Policy spillovers and synergies in a monetary union[1]

Óscar Arce, Samuel Hurtado, and Carlos Thomas

Banco de España

ECB, November 6 2015

[1] The views expressed in these slides are those of the authors and not necessarily those of Banco de España or the Eurosystem.

Motivation

- Current macroeconomic situation in the EMU characterized by important difficulties, including
  - weak growth and persistently low inflation
  - monetary policy constrained by the ZLB
  - a lengthy deleveraging process in some member states ('periphery')
- This situation poses notable challenges for policy makers...
- ... Some of which have emphasized the potential gains from combining
  - supply- and demand-side policy stimuli
  - at both the national and supra-national level

Motivation (cont'd)

- "The way back to higher employment, in other words, is a **policy mix that combines monetary, fiscal and structural measures at the union level and at the national level**". *(M. Draghi, Jackson Hole, 2014)*
- "**Structural and cyclical policies – including monetary policy – are heavily interdependent**. [...]
- "[...] our **accommodative monetary policy means that the benefits of reforms will materialize faster**, creating the ideal conditions for them to succeed. It is the combination of these demand and supply policies that will deliver lasting stability and prosperity". *(Draghi, Sintra, 2015)*

This paper

- Some key questions arise in this context:
  - What are the **spillovers** of national (fiscal and structural) policies to the rest of the MU?
  - How does the **ZLB** shape the sign and intensity of policy spillovers?
  - Are there any **synergies** between national and supranational (unconventional monetary) policy measures?
- This paper tries to shed some light on these issues

Framework

- Two-country monetary union: 'Periphery' and 'Core'
- Standard structure, except:
  - Borrowing constraints on private sector, long-term nominal debt
- Construct baseline scenario, characterized by:
  - Union-wide negative demand shock $\longrightarrow$ monetary policy hits ZLB
  - Negative financial shock in Periphery $\longrightarrow$ enter deleveraging process
- Against this background, study the effects of
  - Structural reforms in the Periphery
  - Fiscal expansion in the Core
  - Forward guidance by common monetary authority

Preview of results

- ZLB alters the sign of spillovers from country-specific policy stimuli:
  - Structural reforms in P: positive spillovers to C outside of ZLB, (slightly) negative at the ZLB
  - Fiscal expansion in C: negative spillovers to P outside of ZLB, positive at the ZLB (as in Blanchard, Erceg & Lindé, 2014)
- Sizable **positive synergies** between (a) Forward Guidance and (b) *jointly-implemented* country-specific measures
  - i.e. Forward Guidance *strengthens* the (short-run) expansionary effects of [structural reforms + fiscal expansion] package
  - synergies may fail to materialize for (certain types of) reforms if not accompanied by demand-side stimuli elsewhere

Model structure

- DSGE model, two-country Monetary Union: 'Periphery' and 'Core'
- Three consumer types in each country
  - Patient households (lenders in eq.)
  - Impatient households (borrowers in eq.)
  - (Impatient) entrepreneurs (borrowers in eq.)
- Three production sectors
  - Consumption goods (entrepreneurs + retailers)
  - Equipment capital producers
  - Construction firms
- Both countries trade consumption goods and debt
- Common monetary authority follows Taylor-rule *subject to the ZLB*
- Standard real and nominal frictions: investment adjustment costs, nominal price and wage rigidities

Financial structure

- **Collateral constraints** *à la* Kiyotaki & Moore (1997) on borrowers
  - As in Iacoviello (2005), real estate is the only collateral
- **Long-term debt**: constant fraction amortized each period ($\simeq$ Woodford, 2001)
- As in Andrés, Arce & Thomas (2014), both features $\Rightarrow$ two asymmetric debt regimes:
  - a) "normal times": collateral is high and (new) debt is restricted by it
  - b) "crisis times": collateral is low, there is no new credit and debt is amortized slowly
- Economy may switch *endogenously* between (a) and (b) if shocks affect collateral values sufficiently

Market power in product & labor markets

- Firms (retailers) and unions set prices and wages, respectively, *à la* Calvo (1983)
- With flexible prices and wages, they would charge (desired) markups

$$\frac{\varepsilon_p}{\varepsilon_p - 1}, \quad \frac{\varepsilon_w}{\varepsilon_w - 1}$$

over marginal costs and reservation wages, $(\varepsilon_p, \varepsilon_w) > 1$: elasticities of demand curves for consumption and labor varieties

- Desired markups as indicators of monopolistic distortions in the product & labor markets

Monetary policy and the ZLB

- Monetary policy follows a simple Taylor rule, subject to the ZLB:

$$R_t^{MU} = \max\left\{1, \bar{R}^{MU}\left(\pi_t^{MU}\right)^{\rho_\pi}\right\},$$

  $\rho_\pi > 1$
- Economy may also switch *endogenously* between in- and out-of-ZLB regimes

