

Discussion of

**New Evidence on the Puzzles.
Results from Agnostic Identification on
Monetary Policy and Exchange Rates
(Almuth Scholl and Harald Uhlig)**

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Introduction:

- ¢ Using agnostic sign restrictions on (R,Liq,P) to identify MP shocks, Scholl and Uhlig confirm the puzzles in the exchange rate reaction: a delayed overshooting but with a peak reaction after months instead of years. This profile for the exchange rate reaction is inconsistent with the UIR-condition.
- ¢ “Agnostic sign restriction” approach uses a minimum set of restrictions to identify the monetary policy (MP) shock:
 - ✘ identify only one shock, ignorant about other shocks;
 - ✘ no restrictions on simultaneous or recursive nature of markets/shocks
(R versus P,Y) and (R versus ER)
 - ✘ results confirm previous results on ER puzzle but the approach avoids the price puzzle (get output puzzle instead ?)

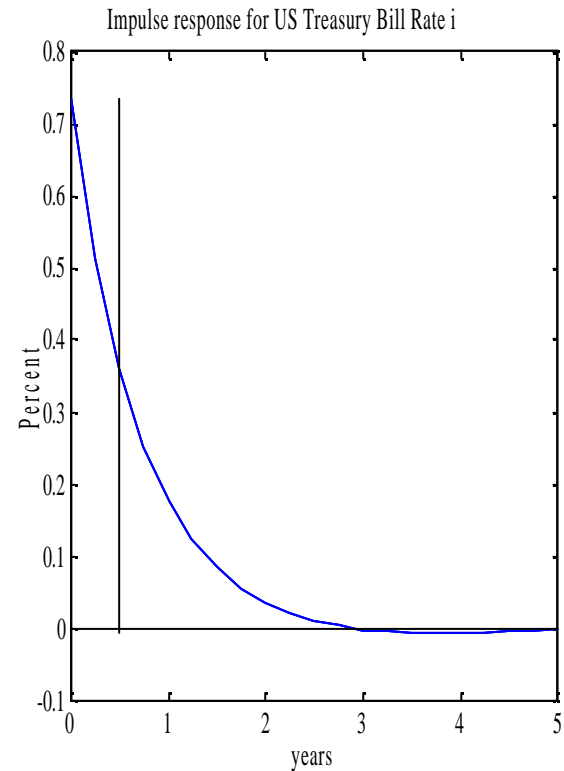
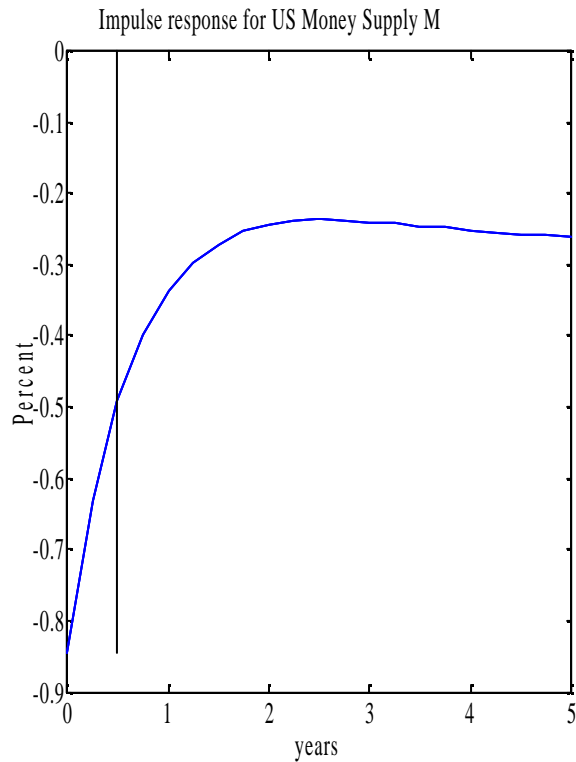
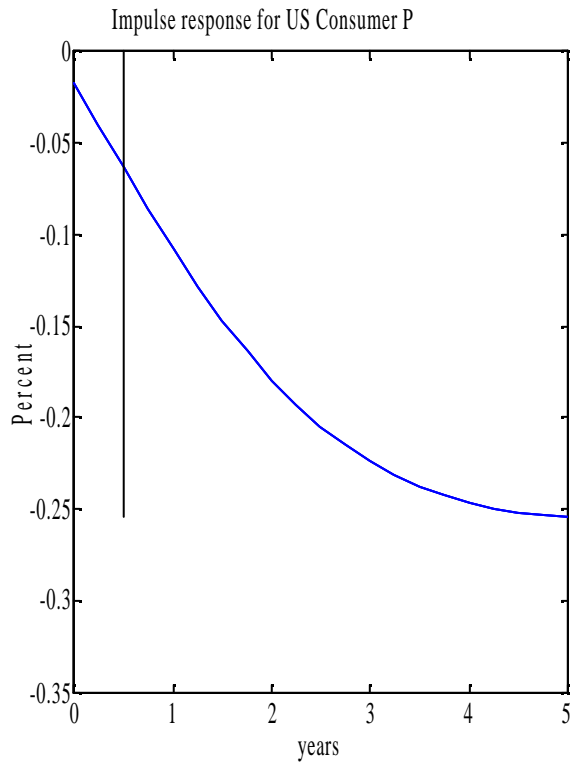
Introduction:

- ¢ Question: Is the use of a minimal set of restrictions in the form of sign restrictions sufficient to recover the IR function and the historical time series of the MP shock ? Is it possible that other shocks (or combinations of shocks) also fulfil the sign restrictions and thereby distort the identification strategy ?
- ¢ Approach: Apply the identification strategy on simulated data from an estimated two country model: does the approach correctly identify the IR and the historical time series of the MP shock ?

