

Does unconventional monetary policy contribute to
economic recovery in the euro area?
A new approach to evaluating the transmission of
monetary policy

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DG ECFIN Research Conference

Brussels

November 28 2016

Motivation

- Recent debates challenge the transmission of ECB monetary policy:
 - ① Debate about "broken monetary transmission mechanism".
 - ② Debate about monetary policy becoming less effective.
 - ③ Debate about "winners" and "losers" of ECB monetary policy.
- The reason for these concerns is that the ECB operates in uncharted territory:
 - ▶ The ECB has used a series of unconventional policy tools such as forward guidance, asset purchases and negative deposit interest rates.
 - ▶ We know very little about how these policies are transmitted to the real economy.

Motivation

- Analyzing the transmission of these measures is difficult because
 - ▶ the interest rate has reached the zero lower bound.
 - ▶ the ECB uses a wide array of different instruments at the same time.
 - ▶ policy effects are perceived to be different across countries.
- The standard model for interest rate policy, the vector autoregressive (VAR) model, is no longer feasible.
- In addition, a large chunk of policy is transmitted through financial markets - even more so during QE. We need an identification mechanism taking account of the simultaneity of financial market responses.

Contribution

- We estimate the transmission of monetary policy in the euro area:
 - ▶ Identify a monetary policy shock at the euro area level using Gertler and Karadi's (2015) VAR-with-instrument approach.
 - ▶ Put the estimated policy shock into country-specific local projections to study the disaggregated effects.
 - ▶ Relate the country-specific effects to structural determinants.
- Key findings:
 - ➊ Monetary transmission is heterogeneous across member countries.
 - ➋ Financial and credit channels other than through the exchange rate seem to be impaired.
 - ➌ The degree of impairment is closely related to structural determinants such as NPL, current account balances or structural rigidities.

Literature

- Our project connects several strands of the literature:
 - ➊ Stock and Watson (BPEA 2012), Mertens and Ravn (AER 2013), Gertler and Karadi (AEJ Macro 2015) introduce external instruments-approach into VAR literature.
 - ➋ Hachula et al. (DIW DP 2016), Andrade et al (ECP DP 2016) use external instruments for euro area VAR models, but with different focus and no country-specific estimates.
 - ➌ Boeckx, Dossche and Peersman (2016) and Boeckx, de Sola Perea and Peersman (2016) use sign-restricted VAR models to study ECB QE.
 - ➍ Burriel and Galesi (BdE DP 2016) estimate Global VAR model for the euro area with rich set of country-specific results.
 - ➎ Ha (2016) and Cesa-Bianchi et al. (2016) use identified shock from external instruments VAR in local projections.

Identifying the VAR with an external instrument

- Following Gertler and Karadi (2015) we apply an external instrument to identify the VAR-based policy shock.
- This methodology combines the event study approach with VAR models.
 - ▶ TSLS approach where the changes in German Bunds on meeting days are the instrument.
- This procedure has several advantages:
 - ▶ We account for the endogeneity of policy.
 - ▶ We obtain estimates of policy shocks which are free from imposed restrictions.
 - ▶ We can use this measure to study the effects of the multitude of policy instruments used by the ECB.

- Estimate monthly euro area VAR model for 1999:1 - 2016:1

$$Y_t = C + \sum_{j=1}^p B_j \cdot Y_{t-j} + D \cdot X_t + U_t$$

where X_t is exogenous.

- Since we are only interested in the responses to a monetary policy (MP) shock, we focus on

$$U_t = S \cdot \varepsilon_t^{MP} = [s^{MP}, s^{q1}, \dots, s^{qn}]' \cdot \varepsilon_t^{MP}$$

where ε_t^{MP} is the structural MP shock and S is a column vector capturing the shock responses.

- The question of how to disentangle the initial impact of ε_t^{MP} on the variables remains (i.e. an estimate for S is needed).