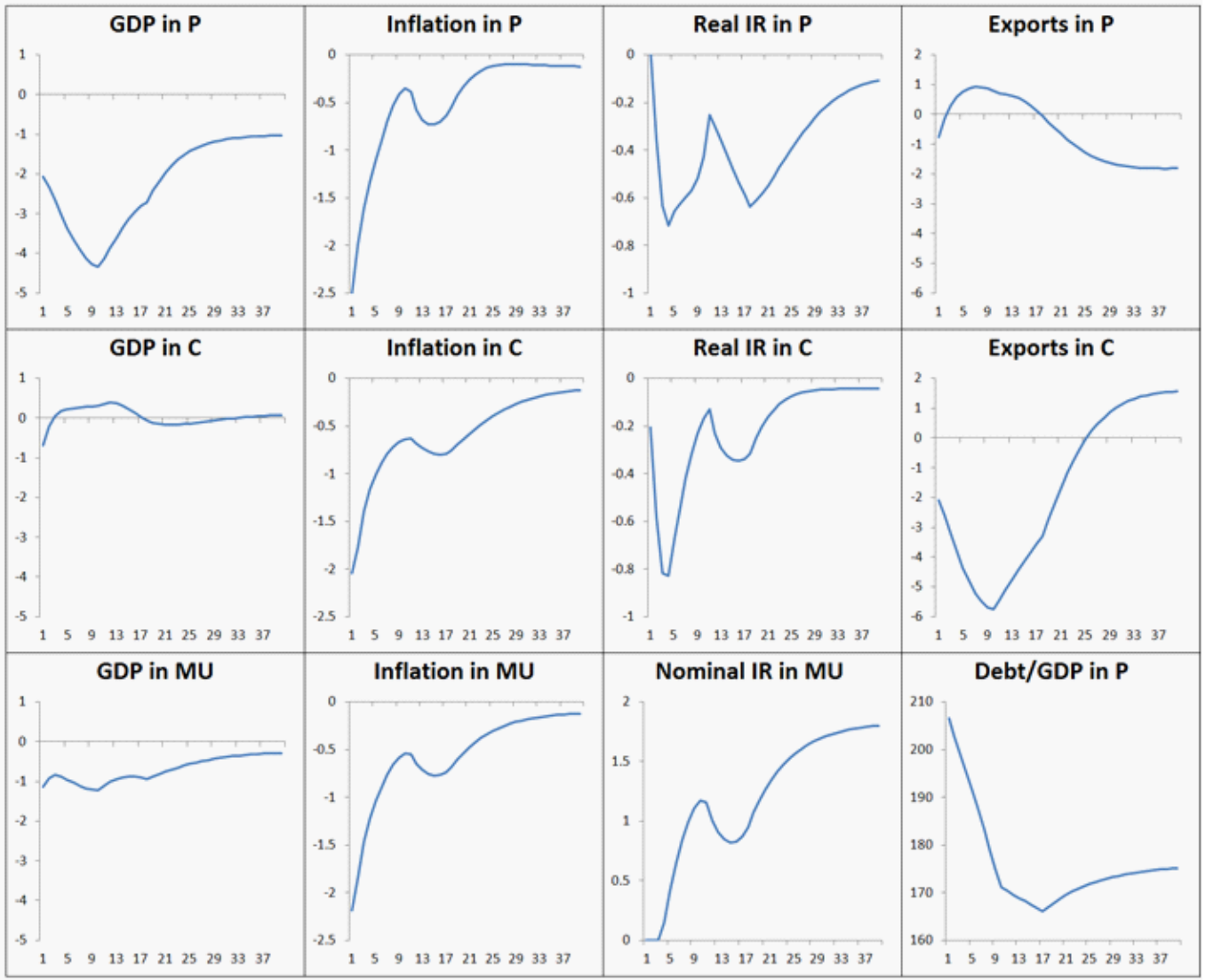
Calibration

- Time period = 1 quarter. Calibrate to EMU
- Size of Periphery $s = 1/3$ (as in Blanchard, Erceg & Lindé, 2014)
- Periphery: calibration similar to Andrés, Arce & Thomas (2014)
  - Some parameters calibrated to 2007 targets (e.g. HH & NFC debt/GDP)
  - Core: for simplicity, symmetric calibration (except imports share and NFA)
- Parameters of financial constraints:
  - Initial LTV ratios: $\bar{m} = 0.70$, $\bar{m}^e = 0.64$ (match HH LTV ratios in 2007, NFC debt/GDP)
  - Amortization rates: $1 - \gamma = 0.02$, $1 - \gamma^e = 0.03$ (match average age of HH & NFC mortgage loans)
- Markups: $\frac{\varepsilon_p}{\varepsilon_p - 1} = 1.17$ (Montero and Urtasun, 2013), $\frac{\varepsilon_w}{\varepsilon_w - 1} = 1.43$ (u-rate = 8.6% in 2007)
- Taylor rule: $\rho_\pi = 1.5$

