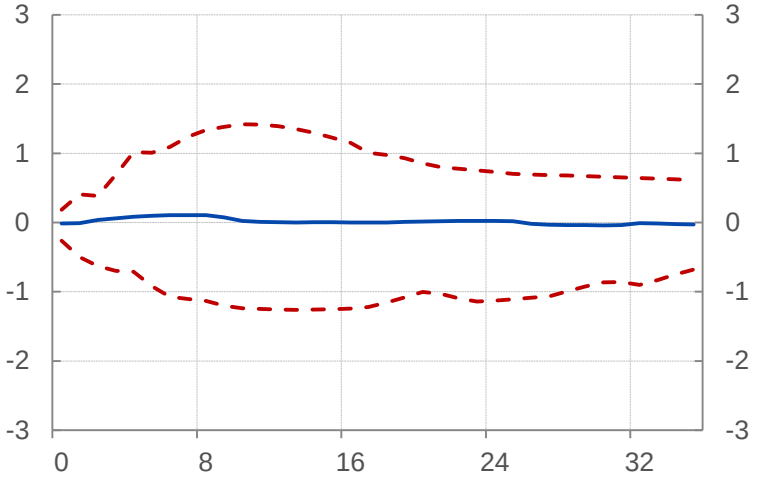
Q #1: effects of the LTRO?

