Fiscal delegation in a monetary union: Instrument assignment and stabilization properties

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[1] **Opinions expressed in this presentation are those of the authors. They do not necessarily coincide with those of the Banco de España or the Eurosystem.**

Problem: debt bias and volatility in a monetary union

- **Joining a monetary union increases sovereign debt fluctuations and levels**
  - Monetary union increases debt bias (Beetsma/Bovenberg (1999) , Buti et. al. (2001), Chari/Kehoe (2007)).
  - Fiscal policy substitutes for independent monetary policy as stabilization tool (particularly for asymmetric shocks)
  - Cross-country banking flows amplified (Bruche/Suárez 2010; Obstfeld 2013)
  - Independent monetary policy unavailable to resist speculative attacks (Eichengreen/Hausmann 2005, DeGrauwe 2011)

Conventional Wisdom - Solutions: The Good

The federalism vision

- Higher risk sharing, incorporating share deposit insurance, common unemployment insurance and Euro Bonds
  - Problem: creates **moral hazard** in national fiscal decisions. US might not be such a great example, budget of states relative to federation cannot be compared to national vs Brussels.

Conventional Wisdom - Solutions: The Bad

There is no solution

- Go back to (a subset) of national currencies while keeping Europe perhaps as a free trade area retaining a few institutions (e.g. competition laws)
  - Problem: How one goes about making the return smooth? Perhaps Brexit will start showing the way and Grexit the end...

Conventional Wisdow - Solutions: The Ugly

Rules - updated Maastricht Treaty

- Improve the enforcement of rules (and, more importantly, sanctions) with Stronger European Authority. Lets punish the governments that are not responsible and make them pay!
  - Problem: Did it work in the past? Should one rely on uniform rules applied to all economies in the EU?

Are these the only alternatives?

... Oversimplifying, there are three strategies for the Eurozone:...return to national currencies... current approach based on Maastricht Treaty of 1992...and, finally, the more ambitious version of federalism. My own clear preference is for the federalism version but I'am not at all convinced that Europeans are ready to make it work successfully...

- Jean Tirole (2015)

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The Acceptable / The Alternative

- Delegating monetary policy to independent central banks has reduced inflation bias... maybe it's time to **delegate (some aspects of) fiscal policy** to an **independent fiscal authority**.

Fiscal Delegation - Concerns

- Is fiscal policy delegation appropriate?
  From a political economy perspective delegation is appropriate to correct biases due to democratic processes, when a consensus goal exist but it is inappropriate for redistributional decisions with many dimensions

$\Rightarrow$ One should not delegate **all** fiscal decisions

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- Is fiscal policy delegation appropriate?
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$$\Rightarrow \text{One should not delegate } \textbf{all} \text{ fiscal decisions}$$

But how about delegating an (subset of) instrument of fiscal policy to ensure budget balance?
Question - **Which instrument can be viable?**

Fiscal Delegation - Concerns II

- Does it correct for debt biases?
  While doing so, does it allow for appropriate stabilization of shocks?

  Question - **What is the gain in reducing biases relative to costs due to potentially impaired stabilization?**

- Finally, is it feasible?

  We provide some discussion on possible ways of implementing such institutional design in Europe.

This paper in more detail

- Simple reduced form model of **deficit bias** in a monetary union where,
  - No policy maker can **commit**.
  - **Elected** policy makers are **impatient**
  - Local policy makers are better informed about local preferences
  - Institutions with **simple, feasible, quantitative mandate** acts with **bias towards that mandate**

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- Focus on the equilibrium of dynamic policy games when instruments are controlled by different institutions
  - Analyze dynamics after government spending shocks and distortionary steady state.

Institutional Set-up

- **One central bank** chooses inflation, discretionally:
- J **regional governments** choose fiscal policy, discretionally:
  - Regional governments are impatient
  - Each region has its own budget constraint
  - Regional governments may issue debt
  - Regional governments act noncooperatively
- **Baseline scenario:** Monetary policy delegation only
- **Alternative scenarios include two forms of fiscal delegation** - Delegated authority dislikes when debt moves away from its target.

Economy of region j - key features

- **Output** depends on **surprise inflation** and **taxes**: (Alesina/Tabellini 1987)

$$x_{j,t} = \nu(\pi_t - \pi_t^e - \tau_{j,t})$$

- **Loss function** depends on inflation, output, and public services: (Leith/Wren-Lewis 2011)

$$L_{Sj} = \sum_{t=0}^{T} \beta_S^t \left\{ \alpha_{\pi S} \pi_t^2 + (x_{j,t} - \tilde{x}_{j,t})^2 + \alpha_{gS} (g_{j,t} - \tilde{g}_{j,t})^2 \right\}$$

Fiscal environment of region j

- Each region faces its own **government budget constraint**:

$$d_{j,t} = R(\bar{d}_t, \pi^e_t, \pi_t) d_{j,t-1} + q g_{j,t} - \tau_{j,t} - \kappa \pi_t$$

- *Ex post* real interest rate exhibits **interest rate contagion** and **erosion of nominal debt**:

$$R(\bar{d}_t, \pi^e_t, \pi_t) = 1/\beta_S + \delta \bar{d}_t + \chi(\pi^e_t - \pi_t)$$

  - **Ex ante real rate** depends on **average debt** $\bar{d}_t \equiv \frac{1}{J} \sum_{j=1}^{J} d_{j,t}$ - Interest Rate Contagion
  - **Fraction of nominal debt** is χ

First Best - Planner

Consider an **omniscient, cooperative, committed Pareto planner:**

$$V_t^P\left(\vec{d}_{t-1},\vec{\epsilon}_t\right) = \max_{\pi_t,\{d_{j,t},\tau_{j,t},g_{j,t}\}_{j=1}^J} \frac{-1}{2}\left\{\alpha_{\pi S}\pi_t^2 + \frac{1}{J}\sum_{j=1}^J\left[\left(\underline{x}_{j,t}-\nu\tau_{j,t}-\tilde{x}_{j,t}\right)^2+\alpha_{gS}\left(g_{j,t}-\tilde{g}_{j,t}\right)^2\right]\right\} + \beta_S E_t V_{t+1}^P\left(\vec{d}_t,\vec{\epsilon}_{t+1}\right)$$

$$\text{s.t.} \quad d_{j,t} = R\left(\bar{d}_{t-1}\right)d_{j,t-1} + q_L g_{j,t} - \tau_{j,t} - \kappa\pi_t \quad \forall j.$$

- **Omniscient:** $q = q_L$
- **Cooperative:** planner chooses $\tau_{j,t}$, $d_{j,t}$ for all j
- **Committed:** $\pi_t^e = \pi_t$ cancels out
- **Pareto:** planner respects J distinct budget constraints

OCCPP: Conditions

- Intratemporal trade-offs

$$\begin{aligned} \nu \hat{x}_{j,t} &= \frac{\alpha_{gS}}{q_L} \hat{g}_{j,t}, \\ \alpha_{\pi S} \pi_t &= -\frac{\kappa \alpha_{gS}}{q_L} \bar{\hat{g}}_t \end{aligned}$$

- Solution is determined by

$$\begin{aligned} \bar{d}_t &= R(\bar{d}_{t-1})\bar{d}_{t-1} - \tilde{\kappa}_P \pi_t + \bar{\tilde{z}}_t, \\ \pi_t &= \beta_S \left(R(\bar{d}_t) + R'(\bar{d}_t)\bar{d}_t \right) E_t \pi_{t+1}, \end{aligned}$$

Policy Functions

- Symmetric solution of the planner's problem can be characterized by
  - an inflation function - $\pi_t = I^P(\bar{d}_{t-1}, \epsilon_t)$
  - a gross borrowing function $\bar{d}_t = B^P(\bar{d}_{t-1}, \epsilon_t)$

  Such that

$$\begin{aligned} B^P(\bar{d}_{t-1}, \epsilon_t) &= R(\bar{d}_{t-1})\bar{d}_{t-1} - \tilde{\kappa}_P I^P(\bar{d}_{t-1}, \epsilon_t) + \bar{\tilde{z}}_t \\ I^P(\bar{d}_{t-1}, \epsilon_t) &= \beta_S \left(\beta_S^{-1} + 2\delta B^P(\bar{d}_{t-1}, \epsilon_t)\right) E_t I^P(B^P(\bar{d}_{t-1}, \epsilon_t), \epsilon_{t+1}). \end{aligned}$$

- Steady State

$$d_{ss}^{\mathcal{S}} = B^{\mathcal{S}}(d_{ss}^{\mathcal{S}}, 0).$$

- Use intratemporal conditions to determine output $\bar{x}_t = X^P(\bar{d}_{t-1}, \epsilon_t)$, and spending $\bar{g}_t = G^P(\bar{d}_{t-1}, \epsilon_t)$

Games with Debt as a Control Variable

- Binding budget constraint implies one of the variables must be determined by the constraint
- Benchmark Monetary Union case - CB sets inflation, Regional Governments set tax and debt $\Rightarrow$ government spending determined such that budget constraint holds.
- Fiscal Delegation - CB sets inflation, Regional Governments set taxes and Fiscal Authority(ies) set debt $\Rightarrow$ government spending determined such that budget constraint holds.
- Important since each players set its control variable considering as given all the other variables set by other players, thus taking debt as given.