Baseline scenario: deleveraging in Periphery and union-wide liquidity trap

- Build a *baseline scenario* in which
  - A union-wide negative demand shock ($\downarrow$ discount rates) makes nominal interest rates *hit the ZLB*
  - A Periphery-specific financial shock ($\downarrow$ LTV ratios) makes HHs & entrepreneurs in Periphery enter the *slow deleveraging* regime
- Size of shocks:
  - Transitory $\downarrow$ in discount rates: union-wide GDP $\downarrow \simeq$ EMU GDP $\downarrow$ in data
  - LTV ratios for HHs and entrepreneurs fall permanently by 7.5pp ($\simeq$ Spain during crisis)
- Dates of exit from *both* ZLB and deleveraging phase are solved endogenously
- (Perfect foresight in all simulations)

The baseline (no policy change) scenario with ZLB



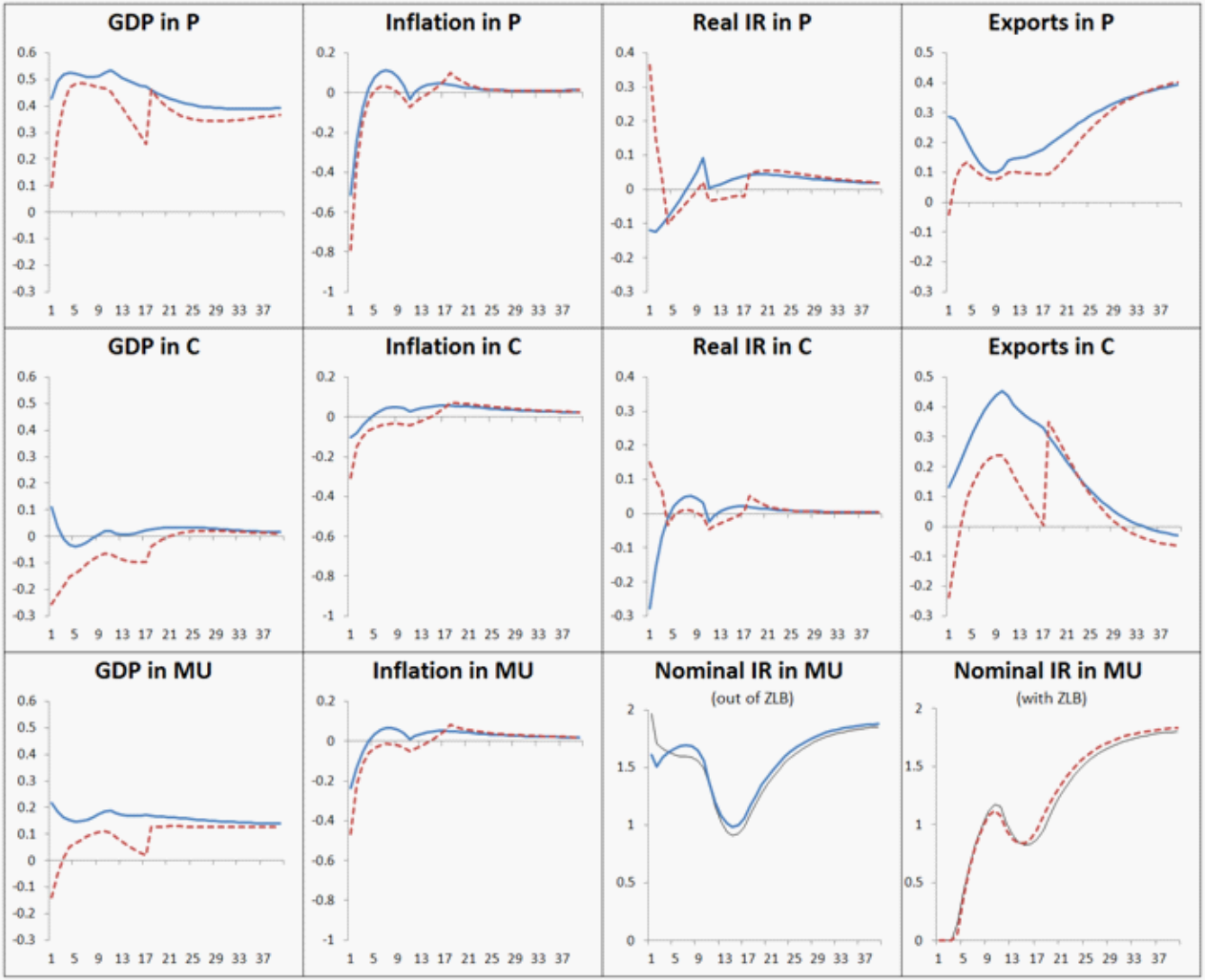
Effects of macroeconomic policies

- Relative to this baseline scenario, we assess the effects of different supply and demand-side policies:
  - Structural reforms in the Periphery
  - Fiscal expansion in the Core
  - Forward guidance by common monetary authority
- From now on, we show effects *relative to* the baseline scenario

Effects of structural reforms in Periphery

- Permanent reductions in desired price and wage markups in the Periphery, 1% each
  - as in Eggertsson, Ferrero & Raffo (2014)

