Discussion of:

'Effectiveness and Transmission of the ECB's Balance Sheet Policies'

by

Jef Boeckx, Maarten Dossche, and Gert Peersman

Luca Benati
University of Bern

ECB workshop on *'Non-Standard Monetary Policy Measures'*
Frankfurt-Am-Main, October 6, 2014

Outline of my discussion

This is a very interesting paper ...

My discussion will focus on two issues:

- **Robustness: *'Are the authors' results robust?'***

  Yes. They hold for

  (*i*) an alternative estimator for the Bayesian VAR, and
  (*ii*) an alternative, state-of-the-art algorithm for imposing zero-and-sign restrictions ...

- **The key question: *'Did the ECB's balance sheet policies have a material impact on the Euro area economy?'***

  Yes. I will present evidence—which is implicit in the authors' work—based on counterfactuals in the spirit of Leeper and Zha's (*JME*, 2003) 'modest policy interventions' ...

I: Robustness of the results

I focus on the authors' baseline specification in (log) levels:

- **aggregate Euro area**
- **6 variables: MRO, CISS, EONIA-MRO spread, and logs of GDP, HICP, total assets, MRO**

Technical details:

1. **Bayesian reduced-form VAR estimated as in Uhlig (*JME*, 2005), instead of the authors' Gibbs-sampling**
2. **Zero-and-sign restrictions imposed *via* the algorithm proposed by Arias, Rubio-Ramirez, and Waggoner (2014, *mimeo*; henceforth, ARRW)**

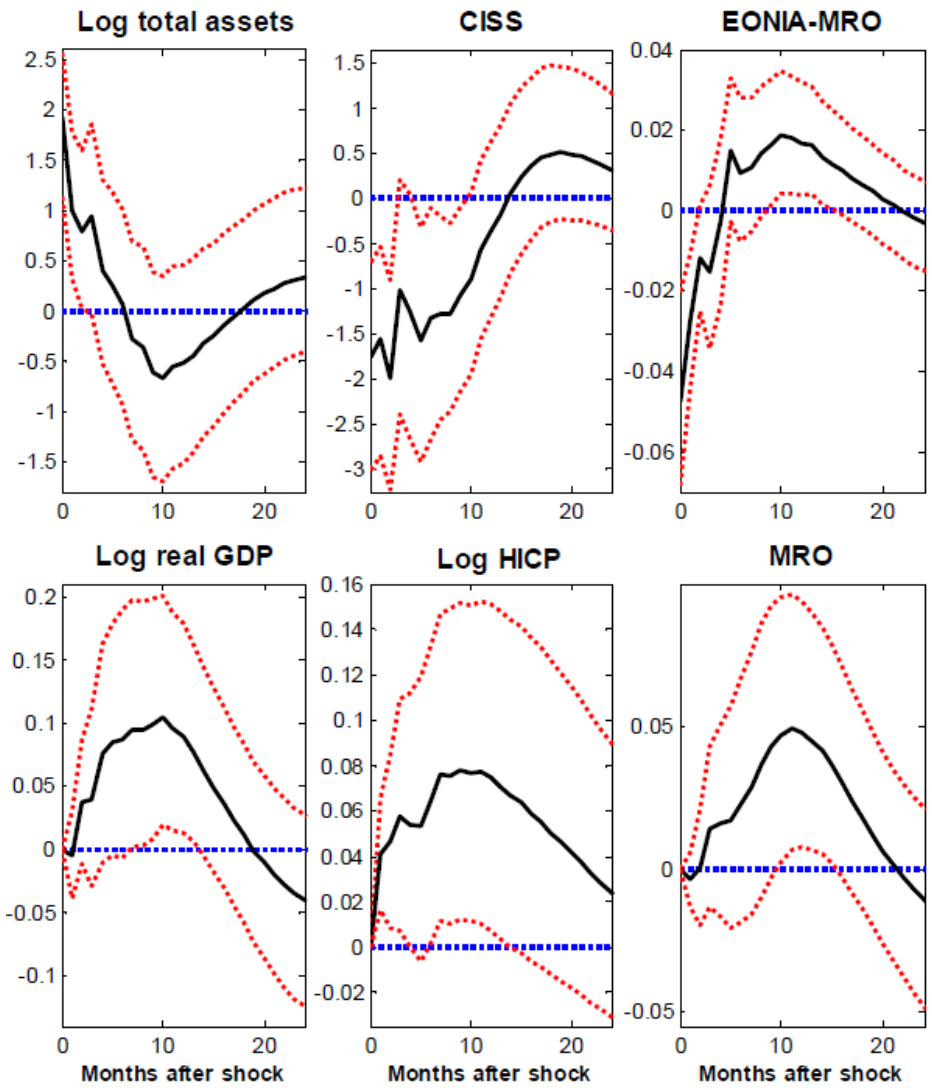
In principle, (2) might be key: ARRW state that their algorithm is only one drawing from the correct distribution of the sign restrictions conditional on the zero restrictions ...

