A Non-Standard Monetary Policy Shock: The ECB's 3-Year LTROs and the Shift in Credit Supply

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ECB Workshop on non-standard monetary policy measures, Frankfurt am Main, 17-18 June 2013

The Issue: Identifying non standard measures

- An extensive literature has discussed the various policy alternatives, when the policy rate hit the zero lower bound.

- The identification of non-standard monetary policy shocks is still an uncharted territory.

- A number of empirical papers have focused on the impact of non-standard measures on asset prices through portfolio balance effects, particularly successful when they are announced.

- However, the first-order objective of the non-standard measures is to support the financial intermediation process to avoid the mistake of the early 1930s and the success of a policy ought to be measured in terms of macroeconomic implications.

The Issue: Identifying non standard measures

Bernake et al. (2004) and Cecioni et al. (2011) provide and extensive survey of the theoretical and empirical literature.

VAR methods for the euro area:

- Lenza, Pill and Reichlin (2010) and Giannone, Lenza, Pill and Reichlin (2012) study the impact of non standard measures by using counterfactual simulations.

- Peersman (2011) and Gambacorta, Hofmann and Peersman (2012) use SVAR with sign restrictions based on bank loans and central bank balance sheets.

3-years LTROs and bank lending standards

We focus on the impact of the 3-year long-term refining operations (LTROs), which amounts to 10.8% of euro area GDP in 2011:

- On 21 Dec. 2011, the ECB allotted EUR 489 billion to 500 banks

- On 29 Feb. 2012, the ECB allotted EUR 530 billion to 800 banks

Euro area credit standards
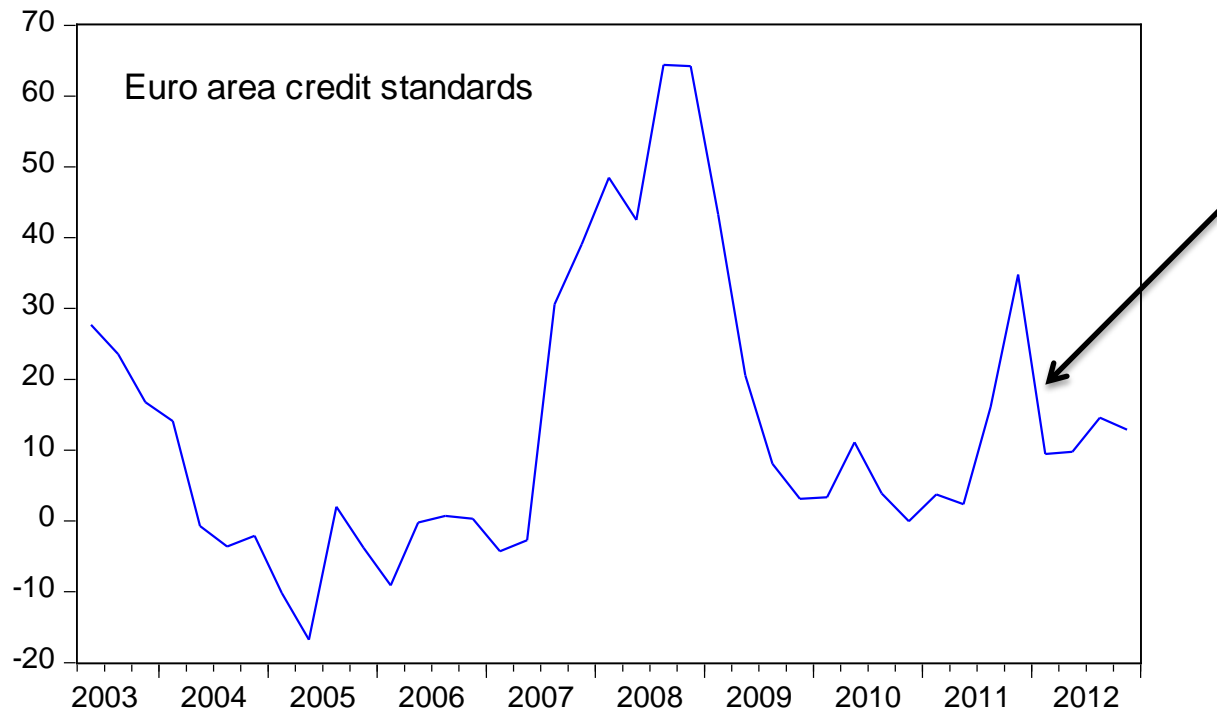
3-years LTROs and bank lending standards

Activity	Dates
3-yr LTROs announcement	8 Dec. 2011
First 3-yr LTROs allotment	21 Dec. 2011
Regular BLS (Jan. 2012)	19 Dec. 2011 - 9 Jan. 2012
Ad-hoc BLS on 3-yr LTROs	8 - 14 Feb. 2012
Second 3-yr LTROs allotment	29 Feb. 2012
Regular BLS (Apr. 2012)	23 Mar. - 5 Apr. 2012

Panel VAR: Characteristics

1. Real GDP growth

2. Deflator inflation

3. BLS demand factor

4. BLS supply factor

5. Cost of lending minus 3-month OIS

6. 3-month OIS

7. Loan growth to NFCs

Panel based on 8 or 11 countries

Sample period: 2003Q1 – 2011Q4

The model is similar in spirit to Ciccarelli et al. 2010

Method

Nickel (1981) bias:

The presence of fixed effects renders least square estimation inconsistent. (y and y(-1) are both function of the fixed effects)

Solution of the problem:

Maximum likelihood – GMM (Arellano-Bond, 1991).

Panel VAR is estimated in first difference using as instrument lagged levels of the dependent variable.

Identification of the credit supply shock

Two alternative methods:

- Recursive (Sims, 1980): GDP, INF, BLS-D, BLS-S, r-i, i, L

- Sign restriction (Uhlig, 2005; Rubio-Ramirez et. Al. 2010).

	Credit supply	Monetary policy	Aggregate Demand
GDP Growth	-	-	-
Inflation	-	-	-
Credit demand factor			-
Credit supply factor	+		
Cost of lending	+	+	-
Interest rate	-	+	-
Loan growth			