Sovereign debt holdings

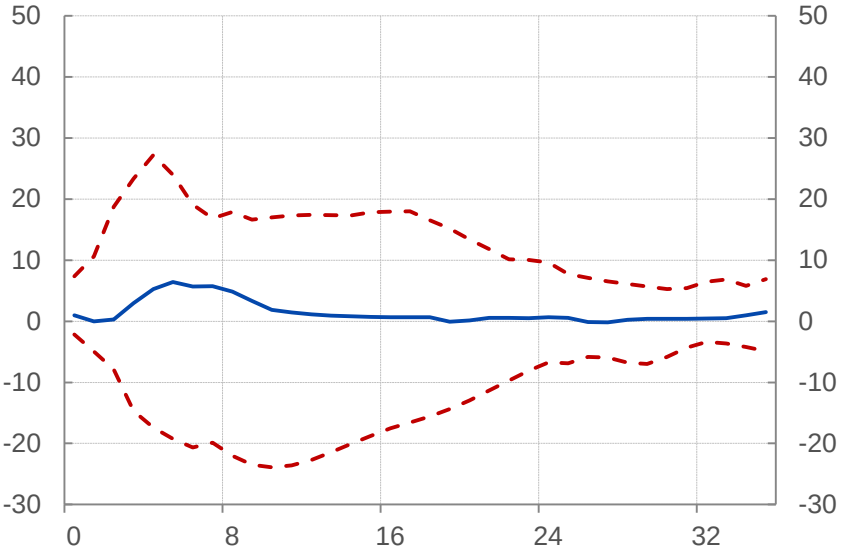
Lending

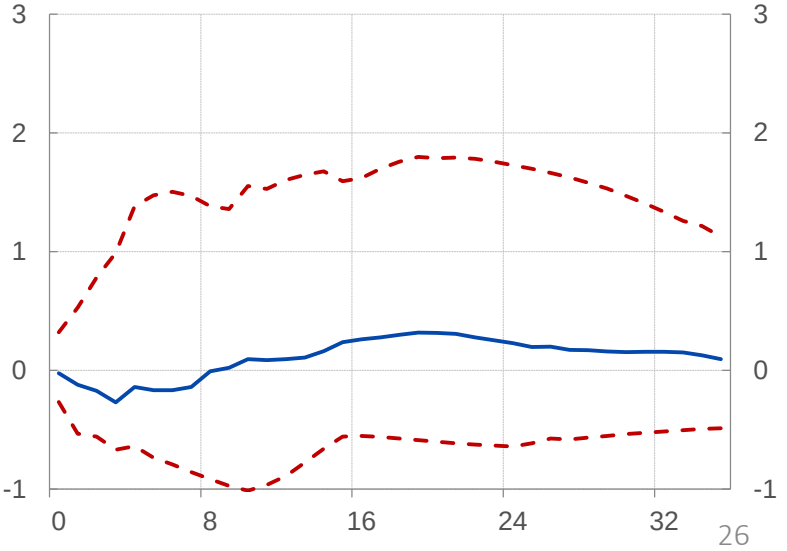
Stressed Countries



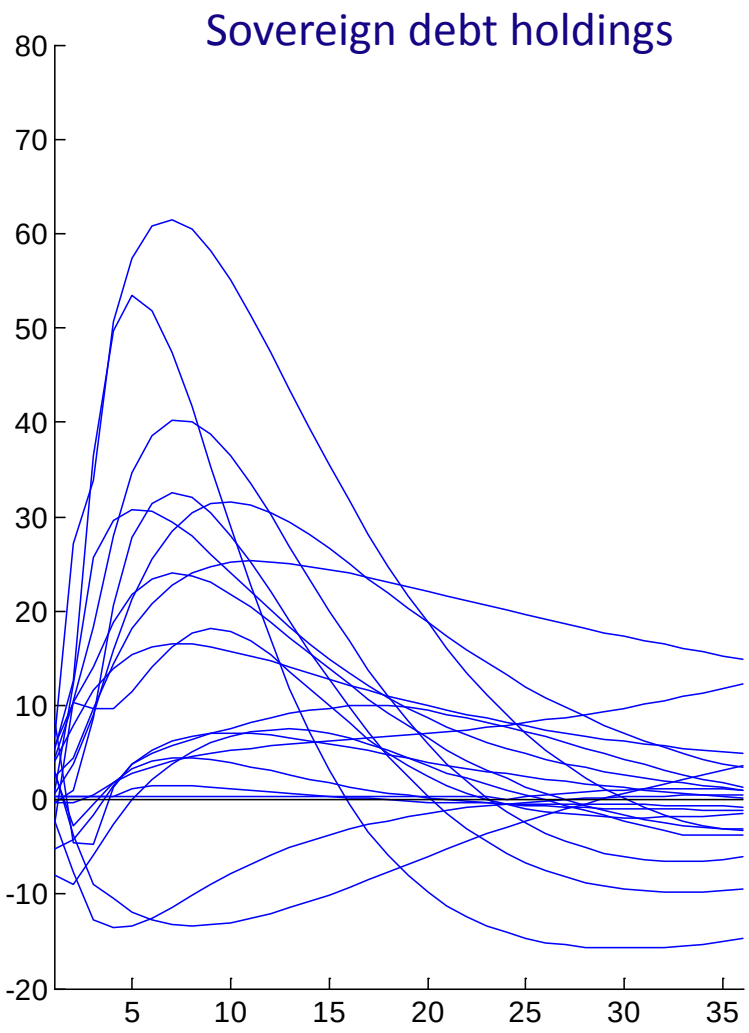


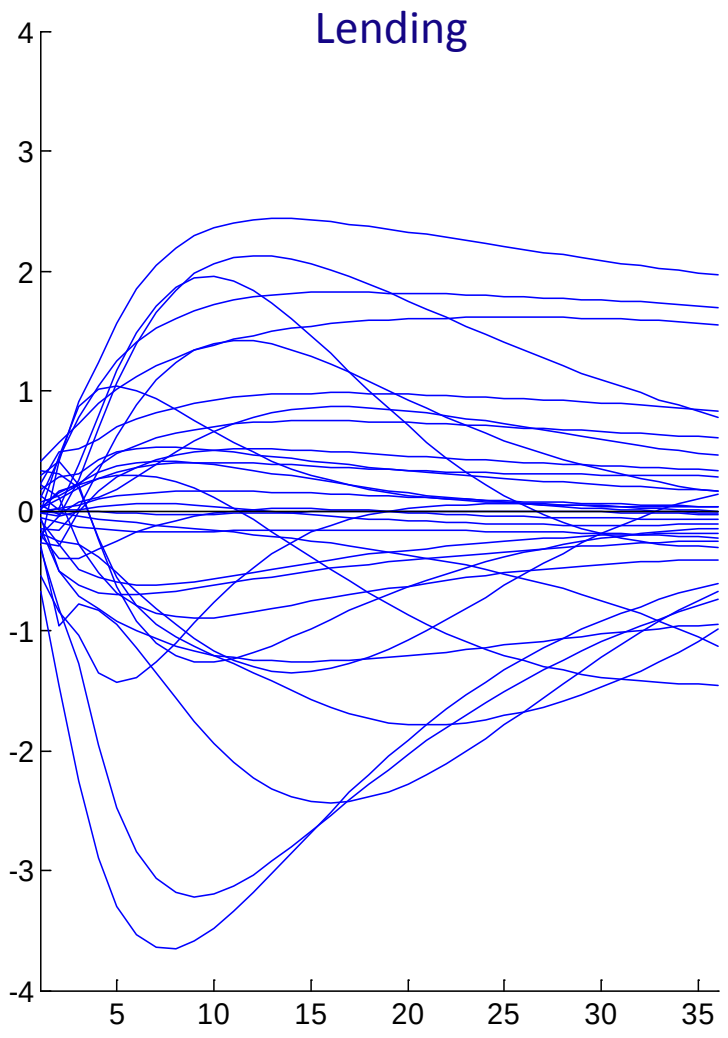
Non-stressed Countries





LTRO bank-level responses, stressed countries



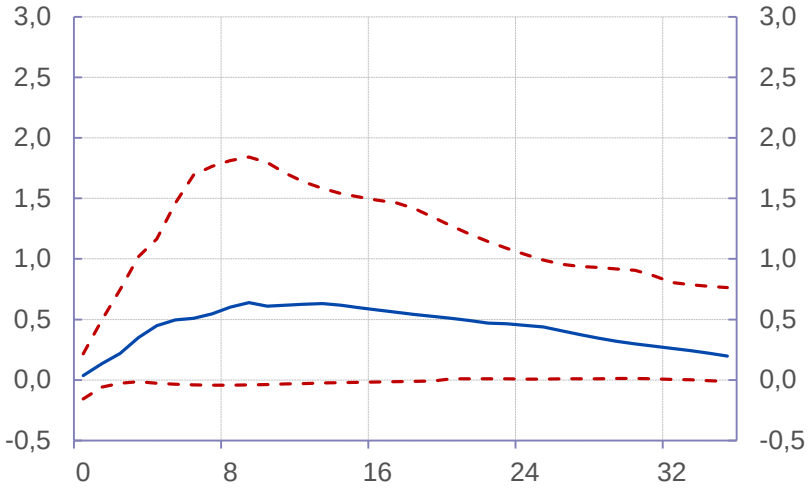


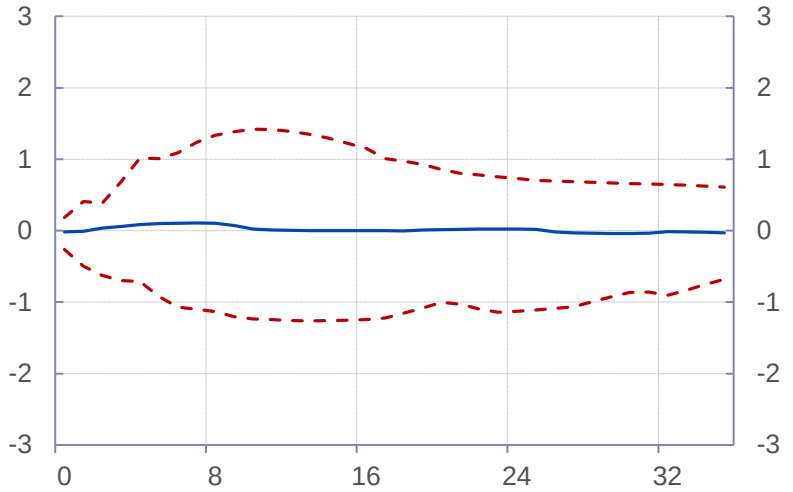
Q #2: LTRO with constant sov. holdings

Lending with *constrained* sov. holdings

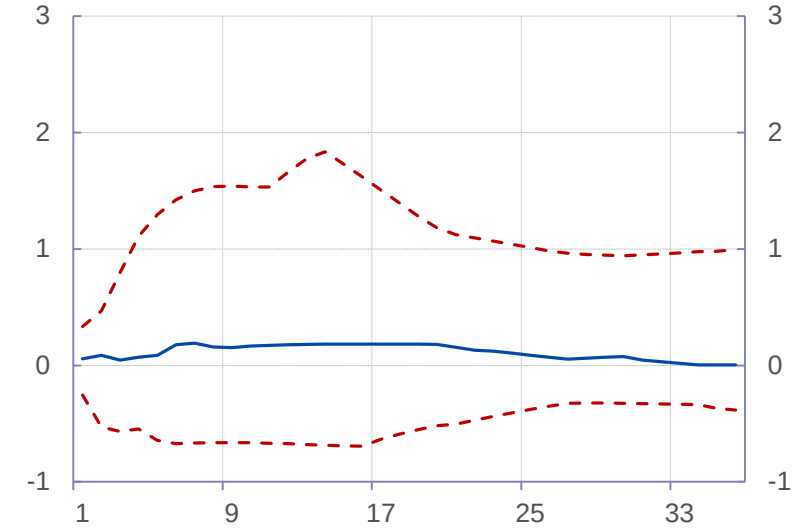
Lending with *unconstrained* sov. holdings