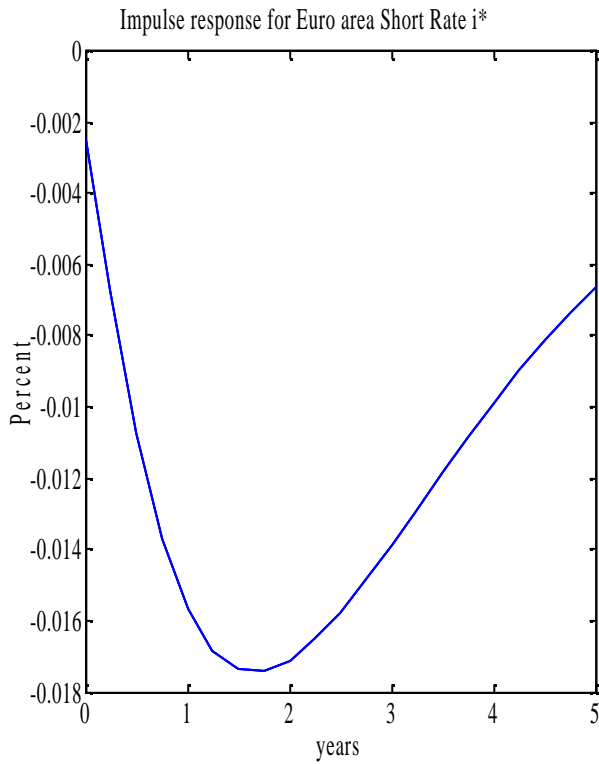
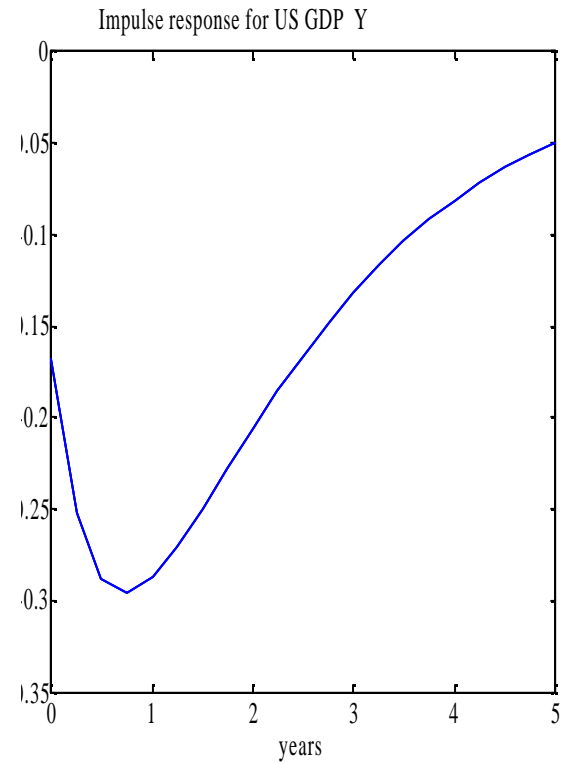
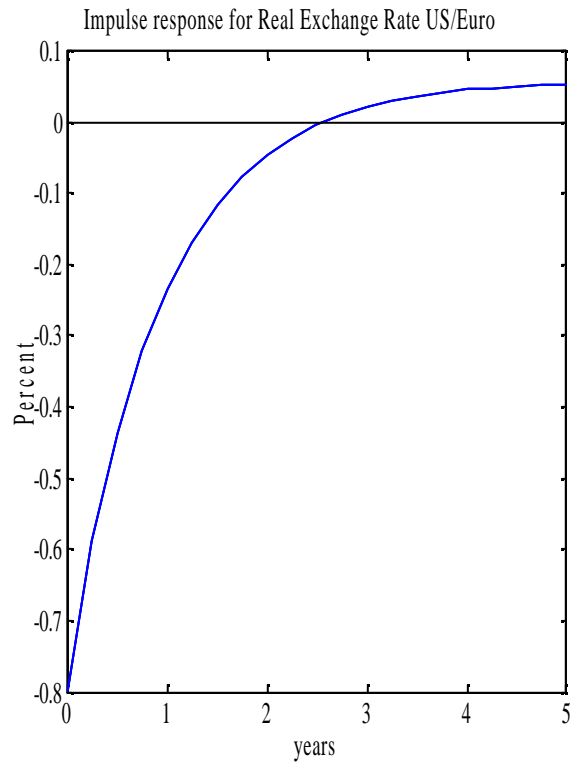
Simulate data with an estimated US-EA DSGE model:

- ¢ Start from an estimated open economy DSGE model that combines the US and euro area model (with exogenous ROW block) (based on de Walque & Wouters 2004, SW 2003 & 2004). Extended with a money demand equation to get the liquidity effect of a MP shock.
- ¢ The model is estimated on 20 observable variables (14 domestic variables plus the ER, net exports, import prices, oil prices) with 30 exogenous shocks.
- ¢ Simulate data for Y , Y^* , P_c , P_c^* , R , R^* , M , M^* , ER based on full stochastic nature of the estimated model.
- ¢ 'Real' MP impulse response and 'real' MP shock time series is known.
- ¢ Apply agnostic sign restrictions of Scholl & Uhlig on simulated data in order to test whether this method correctly identifies the underlying MP impulse response and the MP shock series.

Theoretical IR function of the MP shock: Sign restrictions are respected in the theoretical IR function