Equilibrium for Policy Games with Debt as Control Variable

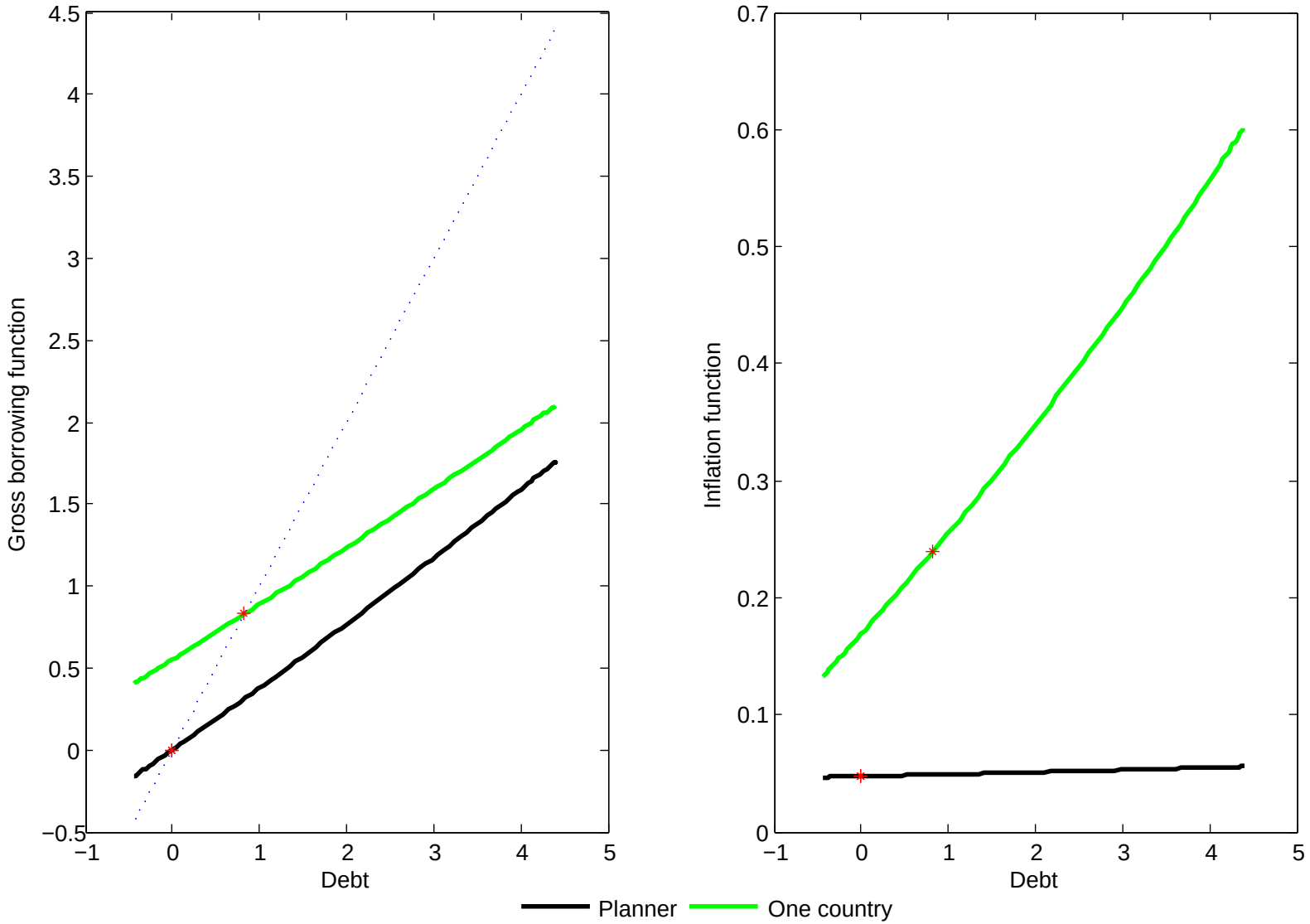
For all cases budget constraint, using intratemporal conditions can be simplified to

$$\bar{d}_t = \left(\frac{1}{\beta_S} + \delta \bar{d}_{t-1}\right) \bar{d}_{t-1} + (\pi_t^e - \pi_t)(1 + \chi \bar{d}_{t-1}) - \breve{\kappa}(\bar{d}_{t-1})\breve{\pi}_t + \bar{\bar{z}}_t, \tag{1}$$

Game	Choice Variables	Euler Equation
$J1$	$\Theta_t^C \equiv \{\pi_t, g_t\}$ $\Theta_t^G \equiv \{\tau_t, d_t, g_{,t}\}$	$\breve{\pi}_t = \beta_G E_t \left(\frac{1}{\beta_S} + 2\delta \bar{d}_t + \left(\gamma + \chi \frac{\alpha_{\pi G}}{\alpha_{\pi C}}\right) \frac{\partial \pi_{t+1}}{\partial d_t}\right) \breve{\pi}_{t+1}$
MU	$\Theta_t^C \equiv \{\pi_t, \{g_{j,t}\}_{j=1}^J\}$ $\Theta_t^{G_j} \equiv \{\tau_{jt}, d_{jt}, g_{j,t}\}$	$\breve{\pi}_t = \beta_G \left(\frac{1}{\beta_S} + \delta \bar{d}_t\right) E_t \breve{\pi}_{t+1}$
F_j	$\Theta_t^C \equiv \{\pi_t, \{g_{j,t}\}_{j=1}^J\}$ $\Theta_t^{G_j} \equiv \{\tau_{jt}, g_{j,t}\}$ $\Theta_t^{F_j} \equiv \{d_{jt}, g_{j,t}\}$	$\breve{\pi}_t = \frac{\alpha_{dF}}{\alpha_{\pi C}} \bar{d}_t + \beta_F \left(\frac{1}{\beta_S} + \delta \bar{d}_t\right) E_t \breve{\pi}_{t+1}$
F	$\Theta_t^C \equiv \{\pi_t, \{g_{j,t}\}_{j=1}^J\}$ $\Theta_t^{G_j} \equiv \{\tau_{jt}, g_{j,t}\}$ $\Theta_t^{F_j} \equiv \{d_{jt}, g_{j,t}\}$	$\breve{\pi}_t = \frac{\alpha_{dF}}{\alpha_{\pi C}} \bar{d}_t + \beta_F E_t \left(\frac{1}{\beta_S} + 2\delta \bar{d}_t + \left(\gamma + \chi \frac{\alpha_{\pi G}}{\alpha_{\pi C}}\right) \frac{\partial \pi_{t+1}}{\partial \bar{d}_t}\right) \breve{\pi}_{t+1}$

Where $\breve{\pi}_t \equiv \frac{\pi_t}{1+\kappa+\chi \bar{d}_{t-1}}$. Note $R(\bar{d}_t) = \left(\frac{1}{\beta_S} + \delta \bar{d}_t\right)$, $R(\bar{d}_t) + R'(\bar{d}_t)\bar{d}_t = \left(\frac{1}{\beta_S} + 2\delta \bar{d}_t\right)$

Figure: Borrowing and inflation policies. Comparing institutional scenarios



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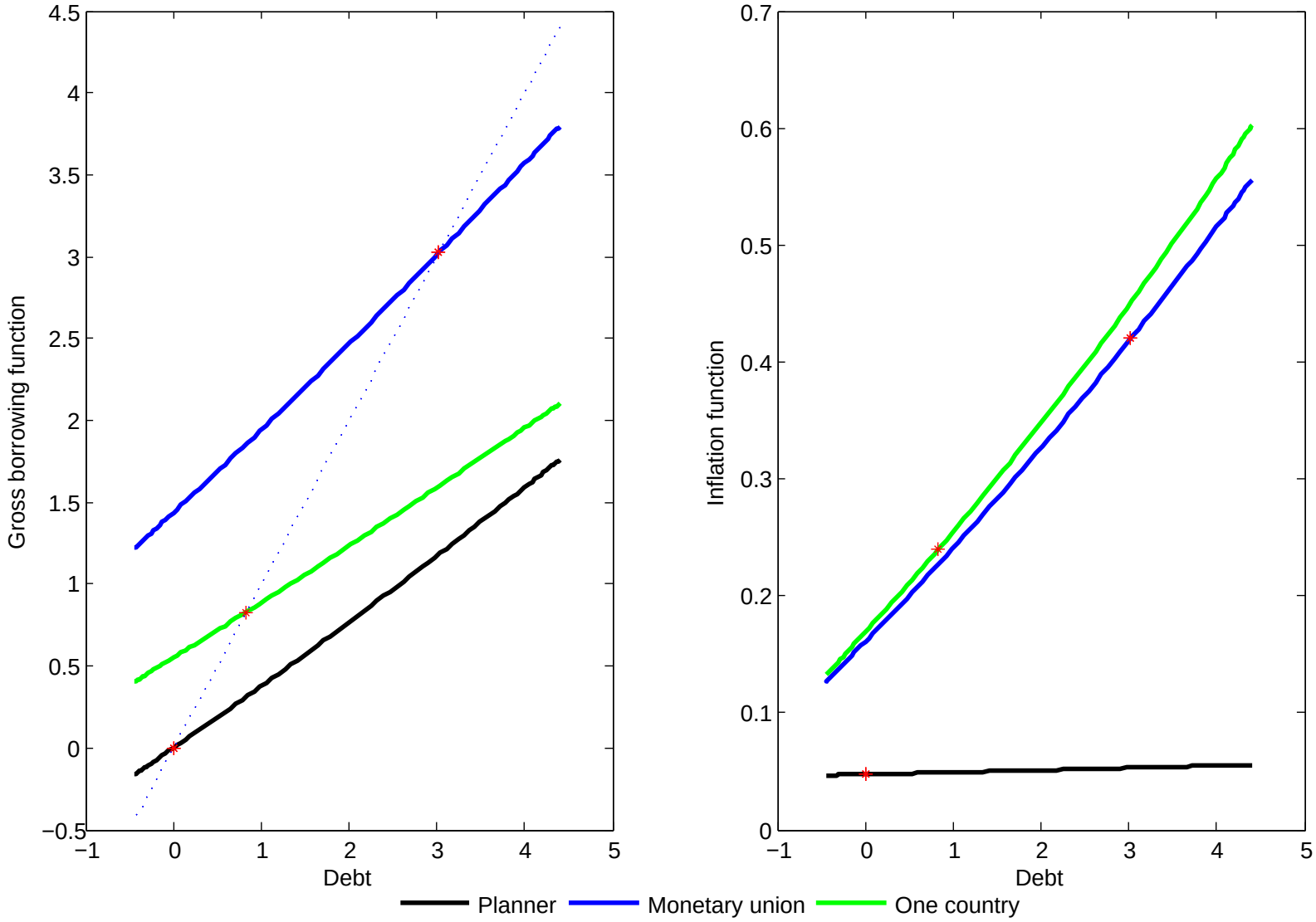

