OPTIMAL MONETARY AND FISCAL POLICY IN THE EMU: DOES FISCAL POLICY COORDINATION MATTER?

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Motivation

Question

How should monetary and fiscal policies be conducted for a group of countries that share the same currency but are hit by asymmetric shocks?

Contribution

Addressing this question assuming:

- No-coordination of fiscal policymakers;
- Micro-foundation of the objectives of the policymakers;

$\longrightarrow$ In the EMU:

- there is common central bank (ECB);
- governments are still independent.

Micro-founded literature (GM(2006) and BJ(2005))

Policy prescriptions under coordination:

1. **Monetary Policy** stabilizes the averege union inflation as in a closed economy.
2. **Fiscal Policy**:

   - stabilizes idiosyncratic shocks;

   - on *average* ensures the efficient provision of the public goods.

Motivation

Questions

- What are the consequences of the lack of coordination among fiscal authorities for the conduction of the optimal monetary and fiscal policy?
- How do the policy prescriptions under no-coordination differ from those under coordination?

The terms of trade externality

How does the lack of coordination affect policy prescriptions?

Uncoordinated policymakers seek to influence their terms of trade in their favor at other countries consumers' expense.

- **At the steady state** to externalize the costs of production and taxation;
- **Over the business cycles** to reduce the volatility of output and consumption.

$\Rightarrow$ In general, there is an additional distortion that the central bank tries to correct.

Results

Optimal monetary and fiscal policy in the EMU: Does fiscal policy coordination matter?

Yes, in general the policy prescriptions valid under coordination do not hold under no-coordination.

Results

Specifically:

- **Monetary Policy:**

  - even in absence of markup shocks does not completly stabilize the average union inflation;

  - in presence of markup shocks stabilizes much more inflation than output.

- **Fiscal Policy:**

  - does not ensure the efficient provision of public goods;

  - is used for stabilization purposes even if shocks are symmetric.

The Plan of Presentation

1. The model;
2. The optimal policy problems;
3. The steady state;
4. The optimal policies;
5. Conclusion;

The Model

- **World Economy:** There is a continuum of small open economies. Each country produces a final good and a continuum of differentiated inputs.
- **Preferences:**

$$\sum_{t=0}^{\infty}\beta^t E_0\left[\frac{C_t^{1-\sigma}}{1-\sigma}+\chi\frac{G_t^{1-\gamma}}{1-\gamma}-\frac{N_t^{\varphi+1}}{\varphi+1}\right]\qquad 0<\beta<1$$

- **Consumer Indexes** $\eta > 0$**:**

$$C_t \equiv \left[(1-\alpha)^{\frac{1}{\eta}}C_{H,t}^{\frac{\eta-1}{\eta}}+\alpha^{\frac{1}{\eta}}C_{F,t}^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}\qquad C_{F,t}\equiv\left[\int_0^1 C_{j,t}^{\frac{\eta-1}{\eta}}dj\right]^{\frac{\eta}{\eta-1}}$$

$$G_t \equiv \left[(1-\nu)^{\frac{1}{\eta}}G_{H,t}^{\frac{\eta-1}{\eta}}+\nu^{\frac{1}{\eta}}G_{F,t}^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}\qquad G_{F,t}\equiv\left[\int_0^1 G_{j,t}^{\frac{\eta-1}{\eta}}dj\right]^{\frac{\eta}{\eta-1}}$$

go1

The Model

- **The Law of one price.** However given the home bias preferences, the PPP does not hold.
- **Complete financial markets.**
- **Labour market:** There is monopolistic competition.
- **Firm technology and price setting in the final good sector:** there is perfect competition and prices are flexible and the technology is such:

$$Y_t = \left[(1-\psi)^{\frac{1}{\eta}} Y_{H,t}^{I \; \frac{\eta-1}{\eta}} + \psi^{\frac{1}{\eta}} Y_{F,t}^{I \; \frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \qquad Y_{H,t}^I \equiv \left(\int_0^1 y_{H,t}^I(k)^{\frac{\varepsilon-1}{\varepsilon}} dk \right)^{\frac{\varepsilon}{\varepsilon-1}}$$

$$Y_{F,t}^I \equiv \left(\int_0^1 Y_{j,t}^{I \; \frac{\eta-1}{\eta}} dj \right)^{\frac{\eta}{\eta-1}} \qquad Y_{j,t}^I \equiv \left(\int_0^1 y_{j,t}^I(k)^{\frac{\varepsilon-1}{\varepsilon}} dk \right)^{\frac{\varepsilon}{\varepsilon-1}}$$