- Idea: receive an estimate for the ratio s^q/s^{MP} from the residuals.

$$\varepsilon_t^{MP} = \frac{u_t^{MP}}{s^{MP}} = \frac{u_t^q}{s^q}$$

$$\Rightarrow u_t^q = \frac{s^q}{s^{MP}} u_t^{MP}$$

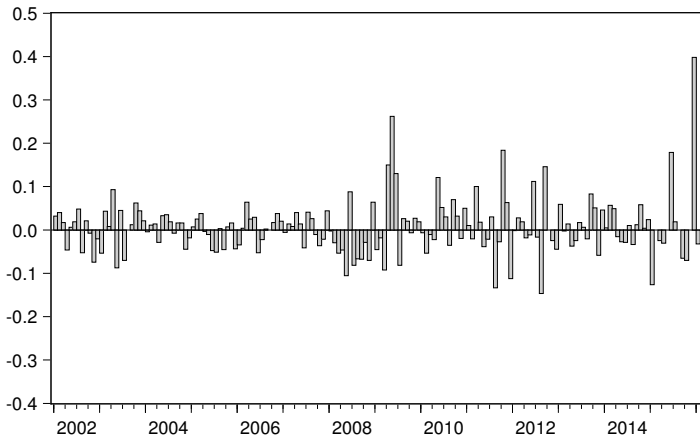
- We estimate s^q/s^{MP} from a TSLS regression of u_t^q on u_t^{MP} using an instrument Z_t .
 - ▶ 1. stage: regress u_t^p on Z_t to obtain the fitted \hat{u}_t^{MP} .
 - ▶ 2. stage: regress u_t^q on \hat{u}_t^{MP} to obtain s^q/s^{MP} .
- The instrument Z_t must be orthogonal to all structural shocks other than the MP shock.
- Based on that the response to monetary policy, s^{MP} , is then obtained from the estimated reduced form variance-covariance matrix.

- The vector of endogenous variables is

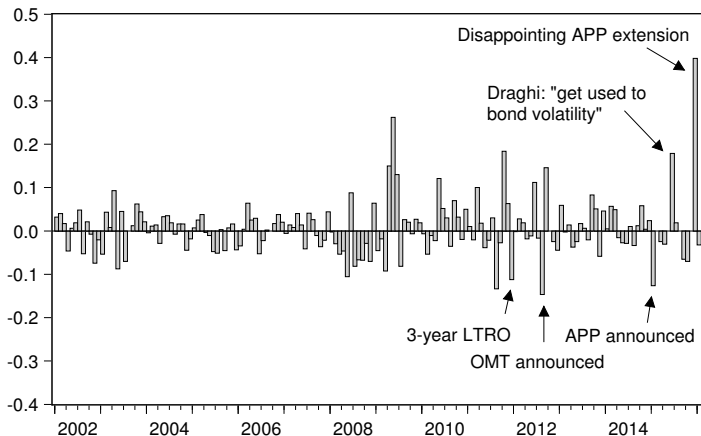
$$Y'_t = \{ \log(IP) \quad \log(HICP) \quad \log(REER) \quad shadowrate \}.$$

- Oil prices (in logs) enter exogenously. We set $p = 6$.
- Choice of instrument: change in German 10-year government bond yields on Governing Council meeting days and selected non-meeting days (SMP1, SMP2, "Whatever-it-takes", ...).
 - ▶ Assumption: change in bond yields on meeting days reflect only monetary policy surprises.
 - ▶ Alternative: change in Euribor Futures. Similar results, but very thin Futures market.

Policy surprises



Policy surprises



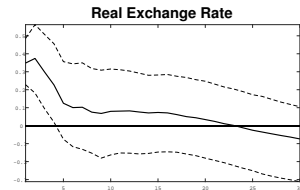
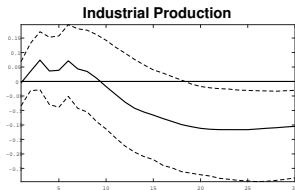
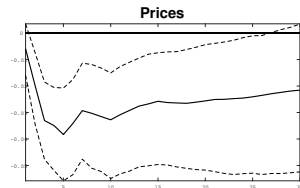
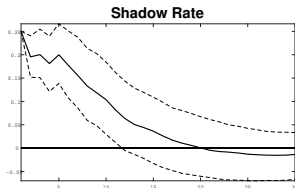
Policy surprises