They also show that, based on their algorithm, some prominent results in the literature—e.g., Mountford and Uhlig (*JAE*, 2009)—turn out to be incorrect ...

ARRW (2014, *mimeo*):

'[...] the current implementation of these techniques does, in fact, introduce sign restrictions in addition to the ones specified in the identification [...]. The additional sign restrictions generate biased impulse response functions and artificially narrow confidence intervals around them. [...] The heart of the problem is that none of the existing algorithms correctly draws from the posterior distribution of structural parameters conditional on the sign and zero restrictions.'

In principle, the authors' results here might therefore be wrong: in fact, they are not ...



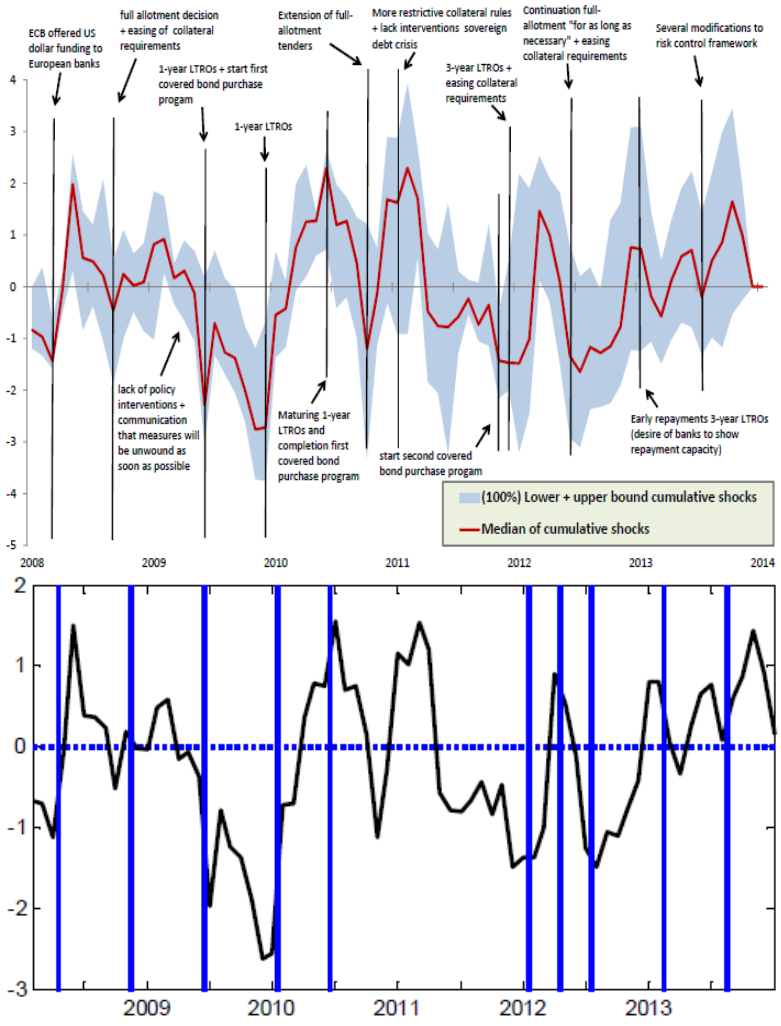
These are the IRFs to identified balance sheet shocks ...

They are near-identical to those shown by the authors in Figure 4 ...

Reassuring in terms of robustness ...

Different from (e.g.) Uhlig's 'penalty function' approach, the authors' algorithm does not seem to suffer from problem discussed by ARRW ...

These are the cumulated ‘balance sheet shocks’ ...