- **Firm technology and price setting in the intermediate good sector:** there is monopolistic competition and prices adjust according to a staggered mechanism *a lá* Calvo.
- **Lump sum taxes.**

go2

The Optimal Policy Problems

The fiscal policymakers:

- maximize the *single country* welfare,
- w. r. t. single country allocations and prices,
- s. t. the single country equilibrium conditions,
- taking as given the average union variables.

The monetary policymmaker

- maximizes the *average union* welfare,
- w. r. t. all allocations and prices,
- s. t. all equilibrium conditions of the world economy,
- taking as given fiscal policy variables.

The Methodology

The linear quadratic approach requires:

1. Finding the *deterministic steady state* of the optimal policy problems;
2. Deriving a *purely quadratic approximation* to both single country and whole monetary union welfare;
3. Maximizing these welfare approximations taking as constraints the first order approximations of the structural conditions.

The Steady State

- **Under coordination.** The steady state is Pareto effecient: the MRS equalize the MRT

$$C_c^{-\sigma} = Y_c^{\varphi} \quad \chi G_c^{-\gamma} = Y_c^{\varphi} \quad Y_c = C_c + G_c$$

- **Under no-coordination.**

$$C_{nc}^{-\sigma} = (1-\psi)\delta Y_{nc}^{\varphi} \quad \chi G_{nc}^{-\gamma} = (1-\psi)(1-\nu) Y_{nc}^{\varphi} \quad Y_{nc} = C_{nc} + G_{nc}$$

with $\delta \equiv \left[\delta_1 + \delta_2 \frac{1-\rho}{\rho} + \delta_3 \frac{1}{\rho}\right]$ and $\rho \equiv \frac{C_{nc}}{Y_{nc}}$ go

$\Rightarrow G_c < G_{nc}$, $C_c > C_{nc}$ and $Y_c > Y_{nc}$.

The Steady State

Why do uncoordinated governments over-expand the G and over-tax L?

Bagger-my-neigbour policy They seek to improve the terms of trade to allow home consumers to work less and pay less taxes at other country consumers' expense.

	Coordination	No-Coordination
$\frac{C}{Y}$	0.97	0.74

Technological Shocks: a Special Case $\gamma = \sigma$

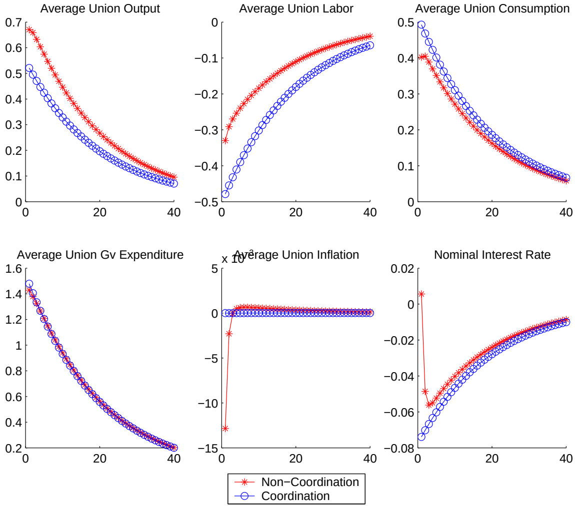
The Case for Average Union Price Stability

In absence of markup shocks if $\sigma = \gamma$ even when fiscal policies are uncoordinated, stabilizing the average union inflation is Nash equilibrium outcome.