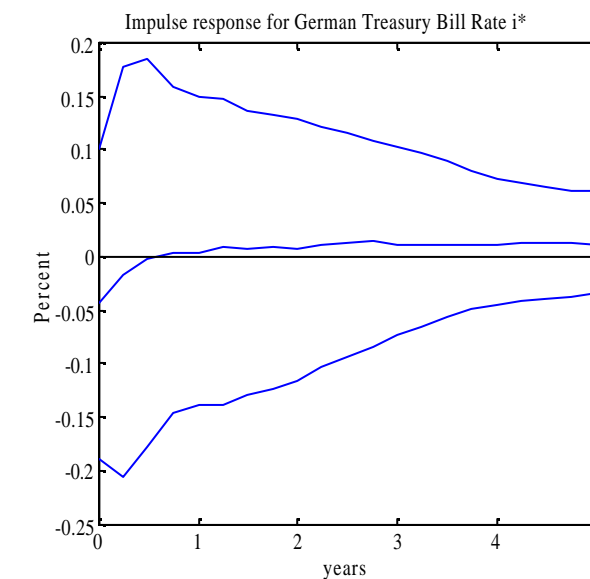
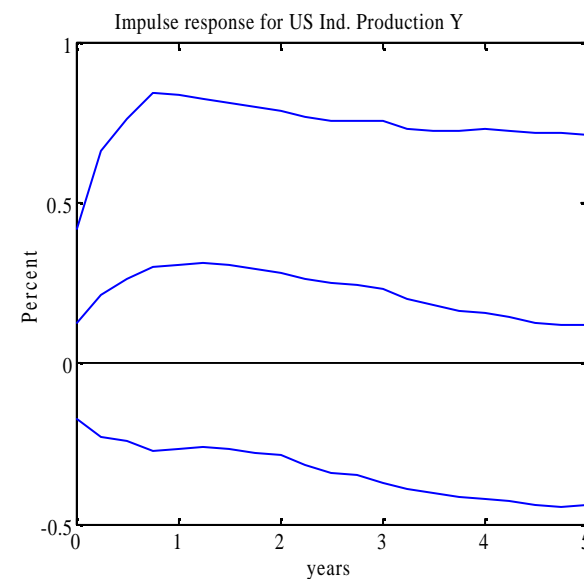
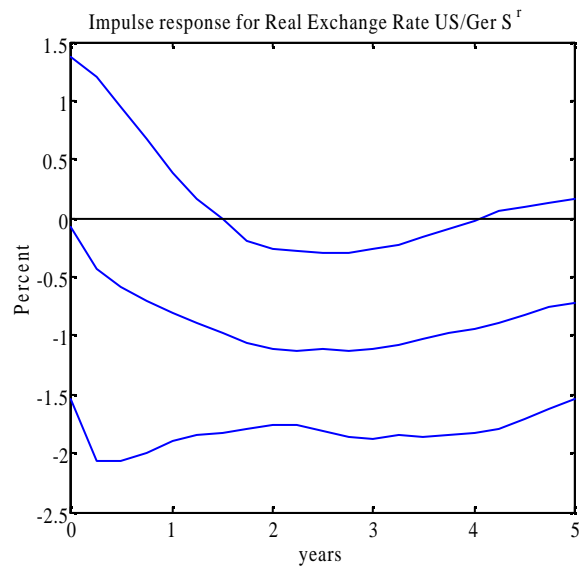
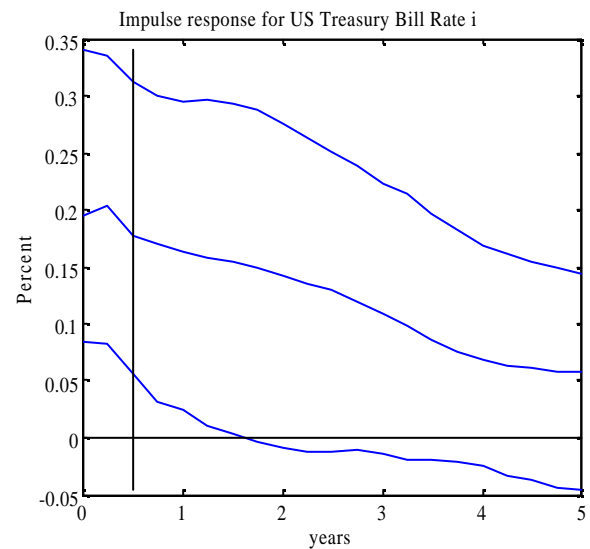
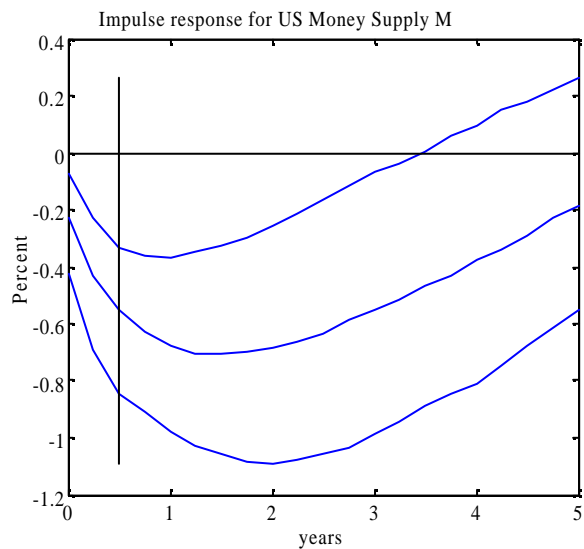
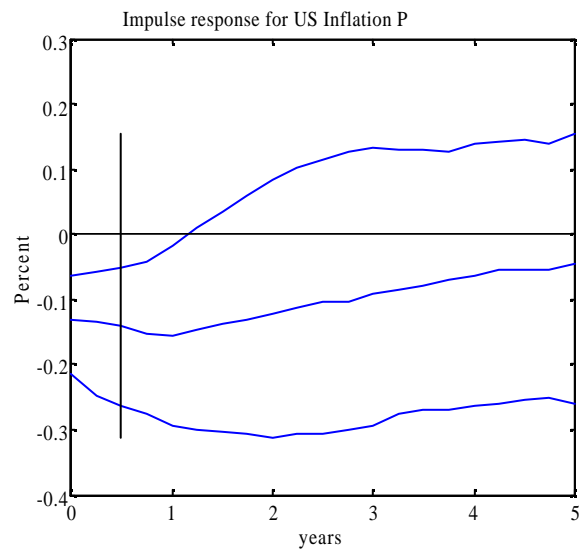
Theoretical IR function of the MP shock: standard MP impulse response - UIR condition applies



Repeat exercise with quarterly data:

- ¢ Estimated US-EA model is based on quarterly data;
- ¢ Repeat Scholl and Uhlig approach on historical quarterly data
 - ✘ Use $Y, Y^*, P_c, R, R^*, M, ER$
 - ✘ Use two lags
 - ✘ Restrictions on R, P_c, M with a horizon of 2 quarters
 - ✘ Results are more or less in line with the results reported in the paper based on monthly data but uncertainty around IR is larger