- Event study on meeting and selected non-meeting days

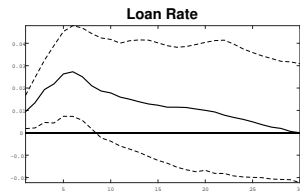
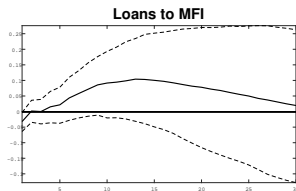
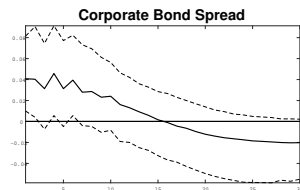
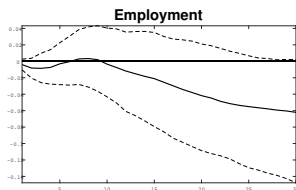
$$\Delta y_t = \alpha + \beta \cdot \text{surprise}_t + \varepsilon_t$$

y_t		coef.	p -value
(log) exchange rate	$\hat{\alpha}$	-0.037	0.47
	$\hat{\beta}$	7.166	0.00
Euribor Future	$\hat{\alpha}$	-0.001	0.41
	$\hat{\beta}$	0.141	0.00
corporate bond spread	$\hat{\alpha}$	-0.002	0.45
	$\hat{\beta}$	0.045	0.25

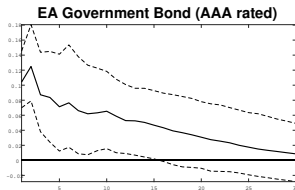
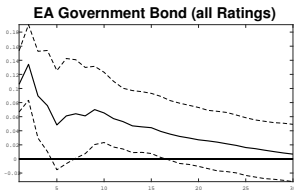
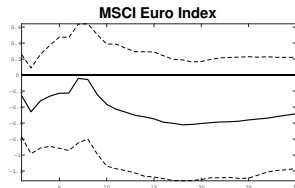
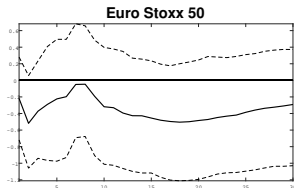
Results from baseline VAR



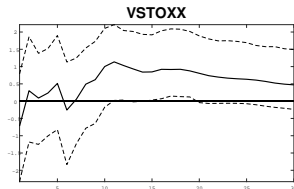
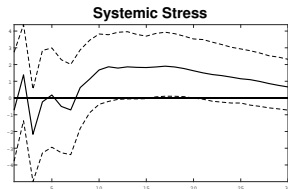
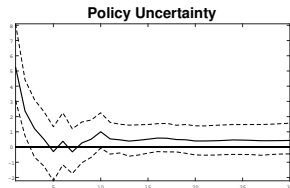
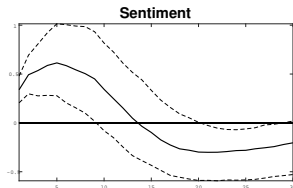
Baseline VAR with alternative 5th variable



Baseline VAR with alternative 5th variable



Baseline VAR with alternative 5th variable



Country-specific effects from local projections

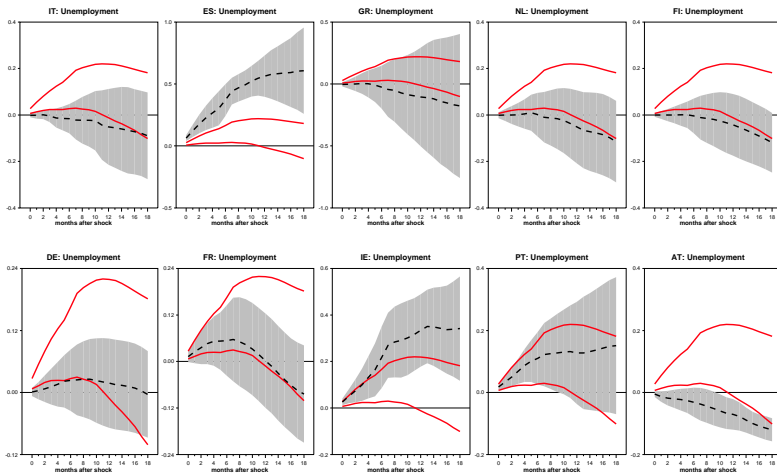
- Country specific effects of a euro area shock are estimated through local projections (Jordà, 2005).
- A series of regressions of y_t^i in country i dated $t+h$ on the identified VAR shock in t as well as control variables

$$y_{t+h}^i = \alpha_h^i + \beta_h^i Shock_t^{EA} + \gamma_h^{i'} \sum_{s=1}^p \mathbf{z}_{t-s}^i + \varepsilon_{t+h}^i$$