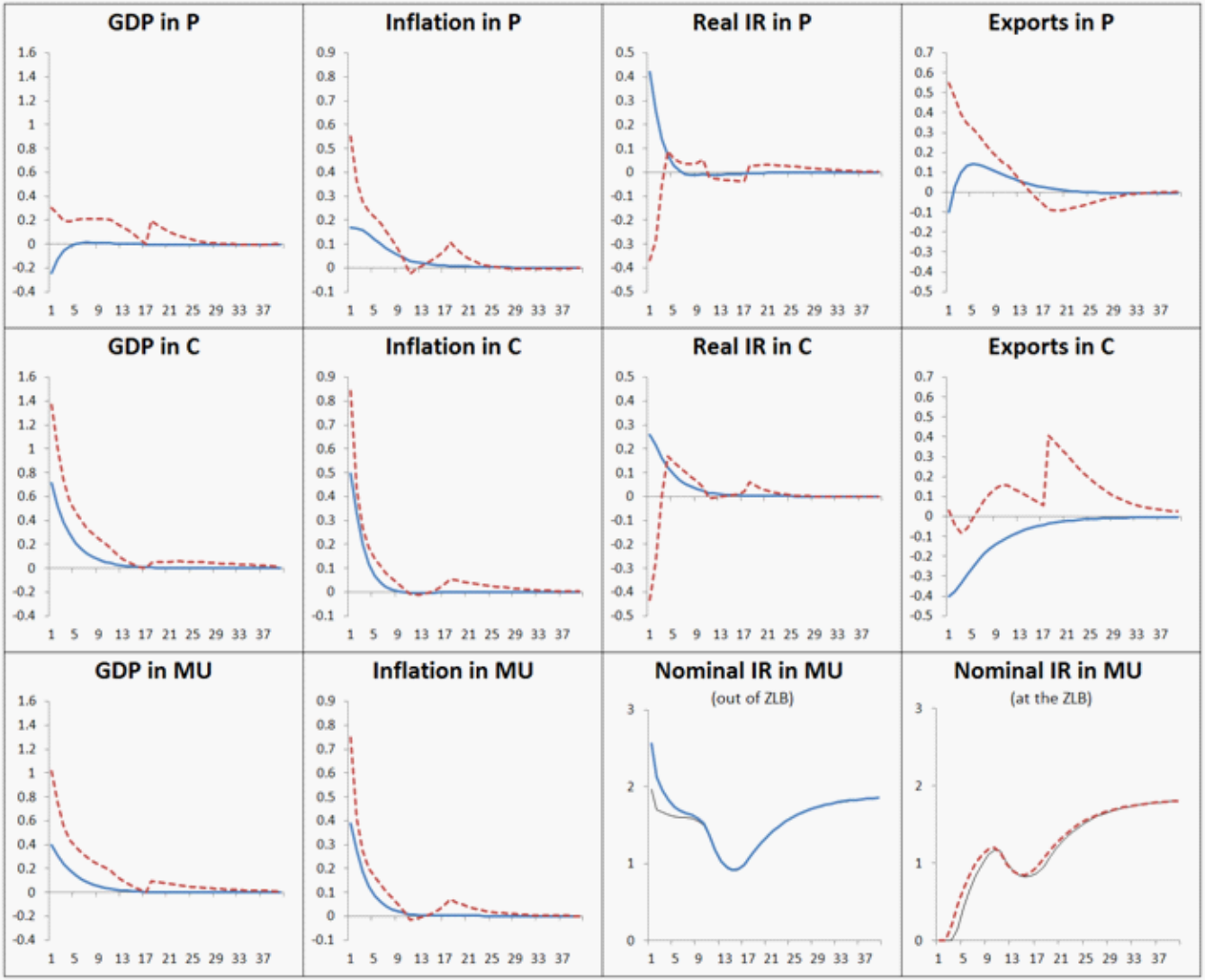
Effects of structural reforms in Periphery



Effects of fiscal expansion in Core

- Temporary increase in gov't spending by 1% of Core GDP (half-life = 1 year)
  - $\simeq$ size of 'Juncker plan'