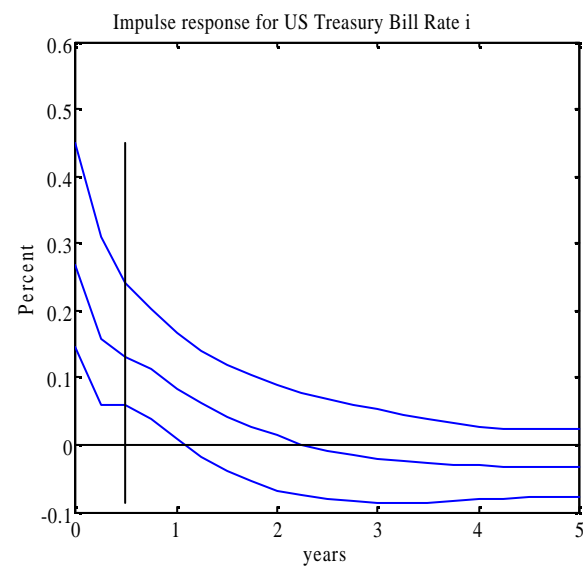
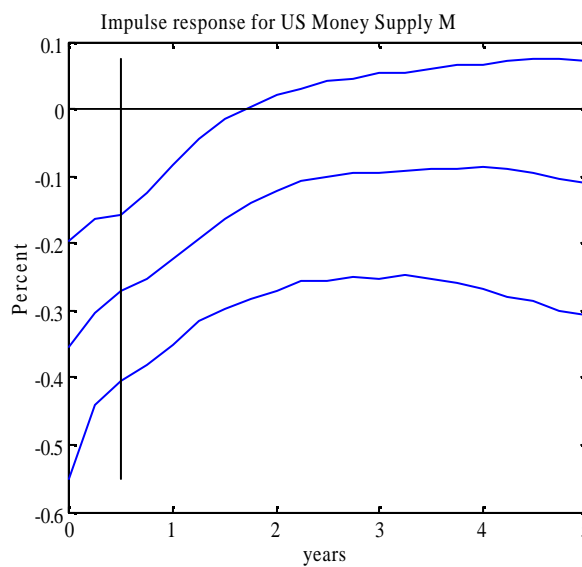
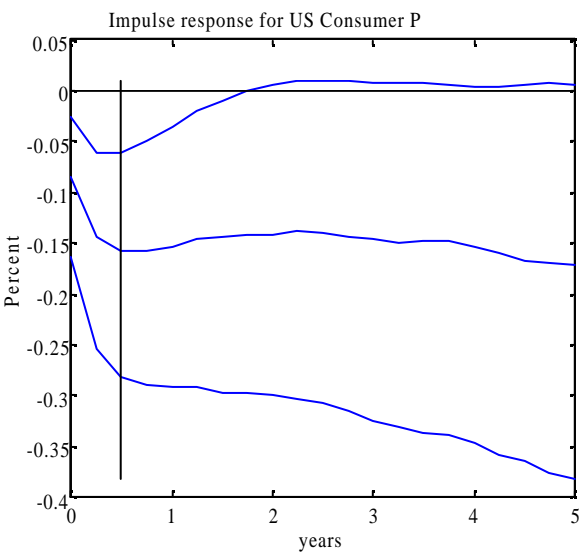
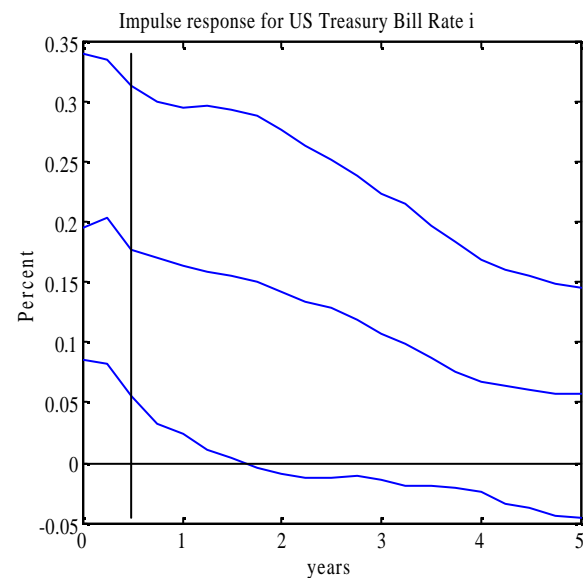
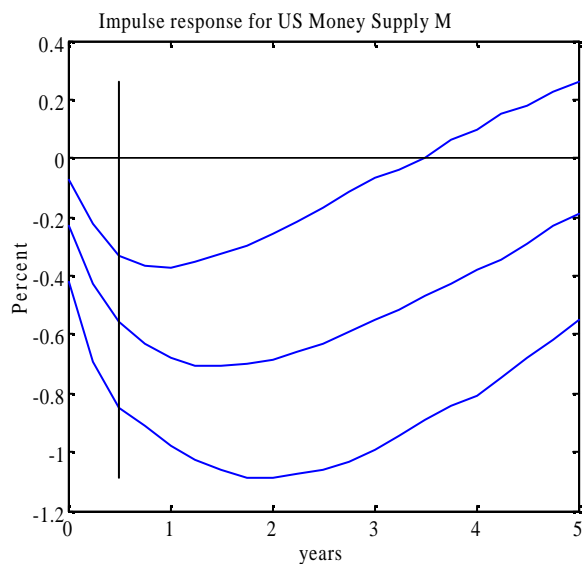
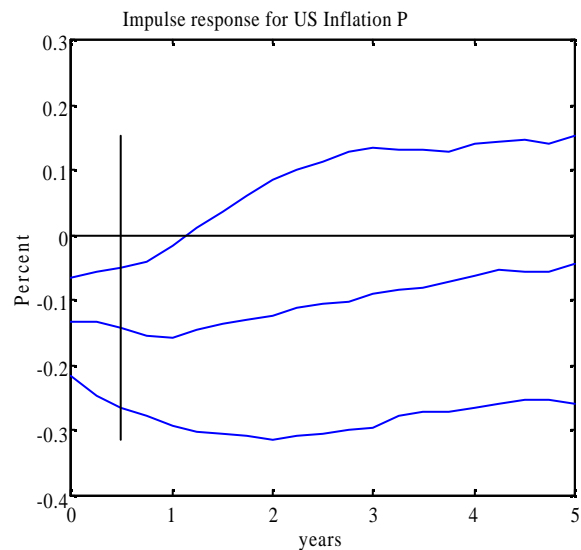
Scholl & Uhlig identification on historical quarterly data:



