

Passive Monetary Policy and Active Fiscal Policy in a Monetary Union

Bartosz Maćkowiak

Sebastian Schmidt

European Central Bank & CEPR

European Central Bank & CEPR

Athens, 30 September 2022

The views expressed here are solely those of the authors

Question and motivation

- How is the price level in a monetary union determined when the central bank keeps the nominal interest rate constant for a long time and buys, or stands ready to buy, government bonds?
- After the financial crisis of 2008, the ECB cut its policy rates sharply. The policy rates changed little in the subsequent *twelve years*. [▶ Chart](#)
- In parallel, the ECB instituted four government bond buying programs. Under the APP and the PEPP, the ECB purchased about one-third of national public debt in the euro area by the end of 2021.
- We use this episode to motivate a model of price level determination in a monetary union in which monetary policy is passive and fiscal policy is active (Leeper, 1991).

More motivation: Fiscal backing for price stability in a monetary union

- It is interesting to study active fiscal policy also because “for the price level to be uniquely determined, fiscal policy must be seen to ‘back’ the price level” (Del Negro and Sims, 2015).
- “Fiscal backing” is the idea that fiscal policy can be passive most of the time, even all the time on the RE equilibrium path, but it must turn active in the face of a threat of an inflationary spiral or a deflation trap.
- In a monetary union, there are multiple fiscal authorities, one for each member country of the union, and in addition there may be a common fiscal authority.
- The question arises how to coordinate the different fiscal policies to back the price level.

What we do

- We extend the fiscal theory of the price level to the case of a heterogeneous monetary union.
- The common central bank pursues passive monetary policy, and fiscal policy at the level of the union is active.
- Different configurations of national fiscal policies and a common fiscal policy with “Eurobonds” amount to active fiscal policy for the union, but can have very different implications for the effects of fiscal policy.
- We propose a configuration where national policies are standard and passive, and a modestly-sized common fiscal authority counterbalances national policies appropriately, if needed, to maintain an overall fiscal stance consistent with medium-term price stability.

Literature

- FTPL classics: Leeper (1991), Sims (1994), Woodford (1994), and Cochrane (2022) who writes: “The ECB is becoming a more classic fiscal theory of the price level operation, money backed by collective general government surpluses (...).”
- Very few FTPL papers study a homogenous monetary union: Bergin (2000), Sims (1997), Section VI, and Woodford (1998), Section 5.
- Jarociński and Maćkowiak (2018), and Bianchi, Melosi, and Rogantini Picco (2021) are recent, more applied FTPL-monetary union papers.
- More generally, we follow the tradition in macroeconomics of specifying rules for policy instruments and studying the behavior of the economy given those rules (e.g., Taylor, 2001, Woodford, 2003, Part I).

Model: Consumption baskets and price levels

- $I > 1$ countries with a common central bank, in each country i there is a representative household and a fiscal authority.
- Household i receives an endowment of good i , Y_{it} , in every period t . The I goods are traded. The consumption basket allows for home bias:

$$C_{it} = \left(\sum_{j=1}^I \gamma_{ij}^{\frac{1}{\theta}} C_{ijt}^{\frac{\theta-1}{\theta}} \right)^{\frac{\theta}{\theta-1}}$$

- The price levels:

$$P_{it} = \left(\sum_{j=1}^I \gamma_{ij} W_{jt}^{1-\theta} \right)^{\frac{1}{1-\theta}}$$

$$P_t = \prod_{i=1}^I P_{it}^{n_i}$$

- GDP of the union:

$$Y_t = \frac{\sum_i W_{it} Y_{it}}{P_t}$$

Model: Flow budget constraints

- National fiscal authority i :

$$(1 + \rho_i Q_{it}) B_{it-1} = W_{it} S_{it} + W_{it} Z_{it} + Q_{it} B_{it}, \quad \text{where } B_{it} = \sum_j B_{jit}^H + B_{it}^{CB}$$

- The central bank:

$$\sum_i (1 + \rho_i Q_{it}) B_{it-1}^{CB} - R_{t-1} \sum_i H_{it-1} = \sum_i W_{it} Z_{it} + \sum_i Q_{it} B_{it}^{CB} - \sum_i H_{it}$$

Sometimes, it is helpful to think of the previous equation as the sum of flow budget constraints of I national central banks.