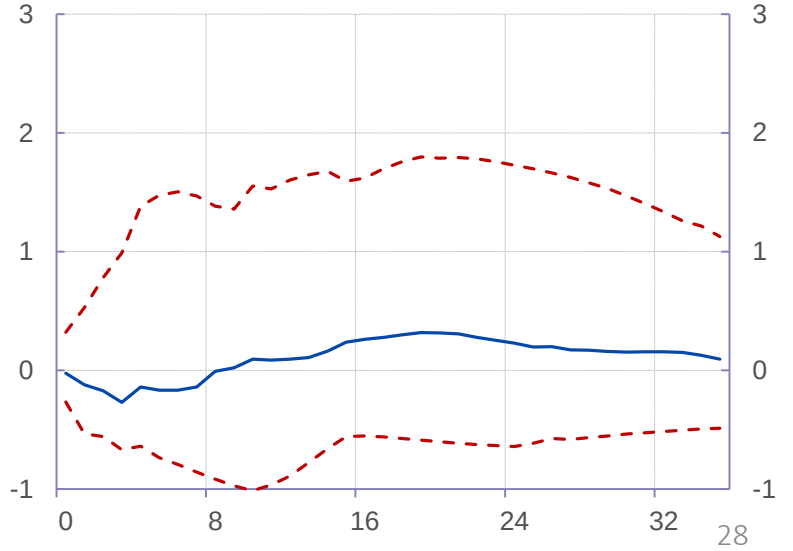
Stressed Countries





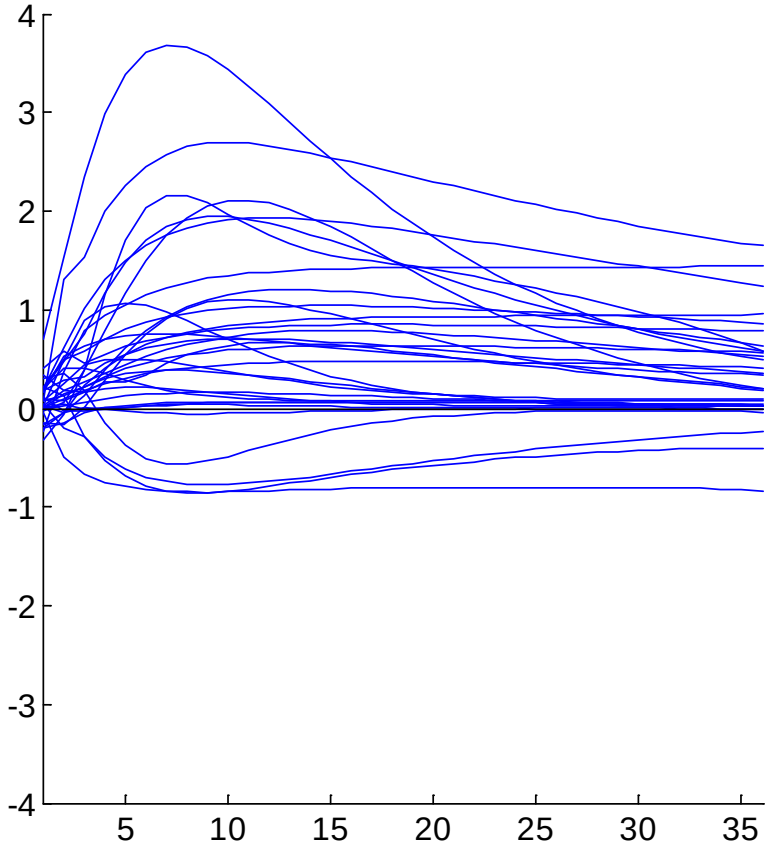
Non-stressed Countries



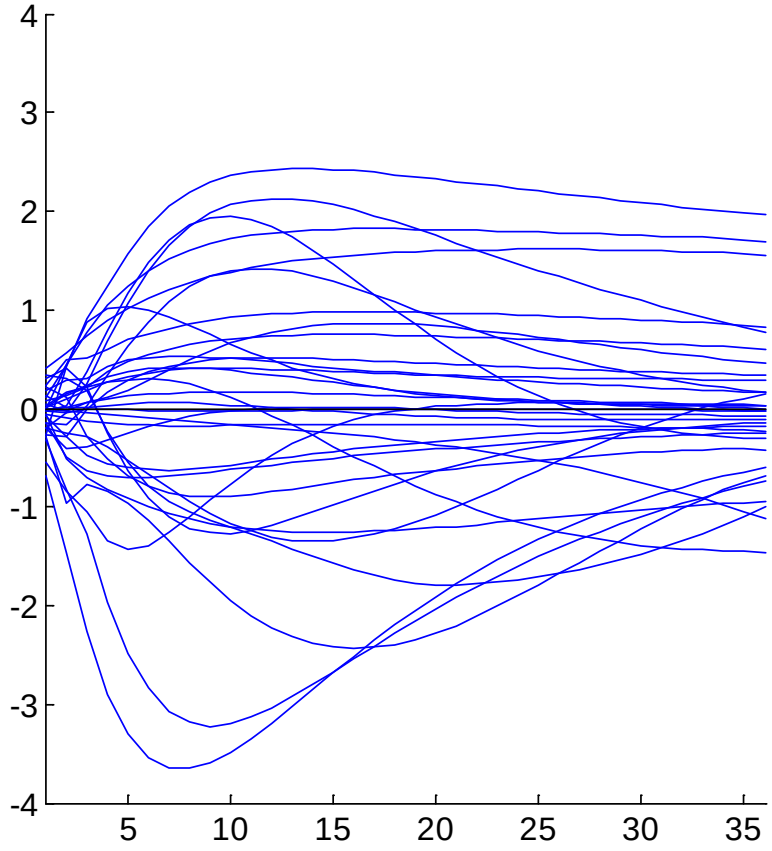


Constrained *vs.* unconstrained bank-level lending responses to LTRO, stressed countries