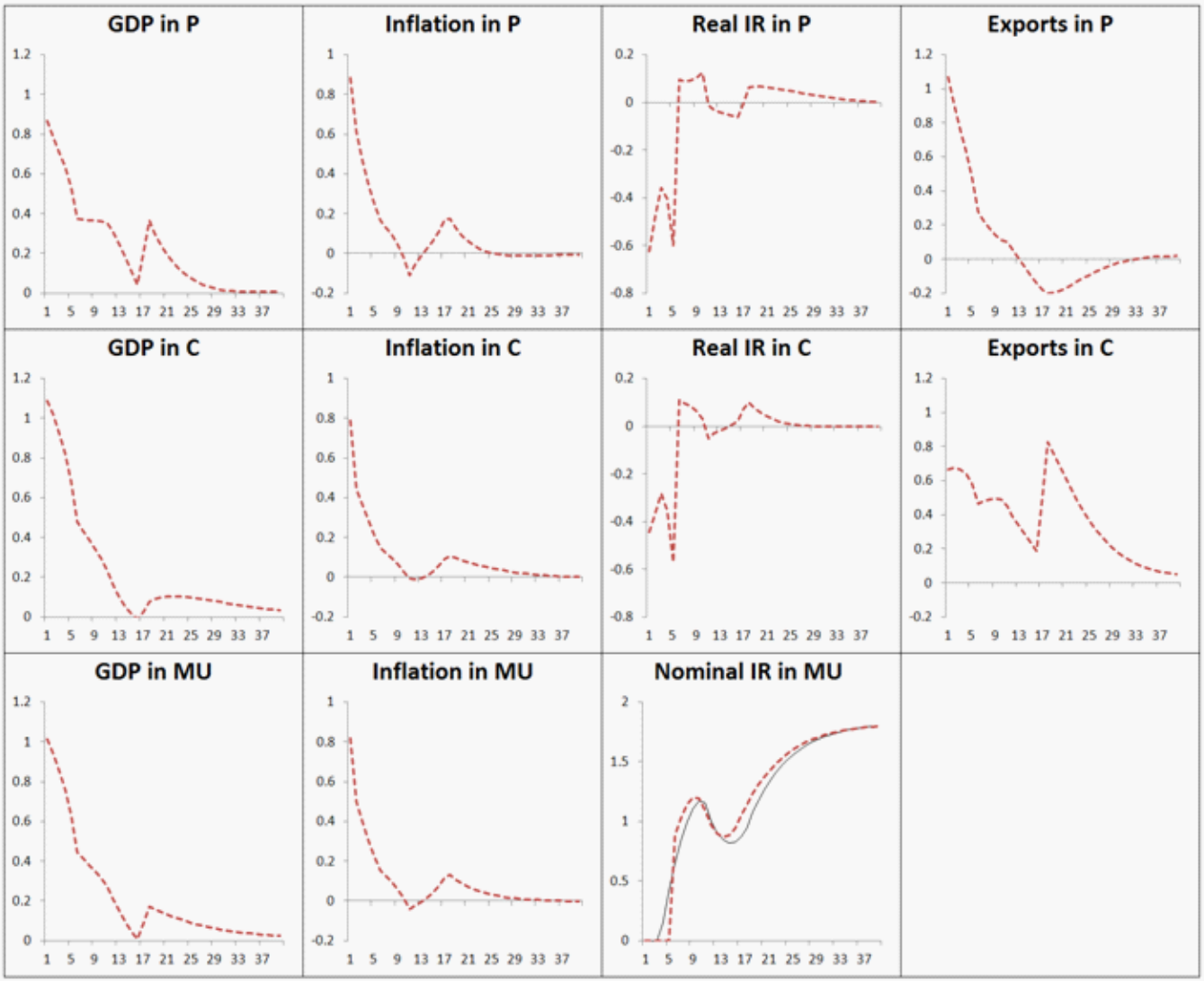
Effects of fiscal expansion in Core



Effects of Forward Guidance

- Monetary authority commits to exiting the ZLB two quarters later that lift-off date ($t = 4$) in baseline scenario
- Combines *state-dependence* (lift-off date in baseline) and *time dependence* (2 quarters after baseline lift-off date)
- First take on FG,
  - Consider alternative formulations, possibly fully state-dependent