Impact of credit supply shock

Panel with 8 countries - recursive

Panel with 11 countries - recursive

Panel with 11 countries – sign restrictions

GDP
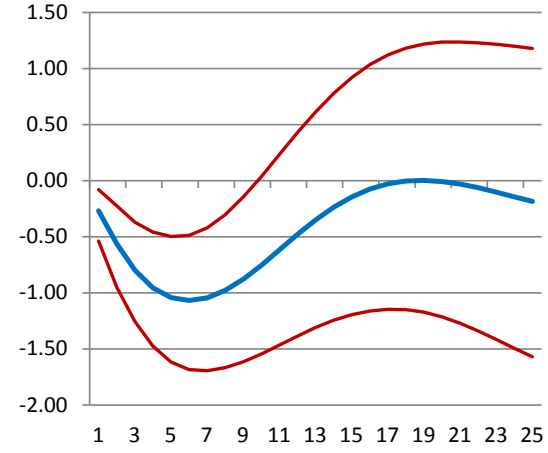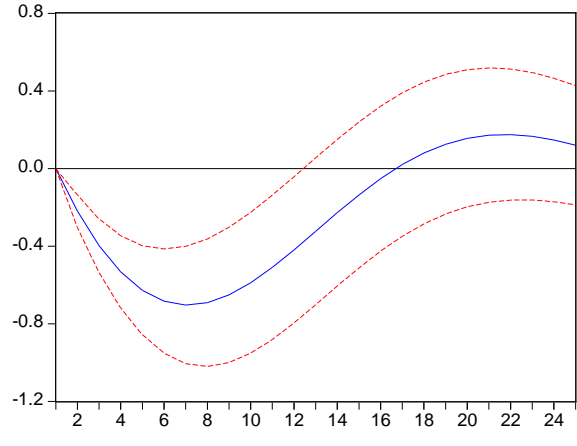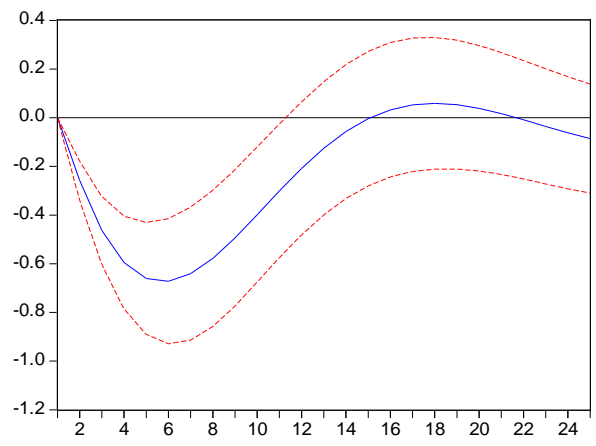
DEFLATOR
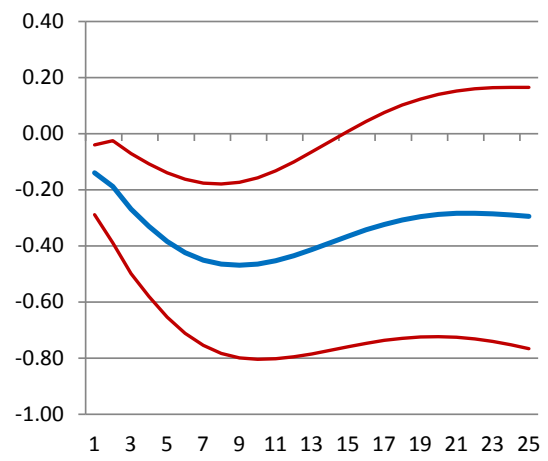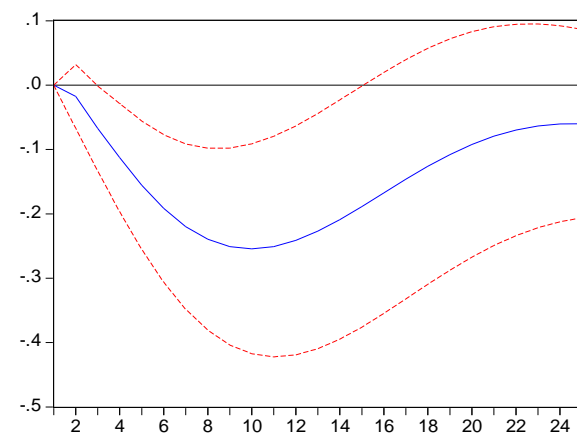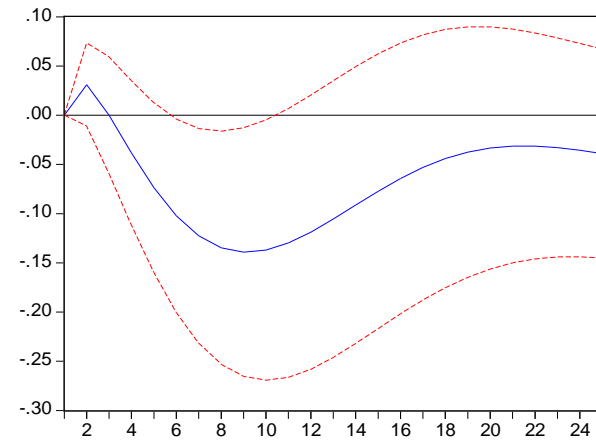
Historical decomposition of the Credit Supply shocks on the macroecomy: Recursive method
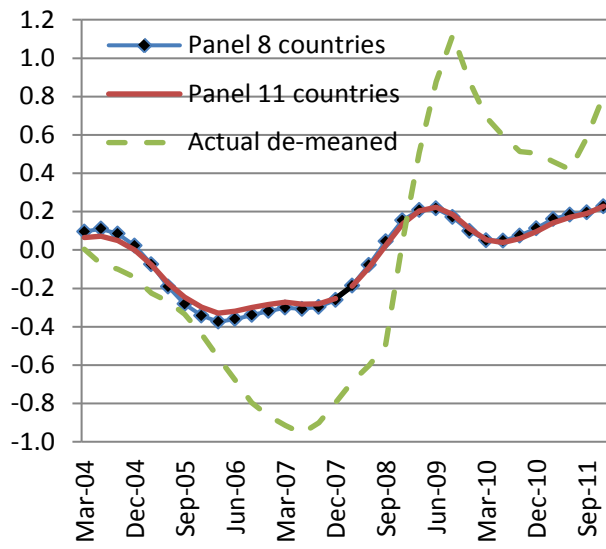

Real GDP growth (yoy, %)
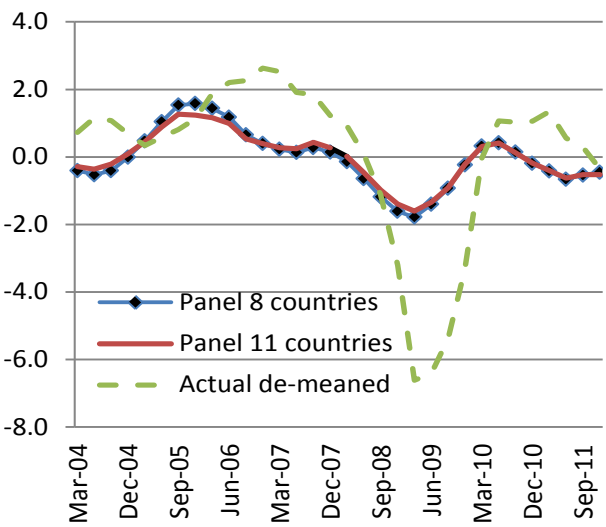
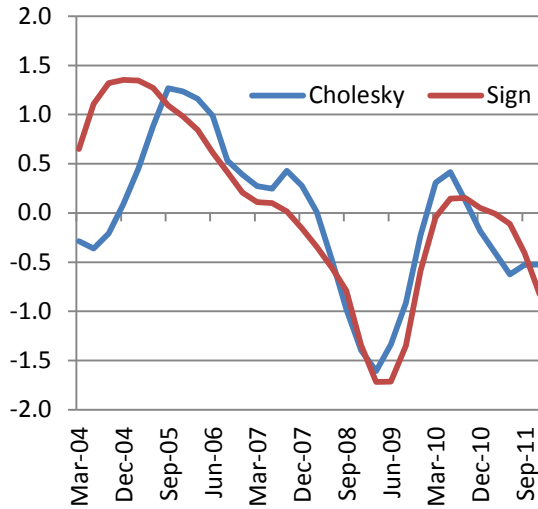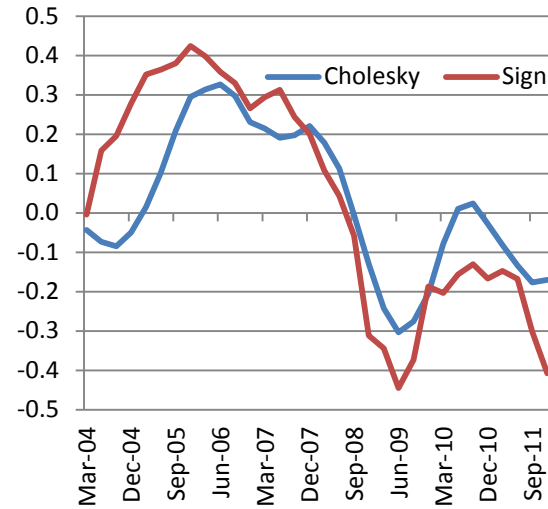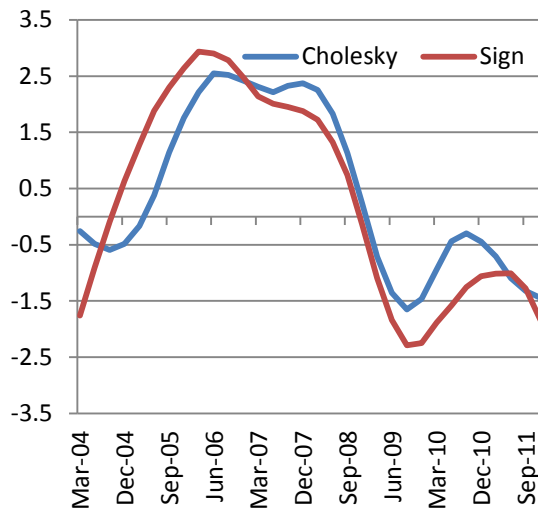GDP deflator inflation (yoy, %)
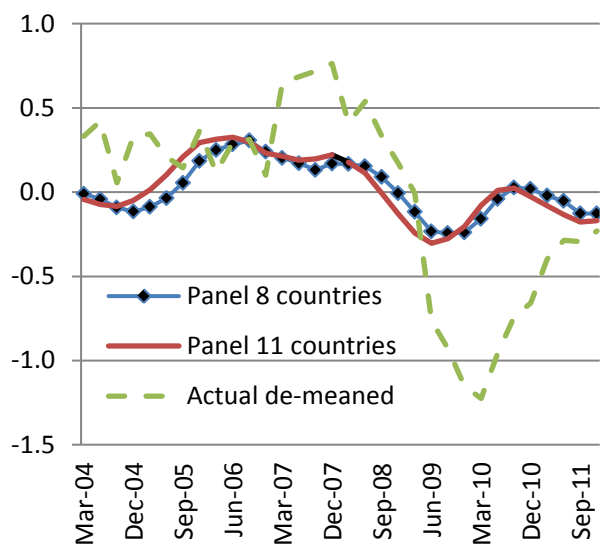
Loan growth to NFCs (yoy, %)
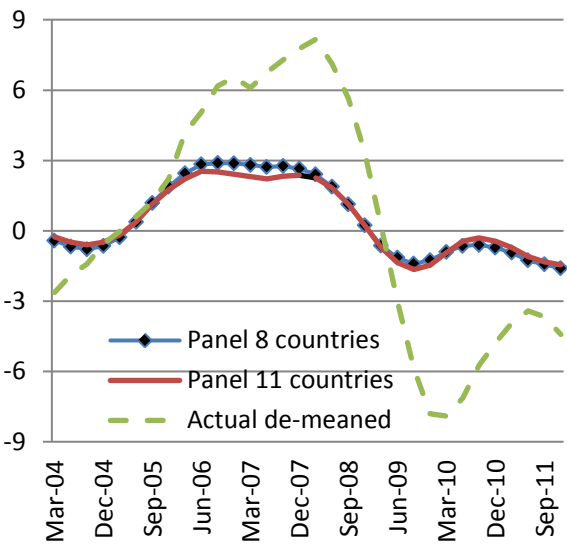
Lending spread to NFCs (yearly average, pp)