Lending with *constrained* domestic sovereign holdings



Lending with *unconstrained* domestic sovereign holdings



Re-cap: responses to LTRO

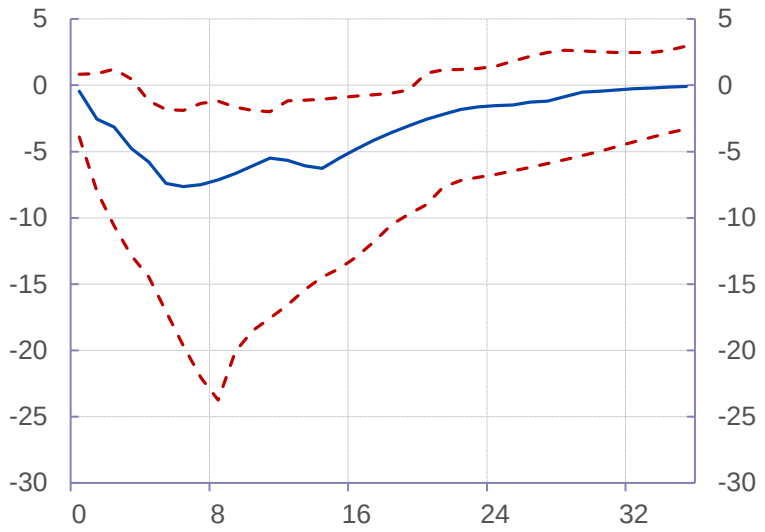
- Only statistically significant response: increase in domestic sovereign holdings of stressed-country banks
- Great heterogeneity in the responses of stressed-country banks – both for lending and sovereign debt holdings:
  - in particular, two groups of banks with sharply different responses of sovereign holdings: one that strongly increased them, and one that did not respond or reduced them slightly
- With sovereign holdings constrained to stay constant
  - lending by banks in stressed countries rises significantly
  - heterogeneity in their responses is much reduced
  - lending by banks in non-stressed countries is unaffected

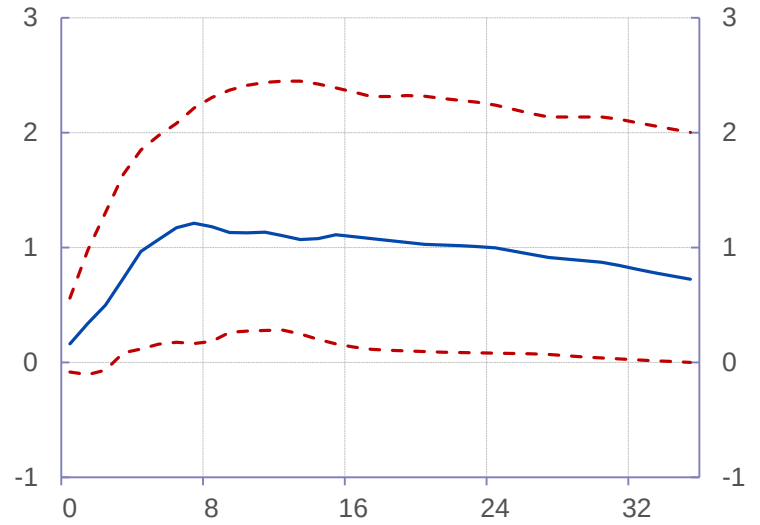
Q #1: effects of the APP and the TLTRO?

