Implications of QE policies of ECB

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Introduction (1): Spillover Effects of ECB & Fed Policies on SoE?

- **FNG Shocks spillover on SoEs**: → via *trade*, *FX liquidity*, *portfolio re-balance ch.*

  FED bal.sheet → significant responses in Latin economies.

  ([Canova2005], [Bhattarai and Neely2016] for review on spillover effects or [Cecioni et al.2011] for domestic effects).

  ([Curcuru et al.2018], [Bernhard and Ebner2017] [Punzi and Chantapacdepong2017], [Gagnon et al.2017], [Georgiadis and Grb2016], [Neely2015], [Fic2013]).

  ECBs bal.sheet matter for EU → fragile bank.systems benefit more from UMP.

  ([Gambacorta et al.2014], [Boeckx et al.2014], [Lewis and Roth2015], [Bluwstein and Canova2015], [Burriel and Galesi2016], [Peersman2011])

→ (a) strong *financial ch.* (b) consensus on *liquidity ch.* (c) mixed results on real sector.

→ portfolio re-balancing ch. may work in the opposite way. ([Georgiadis and Grb2016])

- **ECB Policy affects CESEE** → consensus w.r.t effects on Fin.Markets.

  ([Moder2017], [Feldkircher et al.2017], [Horvth and Voslrov2017], [Fadejeva et al.2014], [Hjek and Horvth2016], [Back et al.2013], [AngelovskaBezhoska et al.2018], [Bluwstein and Canova2015]), incl. event studies ([Ciarlone and Colabella2016], [Falagiarda et al.2015])

Introduction (2): Spillover Effects of ECB QE Policies on CESEE

UMP effects on CESEE after 2008 → only few ([Bluwstein and Canova2015], [Horvth and Voslrov2017], [Moder2017]; event st. [Ciarlone and Colabella2016], [Falagiarda et al.2015])

(1) **Strongest effects on financial variables** → , mainly risk & liquidity.

(2) **Real effects are mixed**.

→ [Ciarlone and Colabella2016], [Falagiarda et al.2015]: UMP has eased the financial conditions.

→ [Horvth and Voslrov2017]: strong response of Y, weak on P. [Moder2017]: opposite.

→ [Bluwstein and Canova2015]: higher FNG bank ownership, → stronger Y-dynamics.

(3) **Intensity** → depends critically on trade/financial integration w/EA.

(4) **Transmission**:

→ [Bluwstein and Canova2015]: → via Ex.R or financial (wealth, risk, portfolio re-bal.) ch.

→ [Moder2017]: → trade (exports) is the main channel for SEE.

→ Event Studies → bank liquidity & portfolio re-bal.(cross-border capital flow) ch. [Ciarlone and Colabella2016], [Falagiarda et al.2015]

Introduction (3): **Spillover Effects of ECB QE Policies: Albania**

- **Literature: UMP effects on Albania:** {1} [Moder2017], {2} [Ciarlone and Colabella2016]

{1} **Bilateral BVAR** $\rightarrow$ assesses the impact of UMP shocks on six variables $\{Y, X, P, i, R_{MP}, ER\}$.

{2} **Event Study** $\rightarrow$ effect of UMP on capital flows & bank credit - 10 other countries.

- **This Study:** Employ broad set of HOME variables to address questions like:

(i) Do the UMP policies generate financial & real effects in Albania?

(ii) How they *compare to conventional MP* effects?

(iii) What are the most relevant *transmission channels* of those policies?

(iv) How FNG shocks explain the dynamics of AL economy in SoE set up?

- **Differs from existing Literature on UMP effects & other:** $\rightarrow$ 19

SoE VAR (1): Albania as a SoE

- Albania a SoE economically linked to Euro Area economy → 20
- Financial & Economic links become channels of Transmission of Foreign Shocks → 21

VAR in Structural form
$$A_0 Y_t = A_1 Y_{t-1} + ... + A_p Y_{t-p} + \epsilon_t \quad (1)$$

MA representation for IR
$$Y_t = \sum_{i=0}^{\infty} \Phi_i u_{t-i} = \sum_{i=0}^{\infty} \Theta_i \epsilon_{t-i}, \qquad \Theta_i = \Phi_i A_0^{-1} \quad (2)$$

ϵ_t $iid \sim N(0, \Sigma)$ orthogonal shocks; and $A_0 ... A(p) \in R^{nxn}$ matrix of coefficients.
$(j, k)^{th}$ element of Θ_i is the impact of the k-th structural shock on j-th variable at horizon i.

Block Exogeneity for SoE
$$\begin{bmatrix} \tilde{A}_{11} & 0 \\ \tilde{A}_{21} & \tilde{A}_{22} \end{bmatrix} \begin{bmatrix} Y_t^{EA} \\ Y_t^{AL} \end{bmatrix} = \begin{bmatrix} A_{11} & 0 \\ A_{21} & A_{22} \end{bmatrix} \begin{bmatrix} X_t^{EA} \\ X_t^{AL} \end{bmatrix} + \begin{bmatrix} \epsilon_t^{EA} \\ \epsilon_t^{AL} \end{bmatrix} \quad (3)$$

$\tilde{A}_{ij} \approx$ elements of the contemporaneous matrix A_0; $A_{ij} \approx$ elements of the matrix of lagged coeff. $\{A_1, ...A_p\}$;
$[\epsilon_t^{EA}, \epsilon_t^{AL}]' \approx$ the vectors of FNG & HOME structural shocks respectively.

Euro Area Data
$$Y_t^{EA} = \{y_t^*, p_t^*, b_t^*, ciss_t, sp_t^*, R_t^*\} \quad (4)$$

Albanian Data
$$Y_t^{AL} = \{y_t^h, p_t^h, R_t^h, s_t, sp_t^h, risk_t^h\} \quad (5)$$

(a) Euro Area: [1:6] Output, HICP, ECB Balance Sheet, CISS index, Euribor Spread (12m-3m), ECB Rate. [Boeckx et al.2014]
(b) Albania: [1:6] Output, CPI, BoA Rate, Exchange Rate, TB spread (12m-3m), TB-Euribor Spread.

SoE VAR (2): *BVAR with Independent Normal Inverse Wishart (INIW) Prior & Block Exogeneity*

- BVAR
  - (-) Dimensionality BVAR overcomes the D-problem via Prior beliefs on param's,
  - (-) Improved forecasts compared to classical approach [Litterman1986],
  - (-) Uncertainty & efficient estimates via B.Simulation.
- SoE framework: Independent Normal Inverse Wishart (INIW) [Kadiyala and Karlsson2012]

Prior mean	$p(b) \sim N(\widetilde{b}_0, J)$	$\widetilde{b}_0$ prior mean, J $\sim$ prior coef. variance	(6)
Prior variance	$p(\Sigma) \sim IW(\bar{S}, \alpha)$		(7)
Cond.Posterior Mean	$H(b\|\Sigma, Y_t) \sim N(M^*, V^*)$		(8)
Cond.Post. Variance	$H(\Sigma\|b, Y_t) \sim IW(\bar{\Sigma}, T+\alpha)$		(9)

Issues: - J is of size $[N*(N*p+1)]x[N*(N*p+1)]$. Inversion of large 'J' a disadvantage in terms of time.
- Difficult to set priors on combination of coeffs. in each/across EQs. See [Banbura et al.2017] for a potential solution.

- Identification of UMP, MP shocks via Sign & Zero restrictions [Arias et al.2014], [Uhlig2005]

a) Sign Restrictions: Weaker & less ambiguous than zero restrictions.

- Do not require the identification of all shocks.
- Consistent with literature & allows for comparison of the results.

SoE VAR (3): Identification via Sign & Zero restrictions: based on [Boeckx et al.2014], [Burriel and Galesi2016]

b) Zero Restrictions: Givens Rotations Matrices [Canova and De Nicolo2002]

$$G(\theta) = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & \dots & \dots & 1 & 0 \\ 0 & 0 & cos & 0 & -sin & 0 \\ 0 & 0 & \dots & 1 & \dots & 0 \\ 0 & 0 & sin & 0 & cos & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

c) Check that restrictions (tab:7) on Θ_i in eq. (2) are satisfied, otherwise discard it & restart.

	Y	P	ECB assets	CISS	Spread	ECB rate
UMP shock (restrict. on Θ_i)	0	0	≥ 0	≤ 0	≤ 0	0
MP shock (restrict. on Θ_i)	≥ 0	≥ 0	0	-	-	≤ 0

'$\geq$' indicates the IR is restricted to be non-negative, '$\leq$' to be non-positive, '-' is unrestricted, '0' to be zero on impact

(-) VAR with lag 1
(-) 10^4 Replications: Posterior IRs computed using 1/2 of replications.
(-) For each replication (>burn replic.) draw 10^2 matrices satisfying both Zero & Sign Restr.
(-) Get the median IR of the 10^2 contemporaneous matrices satisfying Sign & Zero Restr. in each Gibbs draw to address [Fry and Pagan2011] criticism.

SoE VAR (4): Identification of Domestic shocks

- **Cholesky identification based on ordering:** $\{y_t^h, p_t^h, R_t^h, s_t, sp_t^h, risk_t^h\}$.

(-) **MP shocks orthogonal to the information set of BoA**.