Historical decomposition of the Credit Supply shocks on the macroeconomy: Sign restriction method
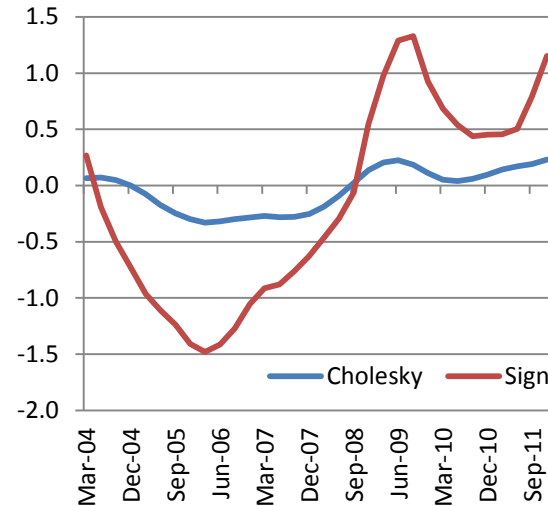
Real GDP growth (yoy, %)

GDP deflator inflation (yoy, %)

Loan growth to NFCs (yoy, %)

Lending spread to NFCs (yearly average, pp)

Credit supply shock and the 3-yr LTROs

April 2012 BLS provides

BLS supply and demand factor for 2012Q1 and expected for 2012Q2
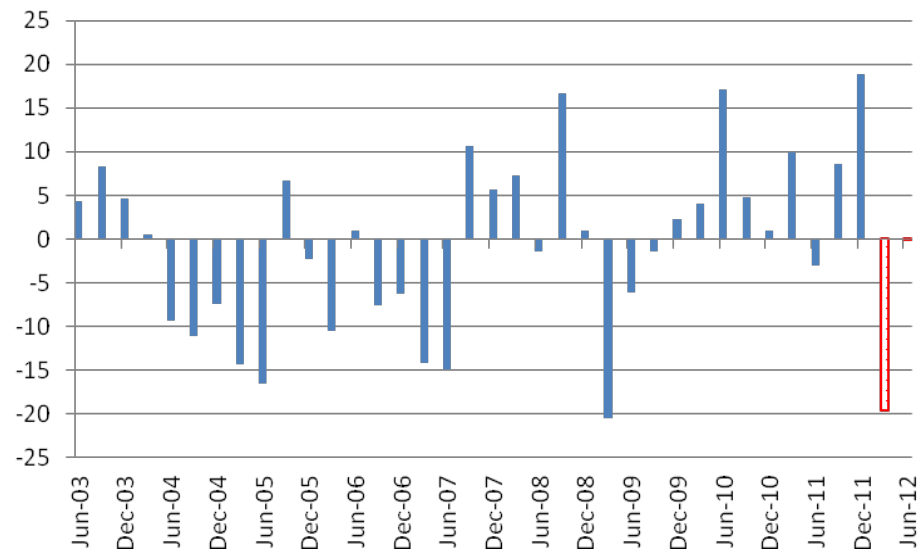
Kalman filter is used to forecast the other variables of the system needed to extract the underlying credit supply shock

Ad hoc February 2012 BLS provides
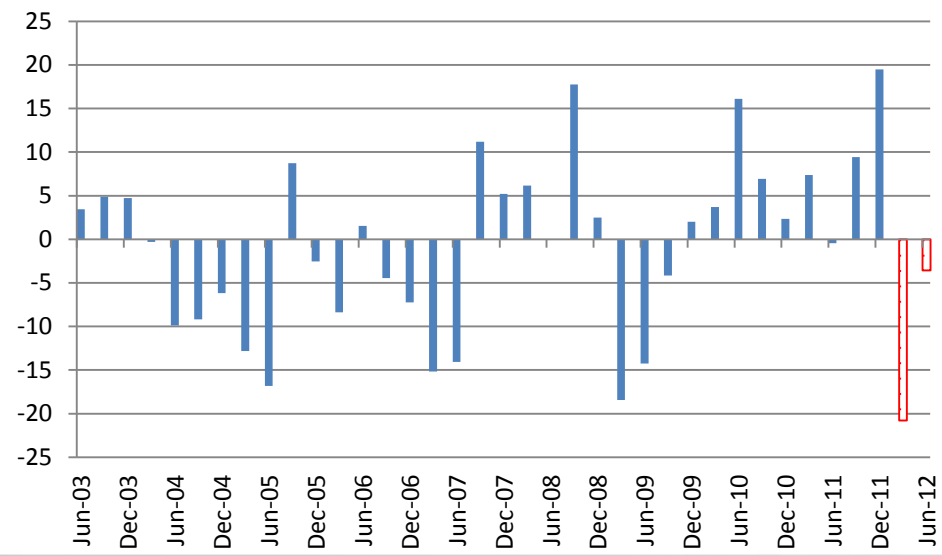
the credit supply shock for 2012Q1 and 2012Q2