Top: **authors’ Figure 3**

Bottom: **my results based on ARRW (median estimate)**

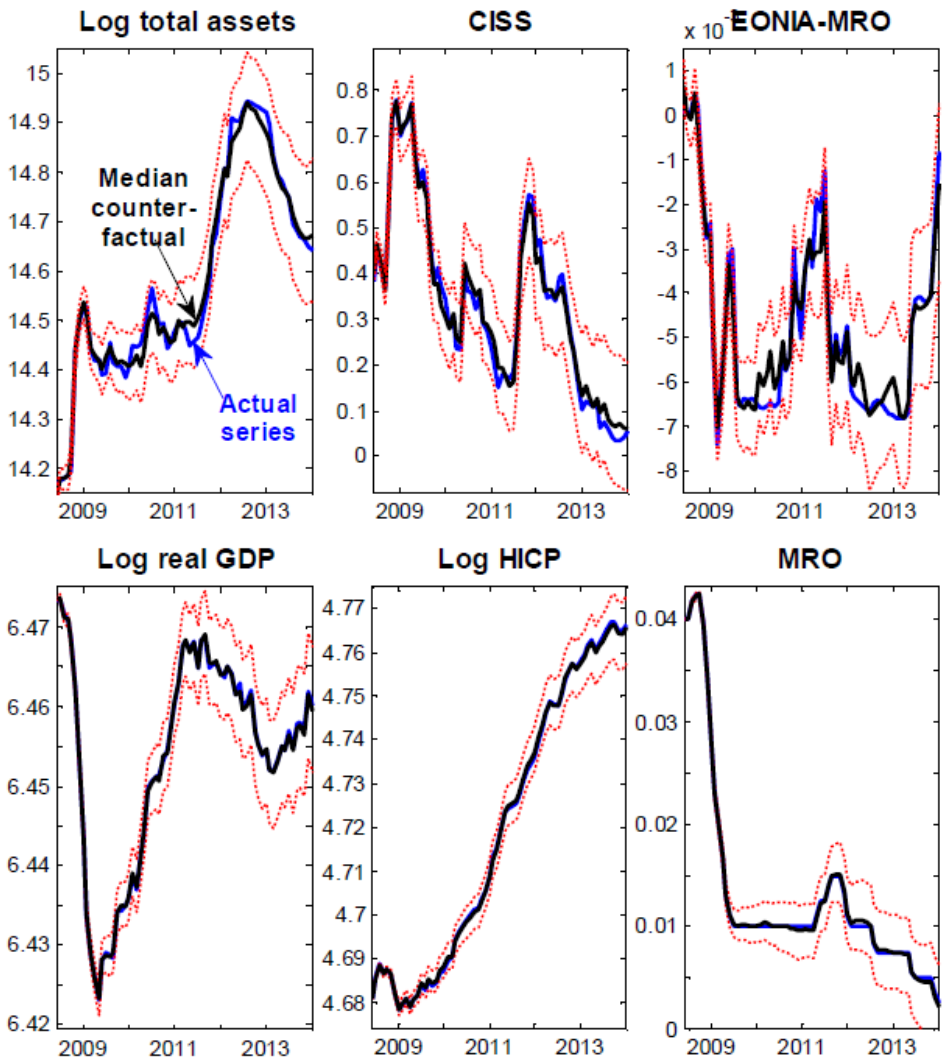
Broad pattern is very similar ...

Minor issue: **authors’ confidence bands can’t be right as a matter of logic ...**

Shocks are white noise by construction: when you cumulate them, you get a random walk ...

Variance of random walk ‘explodes’: indeed, my confidence bands for cumulated shocks (see background slides) increase linearly ...

II: Did the ECB's balance sheet policies have a material impact on the Euro area economy?



We might think of checking this by running a counterfactual 'killing off' identified balance sheet shocks ...

Doing this (left) you get almost nothing, but that's to be expected ...

These shocks are random component of the way ECB's balance sheet responded to macro developments over sample period ...

So they are key to identify IRFs, but—in line with evidence on conventional monetary policy shocks (see, e.g., Sims and Zha, *AER*, 2006)—their role should be expected to be minor ...

Indeed, fractions of forecast error variance they explain (see background slides) are negligible ...

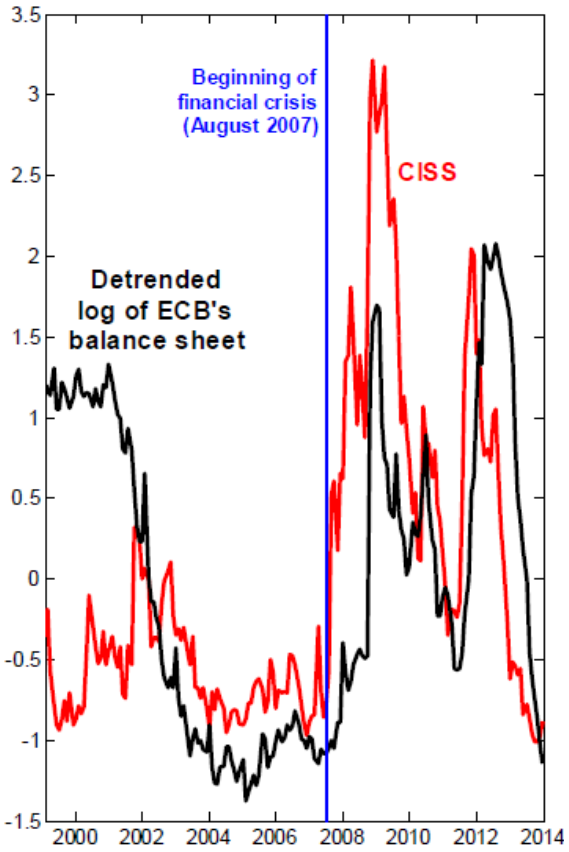
So what we need is a policy counterfactual, modifying the parameters of the ECB's structural balance sheet rule ...

Problem: since Sargent (*Minneapolis FED Quarterly Review*, 1979), SVAR-based policy counterfactuals have been known to be subject to Lucas critique ...

Key issue: impact of change in policy on agents' expectations modifies structure of economy, and SVARs are very bad at capturing this effect ...

However, Leeper and Zha (*JME*, 2003): impact on expectations should be small-to-*nil* if policy change is 'modest' compared to what policy has historically been ...

(Series have been standardized)



So what I do is:

- **extract posterior distribution of parameters of ECB's structural balance sheet rule, and**
- **consider a series of 'modest policy interventions' ...**

Conceptually in line with Leeper and Zha, I define 'modesty' as counterfactual values of policy parameters being within 5th-95th percentiles of posterior distribution ...