"In the formulation and implementation of monetary policy, the Bank of Albania will, therefore, strike a fair balance between restoring inflation to target and smoothing economic fluctuations." (MP document at [Bank of Albania2015]).

(-) **Setting MP rate does NOT take into account a target of ER**
Free floating ER regime. [Bank of Albania2015] (page 14)

(-) **Financial variables, respond contemporaneously to MP, not vice-versa.**

Recursive ordering in ([Bernanke and Mihov1995], [Christiano et al.1998]).

"The main purpose of standing facilities is to adjust the level of liquidity in the banking system and steer short-term interest rates in the money market." (see *'Open Market Operations'* and *'Standing Facilities'* sections in pages 17-18 of the **Monetary Policy Document** of [Bank of Albania2015]).

Evaluation of UMP shocks

(A) An **exogenous expansion of ECB balance sheet**: Impulse responses → 22

a) **Strong impact on Real sector**: Peak in 1 year.

b) **Instant improvement of Financial cond.**: instant ↓ in Fin.stress & Eonia spread.

c) **No response in R of ECB**: contrary to results in [Boeckx et al.2014].

Similar responses in [Boeckx et al.2014] (figure 4, pg.25) except (c) → 23

Possible reasons:

→ 2 x longer data sample (2008-2018:06 vs 2008-2013:12 in [Boeckx et al.2014])

→ Horizon for which the IR of Euro area variables is restricted.

Further check: Two other studies - the same identification scheme - longer samples.

i) no impact on policy R → 24 in [Burriel and Galesi2016] (figure 2, page 19).

ii) no impact on policy R → 25 in [Moder2017] (figure 2, page 23).

(B) An **exogenous decline in ECB policy rate** Impulse responses → 26

a) **Positive effect in Real sector**: Effect dies in < 10 months.

b) **Weak/NO effect on Fin. markets**: no Δ in Eonia spread, CISS, bal.sheet of ECB.

Similar responses in [Burriel and Galesi2016] (figure 7, pg.19) except **Eonia spread** → 27

Possible reason: restrictions on IR of more variables in [Burriel and Galesi2016].

Result (1): **Spillover Effects of UMP & MP shock on Albanian Economy**

(A) **Expansion of ECB Balance sheet → improves Financial Cond. in AL** **IR** → 28

a) **Muted & Controversial effect on Real sector**: ↓ Median response of Y & P.

b) **Strong Financial ch.**: *Term spread* ↓ & *risk* ↓, Ex.R appreciates (0.07%, 0.01%, 0.25%).

c) **Weak effect of R of BoA**: muted negative (median) response.

→ **EUR depreciation**: ([Burriel and Galesi2016], [Gambacorta et al.2014], [Lewis and Roth2015])

→ **Risk, Y & P decline decline** similar in ([Bluwstein and Canova2015]) . I cite:

"Output responses to euro-area UMP shocks ..... in SEE countries are persistently negative and significantly smaller than in the euro area after about two weeks."

Potential reasons: Reverse Portfolio Effects. → I enquire about the Transmission later

(B) **Exogenous decline in R of ECB → weak effects on Albanian economy.** **IR** → 29

a) **Weak/NO effect on Real sector**: No effect on Y^{AL}, P^{AL} ↑, effect dies in 6 months

b/c) **Weak/NO impact on Financial markets**: except weak apprec. of HOME currency.

→ **CESEE** sensitive to R.ECB ([Babeck et al.2016], [Fadejeva et al.2014], [Jimnez-Rodrguez et al.2010])

→ **SEE** less sensitive to the euro area shocks [Hjek and Horvth2016].

→ (+) response of Bulgarian Y to a (+) shock on R.ECB [Minea and Rault2011]

Potential reasons: Sample bias after 2008. ECB MP NOT effective even in Euro area.

Result (2): **The Dynamics due to Domestic Shocks consistent with Economic Theory**

(a) **Output (productivity/aggregate demand) shock** **IR** $\rightarrow$ 30

- Agg.Demand expands, ExR apprec.$\downarrow$, risk $\downarrow$, P picks up, but dies quickly due to MP$\uparrow$

(b) **Price (supply/commodity price) shock**

- Median Output declines, ExR mild depreciates, country risk $\uparrow$.
- Due to the nature of the shock (supply) the effects (incl. MP tightening) die quickly.

(c) **MP (possibly inflationary expectations) shock** **IR** $\rightarrow$ 31

- ExR depreciates, Term Spread $\uparrow$, possibly due to Inflationary pressures picking up.

(d) **Ex.R(supply/commodity price) shock**

- higher term premium, inflation picks up, country risk $\uparrow$.
- Potentially shock on (i) *capital & financial acc.* or (ii) *interventions of CB in FX market*

(e) **Term SPREAD (P-expectations/financial/public expend.) shock** **IR** $\rightarrow$ 32

- Y$\downarrow$ rules out *[public borrowing]* shock, NO policy response rules out *[p-expect]* shock.
- *Spread* shock possibly captures *financial* shock $\rightarrow$ Y$\downarrow$ P up, ER depreciates, risk$\uparrow$.

(f) **Risk (negative 12m Euribor/TB yield/country.prem) shock**

- IR of RISK$\downarrow$ due to UMP, rules out signalling effect due to UMP $\rightarrow$ 12m Euribor$\downarrow$.
- No response by ER rules out *TB yield* shock (usually such shocks trigger ER depreciate)
- Possibly a country risk shock, or a combination of all above.

Result (3):

- **Summary from "Spillover Effects of UMP"**.

(a) **Muted & Controversial effect on Real sector**: ↓ Median response of Y & P.

(b) **Strong Financial ch.**: *Term spread* ↓ & *risk* ↓, Ex.R appreciates (0.07%, 0.01%, 0.25%).

(c) **Weak effect of R of BoA**: muted negative (median) response.

Results [a] and [c] upon UMP shock not consistent, sth. else happening.

- **Alternative specifications to investigate other channels of transmission** → 33

see [Bluwstein and Canova2015]

- Key Result: Upon *UMP shock*

(1) *Capital inflows* decline by 10%. → see 13

→ Output decline peaks at -0.10% compared to -0.07% in the benchmark VAR.

→ Reverse capital flows possible due to improved Financial Conditions in EA upon extensive unconventional measures of ECB.

Result (6): **Change in response of Output due to ECB Policies & Risk shocks** (based on table 33)

$Z^h \longrightarrow$	Portfolio re-balance (2) CA	(3) FA	Bank Lending (4) CP	(5) M3	Remit.ch. (6)Rmn	Trade ch. (8) X	M	Real Eff. (9) C	I
	UMP shock of size {**+5%**}								
Z^hresponse	-10	-8	(-)	(-)	(-)	+ 2	..	..	-1
Δ in Y^h IR	-0.03	..	..	..	..	..		-0.08	
	risk shock of size {**+0.15%**}								
Z^hresponse	-3	+10	-0.15	(-)	-0.5	(+)	-	+0.07	-0.5
Δ in Y^h IR	-0.01	+ 0.02	..	..	-0.01	..		..	
	conventional MP shock								
Z^hresponse	(+)	(+)	..	..	(+)	..	..	..	..
Δ in Y^h IR	..	..	..	..	..	..		..	

(3) Signs (+) or (-) show the shift in median response but ...

(3) ...credible intervals are very wide, not ruling out zero response, or impact is very short.

Result (4):

The story that emerges looking at table 13 row-wise is the following.

(i) **The portfolio re-balancing channel $\rightarrow$ reverse effects**.

$\rightarrow$ **counterbalance the positive effects of UMP via the financial channel**.

$\rightarrow$ The net effect of the $\uparrow$ in ECB balance sheet size on real I and Y is slightly negative.

(ii) **Risk shocks are also important**.