Sovereign Holdings

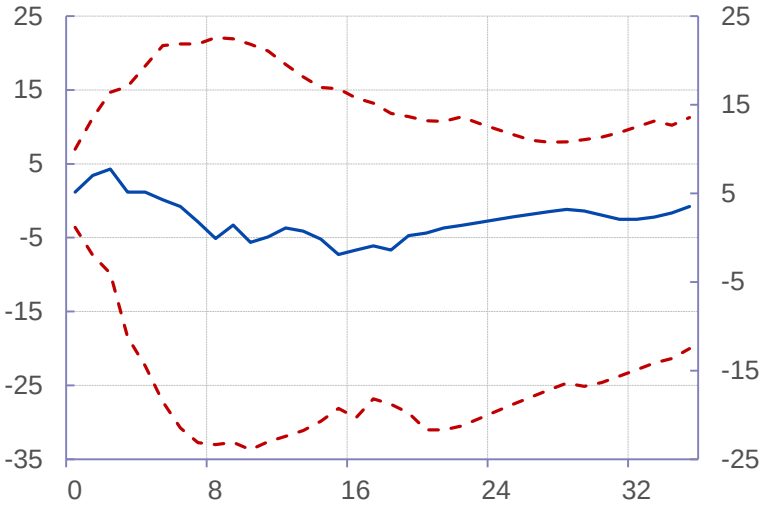
Lending

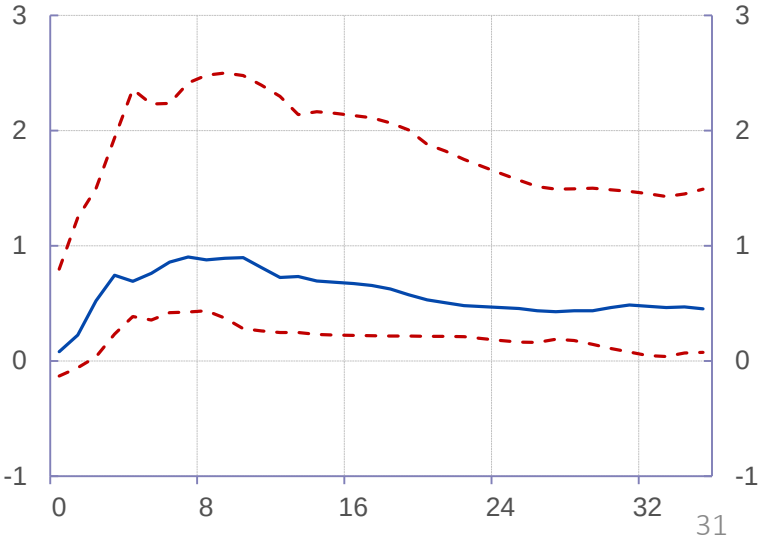
Stressed Countries





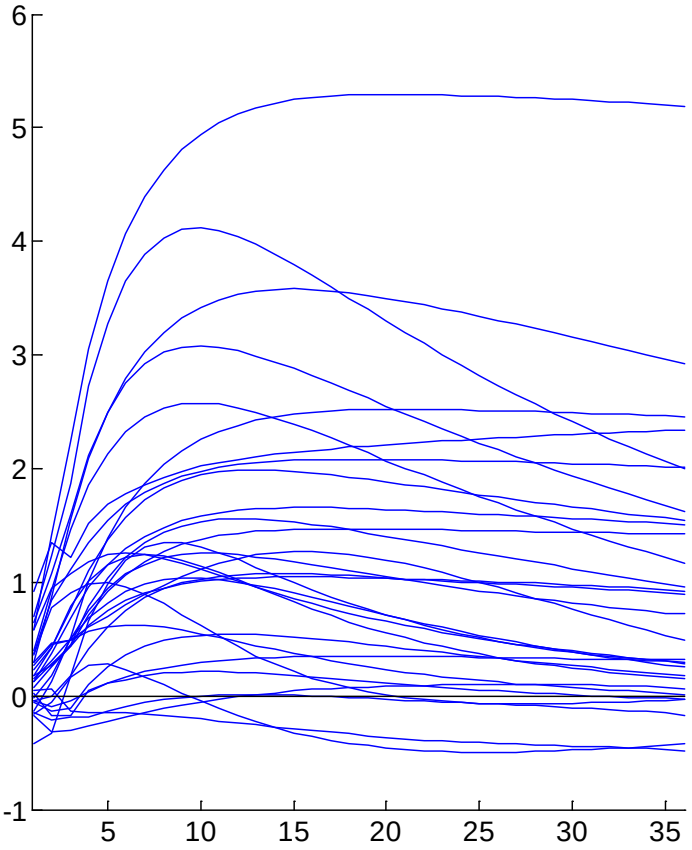
Non-stressed Countries



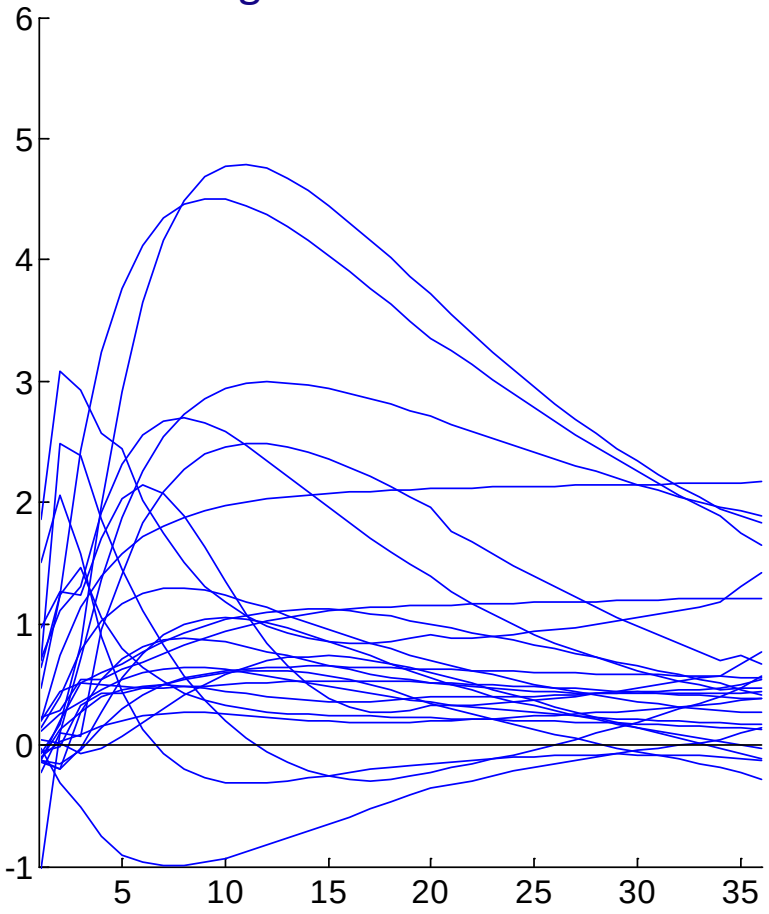


Bank-level lending responses to APP & TLTRO, stressed and non-stressed countries

Lending in stressed countries



Lending in non-stressed countries

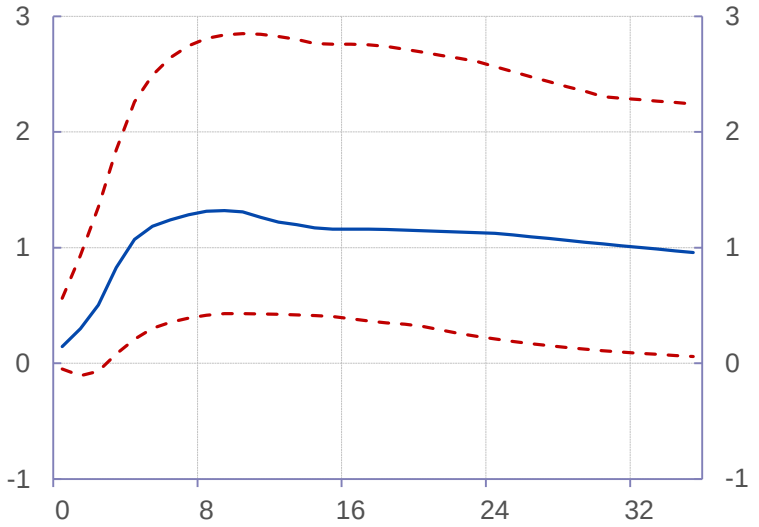


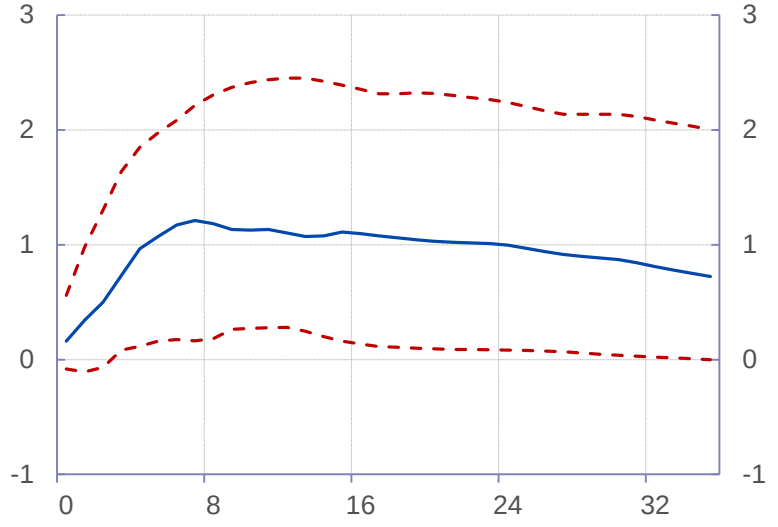
Q #2: APP & TLTRO with constant sov. holdings?

Lending with *constrained* sovereign holdings

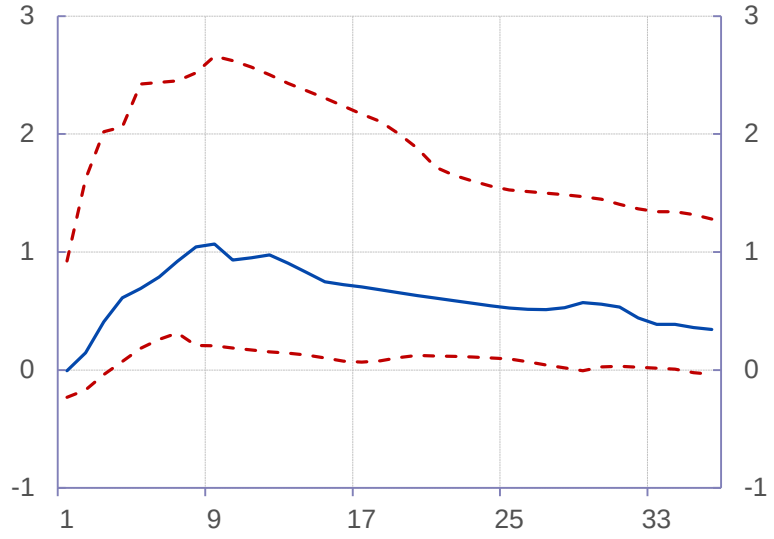
Lending with *unconstrained* sov. holdings

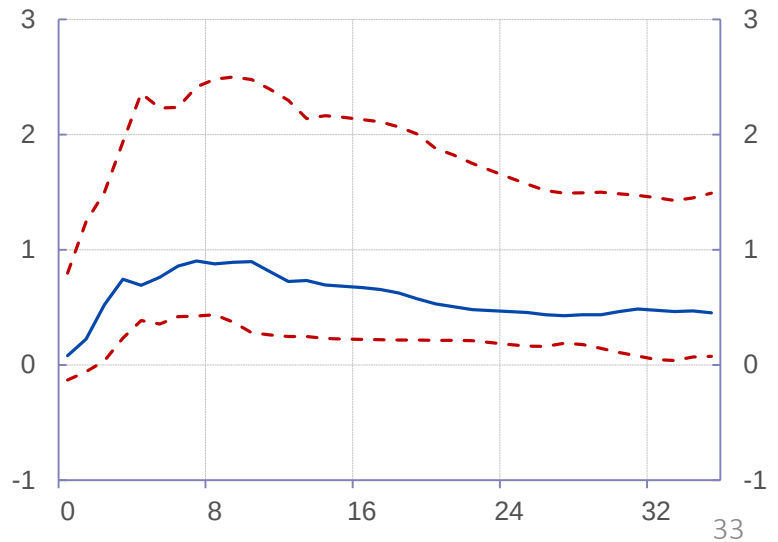
Stressed Countries