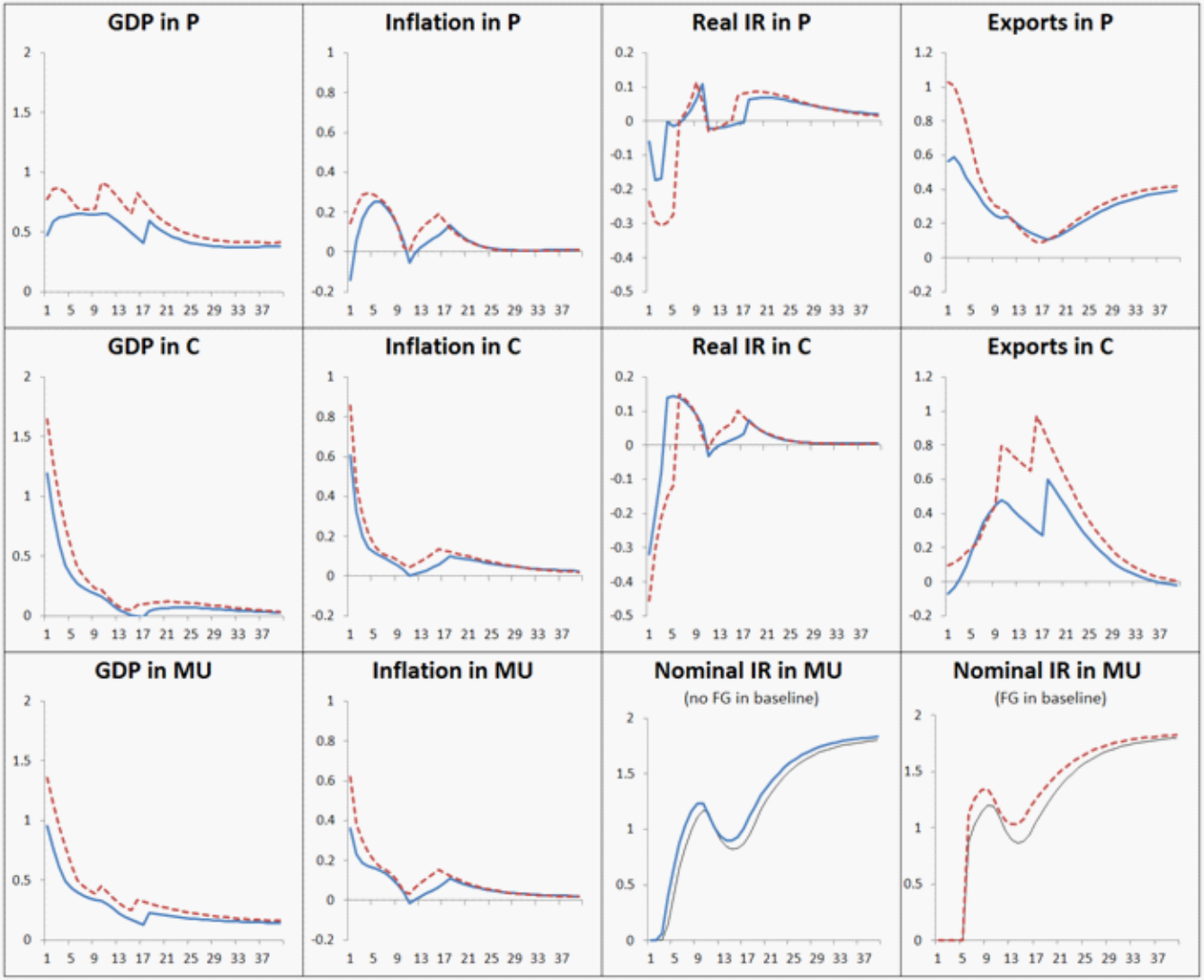
Effects of Forward Guidance



Policy synergies

- Assume the monetary authority announces Forward Guidance
- *Do national polices then become more effective?*
- We compare the *marginal* effect of national policy *package* (reforms + fiscal) relative to two reference scenarios,
  - one where CB applies FG
  - one where CB does not apply FG (i.e. our baseline, no-policy scenario)
- The reverse exercise yields similar (though not identical) results.
- The model is well equipped to analyze synergies:
  - Non-linearities arising from multiple endogenous regime changes (ZLB, deleveraging).
  - Our solution method is fully non-linear

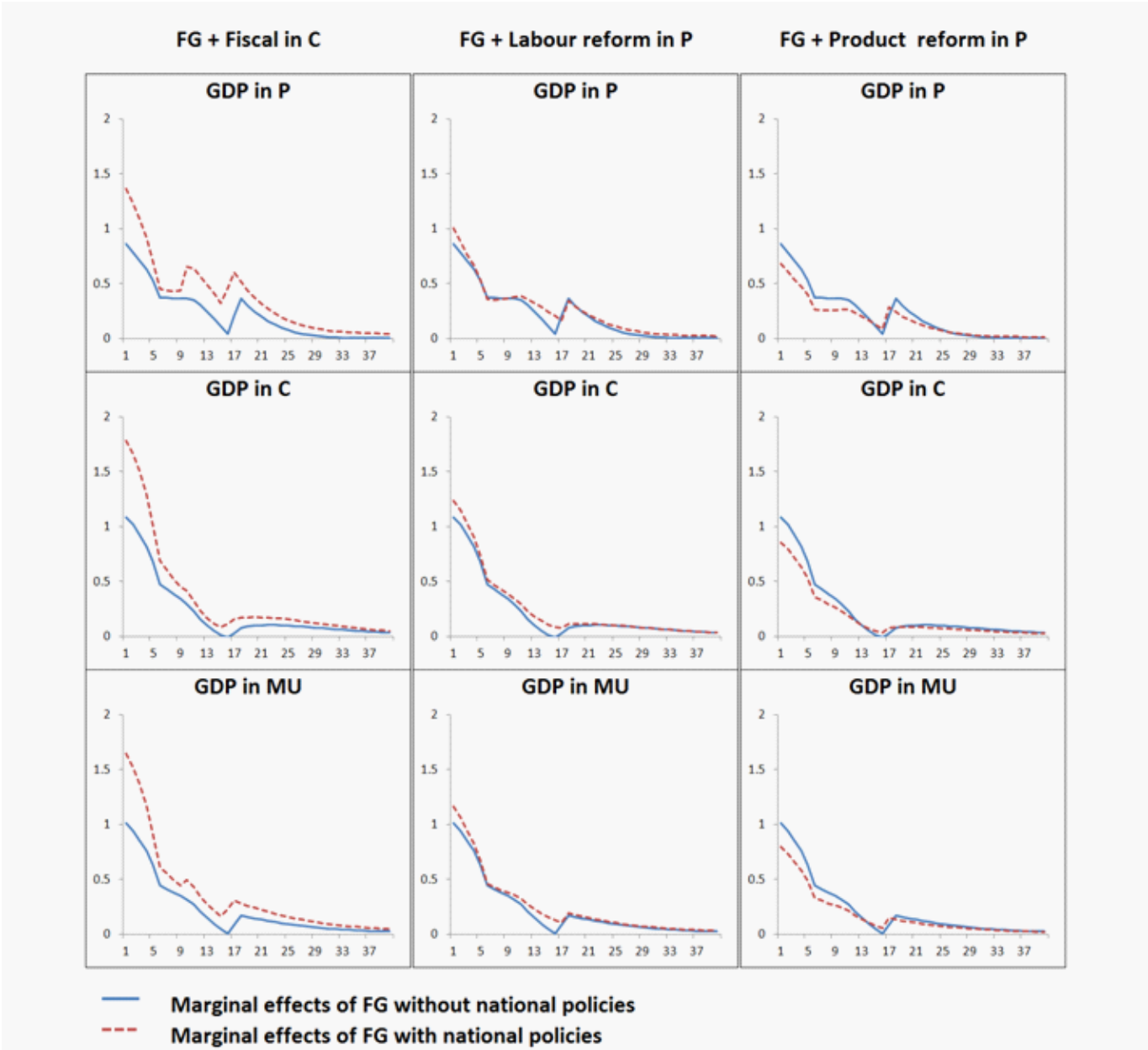
Policy synergies: forward guidance and national policies