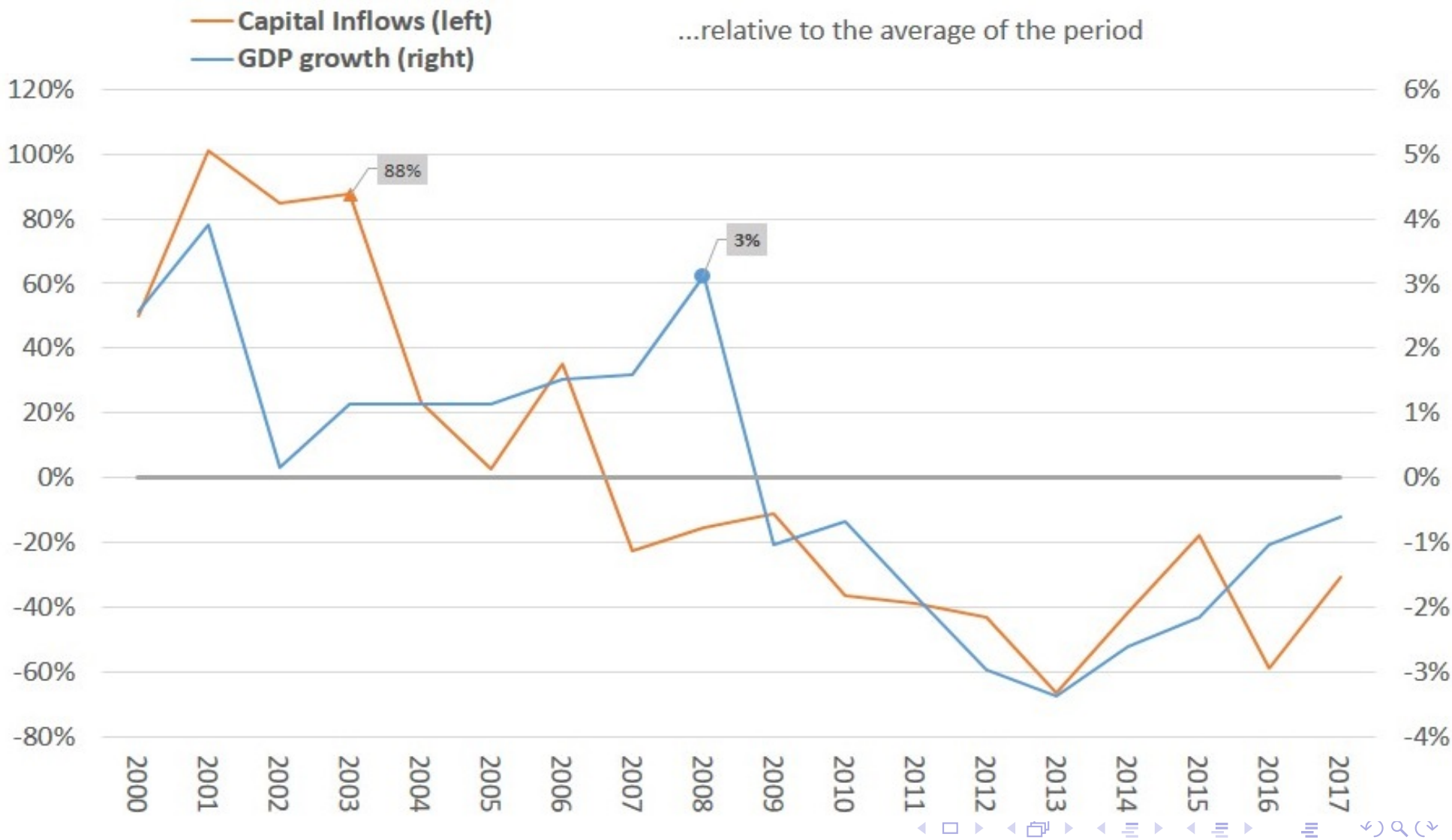
$\rightarrow$ **The magnitude of the impact on real I and Y is smaller**.

$\rightarrow$ **3 channels: (a)the portfolio re-balancing, (b) remittances & (c) bank lending**.

Trade channel: smooth down of negative effects via the $\downarrow$ of iMports upon *risk shock*.

(iii) *Conventional MP shocks* are not significant for the real sector in Albania.

Capital Inflows & Real GDP Growth.



Summary

The scope of the paper:

(i) How do the ECB policies affect Albanian economy, and

(ii) through which channels are these spillover effects transmitted?

Results:.

The exogenous expansion of ECB balance sheet $\rightarrow$

(1) Improved financial conditions in Albania.

(2) Mild negative impact on real sector, suggesting opposing effects via other channels.

(3) Explains a smaller fraction of ec. fluctuations compared to domestic shocks.

Alternative transmission channels:

(4) The *portfolio re-balancing channel* active ch. Reverse effects on real sector.

(5) *'Risk' shocks*: active source of impact factor for the dynamics of economy. Their magnitude is smaller.

Thank You!

Appendix

Introduction: Current Literature

Back to → 4

- **differences from** $\{1\}$ [Moder2017] :

→ broader set of variables: to evaluate the transmission channels,

→ comparative approach: Sign & Zero Restr. identify MP & UMP; HOME shock: cholesky.

→ methodological: UMP identified via Restr. ONLY on responses of EA variables.

→ NO consensus on the directional effects of UMP on SoE's.

- **differences from** $\{2\}$: event study w/ capital flows & bank credit on 10 countries.

- **differences from other studies that include Albanian economy**

$\{3\}$ [Fadejeva et al.2014] does not address UMP shocks but other foreign shocks.

$\{4\}$ [Dushku and Kota2010], [Kolasi et al.2010], [Dushku and Kota2011] & other literature on Albania:

→ in terms of the scope not addressing implications of UMP shocks,

→ (quarterly) data 2003-2009 (or earlier) compared to 2008-2018 in this study,

→ the methodological approach & their identification scheme.

SoE VAR: Albania as a SoE Back to → 5

- **Strong Financial & Economic link of a SoE (Albania) w/ Euro Area.**

(i) Trade Openness: 56% (goods), 96% (g & services) in terms of GDP,

(ii) Financial Flows: 10-15 % of GDP, Capital Flows around 1.5-2.5% of GDP ,

(iii) Banking System: foreign ownership ≈ 65-70 % in 2013; lower now (≈ 50-55%),

(iv) Euroization: both $\frac{FxDeposits}{TotalDeposits} > 50\%$ & $\frac{FxLoans}{TotalLoans} > 50\%$,

	(in billion USD)	2014	2017
$[a]$	Albanian Exports	3,732	4,110
$[b]$	Euro Area Imports	5,532,357	5,387,792
$[a/b]$	Ratio (%)	0.067 %	0.076 %
$[c]$	Albanian Imports	6,243	6,070
$[d]$	Euro Area Exports	6,048,105	5,986,659
$[c/d]$	Ratio (%)	0.1%	0.1%
$[e]$	Albanian nominal GDP	13,228	13,039
$[f]$	Euro Area nominal GDP	13,478,925	12,589,497
$[e/f]$	Ratio (%)	0.1%	0.1%

Source: BoA & WDI. Trade figures account for the total trade flows of goods and services.

SoE VAR: Transmission

Back to → 5

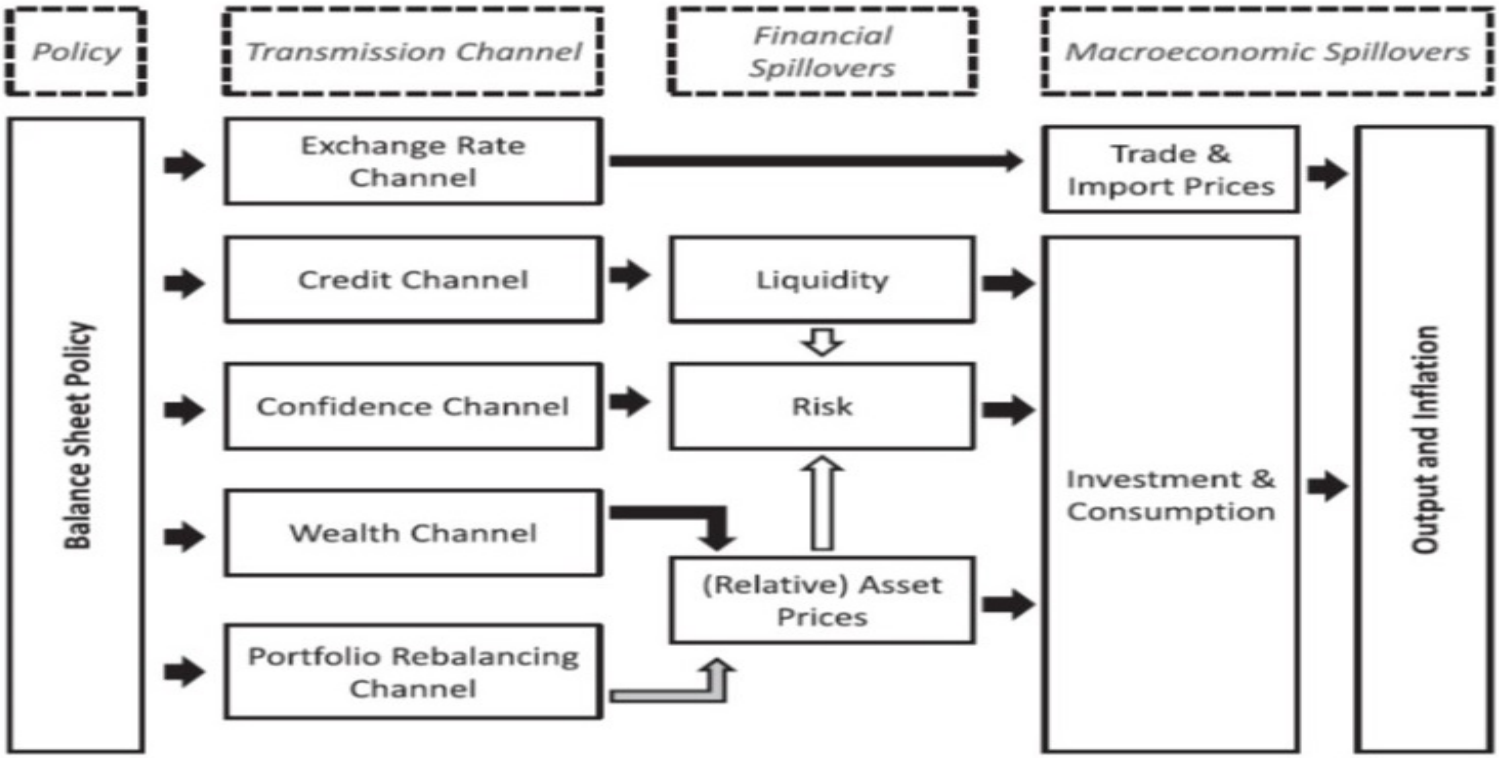
- External shock Propagation in SoE. (Source: [Bluwstein and Canova2015], page 75)