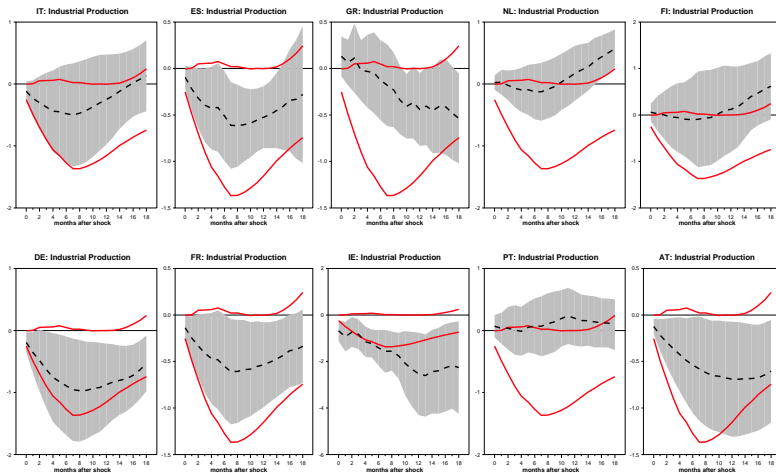
- Plotting β_h^i as a function of h gives a country-specific impulse response function to a euro area shock.
- For all variables we set $p = 1$.
- The vector \mathbf{z} contains y_t and, if appropriate, exogenous variables such as oil prices and the CISS index for systemic risk.

- There are several advantages of local projections as compared to VAR models:
 - 1 We use the identified euro area shock in country-specific models and thus exclude the feedback from national variables to ECB policy.
 - 2 The model requires estimating only a handful of parameters. Thus, it is particularly suited for situation in which the length of available time series is short.
 - 3 Since we do not need to estimate a complete system, the model is more robust with regard to model uncertainty. This should result in more robust estimates.