This can be done for alternative structural parameters: in what follows I focus on parameters on financial stress indicator (CISS)

Since 2002, strong connection between balance sheet and CISS ...

The authors: '*The positive co-movement between both variables mainly reflects the endogenous response of the balance sheet to financial stress.*'

So what if endogenous response had been 'modestly weaker'?

First of all, what does 'modesty' mean? These are medians and 5 th-95th percentiles of posterior distributions of parameters on the CISS in the ECB's structural balance sheet rule:

```
% % Contemporaneous coefficient:    [ 0.5188 [-0.9076 2.1822]]
% % Lagged coefficient (lag 1):     [-0.2592 [-1.2203 0.4527]]
% % Lagged coefficient (lag 2):     [-0.0480 [-0.9915 0.6951]]
% % Lagged coefficient (lag 3):     [-0.0555 [-0.7217 0.7714]]
% % Lagged coefficient (lag 4):     [ 0.2043 [-0.2789 0.6229]]
```

(For details, see background slides ...)

Sample is short, so estimates are imprecise: for all structural parameters, 0 is within the 5 th-95th percentiles range ...

So for each draw from the posterior, I re-run history

- **conditional on all shocks, and**
- **'shrinking' the parameters on the CISS in the ECB's structural balance sheet rule by a 'shrinkage factor' λ between 0 and 1 ...**

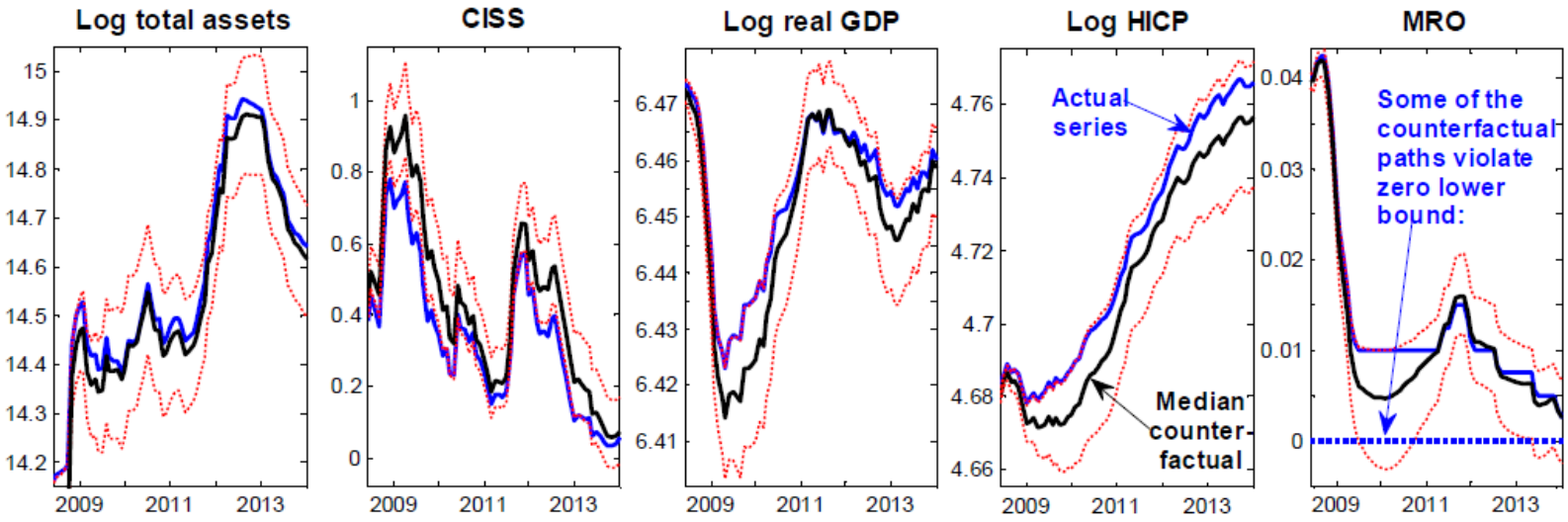
So the exercise I am doing is in line with Sims and Zha's (*AER*, 2006) 'Inflation Hawk Greenspan' counterfactual ...

Only differences are:

- **they identify 'standard' monetary policy shocks, whereas I identify balance sheet shocks;**
- **they multiply the coefficient on inflation in Alan Greenspan's estimated rule by 2; I multiply the coefficients on the CISS by a 'shrinkage factor' λ between 0 and 1 ...**

Let's see the results from 'shrinking' towards zero the posterior distributions of the coefficients on the CISS in the ECB's structural balance sheet rule by 25% ...

This is based on setting λ equal to 0.75 ...



Even this small amount of shrinkage already generates worse counterfactual paths: GDP and prices are lower, CISS is higher ...

Impact on assets is negligible, as there are various channels at work:

- **assets are reacting less to stress, but stress is higher ...**
- **GDP and prices are lower, which has impact on balance sheet ...**

Overall impact on ECB's balance sheet is sum of all these impacts, and it is not obvious, *a priori*, what it should be ...