  (i) Wealth & Portfolio re-balancing ch.: asset prices (user cost of capital),

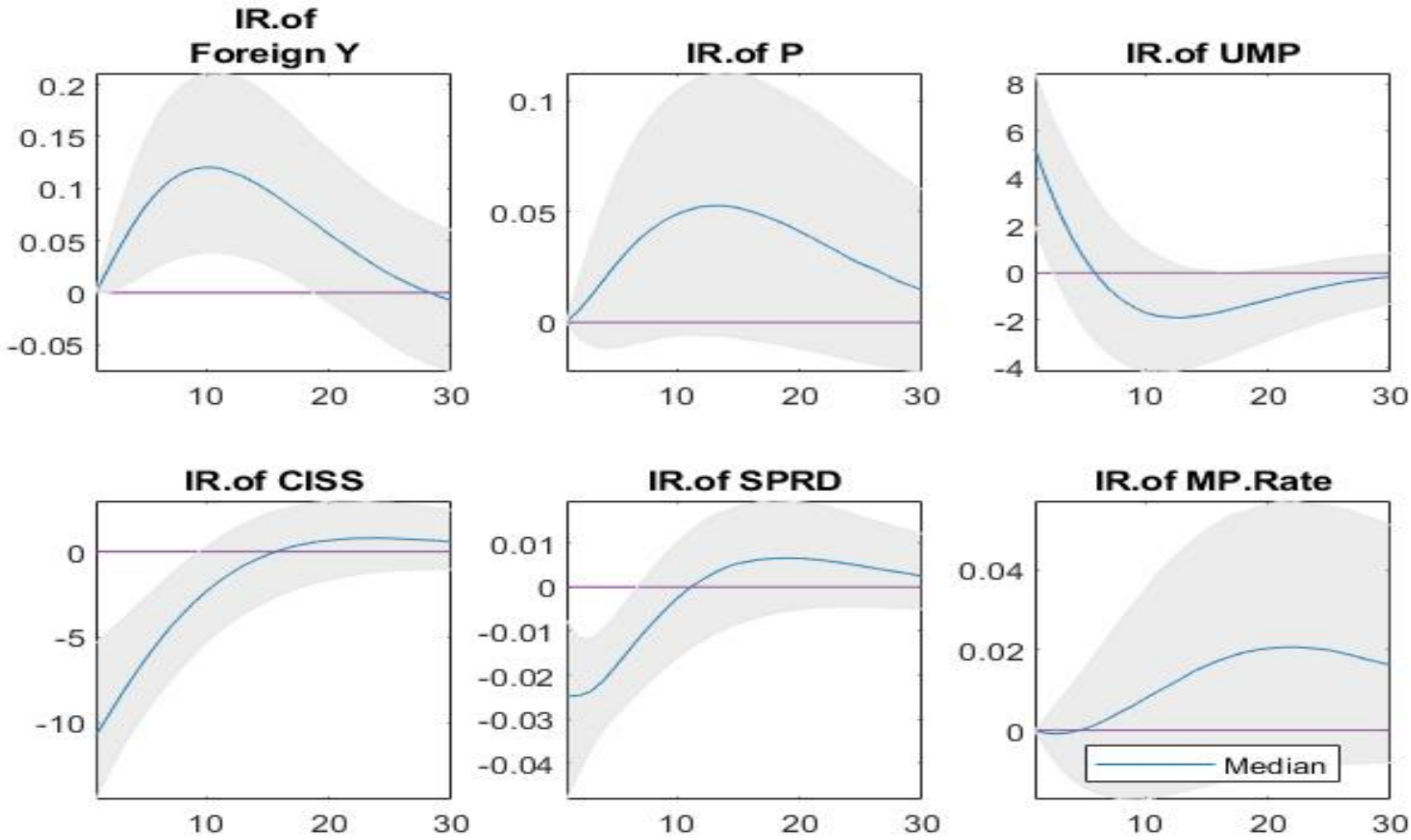
  (ii) Risk/confidence channel: financial risk perceptions,