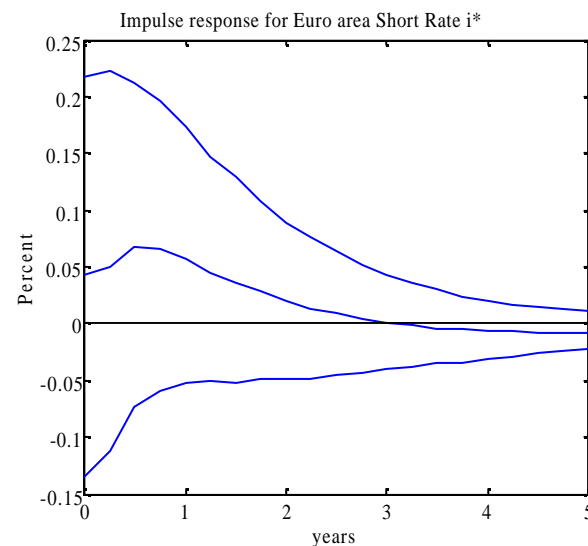
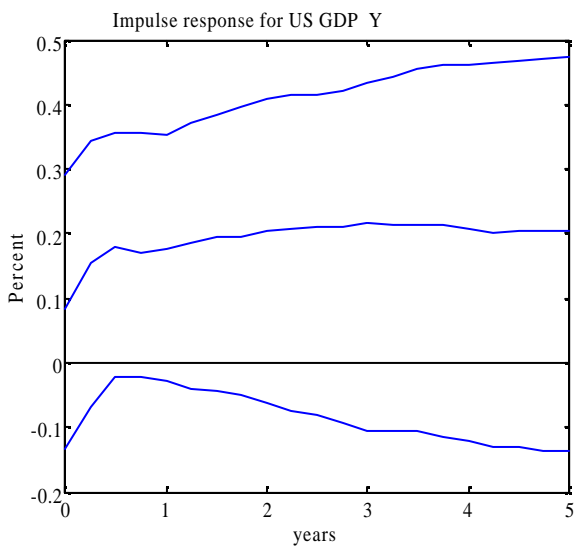
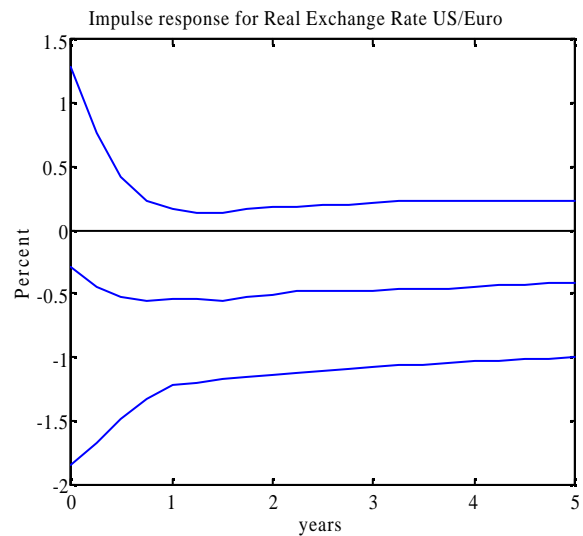
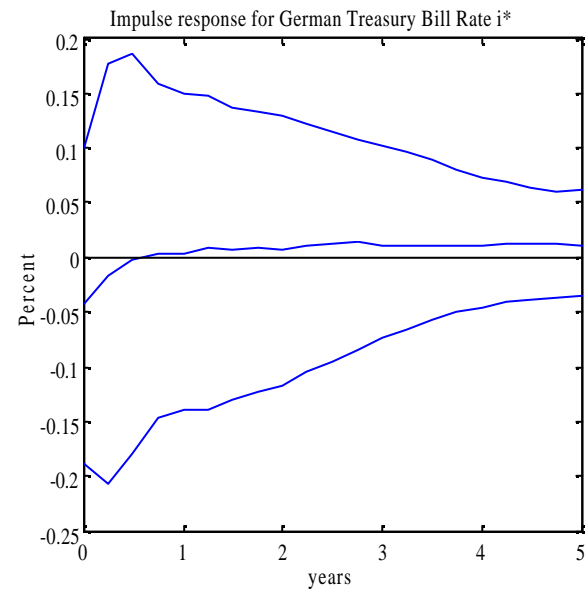
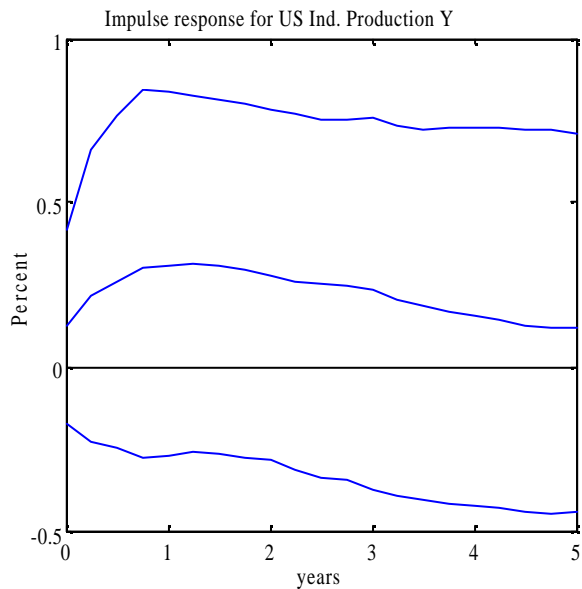
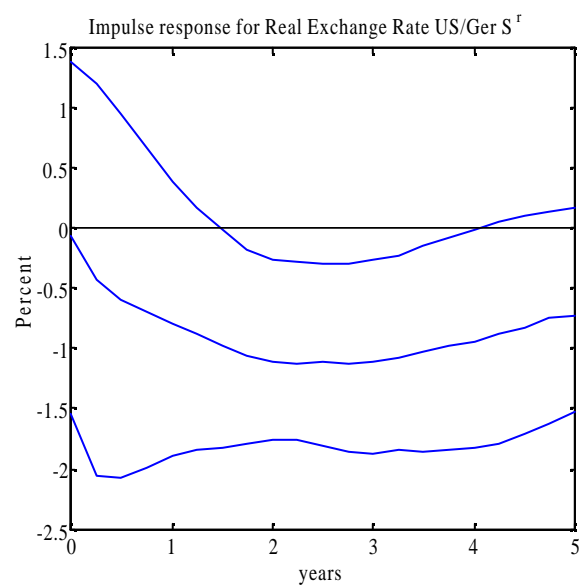
Repeat exercise with simulated data from the estimated JS-EA DSGE model

- ¢ Apply Agnostic Sign Restriction approach on the simulated data for Y , Y^* , P_c , R , R^* , M , ER from the model
- ¢ 1. based on full stochastic structure of the estimated model:
 - ¤ IR ?
 - ¤ Time series of MP shocks ?
- ¢ 2. based on restricted stochastic structure with a dominant MP shock (reduce the size of the other shocks by a factor 20)
 - ¤ IR ?
 - ¤ Time series of MP shocks ?

Scholl & Uhlig identification on historical vs. simulated data:



Scholl & Uhlig identification on historical vs. simulated data:



Repeat exercise with simulated data from the estimated JS-EA DSGE model

¢ 1. based on full stochastic structure of the estimated model:

✘ IR

==> Results on simulated and historical data are very similar;

==> Agnostic Sign Restriction approach is unable to recover the correct IR for the MP shock:

- delayed overshooting of the ER

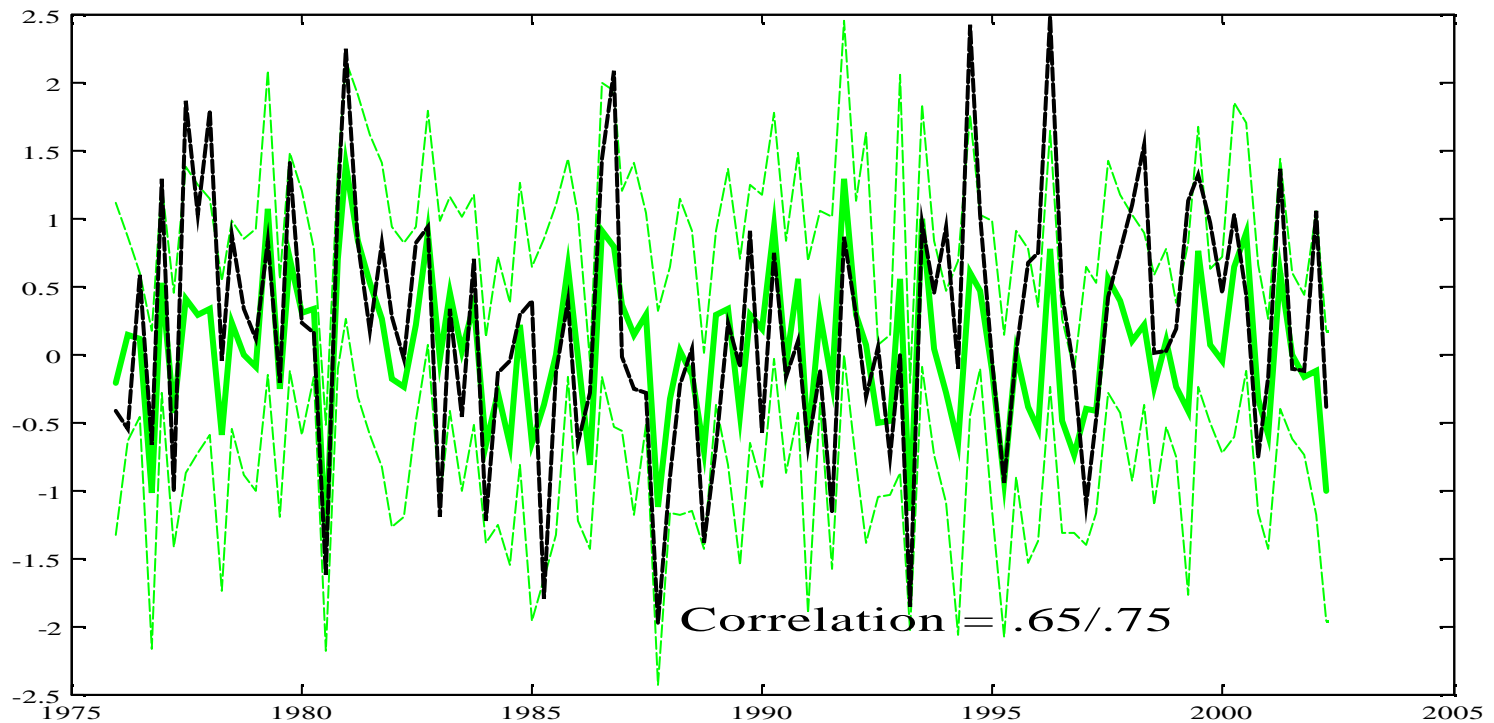
- output puzzle

- underestimate size of the MP shock

✘ Time series of MP shocks ?

Repeat exercise with simulated data from the estimated JS-EA DSGE model

- Time series for MP shock: correlation with 'real' MP shock between 0.65 and 0.75 - standard error is 0.42 (versus 0.85)



green line is median estimate (with dotted 16% and 84% bounds)

Repeat exercise with simulated data from the estimated US-EA DSGE model

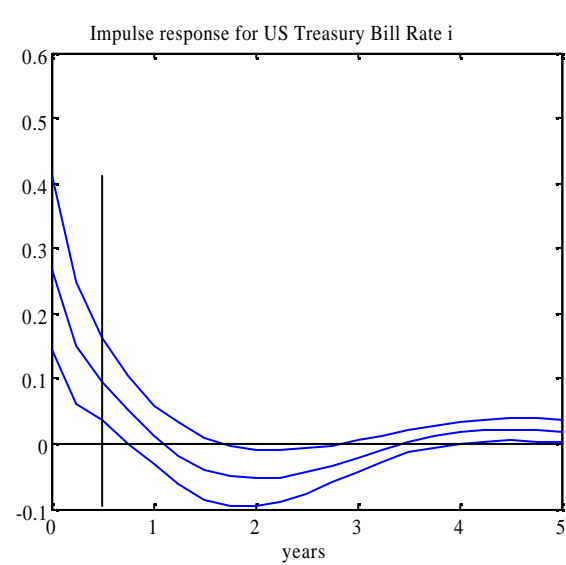
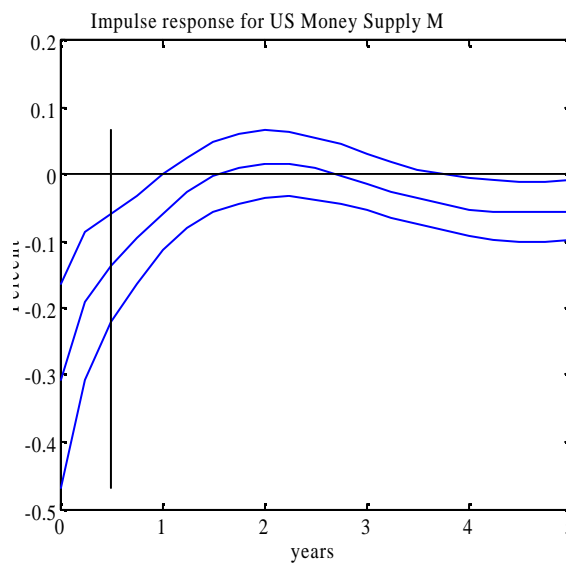
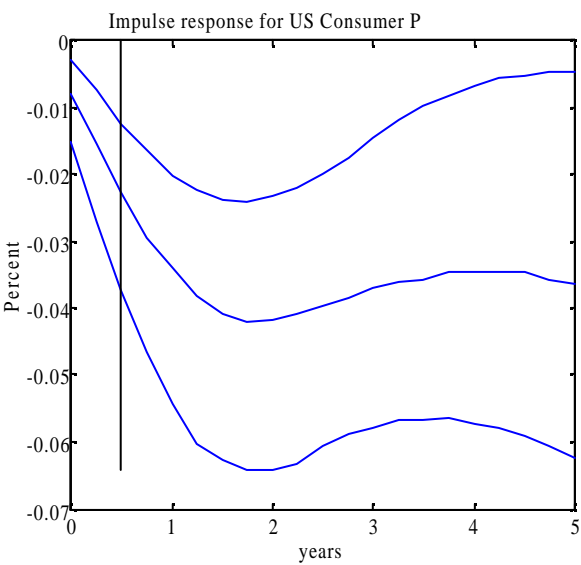
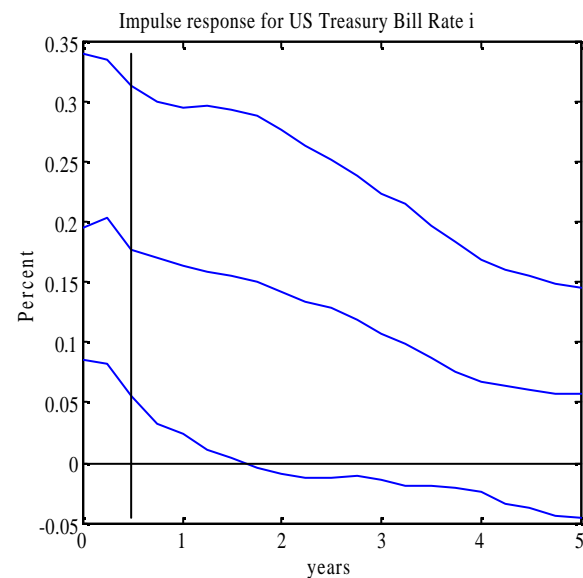
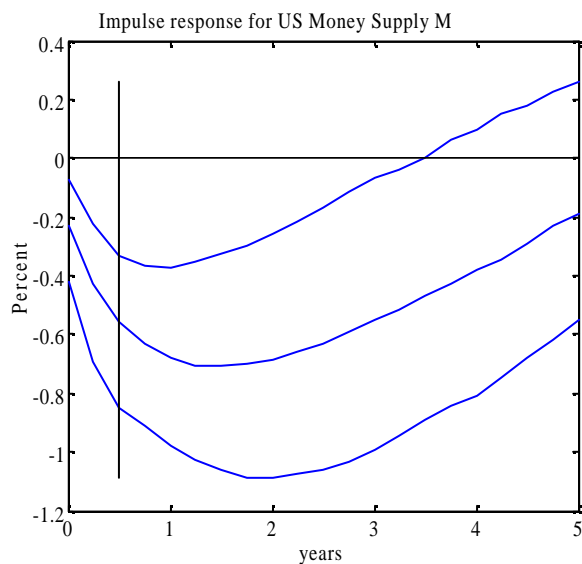
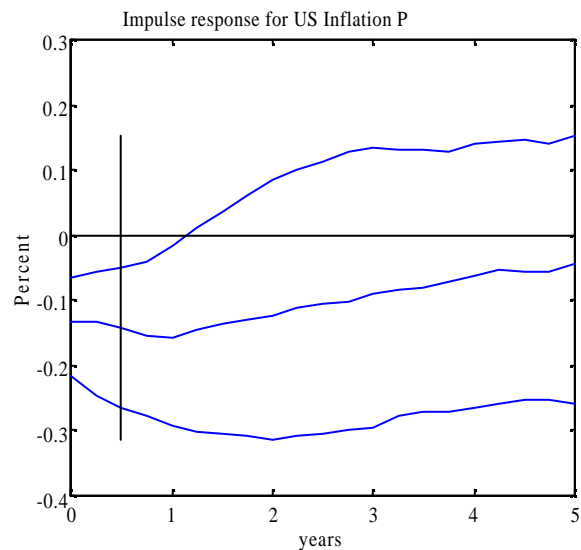
- ✧ Regress identified time series for MP shocks on 'real' structural innovations underlying the simulated data: significant coefficient on 'real' MP shock (<1) but also a significant coefficient on many other structural shocks