Non-stressed Countries





Re-cap: responses to APP and TLTRO

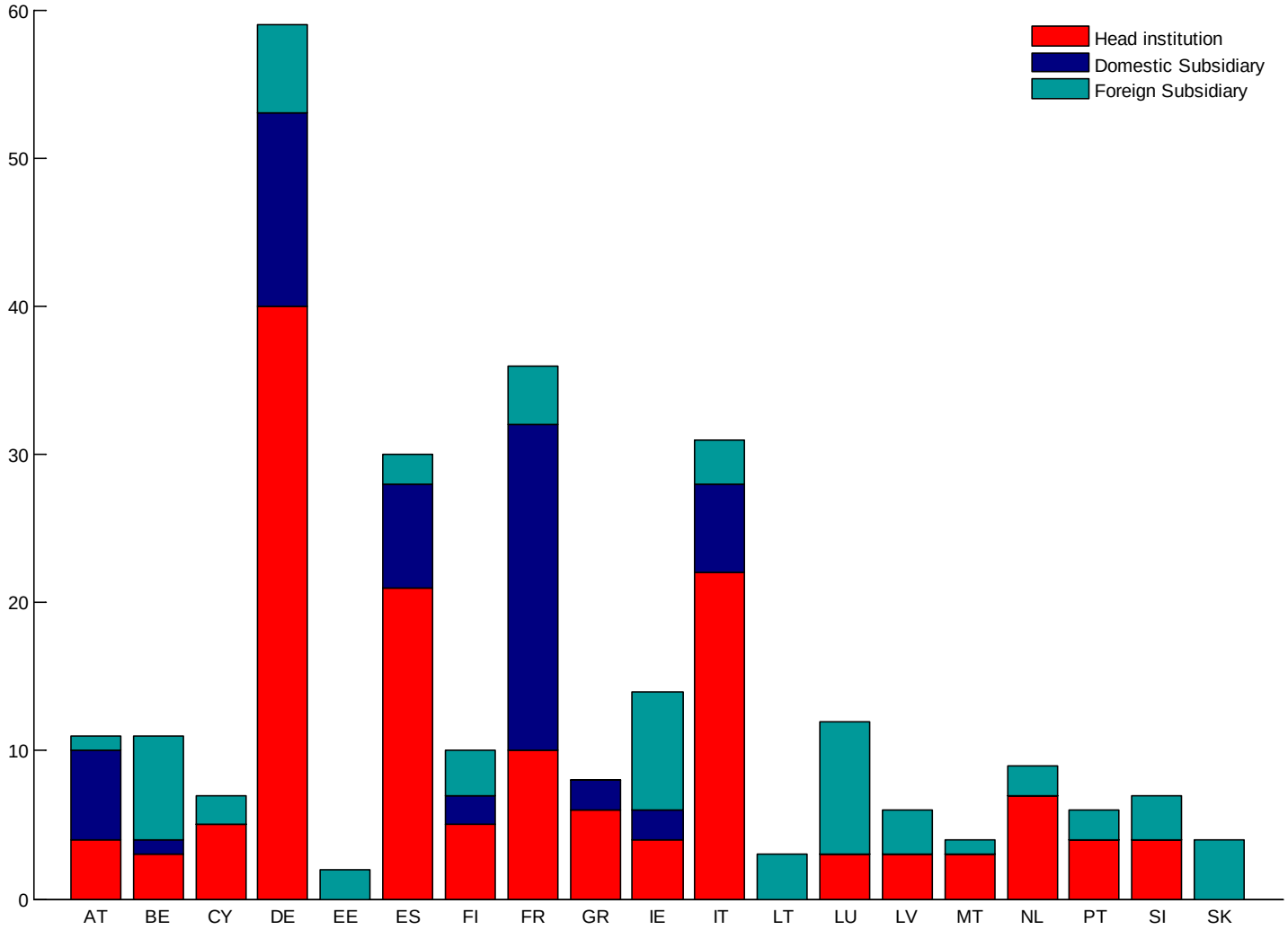
- Statistically significant *reduction* of domestic sovereign holdings by stressed-country banks
- Statistically significant *increase* of lending both in stressed and non-stressed countries
- Much more homogeneous responses of lending in both groups of countries than in the case of LTRO
- With sovereign holdings constrained to stay constant, no appreciable difference in the response of lending
  - This suggests that sovereign bond sales by banks in response to the APP had a minor role in increasing lending
  - The APP must have operated via other channels: yield-reduction channel, indirect refinancing channel (see above)