Policy synergies: channels at work

- To further dissect the sources of these synergies, consider interaction between Forward Guidance and *individual* national policies
  - i.e. consider *separately* reforms in Periphery and fiscal expansion in Core
  - moreover, separate also *product* and *labor* market reform (potentially different synergies!)

Synergies between FG and specific national polices



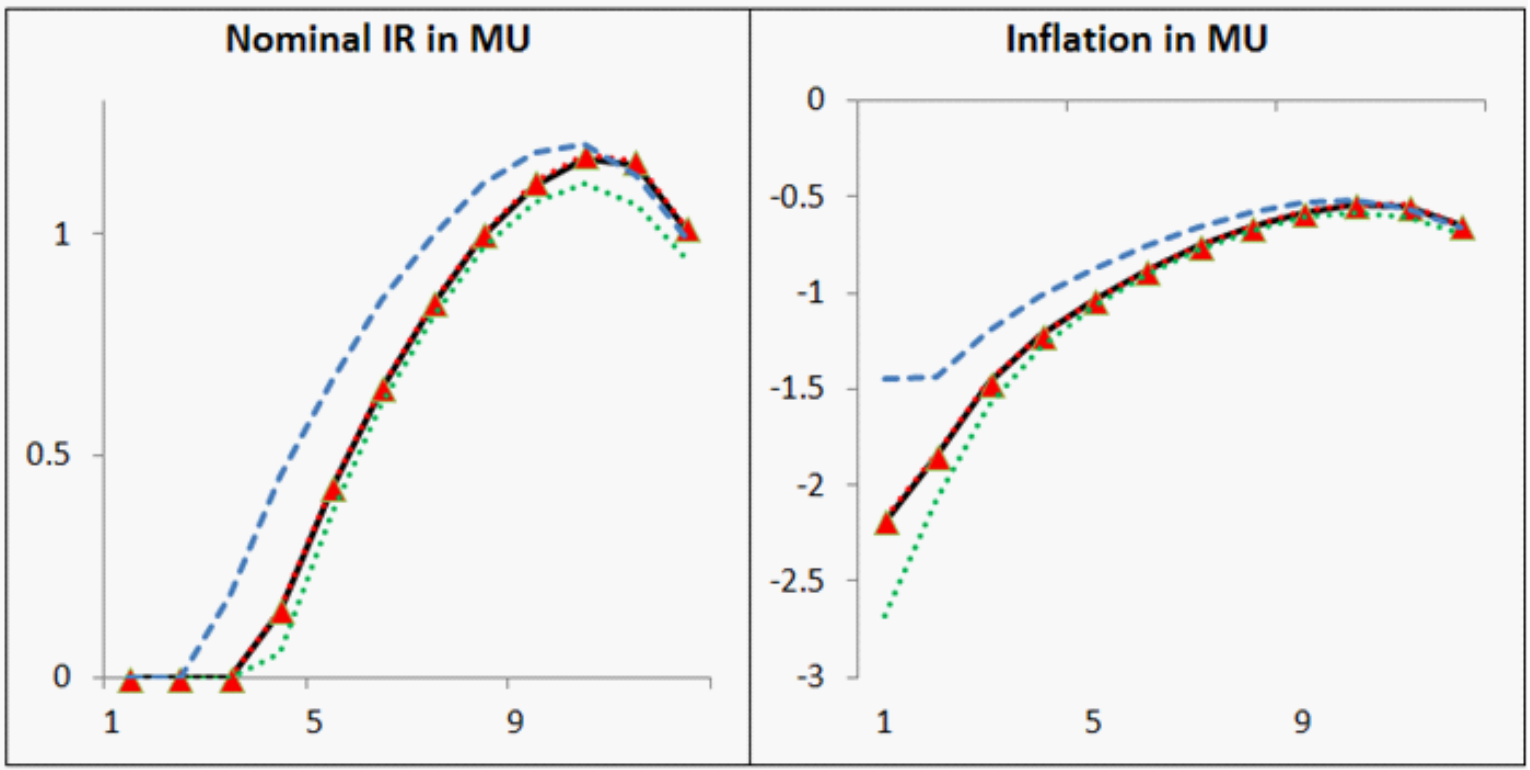
Policy synergies: channels at work (2)