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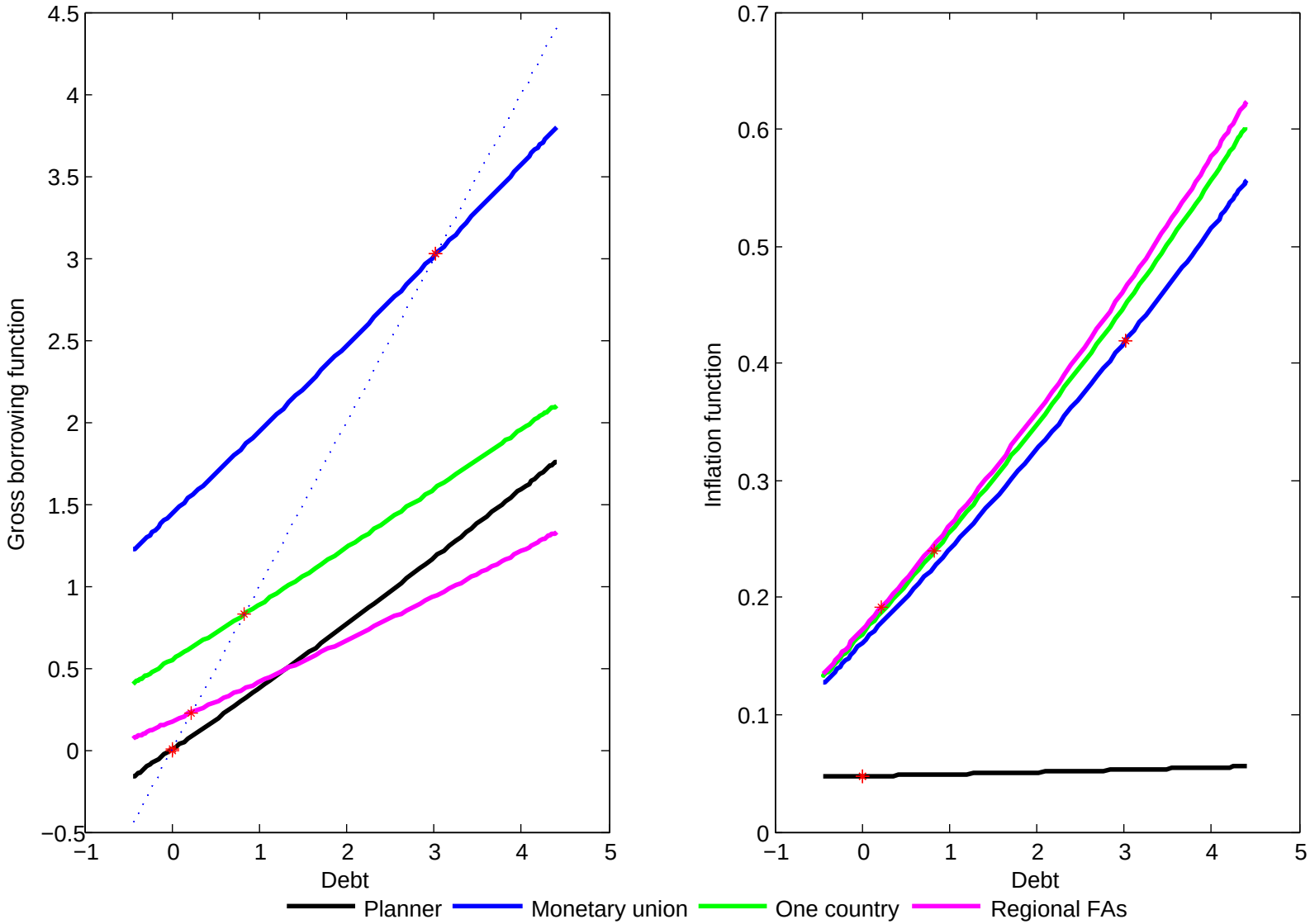

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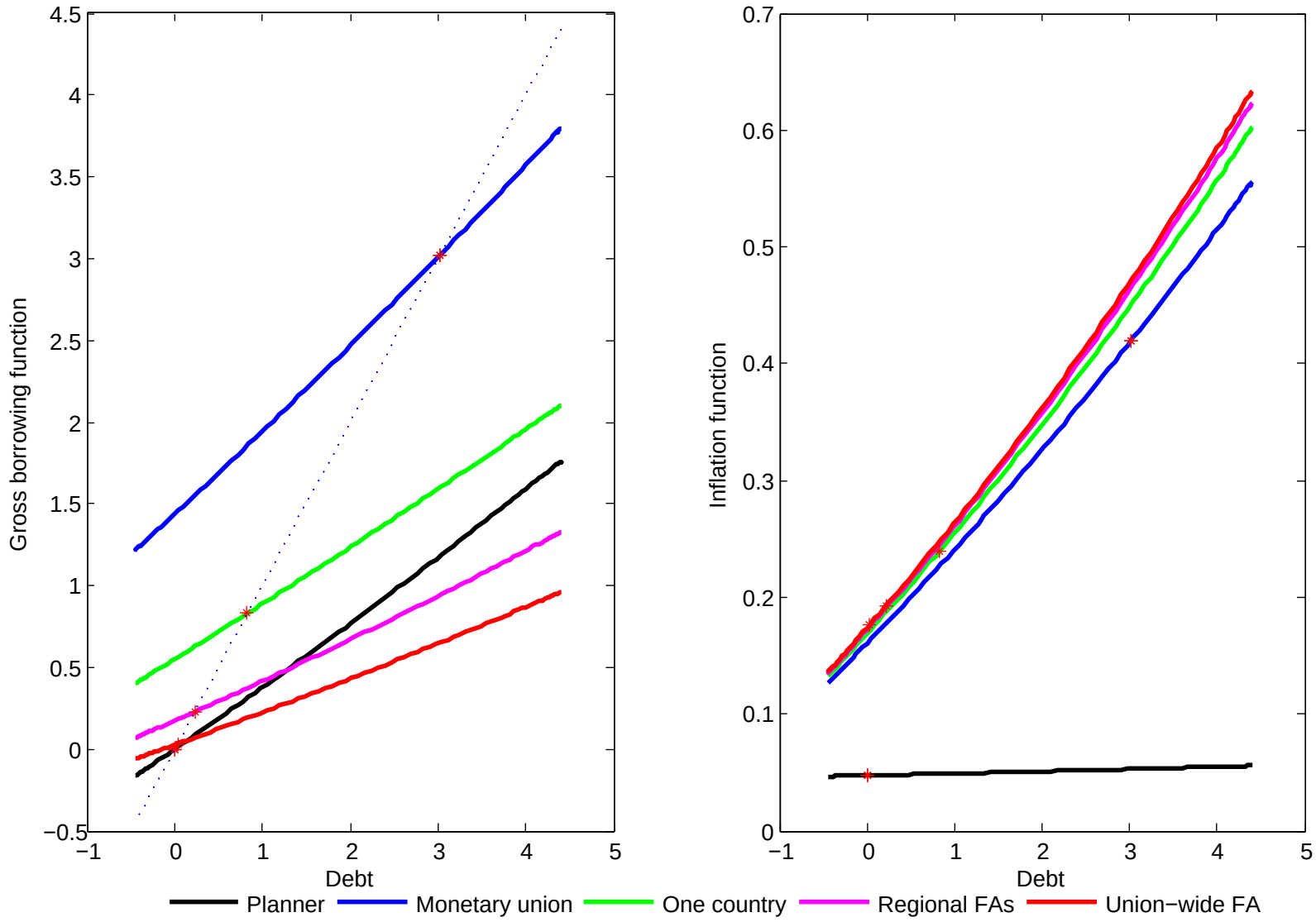