One problem with counterfactual in previous slide is that zero lower bound (ZLB) is violated for non-zero fraction of draws ...

One standard way to insure that, in counterfactuals, ZLB is always satisfied is to do the following:

- **if, at time *t*, counterfactual *R*(*t*) satisfies ZLB, fine;**
- **otherwise, rescale time-*t* policy shock such that *R*(*t*) = 0.**

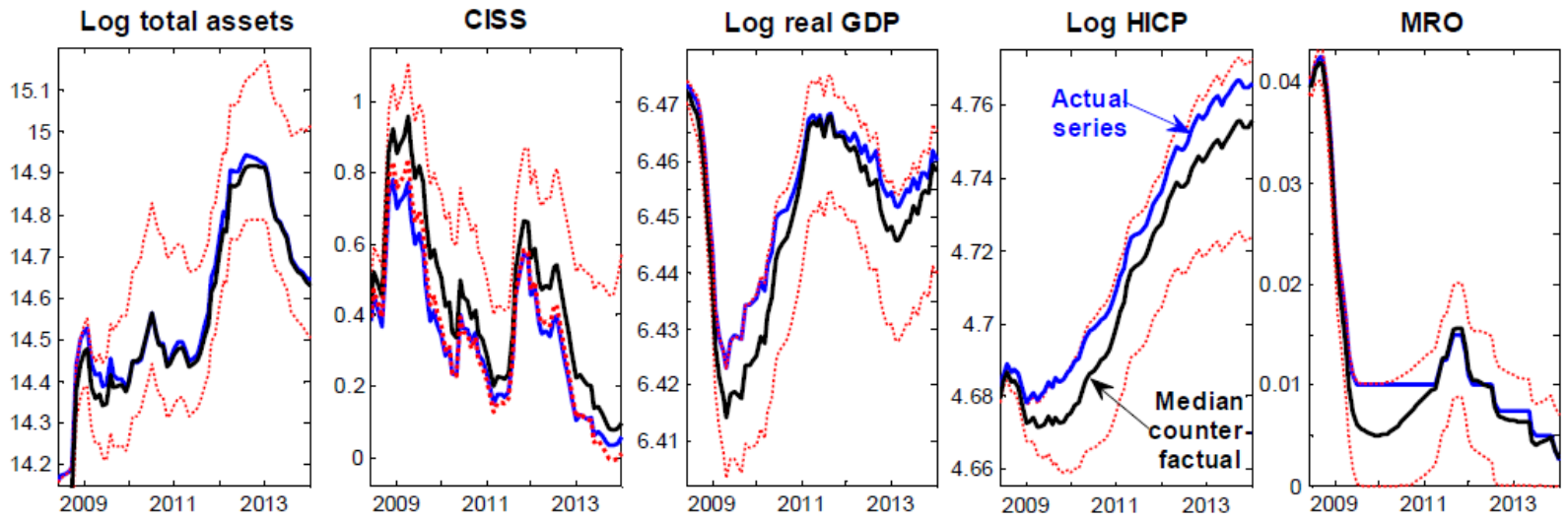
Problem: here, by assumption, balance sheet shocks have zero impact on the MRO, so they can't be used to play this trick ...

So what I do is:

- **I identify a standard monetary policy shock conceptually in line with the way the authors identify balance sheet shocks;**
- **if counterfactual *R*(*t*) violates ZLB, I rescale such shock so that that *R*(*t*) = 0 ...**