Credit supply shock and the Apr. 12 BLS: Recursive method
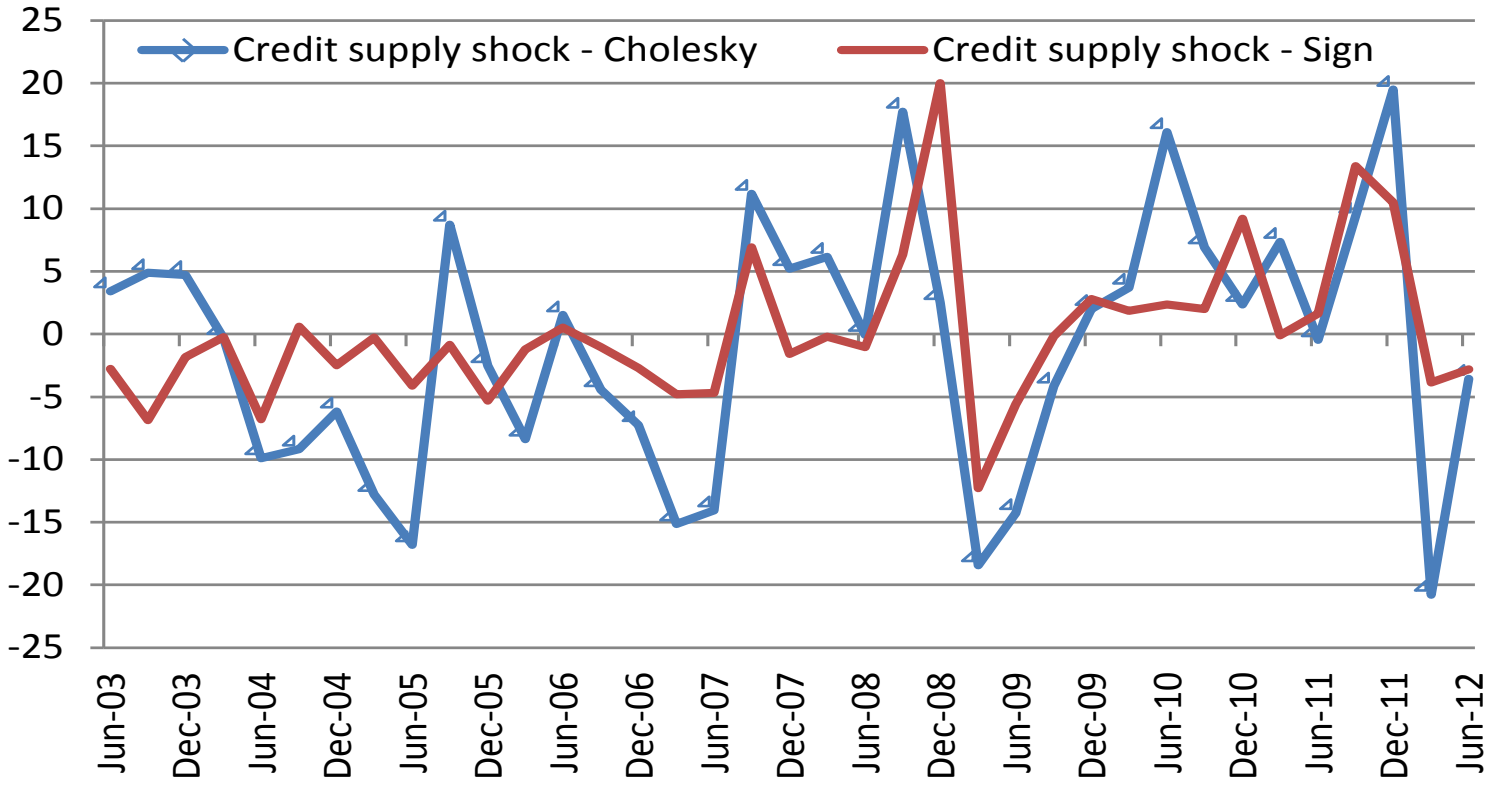

Panel with 8 countries

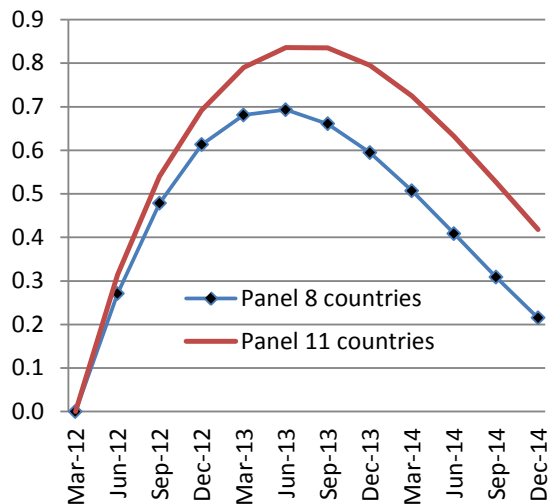Panel with 11 countries

Sharp unexpected improvements in credit standards in 2012Q1

Credit supply shock and the Apr. 12 BLS: Sign restrictions method

Sharp unexpected improvements in credit standards in 2012Q1

Real GDP
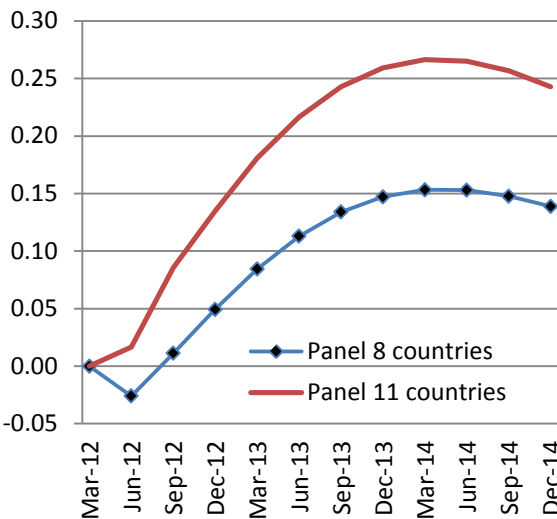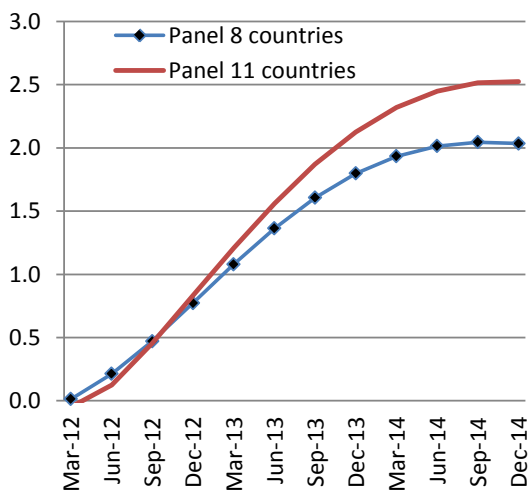
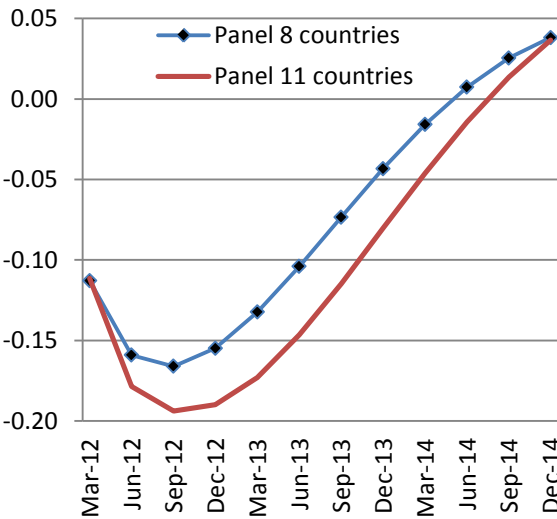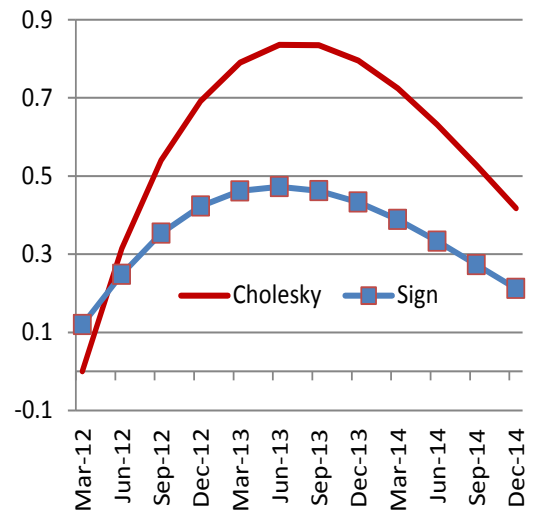GDP deflator