Figure: Temporary public demand shock: comparing institutional scenarios

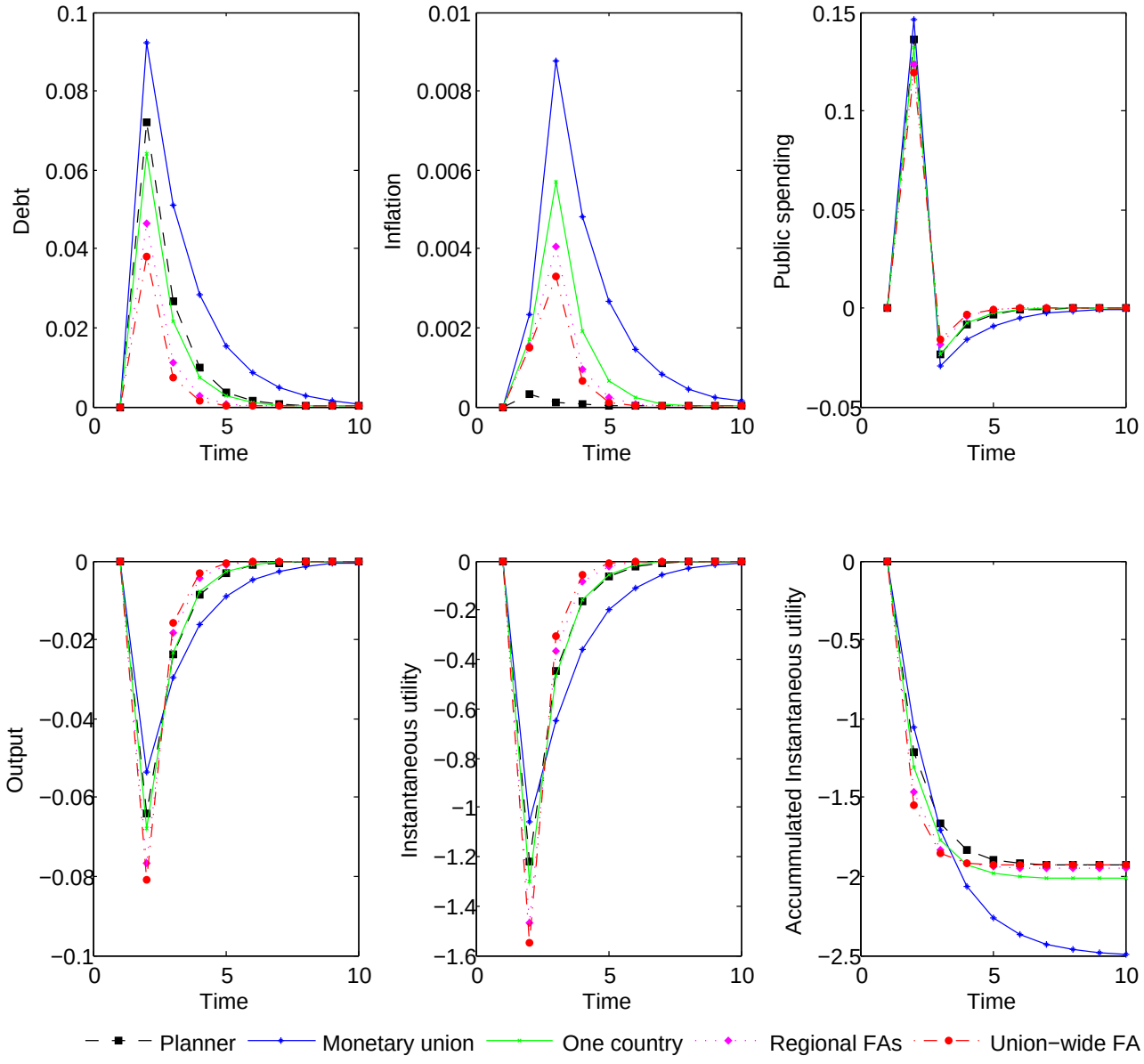
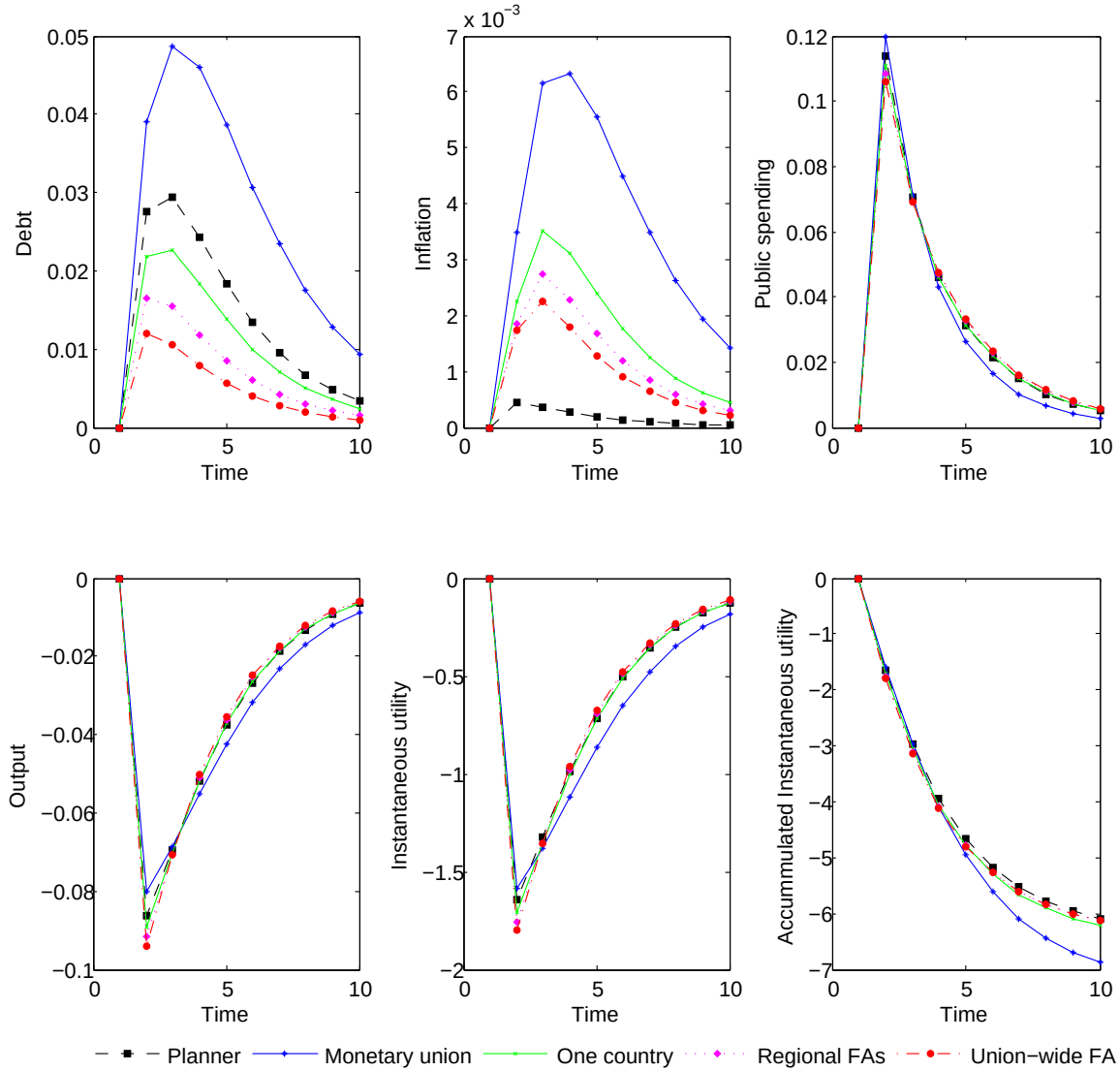


Figure: Autocorrelated public demand shock. Comparing institutional scenarios



Welfare

- Social Welfare of Region j and the union is given by

$$W_j^{\mathcal{S}}(\vec{d},\vec{\epsilon}) \;=\; -L_{\mathcal{S}j}, \quad W^{\mathcal{S}}(\vec{d},\vec{\epsilon}) \;=\; \frac{1}{J}\sum_{j=1}^{J} W_j^{\mathcal{S}}(\vec{d},\vec{\epsilon}).$$

- Welfare at steady state $W_{ss}^{\mathcal{S}} \;\equiv\; W^{\mathcal{S}}(\vec{d}_{ss}^{\mathcal{S}},\vec{0})$.
- Using the policy functions we can also use polynomial approximation to determine welfare such that

$$\begin{aligned} W^P(\bar{d}_{t-1},\epsilon_t) \;=\; & \alpha_{\pi l} I^P(\bar{d}_{t-1},\epsilon_t)^2 + \left(X^P(\bar{d}_{t-1},\epsilon_t) - \bar{\bar{x}}_t\right)^2 \\ & + \alpha_{gl}\left(G^P(\bar{d}_{t-1},\epsilon_t) - \bar{\bar{g}}_t\right)^2 + \beta_{\mathcal{S}} E_t W^P(\bar{d}_t,\epsilon_t+1) \end{aligned}$$

Table: Debt, inflation, and welfare in scenarios $\mathcal{S}$ where debt is a control variable*

Debt $\bar{d}_{ss}^{\mathcal{S}}$	Inflation $\pi_{ss}^{\mathcal{S}}$	Welfare $W_{ss}^{\mathcal{S}}$	Crisis cost* $W^{\mathcal{S}}(d_{ss}^{\mathcal{S}}, \epsilon_0^g) - W_{ss}^{\mathcal{S}}$	Crisis cost* controlling for debt $W^{\mathcal{S}}(0, \epsilon_0^g) - W^{\mathcal{S}}(0,0)$
Correlated shocks (autocorrelation 0.7)				
Scenario P: Planner				
0	0.047	−4512.3	-6.07	-6.07
Scenario I: single country with independent central bank				
0.828	0.240	−4548.7	-6.18	-6.10
Scenario MU: status quo monetary union				
3.022	0.420	−4742.4	-6.90	-6.53
Scenario Fj: Monetary union with regional fiscal authorities				
0.229	0.192	−4525.8	-6.11	-6.09
Scenario F: Monetary union with union-wide fiscal authority				
0.033	0.177	−4521.0	-6.09	-6.09

Figure: Temporary public demand shock. Comparing institutional scenarios (Levels).