Technological Shocks: the General Case $\gamma < \sigma$

- **The Terms of Trade effect:** Even over the business cycles, uncoordinated fiscal policymakers try to use the terms of trade volatility in order to reduce the volatility of output.
- **The Intratemporal versus Intertemporal Substitution Effects:** If $\gamma < \sigma$, there is an incentive to substitute intratemporally C and G.
- **The Steady State Distortion:** Under the baseline calibration the inefficiently high steady state government expenditure output ratio amplifies the impact on output of government expenditure shocks.

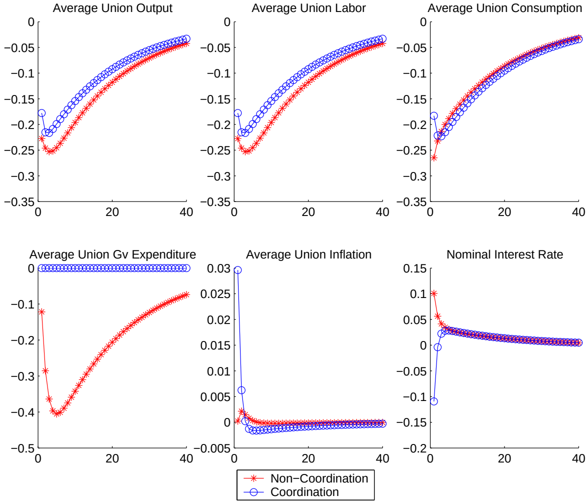
Impulse Responses to a Global Technological Shock:



Markup Shocks

- **Stabilization Policy:** Even with symmetric shocks, fiscal policymakers take as given the aggregate variables and try to stabilize on their own the effects of markup shocks.
- **The Steady State Distortion:** Given the inefficiently low steady state output level, the common central bank prefers to stabilize more inflation than output.

Impulse Responses to a Global Markup Shock:



Conclusion

Within a monetary union, the lack of coordination among fiscal policymakers has crucial consequences not only for the optimal fiscal policy but even for the optimal monetary policy.

Specifically the common central bank:

- Even in absence of markup shocks, does not completely stabilize the average union inflation;
- Under markup shocks, stabilizes inflation much more than output.

Baseline Calibration

$\sigma^{-1} = 1/3$	Intertemporal elasticity of substitution of the private good;
$\gamma^{-1} = 1$	Intertemporal elasticity of substitution of the public good;
$\eta = 4.5$	Elasticity of substitution between home and foreign private g
$\varphi^{-1} = 1$	Intertemporal elasticity of substitution of labor;
$1 - \alpha = 0.6$	Degree of home bias in the private bundle;
$1 - \nu = 0.8$	Degree of home bias in the public bundle;
$1 - \psi = 0.6$	Degree of home bias in the intermediate input;
$\rho_{nc} = 0.72$	Steady state consumption output ratio ;
$\varepsilon = 6$	Elasticity of substitution among goods produced in the same
$\beta = 0.99$	Preferences discount factor ;
$ac = 0.95$	Autocorrelation of technological shocks;

return

$$\delta \equiv \left[\delta_1 + \delta_2 \tfrac{1-\rho}{\rho} + \delta_3 \tfrac{1}{\rho}\right]$$

$$\delta_1 \equiv (1-\alpha) + \xi\alpha(2-\alpha) \quad \delta_2 \equiv \xi\nu(2-\nu) \quad \delta_3 \equiv \xi\psi\tfrac{2-\psi}{(1-\psi)^2}$$

return Preferences

$$\sum_{t=0}^{\infty} \beta^t E_0 \left[\frac{C_t^{1-\sigma}}{1-\sigma} + \chi \frac{G_t^{1-\gamma}}{1-\gamma} - \frac{N_t^{\varphi+1}}{\varphi+1} \right] \quad 0 < \beta < 1$$

with $\eta > 0$:

$$C_t \equiv \left[(1-\alpha)^{\frac{1}{\eta}} C_{H,t}^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}} C_{F,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \qquad C_{F,t} \equiv \left[\int_0^1 C_{j,t}^{\frac{\eta-1}{\eta}} dj \right]^{\frac{\eta}{\eta-1}}$$

$$G_t \equiv \left[(1-\nu)^{\frac{1}{\eta}} G_{H,t}^{\frac{\eta-1}{\eta}} + \nu^{\frac{1}{\eta}} G_{F,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta}{\eta-1}} \qquad G_{F,t} \equiv \left[\int_0^1 G_{j,t}^{\frac{\eta-1}{\eta}} dj \right]^{\frac{\eta}{\eta-1}}$$