Loan to NFCs

Lending spread to NFCs

Impact of the 3-year LTROs using the ad-hoc BLS – recursive method

Real GDP

GDP deflator

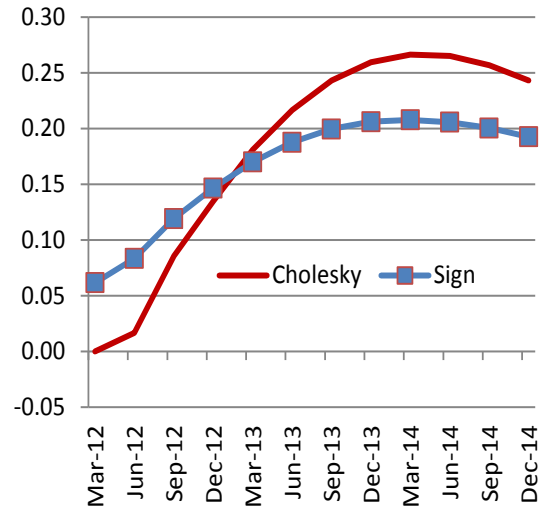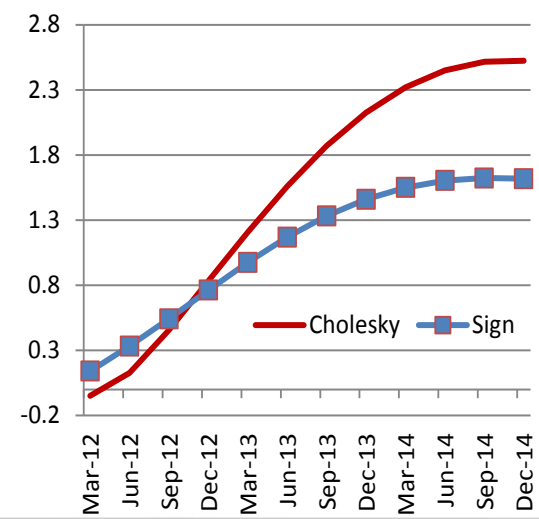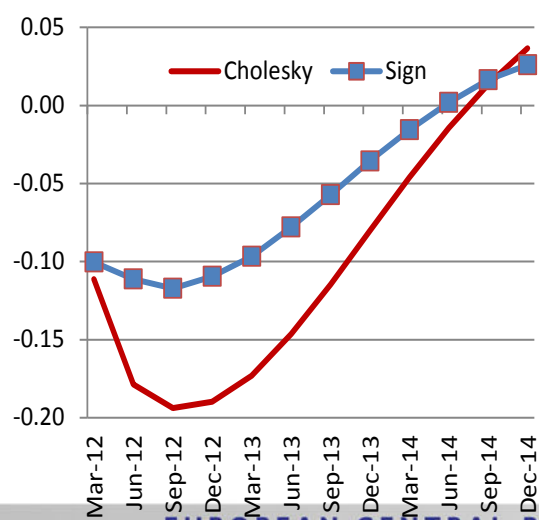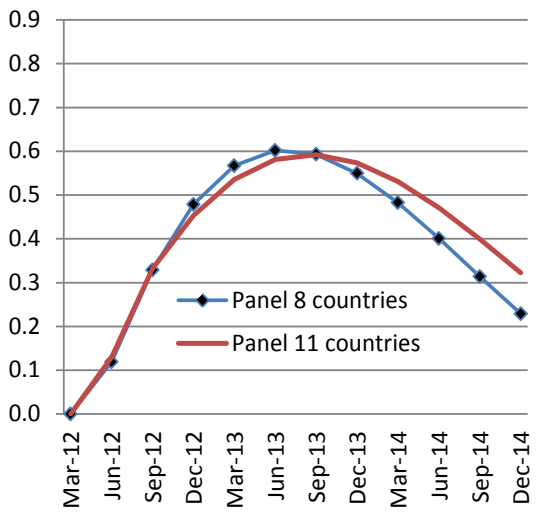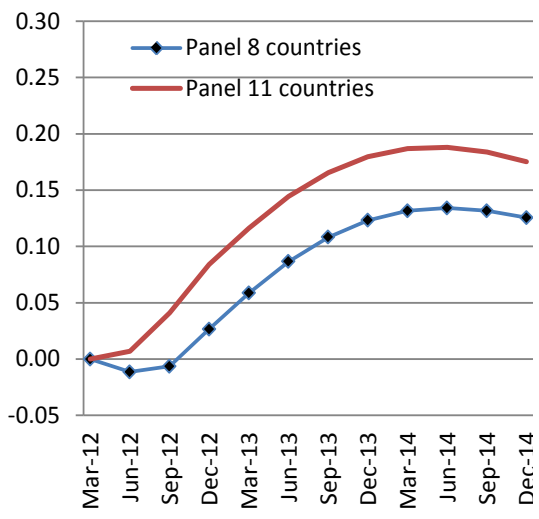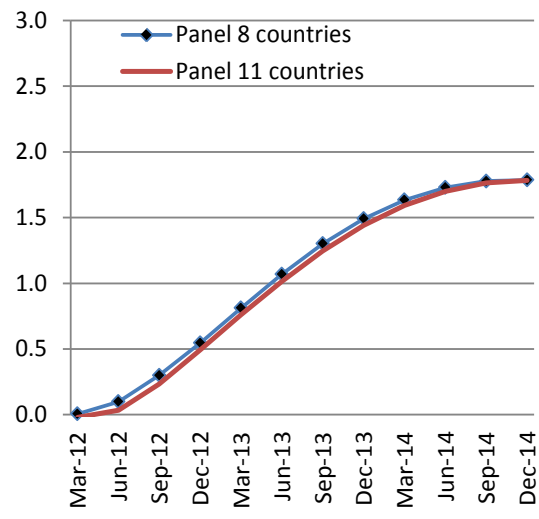Loan to NFCs

Lending spread to NFCs
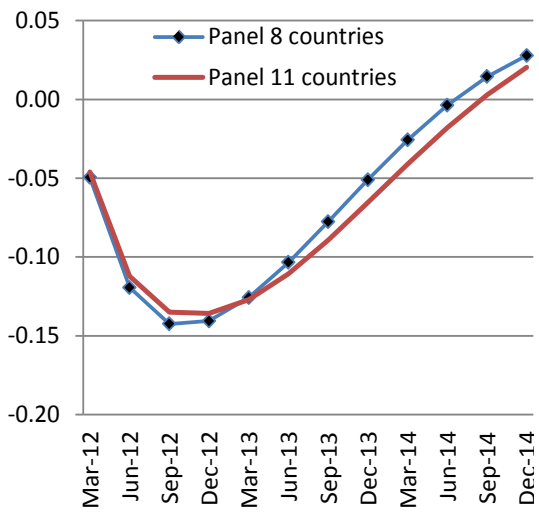
On the exogeneity of the credit supply shock