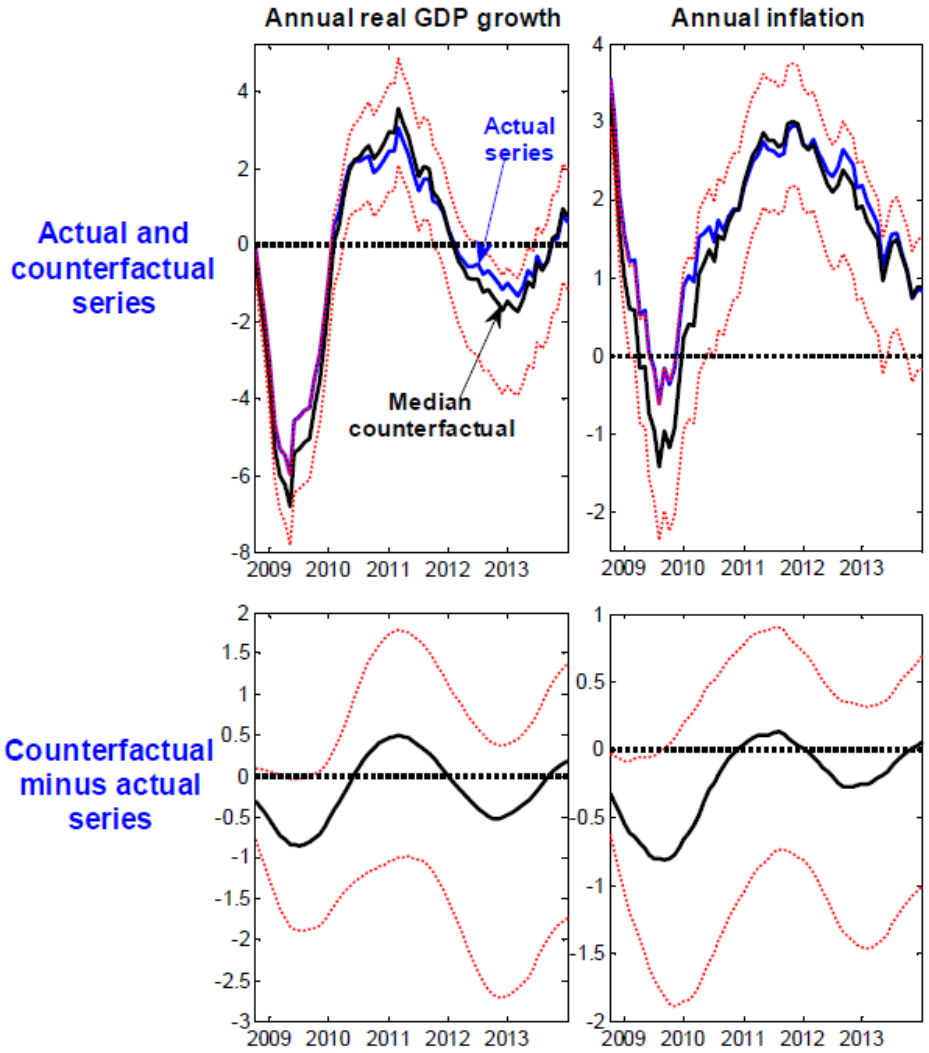
Identifying restrictions: standard monetary policy shock has

- **zero impact on GDP and HICP at $t = 0$,**
- **positive impact on MRO, and**
- **negative impact on EONIA-MRO**
- **other impacts are left unrestricted ...**



This is what we get: ZLB is never violated by construction, and results are in line with counterfactual in previous slide ...

These results are for the levels: let's see annual growth rates for GDP and inflation ...



From second half of 2008 to second half of 2009, both GDP growth and inflation would have been lower ...

Differences are not huge, but—keep in mind—I am here 'shrinking' the structural parameters on the CISS just by 25 per cent ...

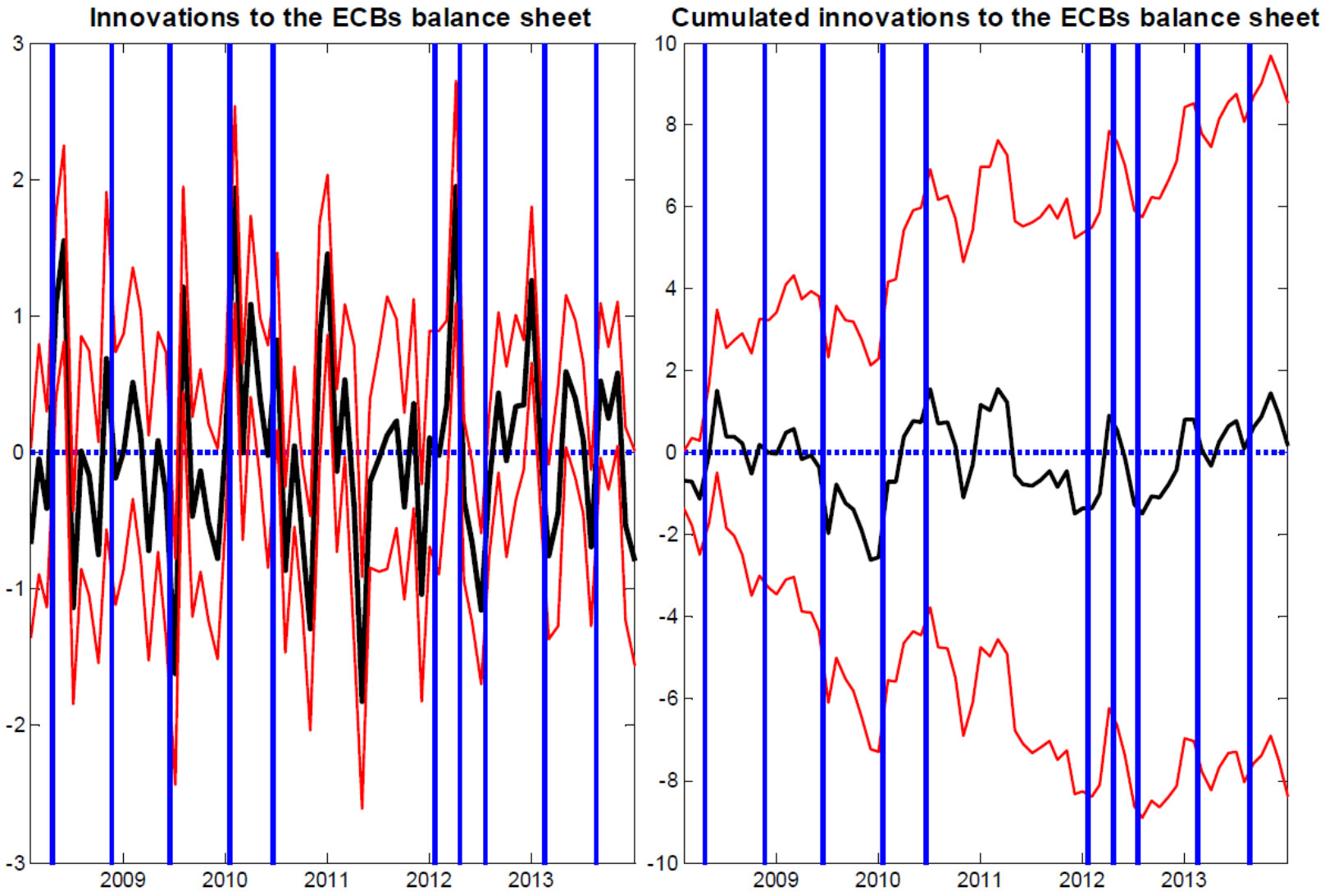
If you 'shrink', e.g., by 50 per cent, median impact is greater, but uncertainty becomes huge ...