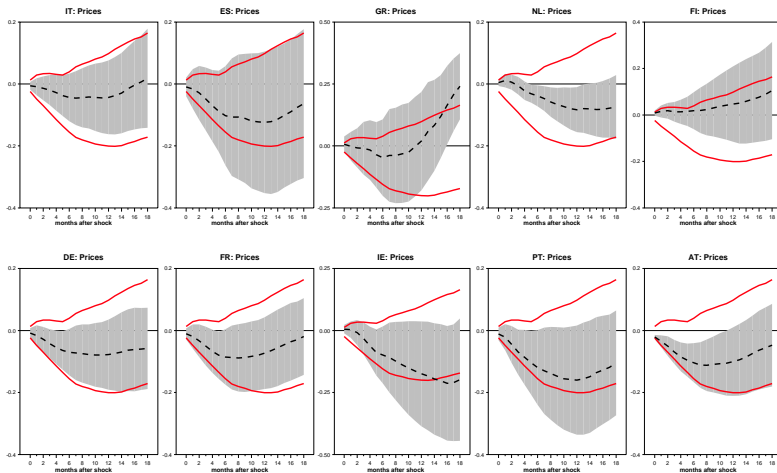
Response of Unemployment



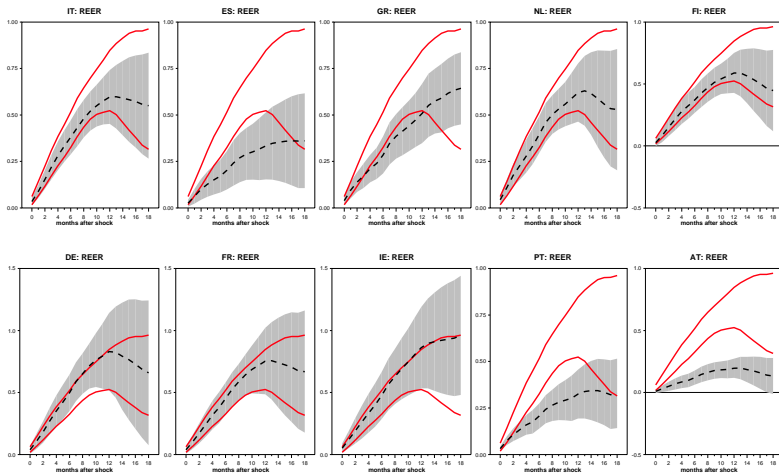
Response of Industrial Production



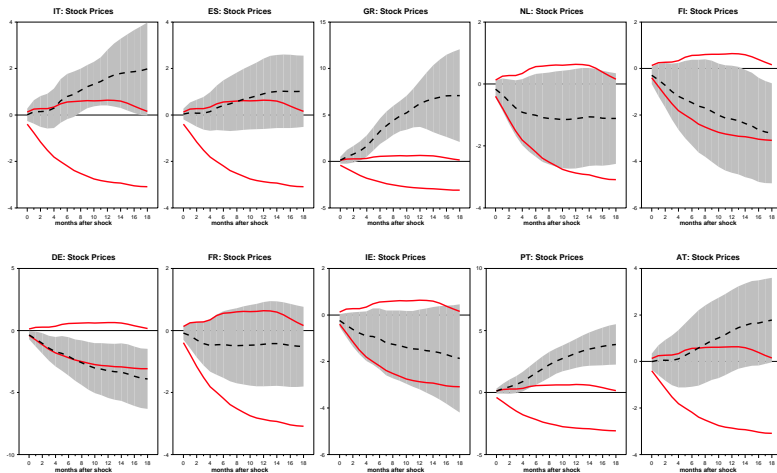
Response of HICP



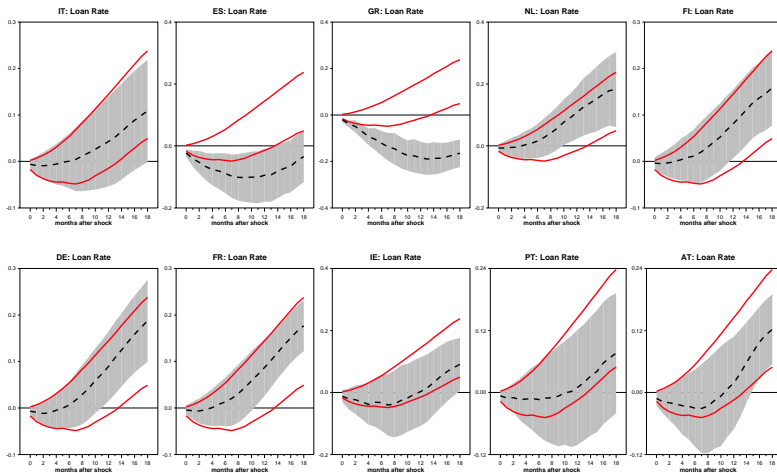
Response of REER



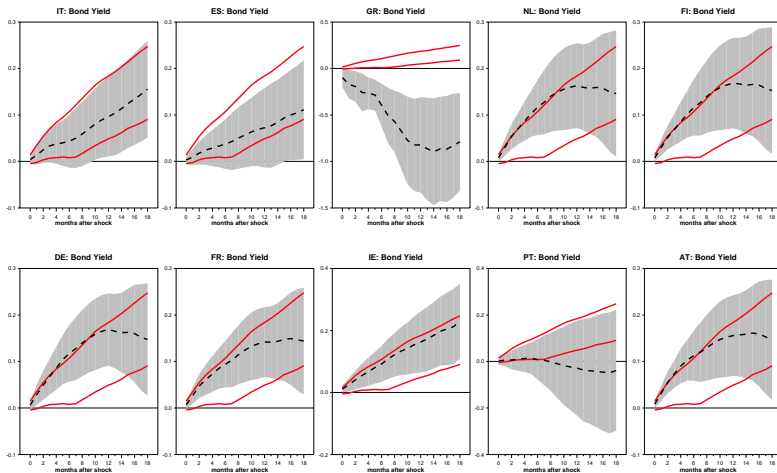
Response of Stock Prices



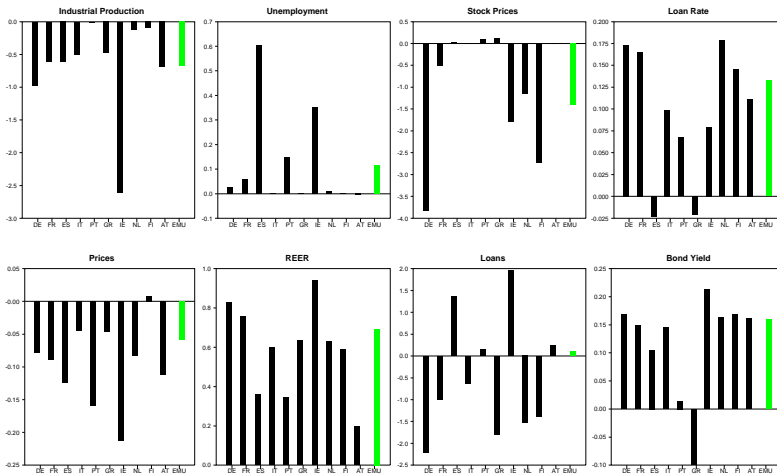
Response of Loans Rate



Response of Bond Yield



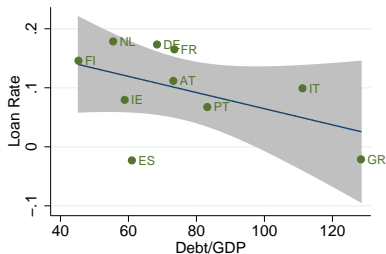
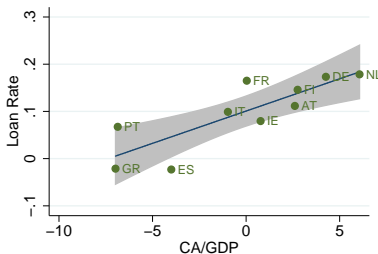
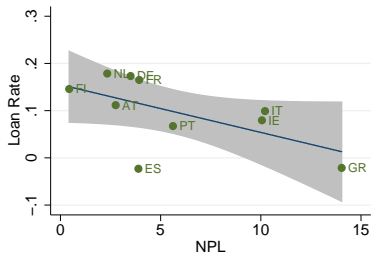
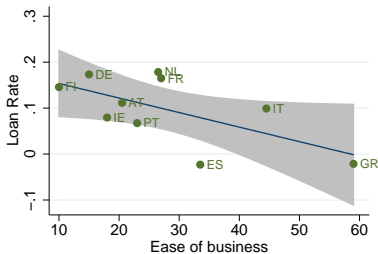
Peak Responses



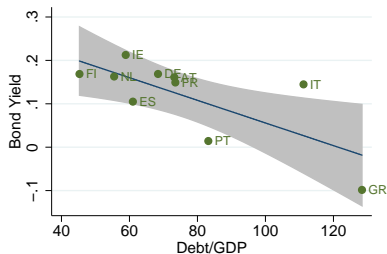
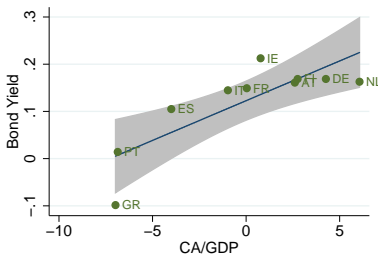
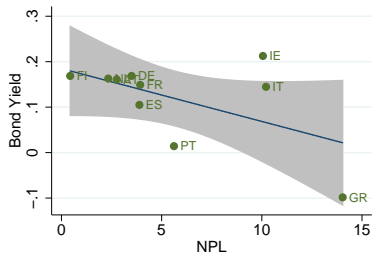
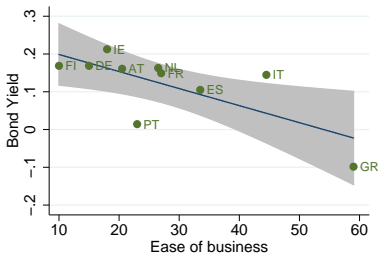
Relating peak responses to structural characteristics

- The impulse responses are heterogeneous across countries.
- To study systematic differences, we relate the peak responses of each variable to a set of six structural indicators.
 - 1 per-capita GDP.
 - 2 World Bank "ease of doing business"-index as a proxy for structural problems.
 - 3 share of non-performing loans on total loans.
 - 4 bank capital as a share of GDP.
 - 5 current account balance to GDP.
 - 6 debt level to GDP.
- Assumption: in the long-run these structural variables are independent from monetary policy.
- All proxies are averaged over 2002 to 2015.
- We show only selected scatter plots.