  (iv) Bank Credit channel: liqudity, euroized economies,

  (v) Exchange Rate channel: trade account,

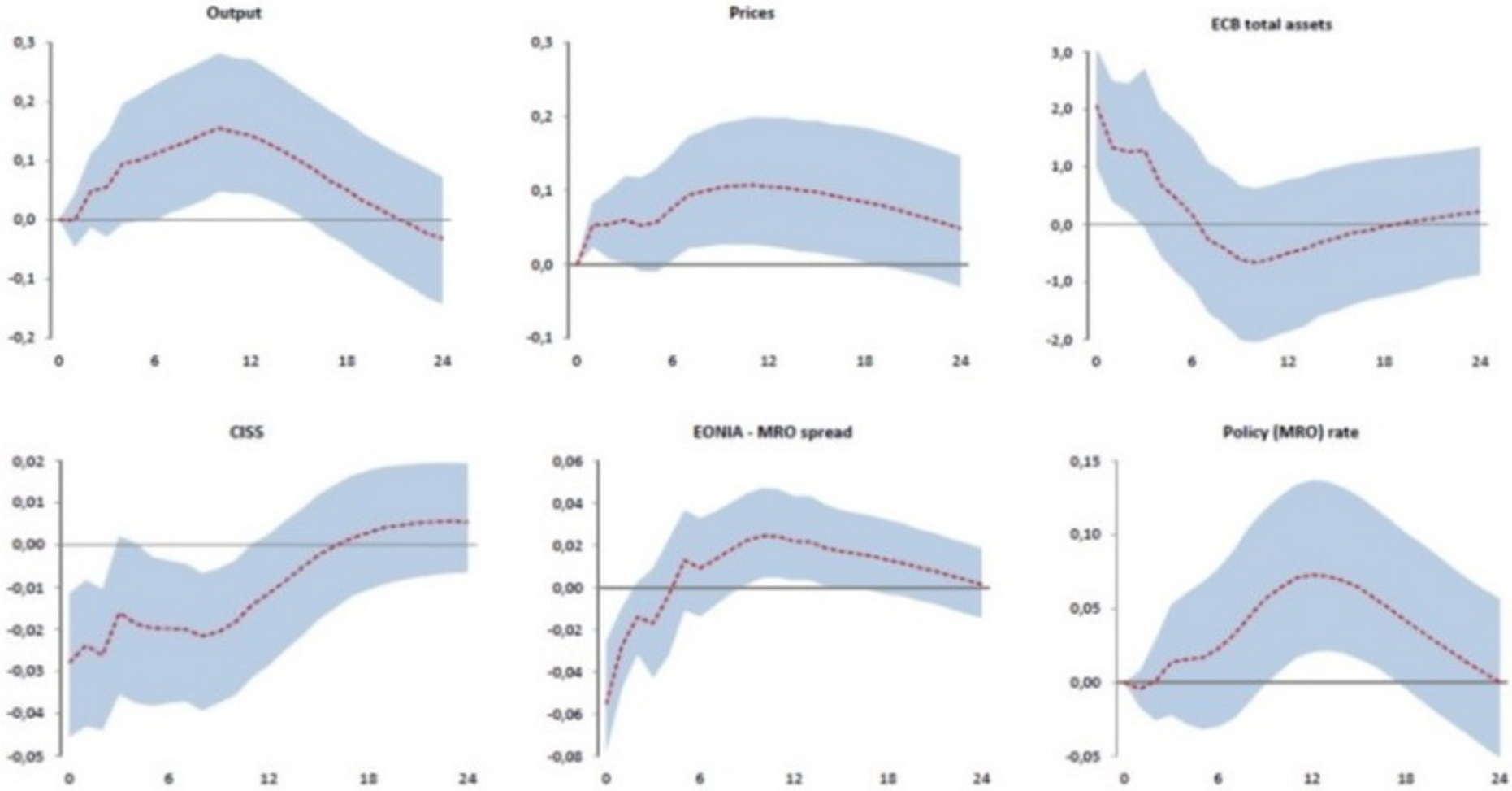


Response of EA variables due ECB's **UMP** shock. Back to 9



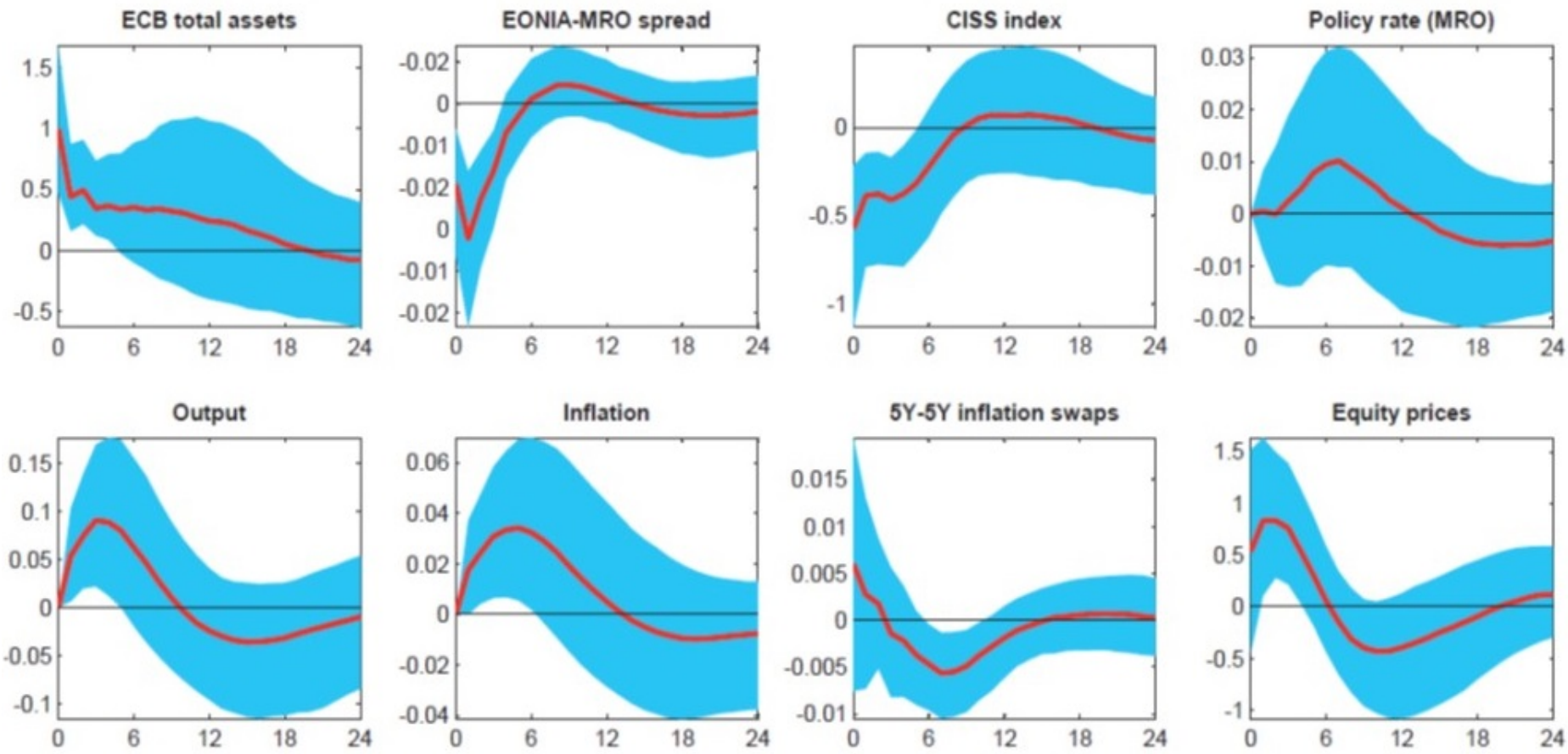
Response of EA variables due ECB's **UMP** shock (fig. 4 in [Boeckx et al.2014], p.25.)

Back to 9



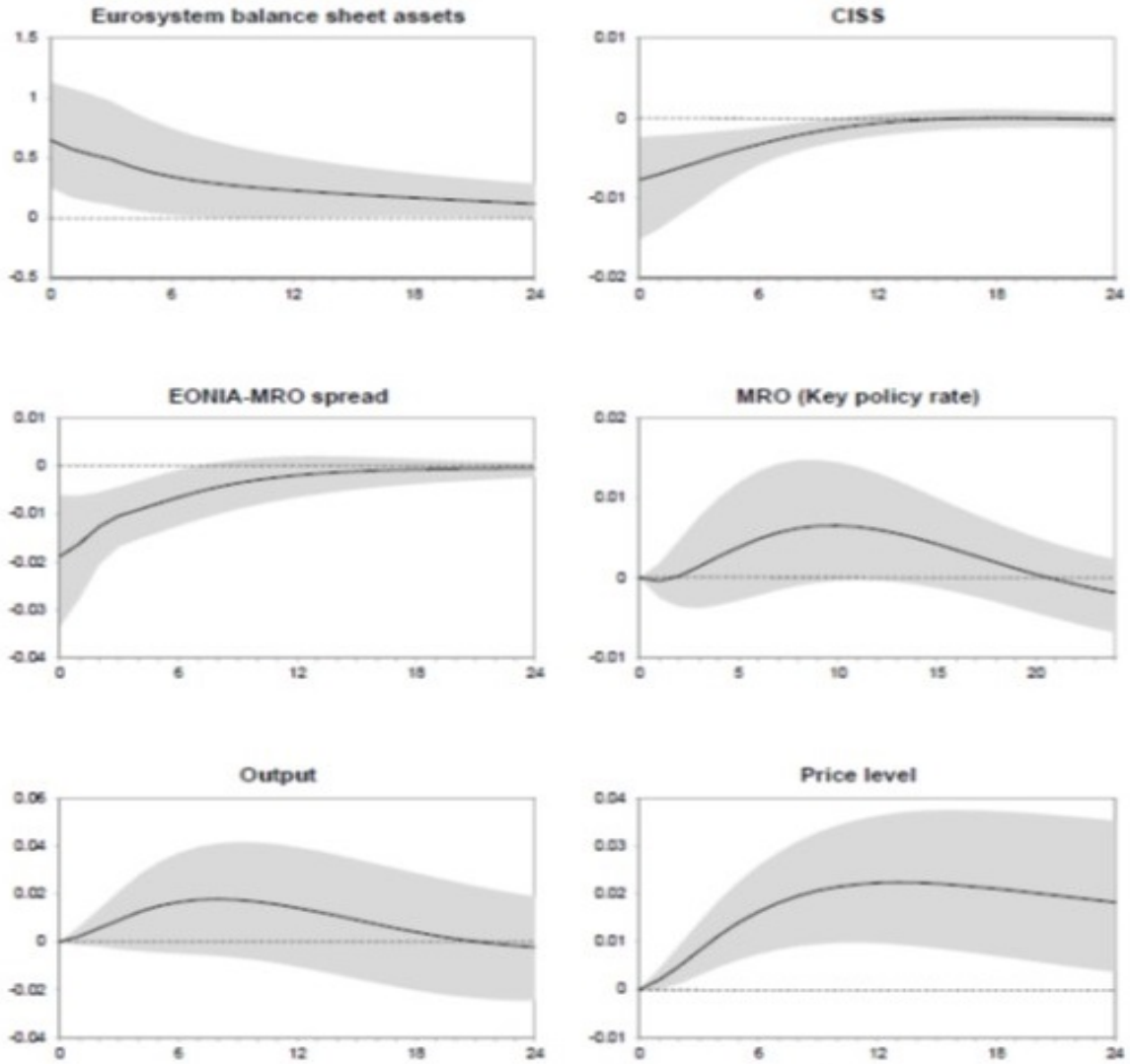
Response of EA variables due ECB's **UMP** shock (fig. 4 in [Burriel and Galesi2016], p.19.) Back to 9

Figure 2: Euro area wide responses to an unconventional monetary policy shock



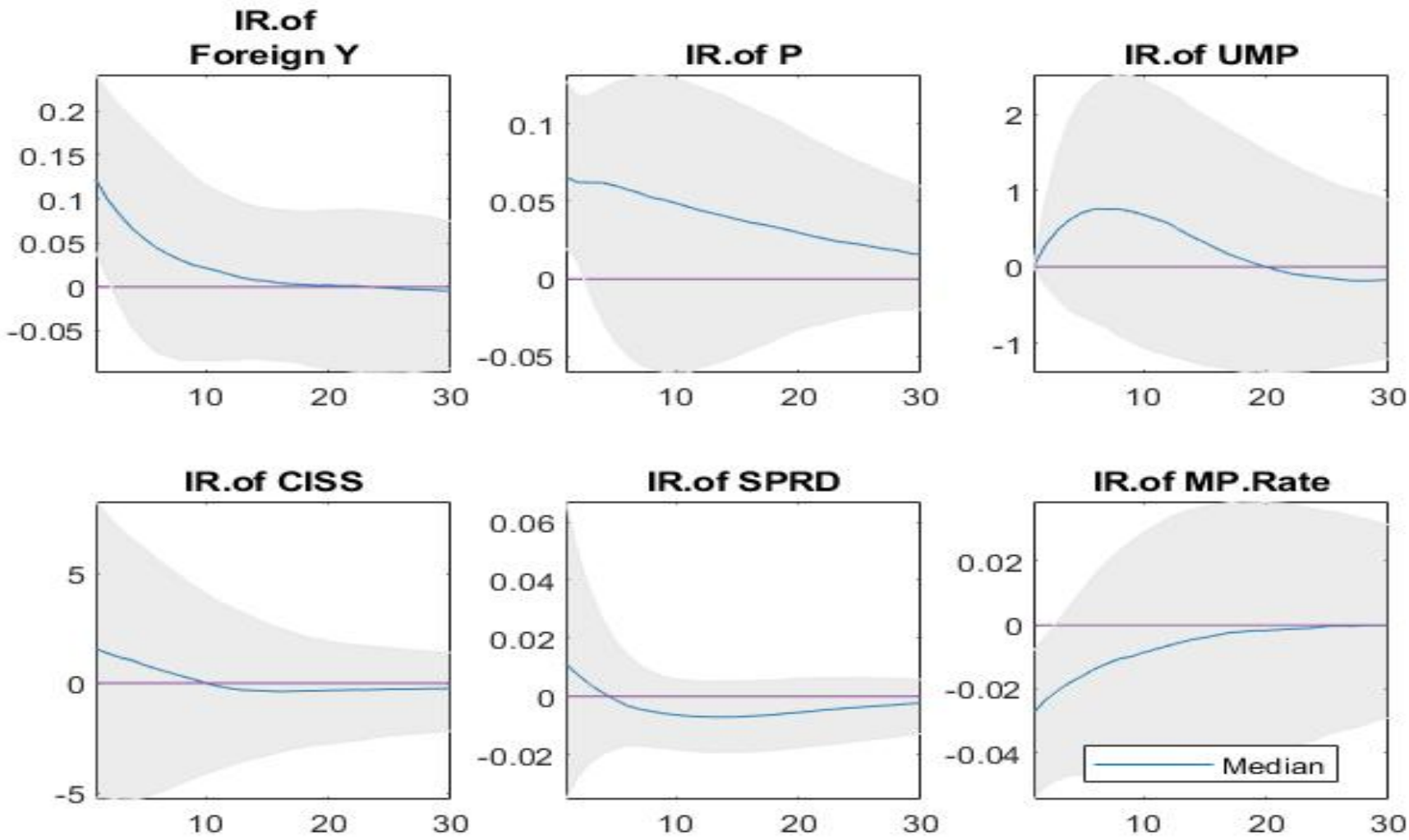
Response of EA variables due ECB's **UMP** shock (fig. 2 in [Moder2017], p.23.) Back to 9