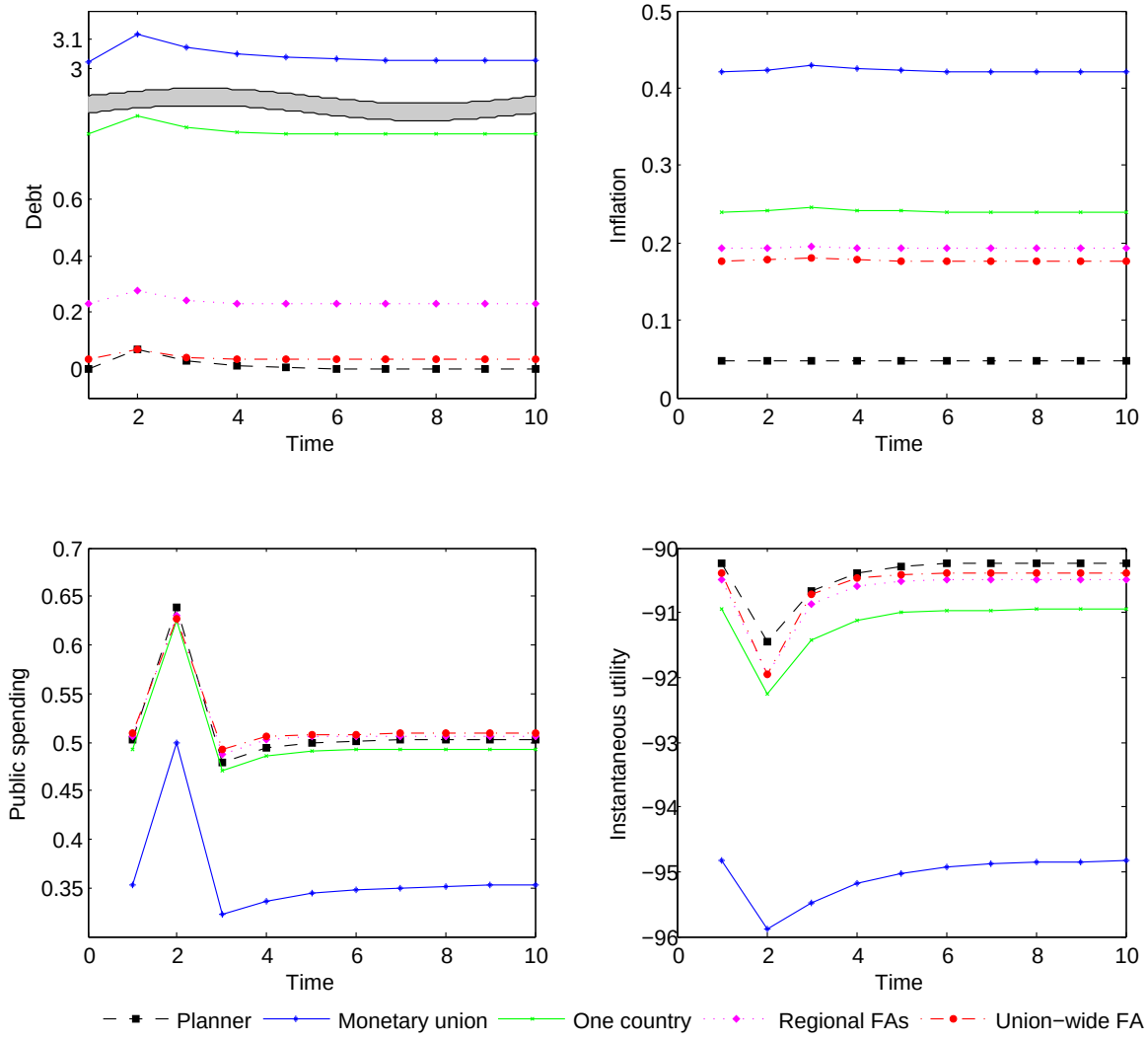
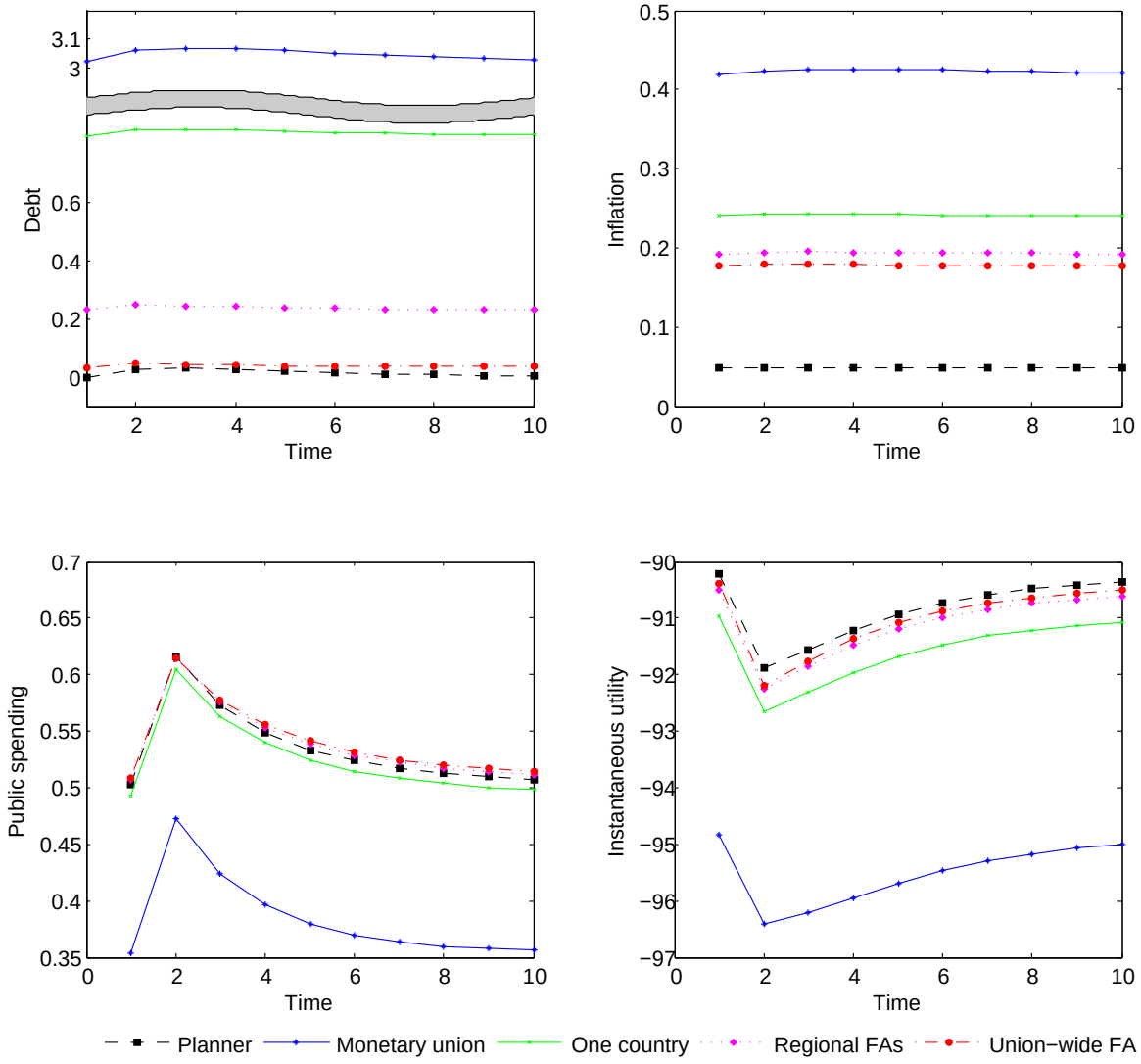


Figure: Autocorrelated public demand shock. Comparing institutional scenarios.



Games with Debt as a Residual

- Benchmark Monetary Union case - CB sets inflation, Regional Governments set tax and spending $\Rightarrow$ debt determined such that budget constraint holds.
- Fiscal Delegation - CB sets inflation, Regional Governments set spending and Fiscal Authority(ies) set taxes $\Rightarrow$ debt determined such that budget constraint holds.
- If Debt is the residual, each player sets its control variable explicitly considering the effect it will have on the state variable tomorrow, implicitly impacting the future decisions of all players.

Debt as A Residual - Monetary Union

- Central bank no longer has a intratemporal trade-off inflation versus spending $\bar{\hat{g}}_t = -\frac{\alpha_{\pi C} q_H}{\alpha_{gS}} \breve{\pi}_t$, now condition is also intertemporal. For the MU case

$$\begin{aligned}
\alpha_{\pi C}\pi_t + \nu\bar{\hat{x}}_t \quad = \quad & \beta_S \frac{\chi\bar{d}_{t-1}+\kappa}{\chi\bar{d}_t+\kappa}\Bigg[(\alpha_{\pi C}\pi_{t+1}+\nu\bar{\hat{x}}_{t+1})\left(\frac{1}{\beta_S}+2\delta\bar{d}_{t-1}\right)+ \\
& +\left(\frac{1}{\nu}+\frac{q_L^2\nu}{\alpha_{gC}}\right)(\alpha_{\pi C}\pi_{t+1}+(1+\chi\bar{d}_t+\kappa)\nu\bar{\hat{x}}_{t+1})\frac{\partial\bar{x}_{t+1}}{\partial d_t}+ \\
& +(\chi\bar{d}_t\alpha_{\pi C}\pi_{t+1}-\nu\bar{\hat{x}}_{t+1})\frac{\partial\pi_{t+1}}{\partial d_t}\Bigg]
\end{aligned}$$

Plus, one intratemporal condition linking output(taxes) and spending, and

$\hat{x}_{j,t} = \beta_G\left(\frac{1}{\beta_S}+\delta\bar{d}_{t-1}\right)E_t\hat{x}_{j,t+1}$