- Household i :

$$\sum_{j=1}^I (1 + \rho_j Q_{jt}) B_{ijt-1}^H + R_{t-1} H_{it-1} + W_{it} Y_{it} = P_{it} C_{it} + W_{it} S_{it} + \sum_{j=1}^I Q_{jt} B_{ijt}^H + H_{it}$$

Model: Intertemporal budget constraint of the public sector in the union

- Let $\tilde{P}_{it} \equiv P_{it}/P_t$ and $\Theta_{itk} \equiv \beta^k (\lambda_{it+k}/\lambda_{it}) (\tilde{P}_{it}/\tilde{P}_{it+k})$, where $k \geq 0$, $\beta \in (0, 1)$, and λ_{it} is the period t marginal value of wealth to household i .
- Household i optimization implies that transversality condition holds

$$\lim_{T \rightarrow \infty} E_t \left[\Theta_{itT} \left(\frac{\sum_j Q_{jT} B_{ijT}^H + H_{iT}}{P_T} \right) \right] = 0$$

- The forward solution of the budget constraint of the public sector in the union

$$\frac{\sum_j (1 + \rho_j Q_{jt}) \left(\sum_i B_{ijt-1}^H \right) + R_{t-1} \sum_i H_{it-1}}{P_t} = \sum_{k=0}^{\infty} E_t \left[\Theta_{itk} \left(\sum_i \tilde{S}_{it+k} \right) \right] \quad \text{for all } i,$$

where $\tilde{S}_{it} \equiv \tilde{W}_{it} S_{it}$, $\tilde{W}_{it} \equiv W_{it}/P_t$.

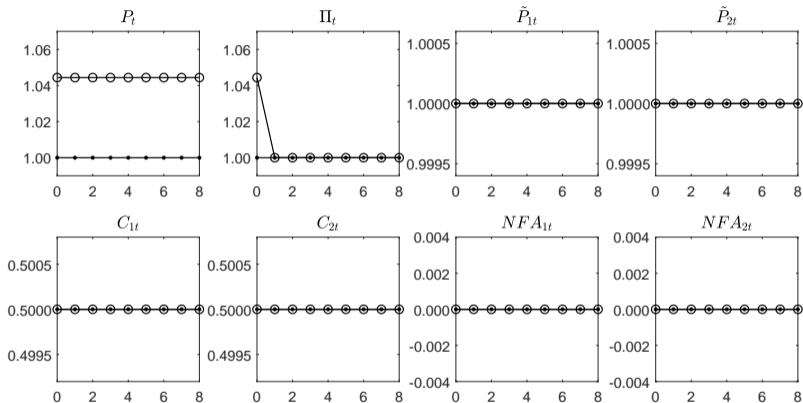
Benchmark passive-money active-fiscal configuration

- The central bank chooses an inflation target $\Pi \geq 1$ and pays a time-invariant interest rate on reserves $R_t = R$ consistent with this target, $R = \Pi/\beta$.
- National fiscal authority i sets $\tilde{S}_{it} = \tilde{S}_i > 0$, except that in period 0 there may be a one-time unanticipated shock to \tilde{S}_{i0} . There is no common fiscal authority.
- Balance sheet policy: the key is that the central bank is seen as ruling out default on bonds, conditional on the specified fiscal policy (we consider default in an extension).
- We solve for variables in the model in every period $t \geq 0$, taking as given period -1 holdings of bonds and reserves. We assume perfect foresight (hence, $\Theta_{itk} = \beta^k$).