Summing up

Very interesting paper, robust results ...

Authors' results suggest that ECB's balance sheet shielded the Euro area economy from worse counterfactual scenarios ...

Background slides


Innovations to the ECBs balance sheet
3
2
1
0
-1
-2
-3
2009
2010
2011
2012
2013
Cumulated innovations to the ECBs balance sheet
10
8
6
4
2
0
-2
-4
-6
-8
-10
2009
2010
2011
2012
2013

Are the reduced-form VAR estimates robust?

Might it be the case that the reduced-form VAR estimates have problems? As I now show, this is clearly not the case ...

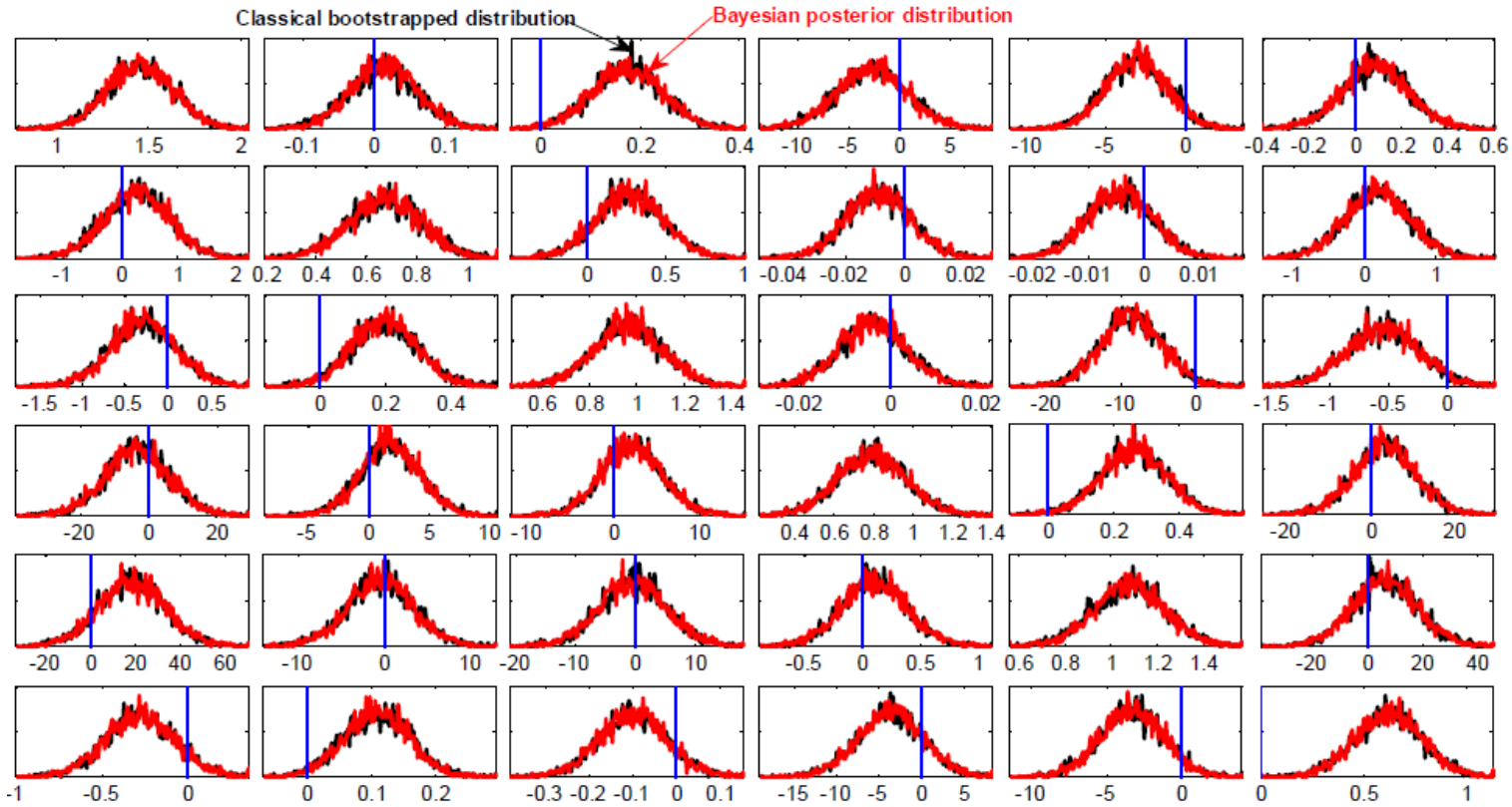
Easiest way to check that there is nothing 'strange' about the Bayesian reduced-form VAR estimates is to compare them with simple OLS estimates ...