$\bar{d}_t = \left(\frac{1}{\beta_S}+\delta\bar{d}_{t-1}\right)\bar{d}_{t-1}+(\pi_t^e-\pi_t)(1+\chi\bar{d}_{t-1})+\left(\frac{1}{\nu}+\frac{q_L^2\nu}{\alpha_{gC}}\right)\bar{\hat{x}}_t-\kappa\pi_t+\bar{\tilde{z}}_t$

Policy Games - Debt as A Residual - *Fj* case

$$
\begin{aligned}
\alpha_{\pi C}\pi_t + \nu\bar{\hat{x}}_t &= \beta_S \frac{\chi\bar{d}_{t-1}+\kappa}{\chi\bar{d}_t+\kappa}\Bigg[(\alpha_{\pi C}\pi_{t+1}+\nu\bar{\hat{x}}_{t+1})(R(d_t)+R'(d_t)d_t)+ \\
&\quad +(\alpha_{gC}\bar{\hat{g}}_{t+1}(1+\chi\bar{d}_t)+q_L(\alpha_{\pi C}\pi_{t+1}+\nu\bar{\hat{x}}_{t+1}))\frac{\partial\bar{\hat{g}}_{t+1}}{\partial d_t}+ \\
&\quad +\left(\frac{1}{\nu}\right)(\alpha_{\pi C}\pi_{t+1}+(1+\chi\bar{d}_t+\kappa)\nu\bar{\hat{x}}_{t+1})\frac{\partial\bar{\hat{x}}_{t+1}}{\partial d_t}+ \\
&\quad +(\chi\bar{d}_t\alpha_{\pi C}\pi_{t+1}-\nu\bar{\hat{x}}_{t+1})\frac{\partial\pi_{t+1}}{\partial d_t}\Bigg] \\
\hat{g}_{j,t} &= \beta_G E_t\left[R(\bar{d}_t)\hat{g}_{j,t+1}-\left(\frac{q_L}{\alpha_{gG}}\hat{x}_{j,t+1}-\frac{1}{\nu}\hat{g}_{j,t+1}\right)\frac{\partial\bar{x}_{t+1}}{\partial d_t}\right], \\
\nu\hat{x}_{j,t}+\alpha_{dF}d_{j,t} &= \beta_F E_t\left[\nu\hat{x}_{j,t+1}R(\bar{d}_t)+\left(q_L\nu\hat{x}_{j,t+1}-\alpha_{gG}\hat{g}_{j,t+1}\right)\frac{\partial g_{j,t+1}}{\partial d_t}\right], \\
\bar{d}_t &= \left(\frac{1}{\beta_S}+\delta\bar{d}_{t-1}\right)\bar{d}_{t-1}+(\pi_t^e-\pi_t)(1+\chi\bar{d}_{t-1})+\frac{1}{\nu}\bar{\hat{x}}_t+q_L\bar{\hat{g}}_t-\kappa\pi_t+\bar{\tilde{z}}_t
\end{aligned}
$$

Figure: Temporary public demand shock. Comparing scenarios when debt is a residual.

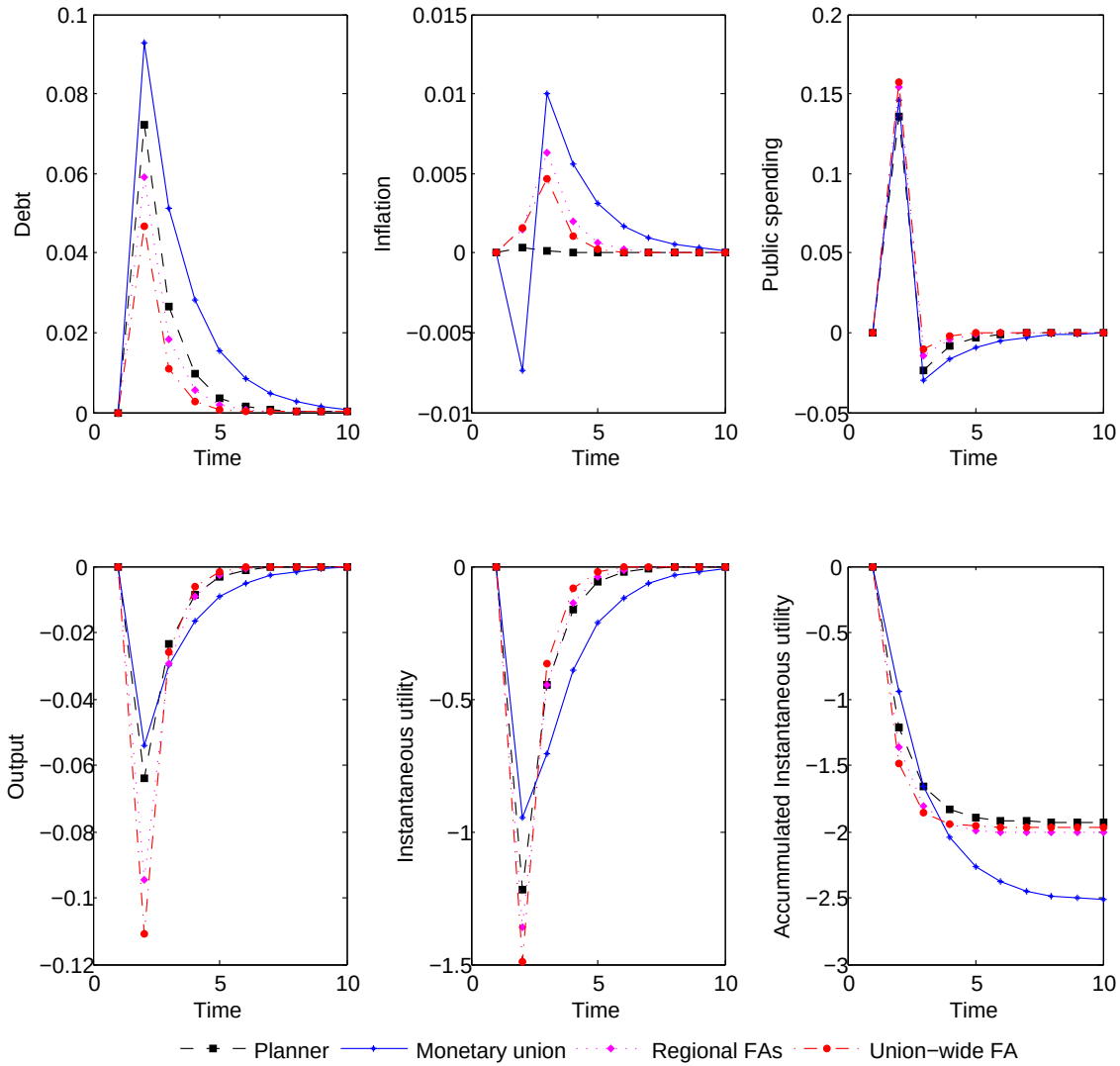
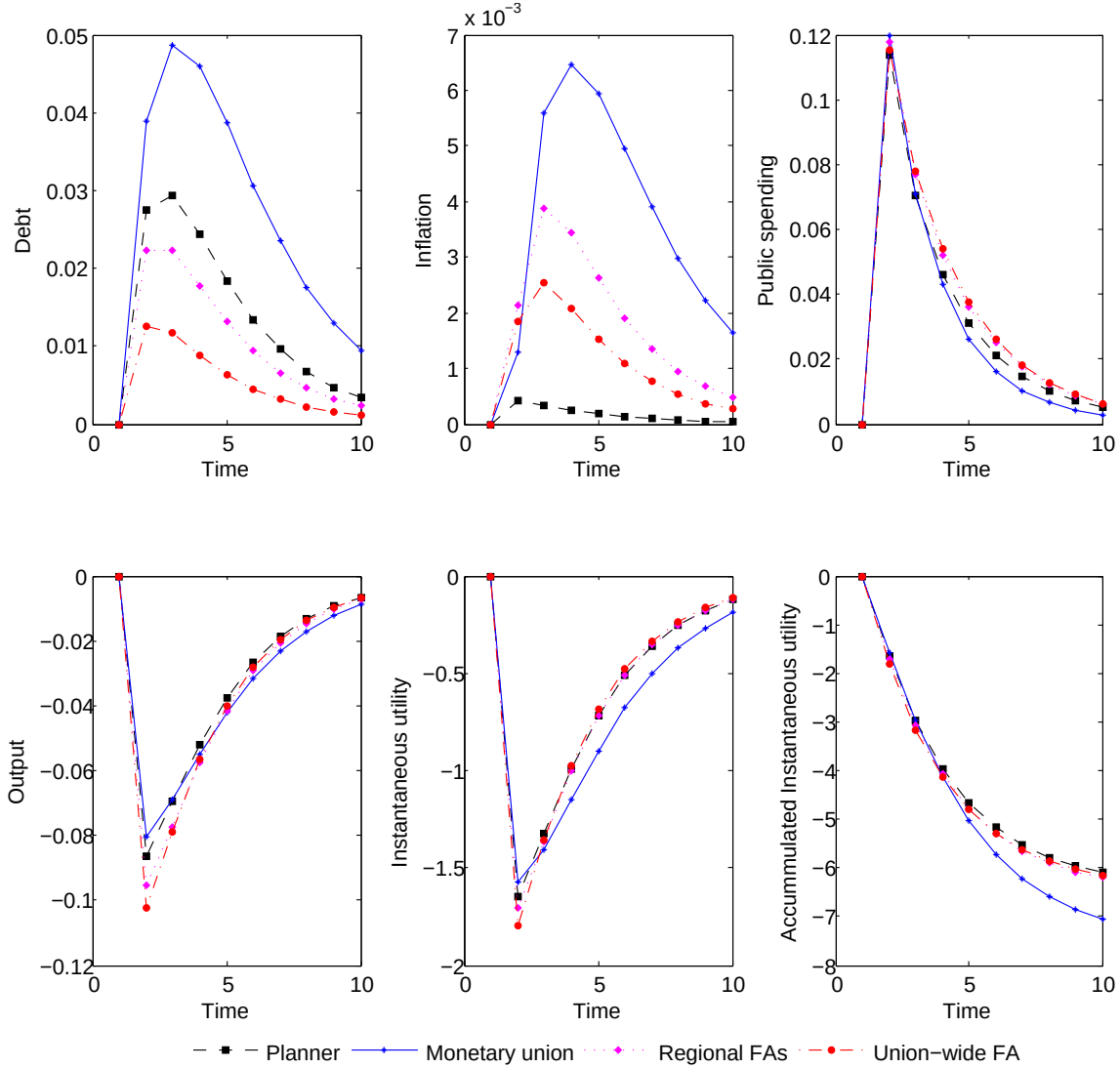


Figure: Autocorrelated public demand shock. Comparing scenarios when debt is a residual.