Using lending rate
minus 3m OIS

Using corporate credit
spreads

Using financial
innovations

Credit spread shocks ordered third in the panel VAR excluding BLS demand and supply factors (x-axis) versus credit supply shocks ordered seventh in the panel VAR including BLS demand and supply factors (y-axis)
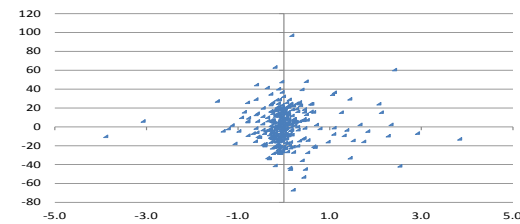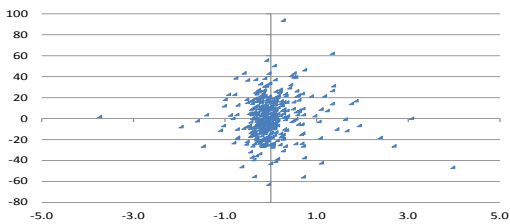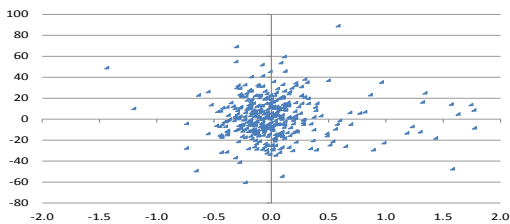
Credit supply shocks ordered fourth in the panel VAR including BLS demand and supply factors (x-axis) versus credit supply shocks ordered seventh in the panel VAR including BLS demand and supply factors (y-axis)
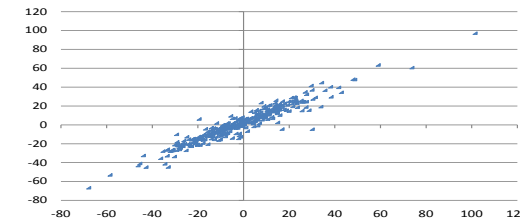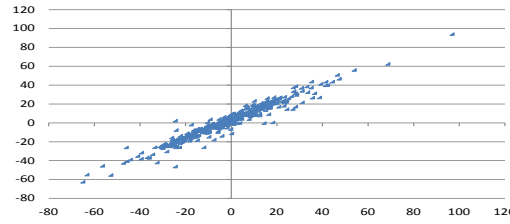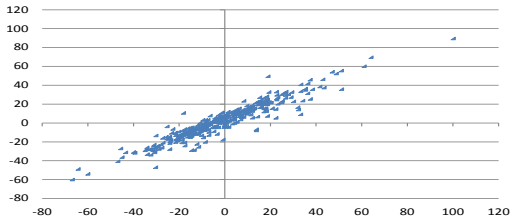
On the exogeneity of the credit supply shock

Credit supply shocks identified using recursive method

$$\text{Credit supply shock}(i,t) = a * x(i,t) + b*x(i,t-1) + c*x(i,t-2) + d(i) + e(i,t)$$

|	Coef (t)	s.e. (t)	Coef (t-1)	s.e. (t-1)	Coef (t-2)	s.e. (t-2)	R^2
Lending rate spreads (i,t)	13.292***	(2.543)	-14.754***	(3.696)	2.472	(2.759)	0.074
Corporate spreads (i,t)	5.47***	(1.577)	-5.975**	(2.404)	2.254	(1.674)	0.040
Financial innovation (i,t)	5.402***	(1.473)	-1.509	(2.069)	-2.084	(1.734)	0.080
VIX (t)	0.594***	(0.178)	0.266	(0.202)	-0.504***	(0.192)	0.060
3-month EURIBOR-OIS (t)	13.38***	(2.71)	-8.346**	(3.465)	-0.786	(2.804)	0.068
Stock market returns (i,t)	-0.566***	(0.11)	0.201	(0.127)	-0.033	(0.114)	0.076
Long-short lending rates (i,t)	-2.907	(3.007)	-0.292	(3.546)	2.923	(3.095)	0.007
Yield curve (i,t)	4.072***	(1.57)	-8.525**	(3.333)	3.958	(2.462)	0.023
Lending rate spread shocks (5 var.) (i,t)	15.58***	(2.792)	0.983	(2.766)	1.495	(3.059)	0.088
Lending rate spread shocks (7 var.) (i,t)	16.478***	(2.818)	1.451	(2.811)	2.366	(3.068)	0.094
Corporate credit shocks (5 variables) (i,t)	6.853***	(1.784)	0.804	(1.895)	1.369	(1.961)	0.048
Corporate credit shocks (7 variables) (i,t)	6.599***	(1.83)	-0.049	(1.94)	1.41	(1.989)	0.042
Financial shocks (5 variables) (i,t)	5.742***	(1.523)	3.677**	(1.613)	-0.588	(1.74)	0.087
Financial shocks (7 variables) (i,t)	5.922***	(1.533)	3.662**	(1.616)	-0.899	(1.751)	0.091

On the exogeneity of the credit supply shock

Credit supply shocks identified using sign restriction method

Credit supply shock(i,t) = a * x(i,t) + b*x(i,t-1) + c*x(i,t-2) + d(i) + e(i,t)

	Coef (t)	s.e. (t)	Coef (t-1)	s.e. (t-1)	Coef (t-2)	s.e. (t-2)	R^2
Lending rate spreads (i,t)	1.222***	(0.06)	-1.407***	(0.087)	0.37***	(0.065)	0.548
Corporate spreads (i,t)	0.444***	(0.046)	-0.58***	(0.07)	0.277***	(0.048)	0.238
Financial bond premium (i,t)	0.326***	(0.048)	-0.237***	(0.067)	0.008	(0.056)	0.160
VIX (t)	0.029***	(0.006)	0.012*	(0.007)	-0.027***	(0.006)	0.122
3-month EURIBOR-OIS (t)	1.136***	(0.072)	-0.993***	(0.092)	0.115	(0.074)	0.420
Stock market returns (i,t)	-0.034***	(0.003)	0.009**	(0.004)	0.001	(0.003)	0.261
Long-short lending rates (i,t)	-0.142	(0.1)	0.084	(0.118)	0.176*	(0.103)	0.025
Yield curve (i,t)	0.405***	(0.047)	-0.75***	(0.1)	0.402***	(0.074)	0.219