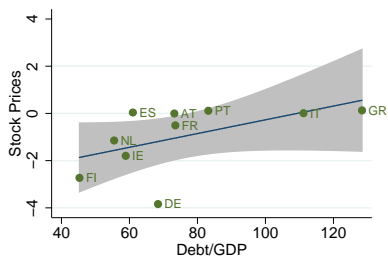
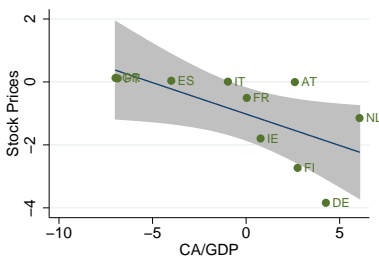
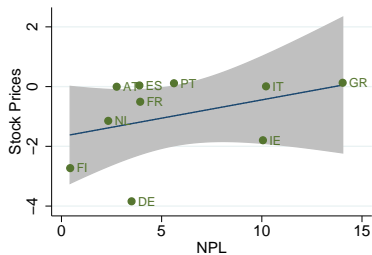
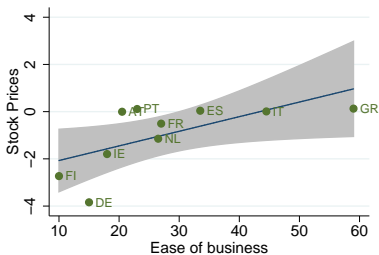
Response of Loan Rate vs. Fundamentals



Response of Bond Yield vs. Fundamentals



Response of Stock Prices vs. Fundamentals



Summary and Policy Implications

- Our results suggest:
 - ▶ A very heterogeneous transmission mechanism - both across channels and across countries.
 - ▶ Policy is transmitted through FX rates, spreads, yields, sentiment, ...
 - ▶ ... but less through banking system, stock markets.
 - ▶ Strength of transmission depends on structural characteristics.
- A "one-size-fits-all" monetary policy might not be the best tool to boost demand if national banking systems are blocked - not least since banks provide most financing in continental Europe.
- Structural policies and, if feasible, fiscal policies more suitable as they bypass the banking system.
- To do: changes in the transmission process after 2008/10/12 when the ECB adopted unconventional policies?

Additional slides

Bloomberg news on December 3 2015

Stocks Plunge With Dollar, Bonds as ECB Decisions Disappoint

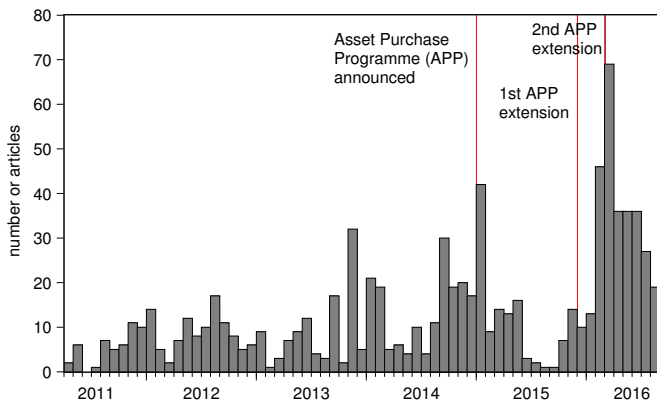
Jeremy Herron Oliver Renick
OJRenick

December 3, 2015 — 12:11 AM CET

Updated on December 3, 2015 — 10:32 PM CET

Equities tumbled around the world and government bonds sank, while the euro rallied the most in six years after the scale of additional stimulus from the European Central Bank disappointed investors just as the Federal Reserve signaled interest-rate increases are imminent.

The Standard & Poor's 500 Index fell the most in two months and European equities had



Number of articles on the *Nexis* database and the *Financial Times* archive in which the phrases “monetary policy”, “ECB” and “ineffective” occurred jointly.

Response of Loans