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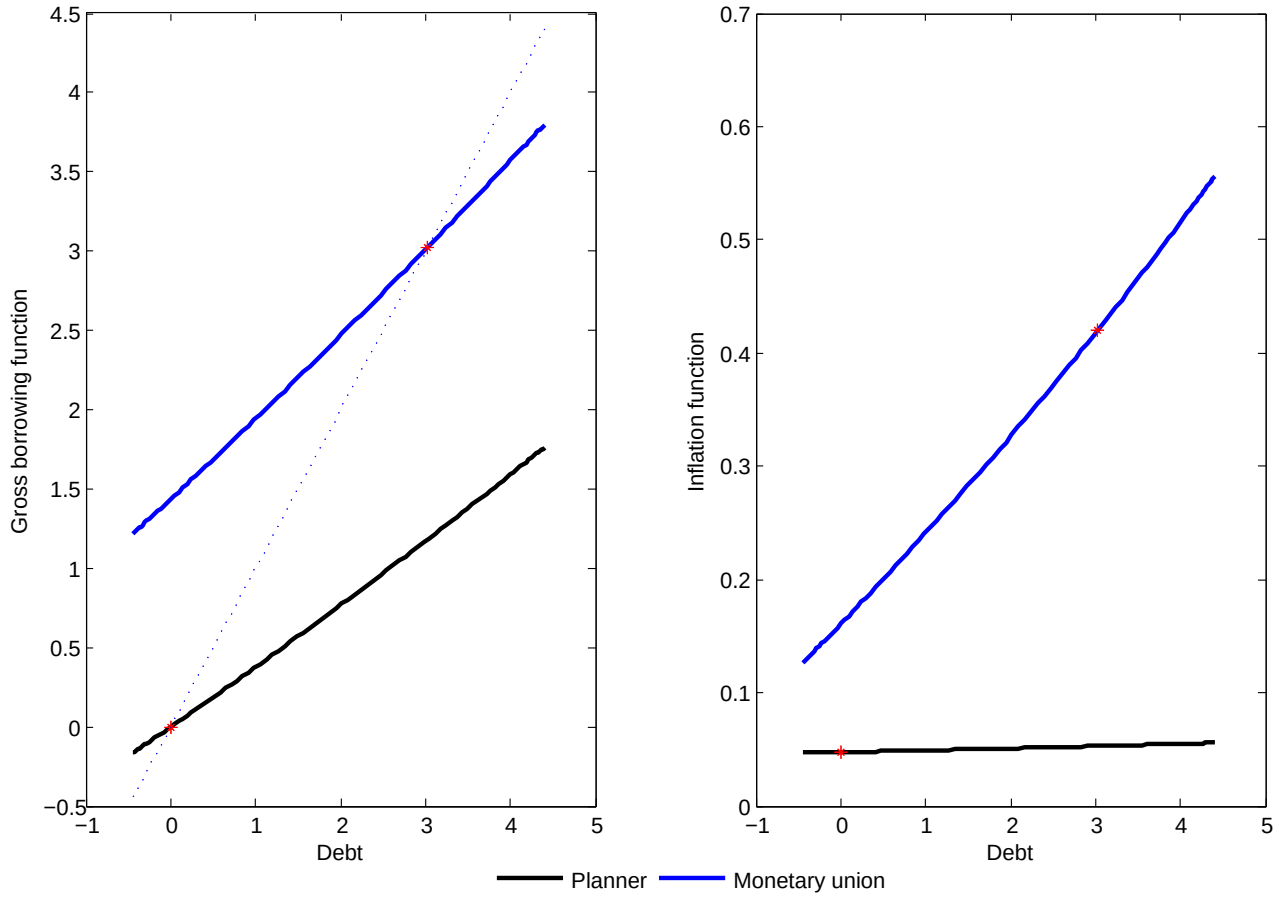
Correlated shocks (autocorrelation 0.7)				
Scenario P: Planner				
0	0.047	−4511.4	-6.07	-6.07
Scenario MUdr: status quo monetary union				
3.023	0.680	-4872.8	-7.07	-6.79
Scenario Fjdr: Monetary union with regional fiscal authorities				
0.487	0.225	−4540.5	-6.18	-6.13
Scenario Fdr: Monetary union with union-wide fiscal authority				
0.0001	0.181	−4525.9	-6.12	-6.12

Figure: Borrowing and inflation. Comparing institutional scenarios when debt is a residual and a control variable



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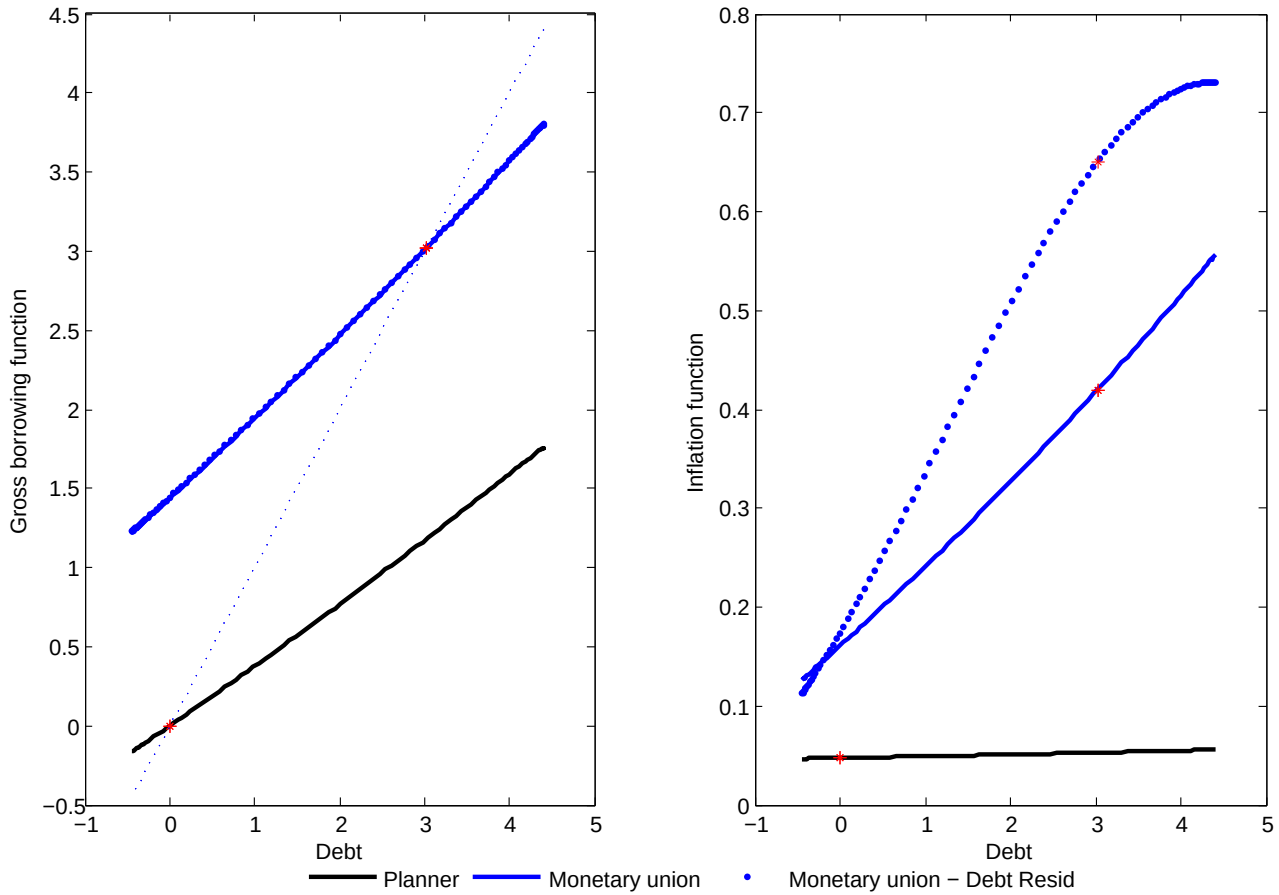