Figure 2: Euro area: Response to a balance sheet shock



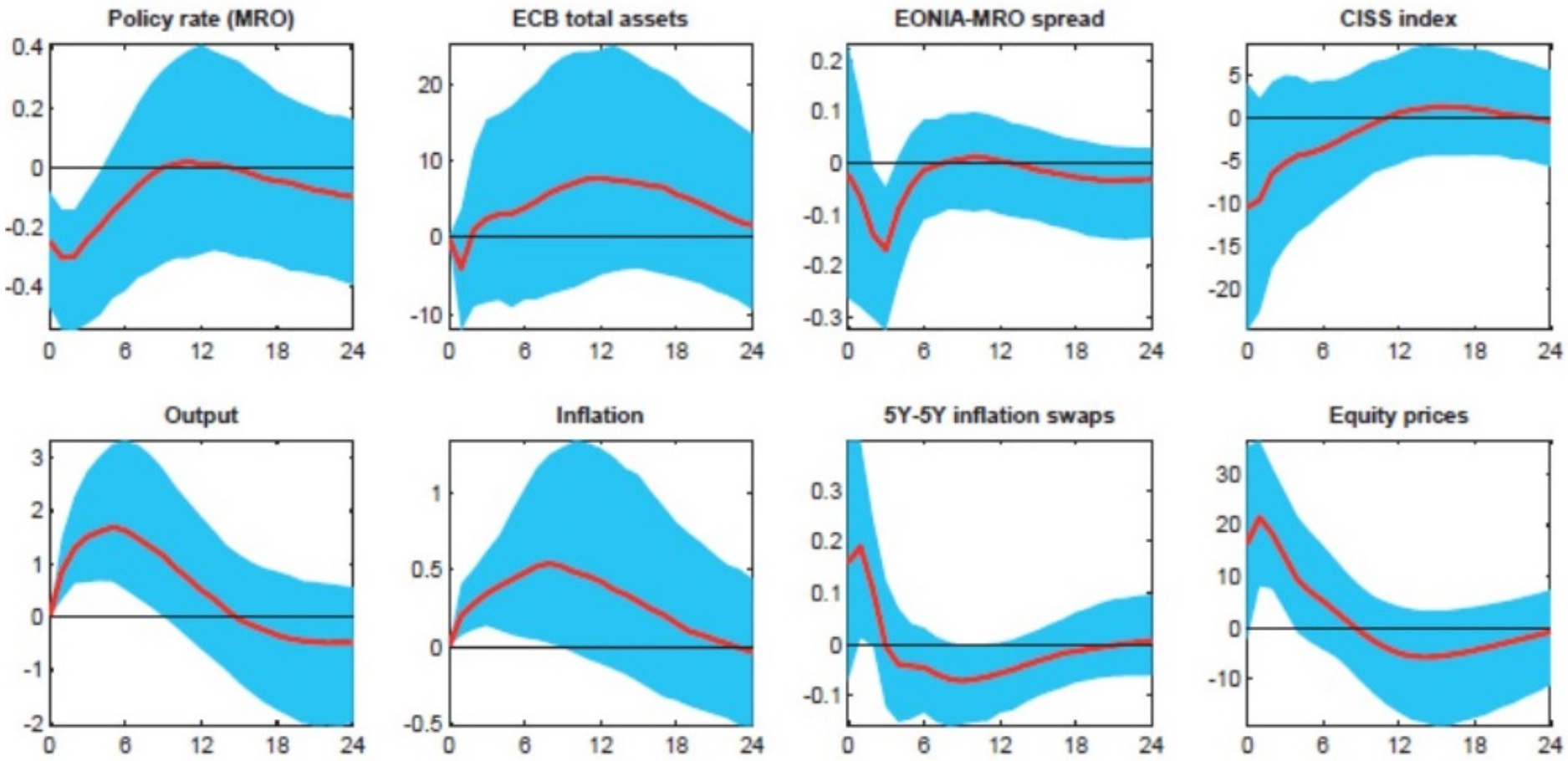
Note: Response of variables to an expansionary one standard deviation Eurosystem balance sheet shock. The

Response of EA variables due ECB's Conventional **MP** shock. Back to 9



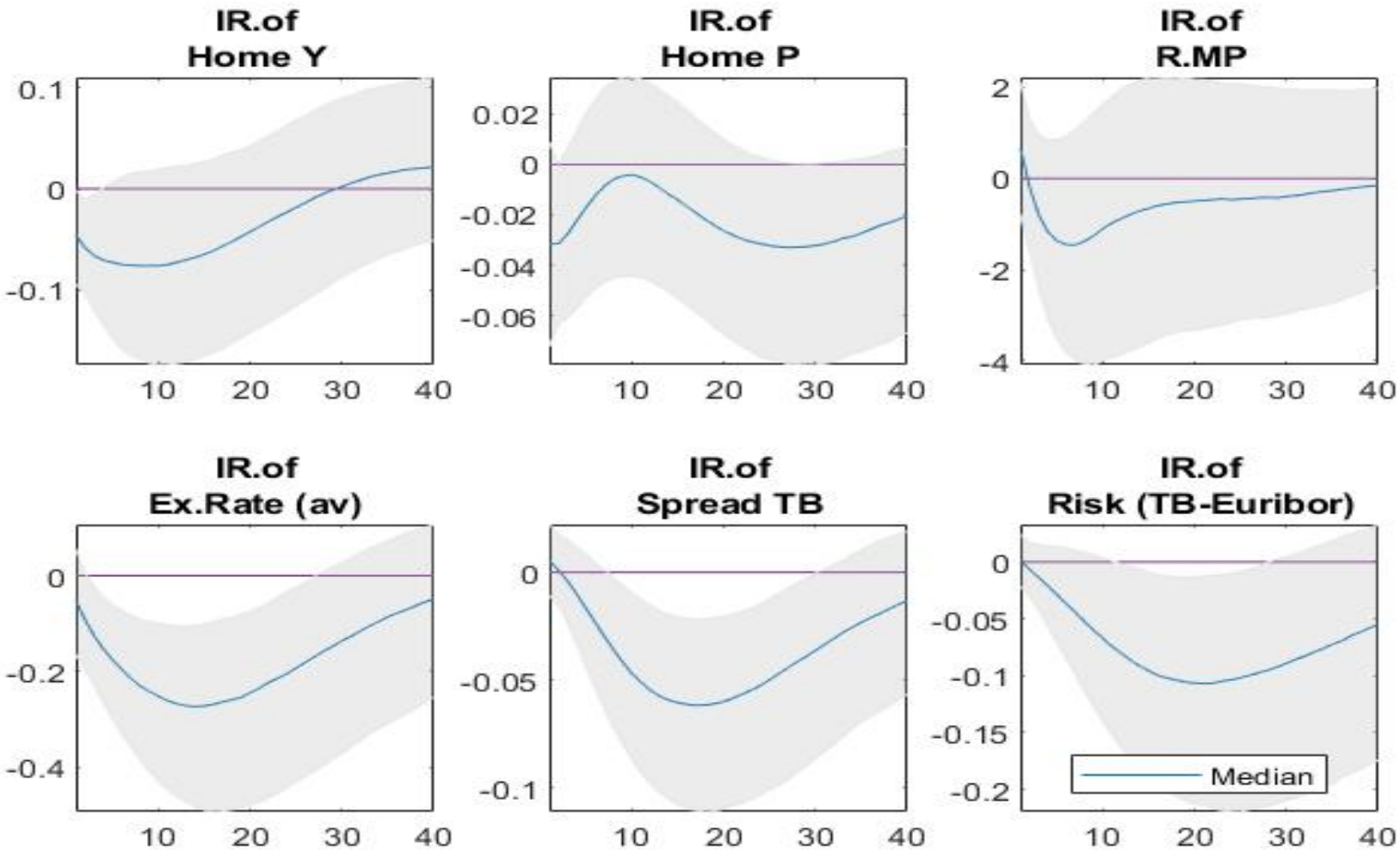
Response of EA variables due ECB's **CMP** shock (fig. 7 in [Burriel and Galesi2016], p.29.) Back to 9