4. Conclusions

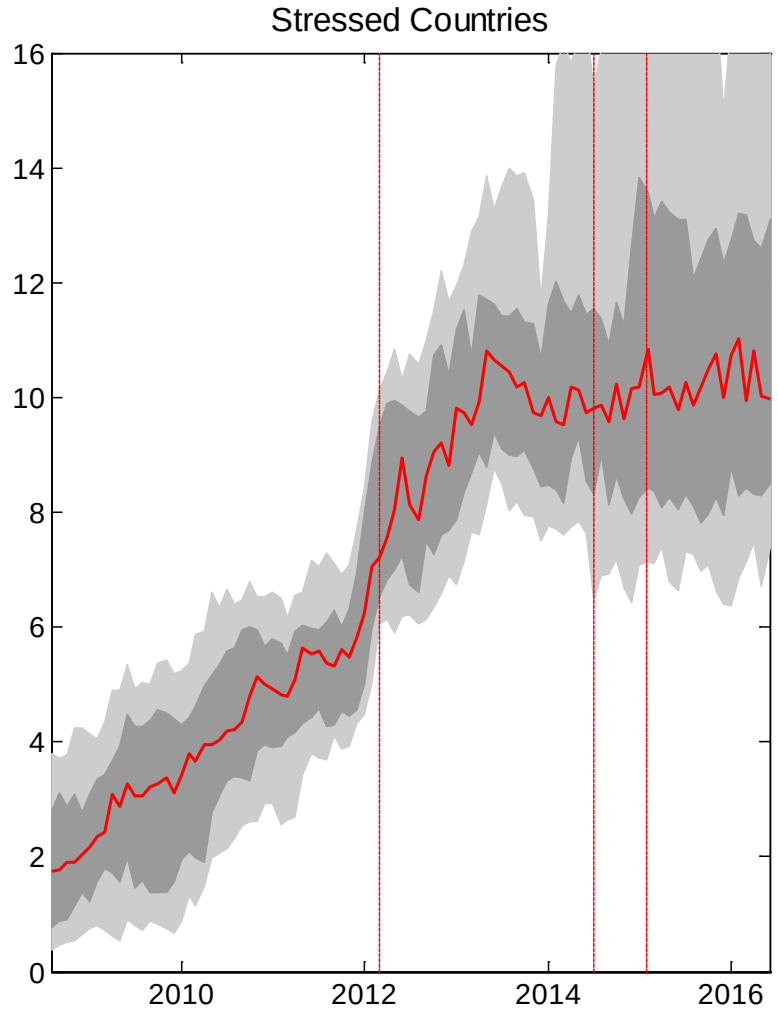
- *Different* unconventional monetary policies can be expected have *different* effects on lending
  - provision of liquidity against collateral (LTRO) features "leakage" towards securities purchases by banks, e.g. sovereign debt
  - "directed" provision of liquidity (TLTRO) reduces leakage
  - asset purchase programs (APP) tend to reduce banks securities' holdings, and may have a direct refinancing effect
- The Euro area evidence conforms to these predictions:
  - the LTRO had no significant overall effect on lending and increased banks' sovereign debt holdings in stressed countries
  - the TLTRO and the APP raised overall bank lending and reduced banks' sovereign debt holdings in stressed countries