Lower interbank credit risk after the 3-year LTROs
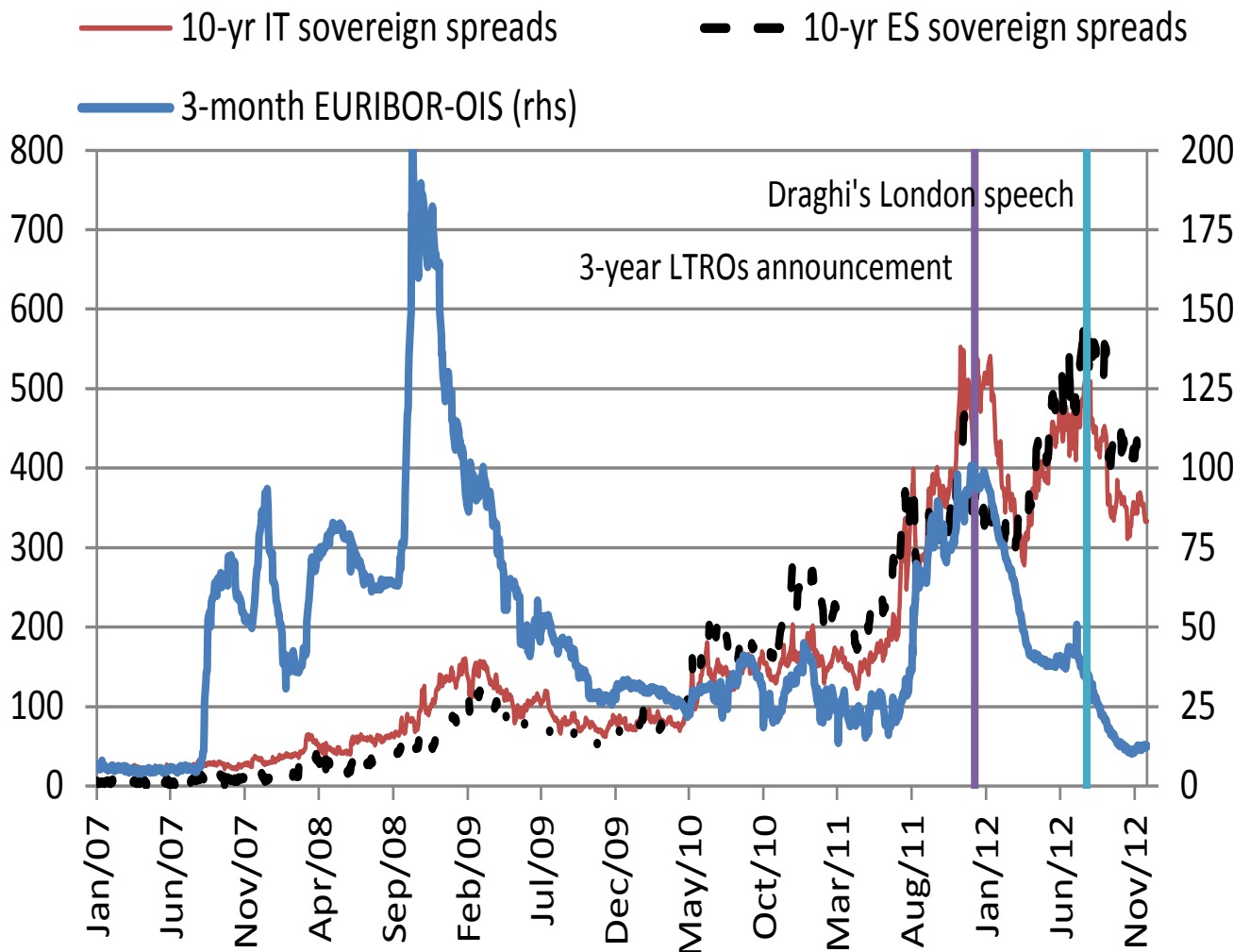
Lower interbank credit risk despite negative news in 2012Q2:

1. Bank solvency in Spain

2. Negative unexpected macroeconomic releases

3. Higher political risk (political elections in Greece, referendum in Ireland on the fiscal compact, discussion on banking union, etc.)

Conclusions

- We can identify the impact of the 3-yr LTROs using the BLS.

- The impact of the 3-years LTROs is treated as a shift in credit supply.

- The 3-year LTROs are found to be expansionary associated with an increase in real GDP, inflation, loan volumes and a compression of lending rate spreads.

- The identified credit supply shock contains additional information with respect to other financial variables
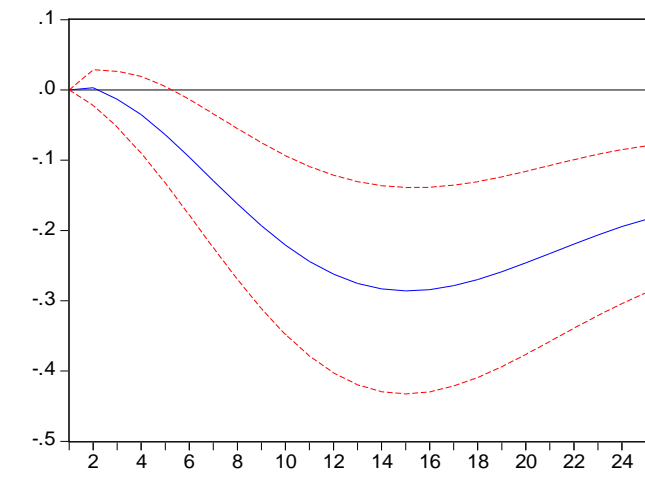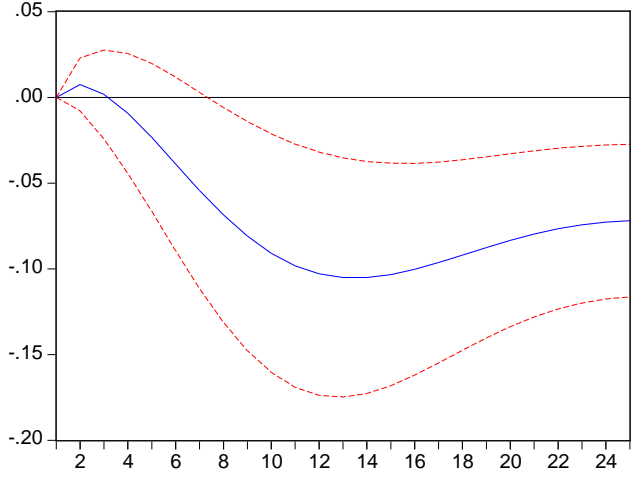
Impact of monetary policy shock
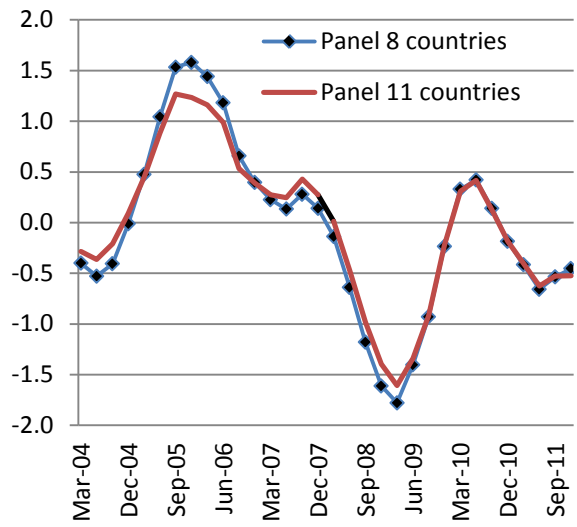