Figure 7: Euro area wide responses to an conventional monetary policy shock



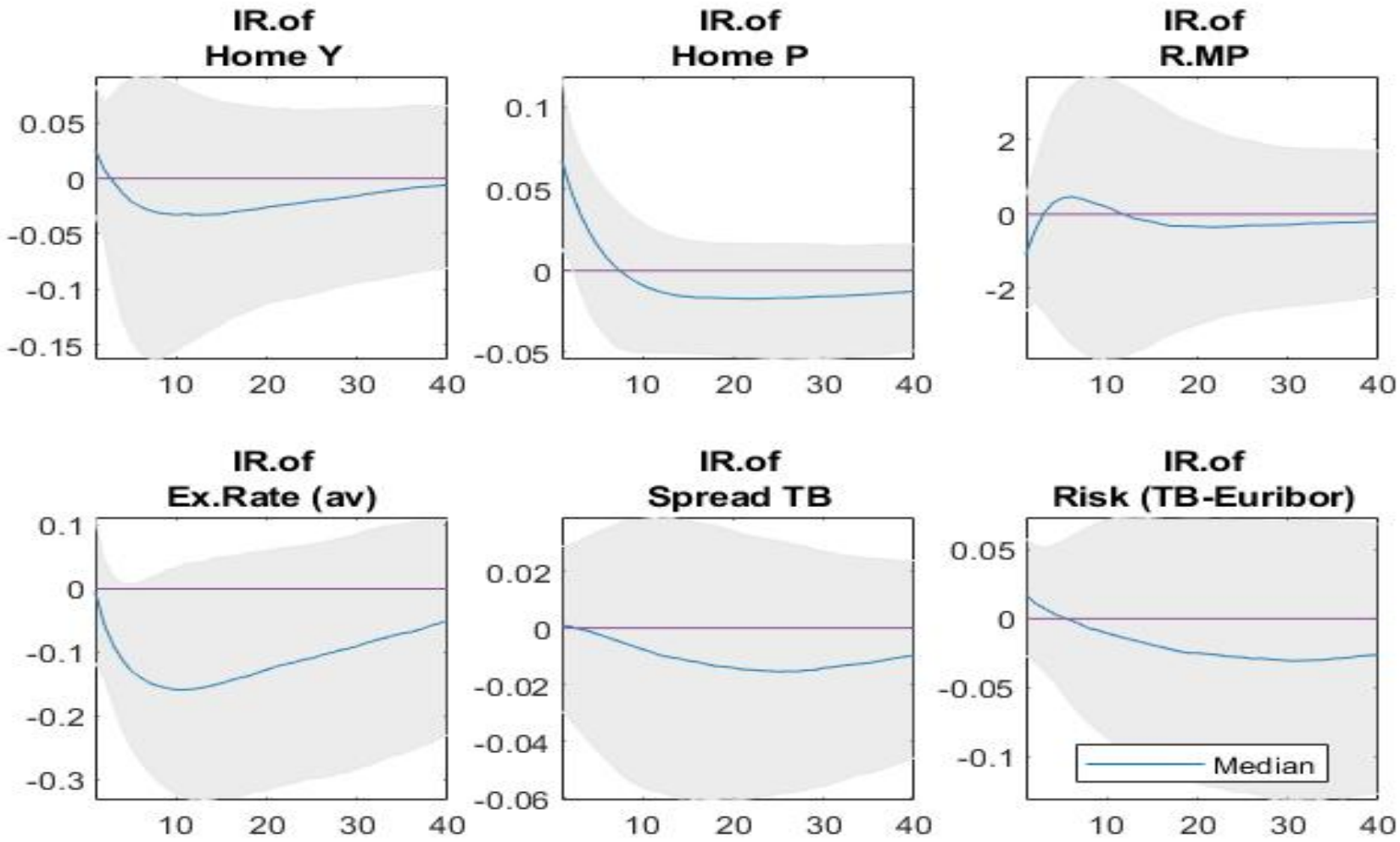
Response of Albanian variables due ECB's **UMP** shock.

Back to 10

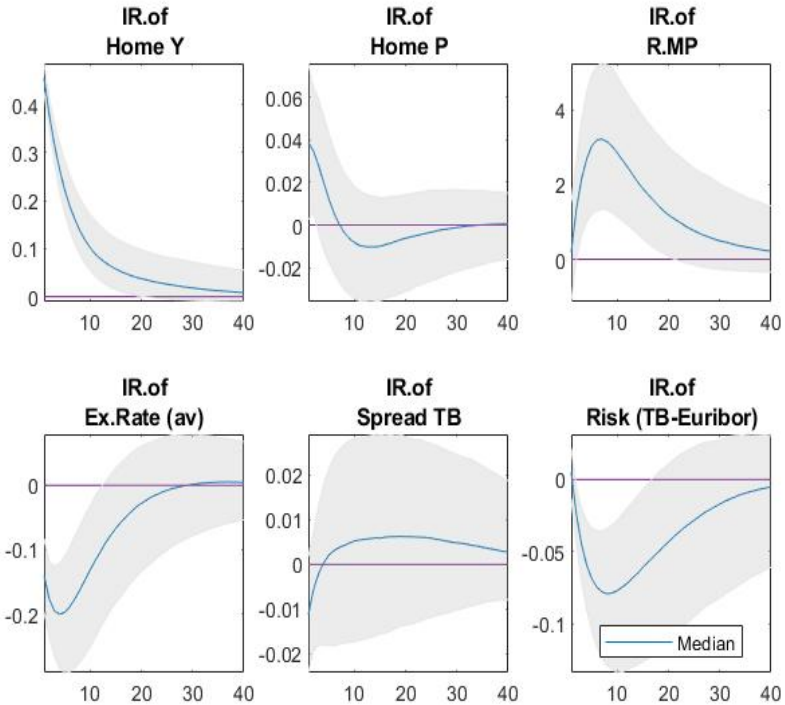


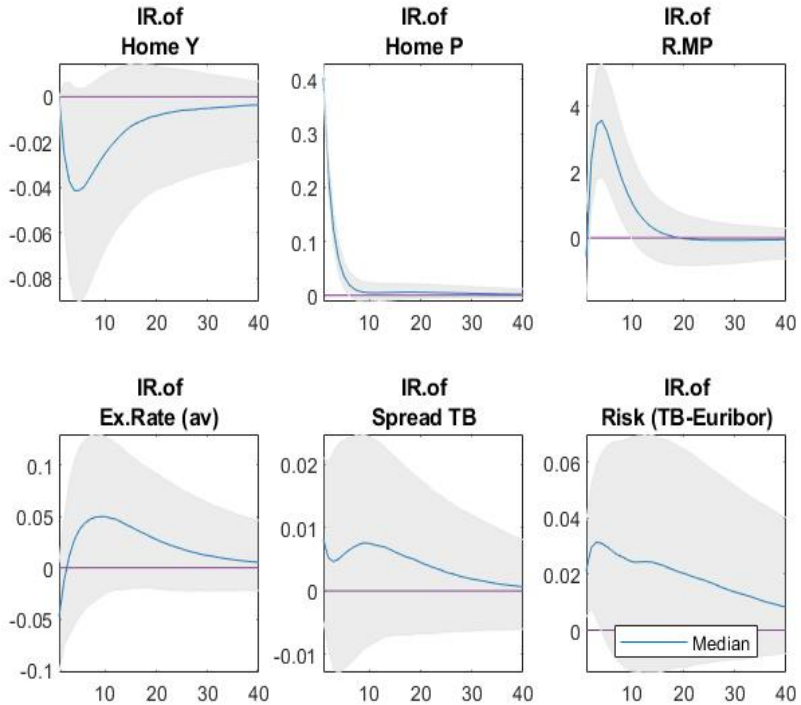
Response of Albanian variables due ECB's standard **MP** shock.