So, for each individual VAR parameter—including the elements of the covariance matrix—I compare

- **the posterior distribution generated by Uhlig's approach, and**
- **the bootstrapped distribution obtained by estimating the VAR *via* OLS, and then bootstrapping it ...**

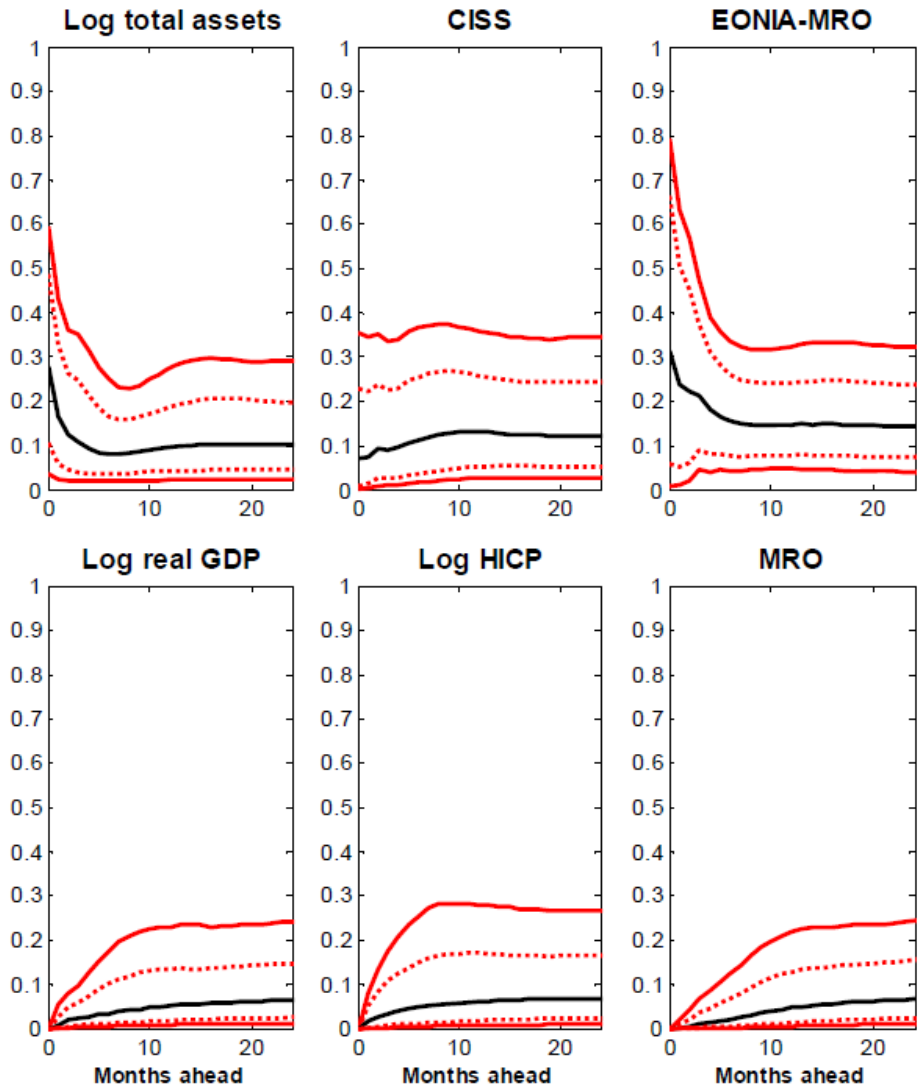
These are the 2 distributions for the elements of the matrix B_1 in the VAR:

$$Y_t = B_0 + B_1 \bullet Y_{t-1} + \ldots + B_p \bullet Y_{t-p} + u_t$$



2 distributions are remarkably close ...

Results for all other VAR parameters are in line with these, so reduced-form Bayesian VAR estimates have nothing strange ...



These are the fractions of forecast error variance (FEV) explained by 'balance sheet shocks' ...

Beyond 6 months, these shocks are uniformly negligible across the board ..

At short horizons, they matter (unsurprisingly) for the ECB's assets, and for the spread EONIA-MRO ...

Key point: for GDP and prices, they are negligible ...

Indeed, when I 'kill them off', almost nothing happens :..