Two main channels at work:

- A **discounting channel**: *ceteris paribus*, FG lowers long-run real interest rates
  - structural reforms produce medium/long-run gains in output & consumption
  - present-discounted value of such gains $\uparrow \Rightarrow$ investment & consumption *today* $\uparrow$
  - (additional push through asset prices and net worth)
- A **lift-off channel**: national policies may also affect the ZLB lift-off date (and shape) in absence of FG:
  - demand-side (inflationary) stimuli tend to *bring forward* lift-off date $\Rightarrow$ *moderates* their positive effects* $\Rightarrow$ FG disables this channel $\Rightarrow$ *positive synergies*
  - supply-side (deflationary) reforms tend to *delay* lift-off date $\Rightarrow$ ... $\Rightarrow$ *negative synergies*

* Erceg and Lindé (2014)

Policy effects on inflation and nominal rate



Baseline (no policy): deleveraging in P and demand shocks in C and P

Baseline plus labor market reforms in P

Baseline plus product market reforms in P

Baseline plus fiscal expansion in C

Deviations from the initial steady state, except for nominal interest rates which are in levels

Policy synergies: channels at work (3)

Putting things together:

- **Fiscal expansion:** *positive* lift-off effect; discounting effect less important (gains are short-lived) $\Rightarrow$ positive synergies
- **Product market reform**: *negative* lift-off effect dominates (positive) discounting effect $\Rightarrow$ *negative* synergies
- **Labor market reform**: lift-off effect is negligible (barely deflationary!) + discounting effect = positive (but small) synergies

Concluding remarks

- On cross-country policy **spillovers** at the ZLB:
  - Structural reforms in Periphery have negative spillovers to Core (deflationary effects)
- On **synergies** between policies:
  - We find sizeable *positive* synergies between national policies and non-conventional monetary policy (forward guidance)
  - Synergies are stronger between FG and demand-side (inflationary) national stimuli ...
- Word of caution: alternative formulations of FG strategy may imply different results
  - On-going work: consider e.g. fully state-contingent formulation

Long-term debt

- Collateral constraints on (i) impatient households and (ii) entrepreneurs. Focus here on (i); analogous for (ii)
- We assume *long-run debt*: a constant fraction $1-\gamma$ of outstanding nominal principal is amortized each period ($\simeq$ Woodford, 2001)
- Dynamics of *real* outstanding debt:

$$b_t = \underbrace{\frac{b_{t-1}}{\pi_t}}_{\text{initial debt}} - \underbrace{\frac{1-\gamma}{\pi_t} b_{t-1}}_{\text{amortization}} + \underbrace{b_t^{new}}_{\text{new gross flow}} = \frac{\gamma}{\pi_t} b_{t-1} + b_t^{new}.$$

- Debtors can*not* be *forced* to repay faster than at the contractual rate, $1-\gamma$ (though they may *choose* to)

Long-term debt and asymmetric debt constraint

- New borrowing is subject to a collateral constraint...

$$b_t^{new} \leq \max\{0, \underbrace{m_t \frac{1}{R_t} E_t \pi_{t+1} p_{t+1}^h h_t - \frac{\gamma}{\pi_t} b_{t-1}}_{\text{EXCESS COLLATERAL}}\} \quad (1)$$

- In equilibrium, (1) binds with equality $\Rightarrow$ an *asymmetric debt-regime*:
  - When collateral is **high** (*excess collateral* > 0), $b_t^{new} > 0$ and

$$b_t = m_t \frac{1}{R_t} E_t \pi_{t+1} p_{t+1}^h h_t.$$

  - When collateral is **low** (*excess collateral* < 0), $b_t^{new} = 0$ and b_t follows the contractual amortization path:

$$b_t = \frac{\gamma}{\pi_t} b_{t-1}$$

Dates of regime changes

	T_{ZLB}	T^*	T^{**}
Baseline with ZLB (no policies)	4	10	18
Forward Guidance only	6	10	16
Forward Guidance + national policies	6	9	15

T_{ZLB} : First quarter in which nominal interest rate > 0
T^* : First quarter in which new credit to entrepreneurs > 0
T^{**} : First quarter in which new credit to households > 0