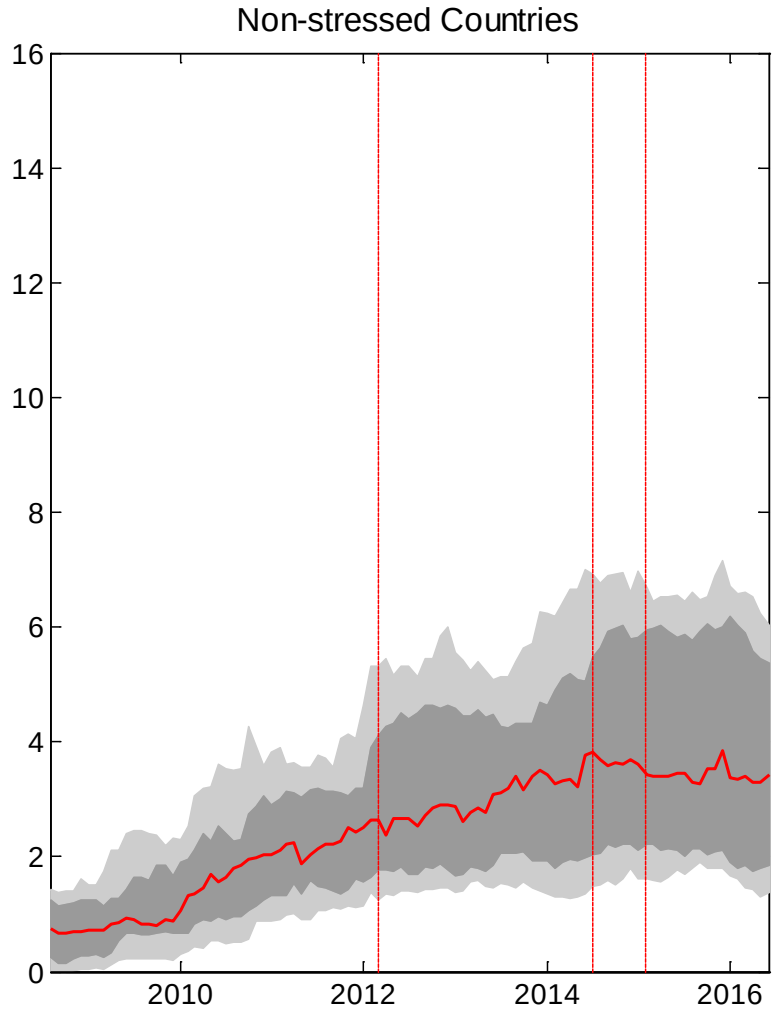
⇒ Policy question: had the ECB gone for TLTRO and APP in 2011-12, would lending have picked up speed earlier?

Sample: 306 banks

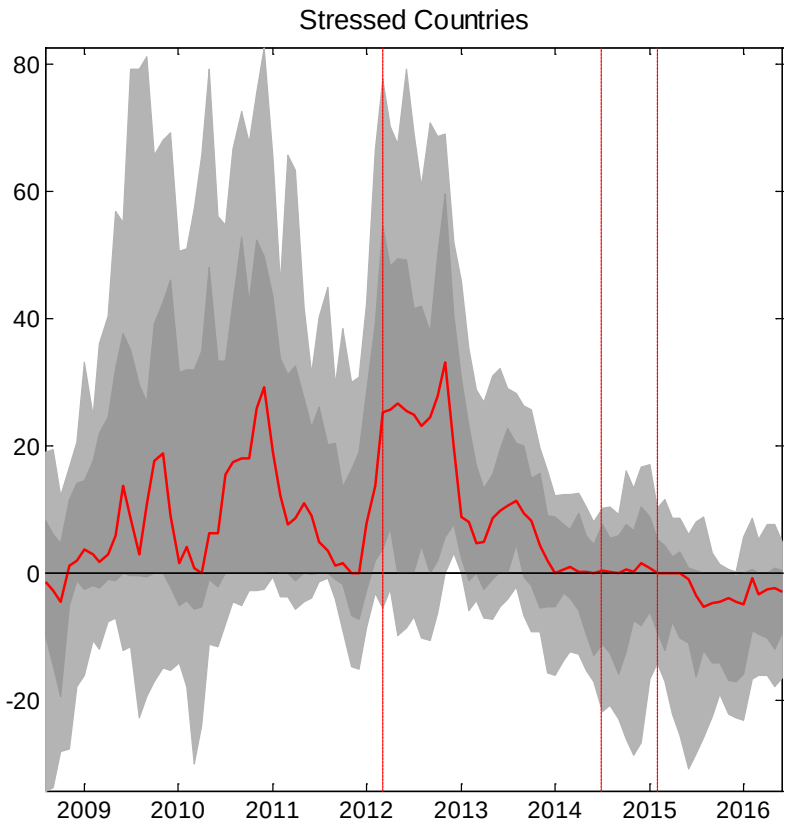


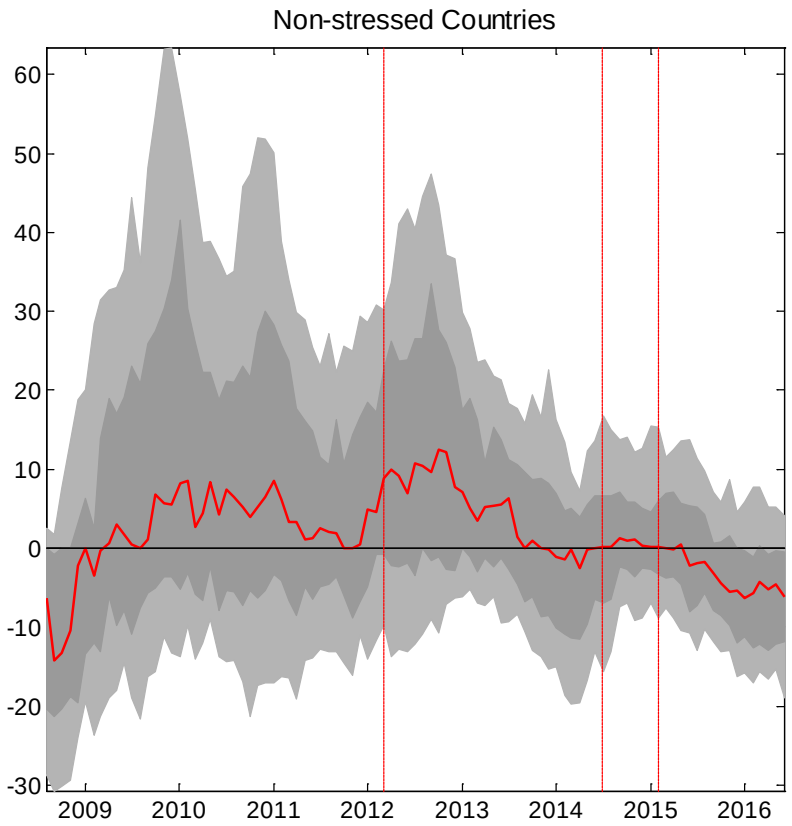
Ratio of Domestic Sov. Holdings to Main assets





Domestic Sovereign holdings - yoy growth rate





Loans to NFCs – yoy growth rate