innovation in	coef.	st.er.	t-stat.
US MP	0.38	0.03	13.13
US productivity	1.22	0.32	3.76
US time preference shock	0.21	0.04	5.46
US public spending	0.10	0.06	1.64
US labour supply shock	-0.04	0.01	-2.82
US price markup shock	-0.86	0.11	-8.16
US investment spec. techn.	0.13	0.04	3.01
UIR shock	0.14	0.05	2.98

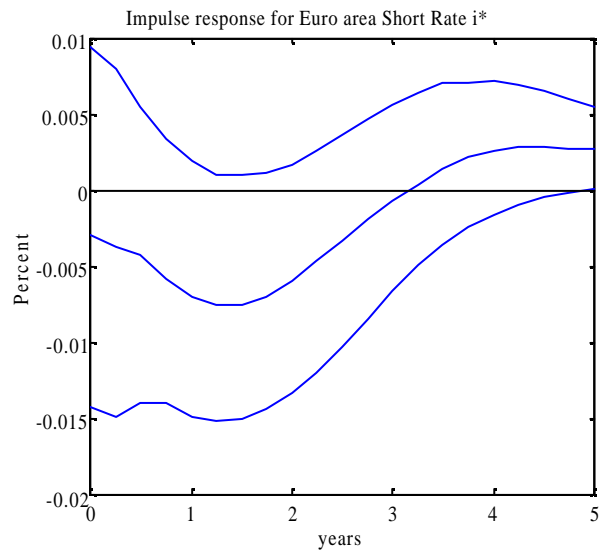
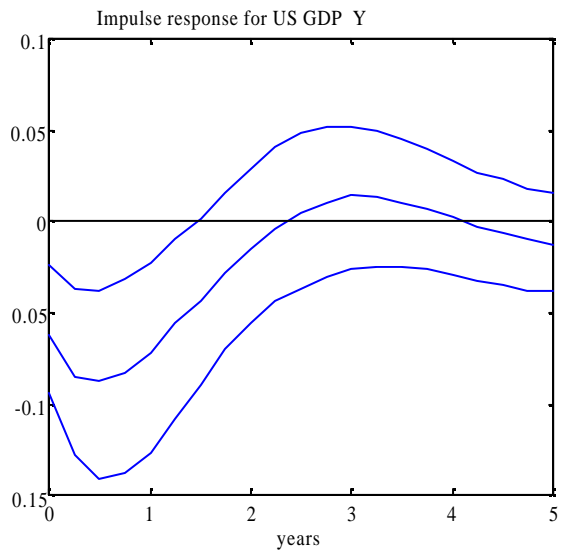
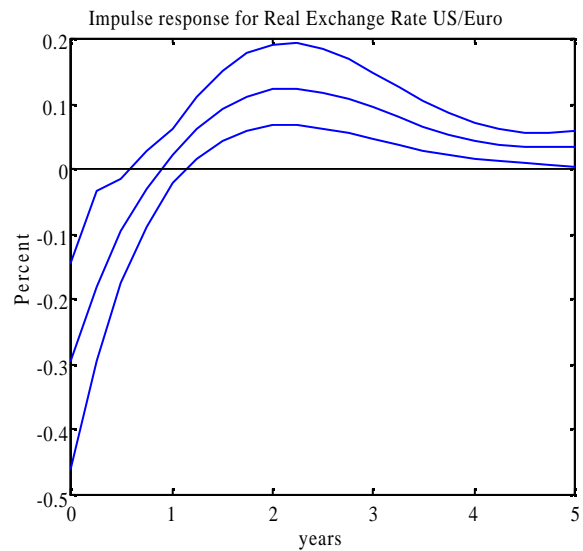
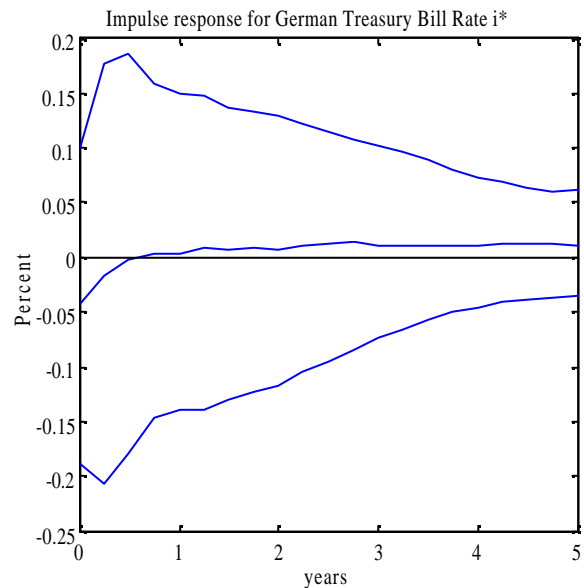
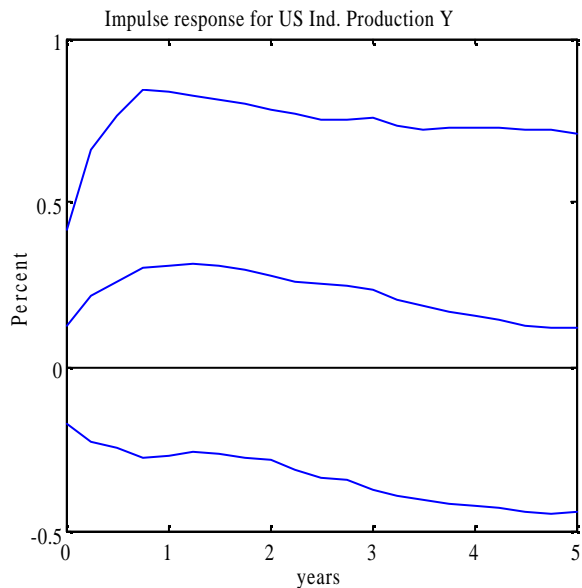
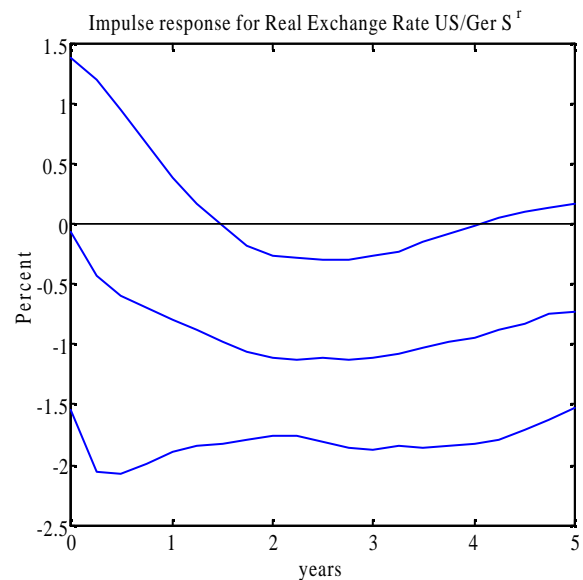
Repeat exercise with simulated data from the estimated JS-EA DSGE model