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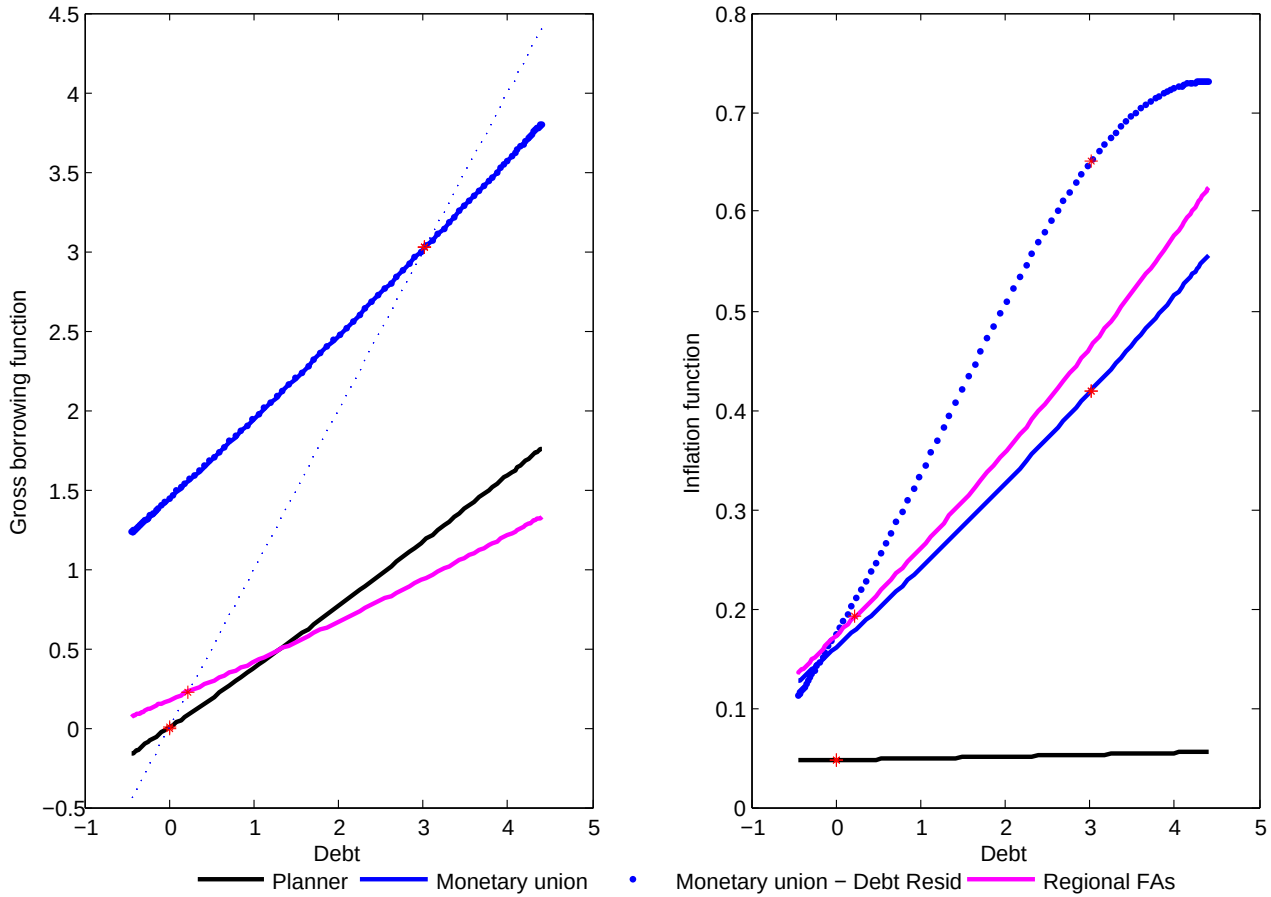

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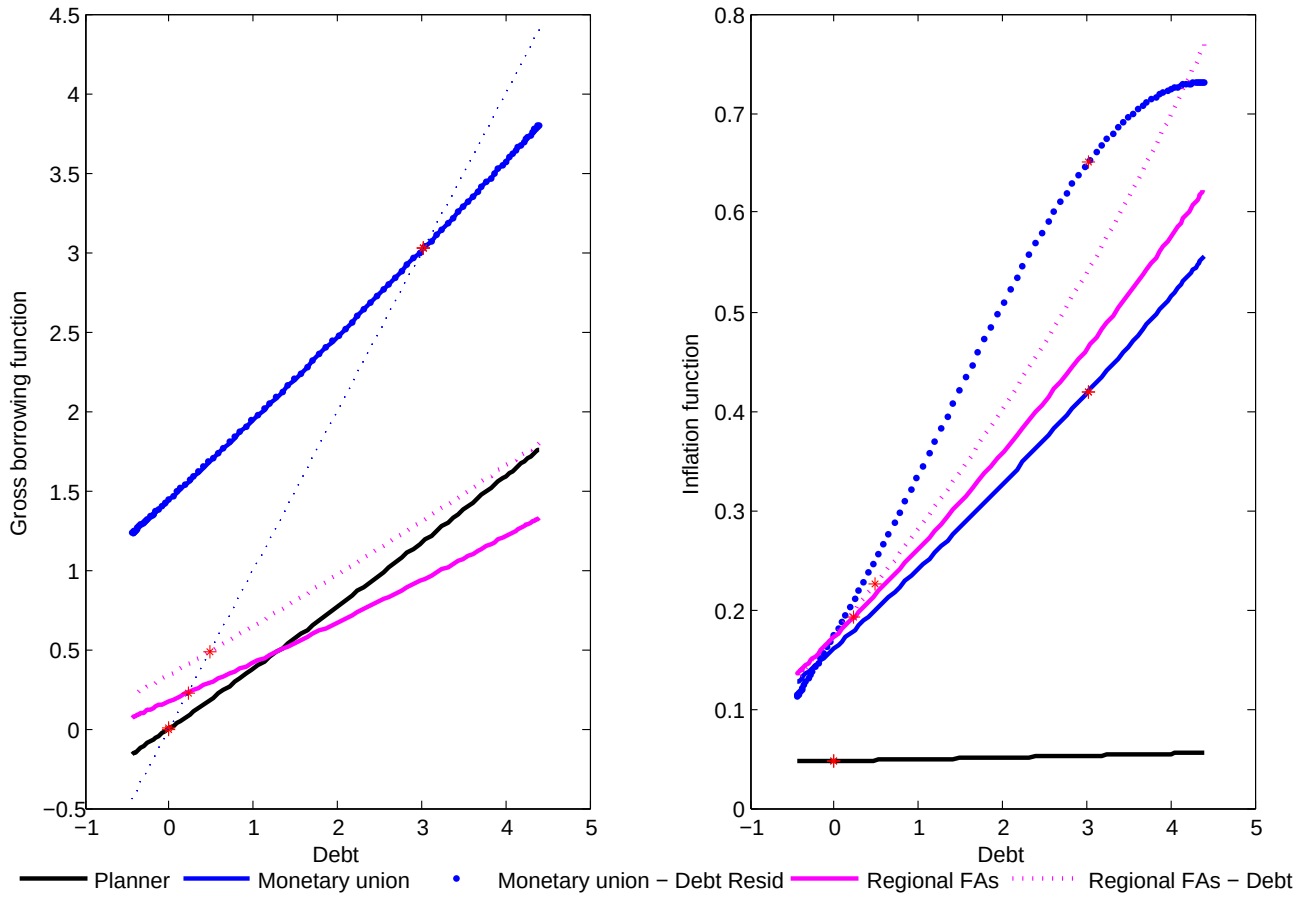

Fiscal Delegation

- If **excessive debt** is a problem in EMU, model points to **establishment of a European Fiscal Authority (EFA)**
- That is a powerful way to control debt in each country, correcting biases due to impatient elected officials and common pool problems.
- Institutional set-up still is able to provide sufficient stabilization. Important considerations such as each country's capacity to obtain revenues from taxes, their rate of growth and benefits and costs of default can be taken in consideration while setting the instrument.
- This is a striking contrast to uniform rules, previously in place in the EMU, which are almost meant to be eventually broken.

A European Fiscal Authority

- EFA would **monitor and forecast** fiscal trends in each member state
- EFA could **provide advice** on fiscal impact of new policy proposals
- **EFA would have power to set fiscal instrument(s) that give it effective control over national debt levels**
- Does not necessarily need to be debt...taxes will do...for instance Gruen(1997) proposes adding a shift parameter X to the tax code:

$$\text{tax rate}_{i,t} = F(\text{income}_{i,t}, \text{ lots of other stuff}_{i,t}) + X_t$$

that way redistributive properties embedded in tax code are maintained. Also feasible: adjustment to public sector expenditure (Costain/de Blas (2012A,B)), adjustment factors to pensions.

Is EFA politically feasible?

- Fiscally fragile countries in the Eurozone **need ECB protection against speculative attacks** (for example: cap risk premia).
- Fiscally strong Eurozone countries oppose ECB guarantees because they fear **moral hazard**: the weaker countries may fail to balance their budgets if they take ECB protection for granted.

- **A feasible quid pro quo:**
- Members **voluntarily delegate** one or more fiscal instruments to EFA.
- EFA evaluates whether instruments give it **effective control of debt**.
- When a member state has delegated an effective fiscal instrument to the EFA, **ECB promises protection against speculative attacks** (which might be less likely since EFA decreases biases, increases credibility, reducing premia).
  - If EFA says instrument is not effective, or is **no longer** effective, **ECB revokes protection**.

Still to do

- More careful parametrization of reduce-form model.
- Include case of federal government centralizing expenditure.
- Increasing the complexity of the agents part of the model. Important to consider terms of trade fluctuations during stabilization. Does it prevent EFA from providing adequate stabilization?
- Increasing complexity of tax system. Would Gruen(1997) tax multiplier set up work well?

THANKS FOR YOUR ATTENTION!