Panel with 8 countries
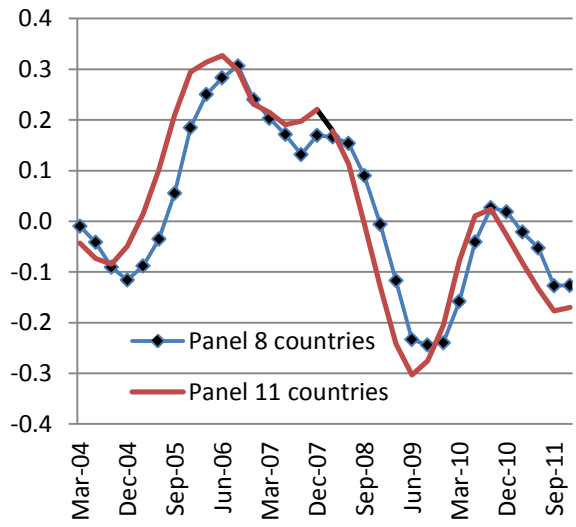
Panel with 11 countries
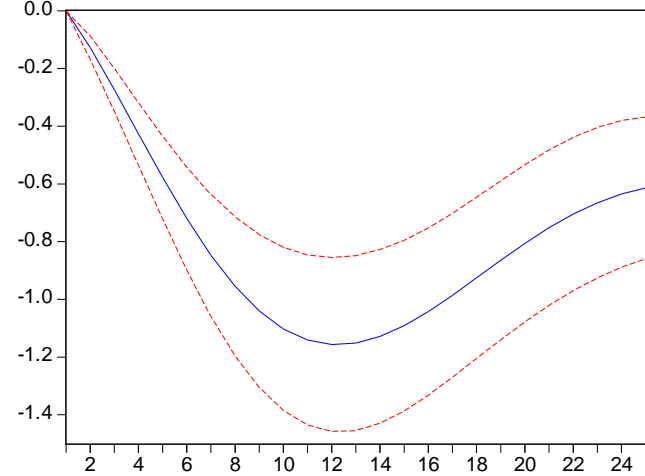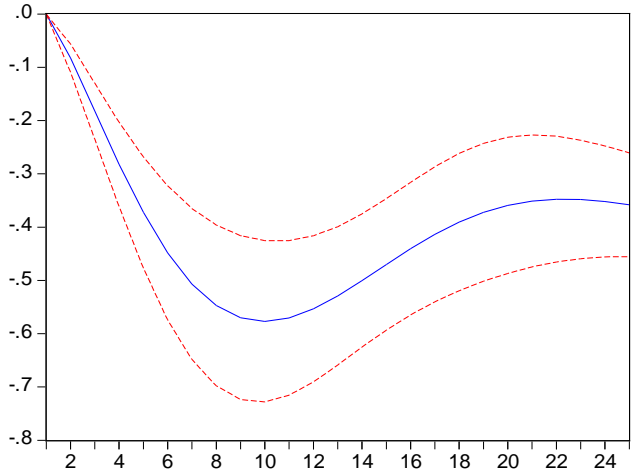
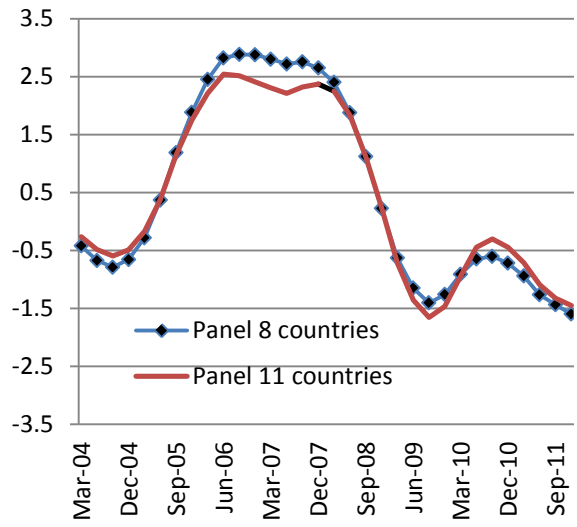# Historical decomposition of CS shock on the macro: Recursive

Real GDP growth (yoy, %)

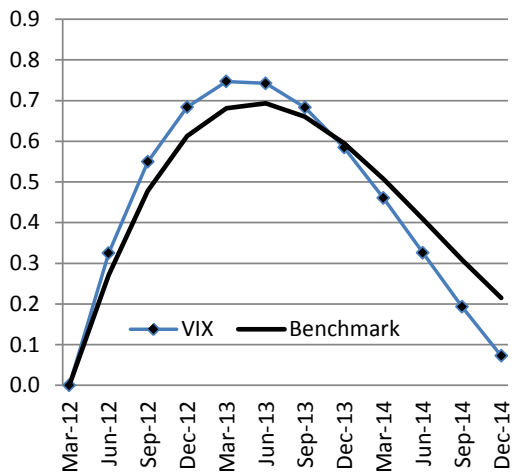GDP deflator inflation (yoy, %)

Loan growth to NFCs (yoy, %)

Lending spread to NFCs (yearly average, pp)
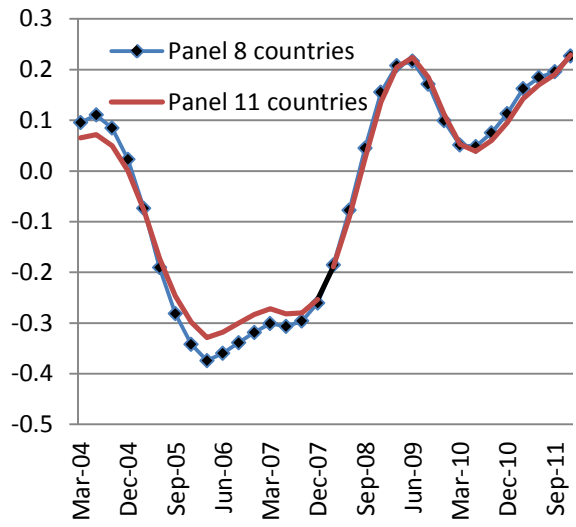
Real GDP

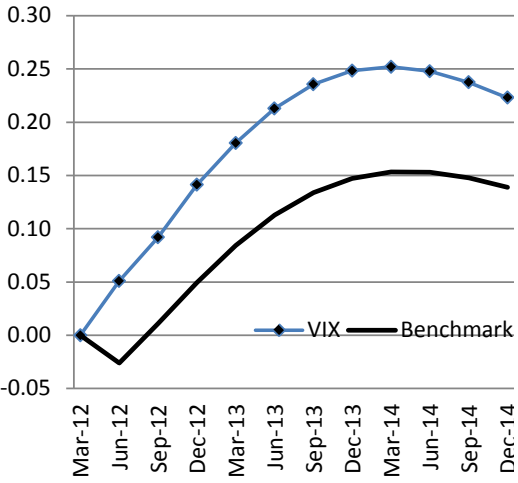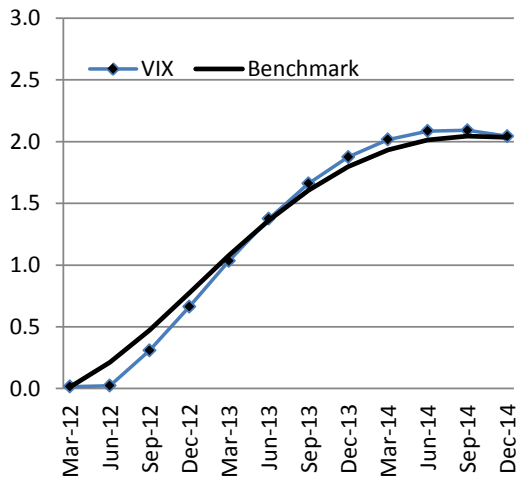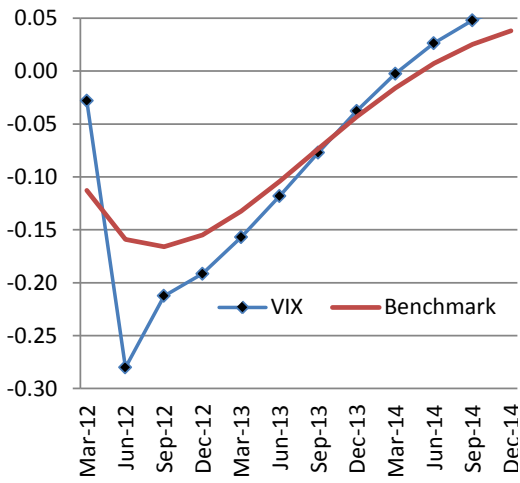GDP deflator

Loan to NFCs

Lending spread to NFCs

Rubio-Ramirez, Waggoner and Zha algorithm

- Let U denote a draw from the uniform distribution

- Draw a set of unrestricted parameters U from the posterior distribution (inverse Wishard for the covariance matrix $\sum=AA'$, where A is the Choleski decomposition of $\sum$, and Normal for the reduced form parameters B).

- For each draw of U, compute $\sum$ and B.

- Compute the eigenvectors of $\sum$ normalized.

- Draw N independent standard normal vectors of length N from a uniform distribution.

- Generate impulse responses.

- If these impulse responses satisfy the sign restrictions, keep the draw; otherwise, repeat all the steps.

Prior for the reduced-form VAR: $\sum$ and B estimated using the Arellano-Bond GMM estimator.