- ¢ 2. based on restricted stochastic structure with a dominant MP shock (reduce the size of the other shocks by a factor 20)
 - ✘ IR ?
 - ✘ Time series of MP shocks ?

Scholl & Uhlig identification on historical vs. simulated data:



Scholl & Uhlig identification on historical vs. simulated data:



Repeat exercise with simulated data from the estimated JS-EA DSGE model

2. based on restricted stochastic structure of the estimated model: dominant MP shock

✧ IR

==> Agnostic Sign Restriction approach recovers the correct IR for the MP shock:

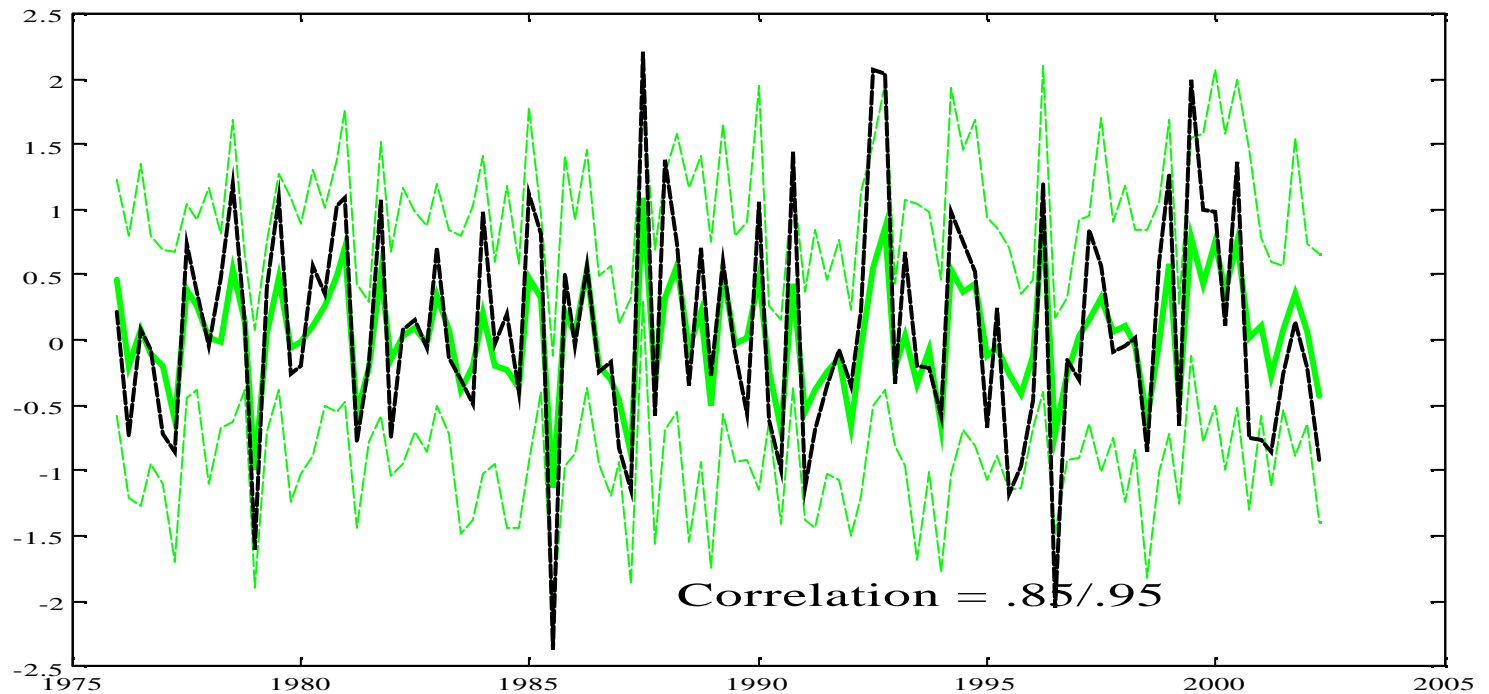
- UIR condition respected - no delayed overshooting of the ER
- no output puzzle
- but still underestimate the size of the MP shock

(and therefore the contribution of MP to overall variance)

✧ Time series of MP shocks ?

Repeat exercise with simulated data from the estimated JS-EA DSGE model

- Time series for MP shock: correlation with 'real' MP shock between 0.85 and 0.95 - standard error is 0.52 (versus 0.85)



green line is median estimate (with dotted 16% and 84% bounds)

Repeat exercise with simulated data from the estimated US-EA DSGE model

- ✧ Regress identified time series for MP shocks on 'real' structural innovations underlying the simulated data: significant coefficient on 'real' MP shock (now it is higher but still <1) and less distortion from the other structural shocks

innovation in	coef.	st.er.	t-stat.
US MP	0.45	0.02	19.21
US productivity	0.33	0.93	0.35
US time preference shock	1.84	0.57	3.22
US public spending	-0.28	0.77	-0.37
US labour supply shock	0.09	1.15	0.08
US price markup shock	-2.74	1.62	-1.70
US investment spec. techn.	1.08	0.64	1.68
UIR shock	0.46	0.62	0.74

Conclusion:

- ⊘ Simulation results indicate that there is no guarantee that a minimum set of sign restrictions will correctly identify the MP shock;
- ⊘ Therefore the results of Scholl and Uhlig are probably not decisive on the UIRP hypothesis (conditional on the MP shock);