Back to 10

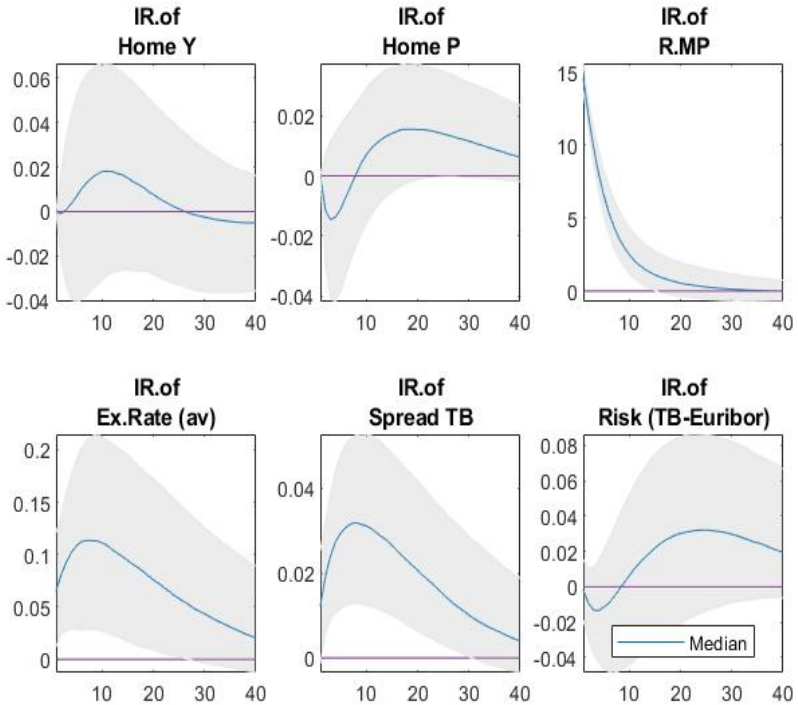


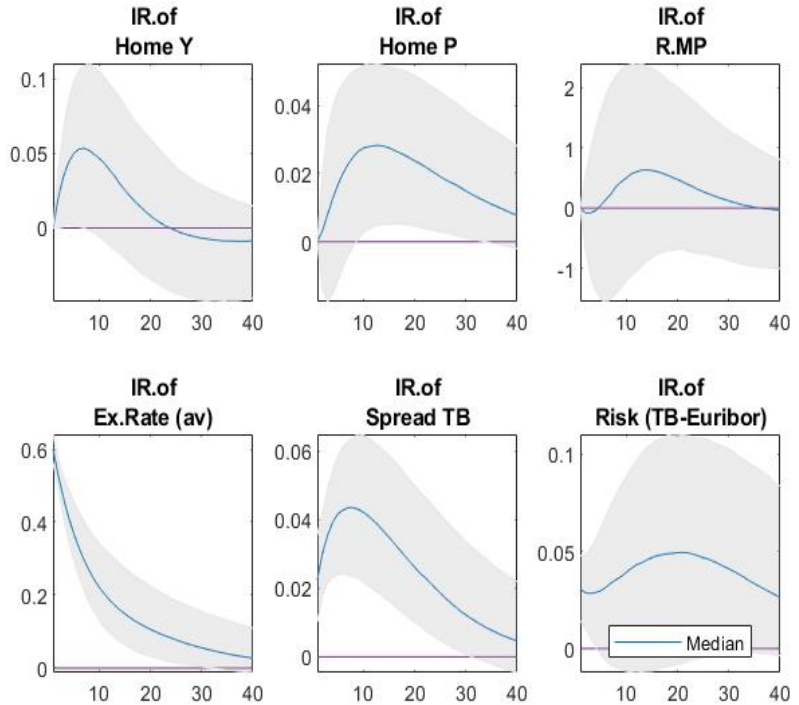
IR of Albanian variables upon [a] *Y shock* (left) & [b] *P shock* (right). Back to → 11



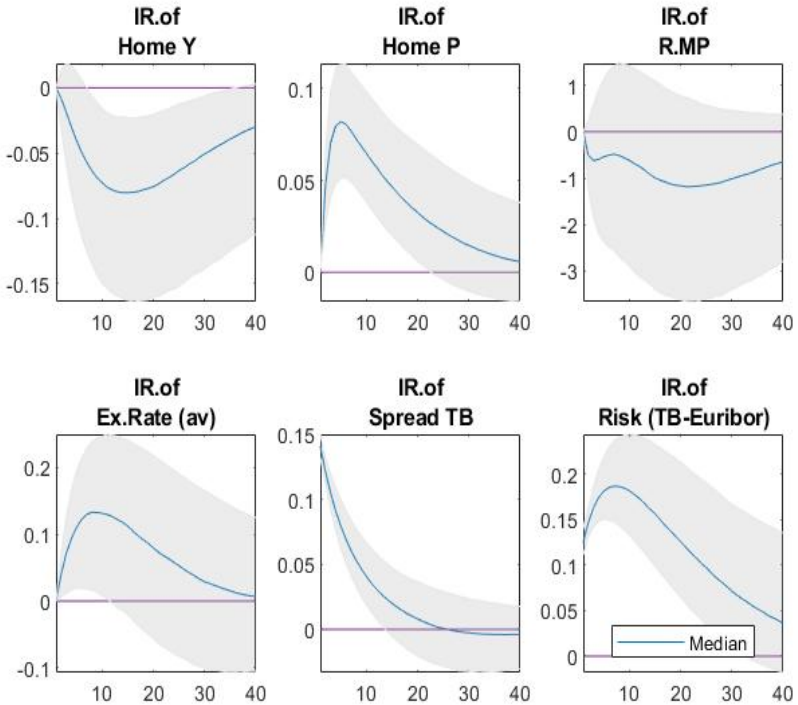


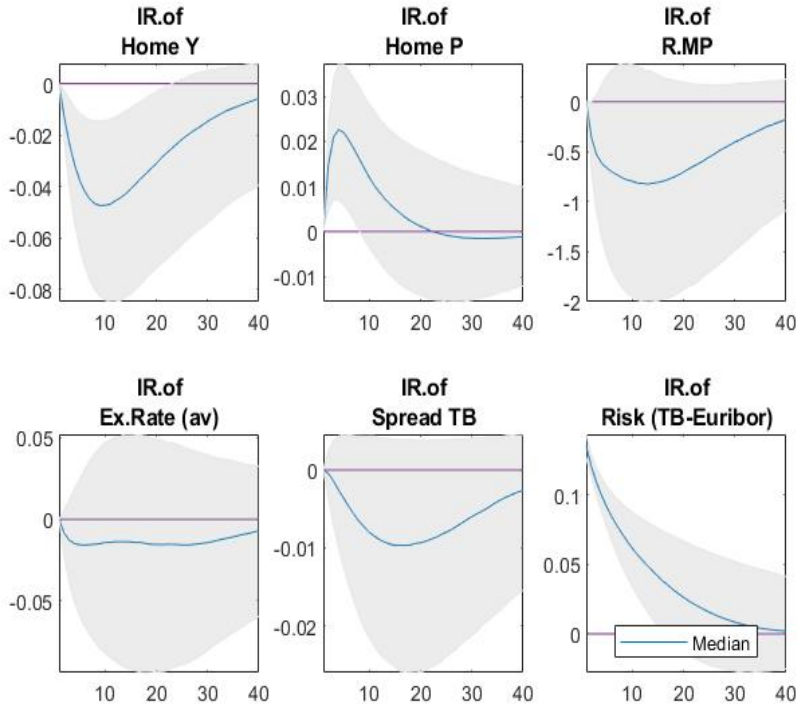
IR of Albanian variables upon [c] *MP shock* (left) & [d] *ER shock* (right). Back to → 11





IR of Albanian variables upon [e] *Spread shock* (left) & [f] *Risk shock* (right). Back to → 11





Alternative specifications & ordering

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	Model names	Variables								
(1)	Benchmark VAR(12)			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	
	Portfolio Re-balancing									
(2)	Capital Flows			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	ca_t^h
(3)	Financial Flows			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	fa_t^h
	Credit channel									
(4)	Credit to Economy			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	cp_t^h
(5)	Broad Money			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	$m3_t^h$
	Remittances channel									
(6)	Remittances			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	rmn_t^h
(7)	Gross Reserves			y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	grs_t^h
	Trade channel									
(8)	Export & Imports	x_t^h	m_t^h	y_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	
	Aggregate Demand									
(9)	Consumption & Investm	y_t^h	c_t^h	i_t^h	p_t^h	R_t^h	s_t	sp_t^h	$risk_t^h$	

y_t^h: output; p_t^h: prices; R_t^h: policy rate; s_t: exch. rate; sp_t^h: TB spread (12m-3m); $risk_t^h$: 12m TB - 12m Euribor.

ca_t^h: Capital Flows; fa_t^h: Financial Flows; x_t^h: Real exports; m_t^h: Real imports

c_t^h: Real Consumption; i_t^h: Real investments; grs_t^h: Gross Reserves; rmn_t^h: Remittances

nfa_t^h: Net foreign assets (fixed exchange rate); $m3_t^h$: Broad Money (fix exchange rate)

cp_t^h:Credit to economy denominated in foreign currency (fix ex. rate)

Note: Monetary variables like broad money, credit to economy and net foreign assets are in real terms.

Result (5): **IR of each variable at the peak: in Benchmark VAR(12) & alternatives** $\longrightarrow$ 12

Table: Responses of Albanian indicators to *UMP & Risk shocks* (based on IRFs).

$Z^h \longrightarrow$	VAR(12) (1) –	Portfolio re-balance (2) CA	(3) FA	Bank Lend ch (4) CP	(5) M3	Remit.ch. (6)Rm	Trade ch. (8) X , M	Real Effects (9) C , I
IR	Response (in %) at the peak upon *UMP shock* of size {**+5%**}							
of Z^h	–	-10	-8	-0.2	-0.2	-0.5	+2, 0	0 , -1
of Y^h	-0.07	-0.10	-0.07	-0.07	-0.07	-0.07	-0.07	-0.15
of P^h	-0.03	-0.04	-0.03	-0.04	-0.03	-0.03	-0.04	-0.05
	Response (in %) at the peak upon *'risk' shock* of size {**+0.15%**}							
of Z^h	–	-3	+10	-0.15	-0.02	-1	0, -0.25	+0.07, -0.5
of Y^h	-0.05	-0.06	-0.03	-0.05	-0.04	-0.06	-0.05	-0.05
of P^h	+0.02	+0.02	+0.02	+0.02	+0.025	+0.03	+0.02	+0.04

Z^h is the added variable(s) in each model specification indexed (2) to (9) as shown next to each index. **Response of** Z^h indicates IR of the added variable(s) in the respective specification. Responses of Y & P upon conventional MP shock are ≈ 0 (not shown)

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