Price indexes:

$$P_{C,t} = \left[(1-\alpha) P_t^{1-\eta} + \alpha P_t^{*\,1-\eta} \right]^{\frac{1}{1-\eta}}$$

$$P_{G,t} = \left[(1-\nu) P_t^{1-\eta} + \nu P_t^{*\,1-\eta} \right]^{\frac{1}{1-\eta}} \quad P_t^* \equiv \left[\int_0^1 P_t^{j\,\frac{\eta-1}{\eta}} dj \right]^{\frac{\eta}{\eta-1}}$$

◂ return Risk sharing and other optimality conditions. Under the assumption of complete financial markets:

$$\frac{P^j_{C,t}}{P_{C,t}} = \left(\frac{C^j_t}{C_t}\right)^{-\sigma} \quad \Xi_t N_t^{\varphi} C_t^{\sigma} = \frac{W_t}{P_t} \quad \frac{1}{1+i_t} = \beta E_t \left\{ \left(\frac{C_{t+1}}{C_t}\right)^{-\sigma} \left(\frac{P_t}{P_{t+1}}\right) \right\}$$

Final good market clearing condition

$$Y_t = (1-\alpha)\left(\frac{P_t}{P_{C,t}}\right)^{-\eta} C_t + \alpha \int_0^1 \left(\frac{P_t}{P^j_{C,t}}\right)^{-\eta} C^j_t dj + (1-\nu)\left(\frac{P_t}{P_{G,t}}\right)^{-\eta} G_t + \nu \int_0^1 \left(\frac{P_t}{P^j_{G,t}}\right)^{-\eta} G^j_t dj$$

Intermediate good market clearing condition

$$Y_{H,t} = \left[(1-\psi)\left(\frac{P_{H,t}}{P_t}\right)^{-\eta} Y_t + \psi \int_0^1 \left(\frac{P_{H,t}}{P_j}\right)^{-\eta} Y^j_t dj\right]$$

Final sector firm technology:

$$Y_t = \left[(1-\psi)^{\frac{1}{\eta}} \left(Y^I_{H,t}\right)^{\frac{\eta-1}{\eta}} + \psi^{\frac{1}{\eta}} \left(Y^I_{F,t}\right)^{\frac{\eta-1}{\eta}}\right]^{\frac{\eta}{\eta-1}}$$

$$Y^I_{H,t} \equiv \left[\int_0^1 \left(y^I_{H,t}(k)\right)^{\frac{\varepsilon-1}{\varepsilon}} dk\right]^{\frac{\varepsilon}{\varepsilon-1}} \quad Y^I_{F,t} \equiv \left[\int_0^1 \left(Y^I_{j,t}\right)^{\frac{\eta-1}{\eta}} dj\right]^{\frac{\eta}{\eta-1}}$$

$$Y^I_{j,t} \equiv \left[\int_0^1 \left(y^I_{j,t}(k)\right)^{\frac{\varepsilon-1}{\varepsilon}} dk\right]^{\frac{\varepsilon}{\varepsilon-1}} P_t = \left[(1-\psi)P_{H,t}^{1-\eta} + \psi P_{F,t}^{1-\eta}\right]^{\frac{1}{1-\eta}}$$

$$P_{H,t} = \left[\int_0^1 p_{H,t}(k)^{1-\varepsilon} dk\right]^{\frac{1}{1-\varepsilon}} P_{F,t} = \left[\int_0^1 \left(P_{j,t}\right)^{1-\eta} dj\right]^{\frac{1}{1-\eta}} P_{j,t} = \left[\int_0^1 p_{j,t}(k)^{1-\varepsilon} dk\right]^{\frac{1}{1-\varepsilon}}$$