Analytical result and parameterization

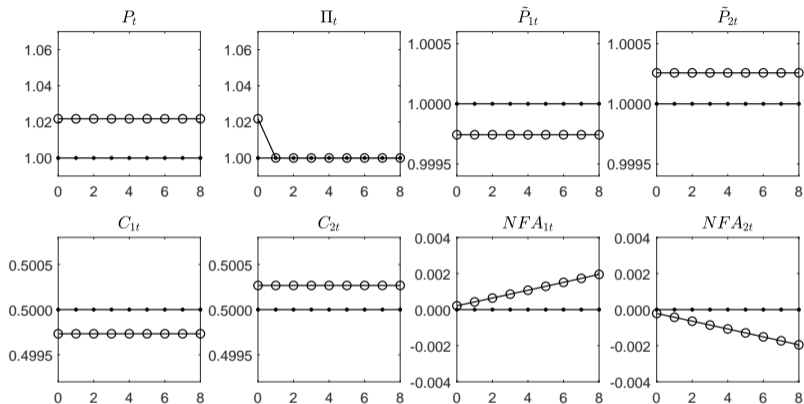
- We focus on the case $I = 2$ and $Y_{it} = Y_i$.
- When $\theta = 1$ (a unit trade elasticity), we prove that there exists a unique equilibrium path $\{P_t, P_{it}, W_{it}, Q_{it}, C_{it}\}$.
- More generally, we solve the model numerically.
- Let us assume that the two countries symmetric ($n_1 = n_2 = 0.5$, initial net foreign assets equal 0).
- We set $\beta = 0.995$, $\Pi = 1$, $\rho_i = 0.95$, $\tilde{S}_i = 0.02n_i$, $\theta = 2$, and the γ 's are chosen to obtain home bias.

Baseline (no shocks) and symmetric fiscal expansion



Lines with points: baseline, no shocks. Lines with circles: symmetric fiscal expansion, $\tilde{S}_{i0} = -0.15n_i$.

Asymmetric fiscal expansion



Lines with points: baseline, no shocks. Lines with circles: fiscal expansion in country 2, $\tilde{S}_{20} = -0.15n_2$.

Benchmark passive-money active-fiscal configuration: Summary

- In a monetary union, the benchmark passive-money active-fiscal policy mix determines a unique price level for the union and a unique price level for each country.
- Fiscal expansions or contractions move the price level of the union.
- When they are asymmetric, they also change relative price levels and *necessarily* shift wealth between the countries in the union.

Configuring national policies and a common fiscal authority

- National fiscal authority i :

$$\tilde{S}_{it} = \phi_{it} + \phi_B \frac{Q_{it-1} B_{it-1}}{P_{t-1}}, \quad \phi_B > \beta^{-1} - 1$$

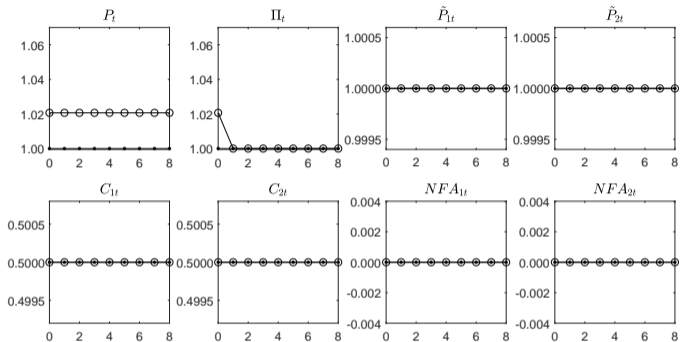
- A common fiscal authority with Eurobonds:

$$(1 + \rho Q_t) F_{t-1} / P_t = \tilde{S}_t^F + Q_t F_t / P_t, \quad \tilde{S}_t^F \equiv \sum_i \tilde{S}_{it}^F$$

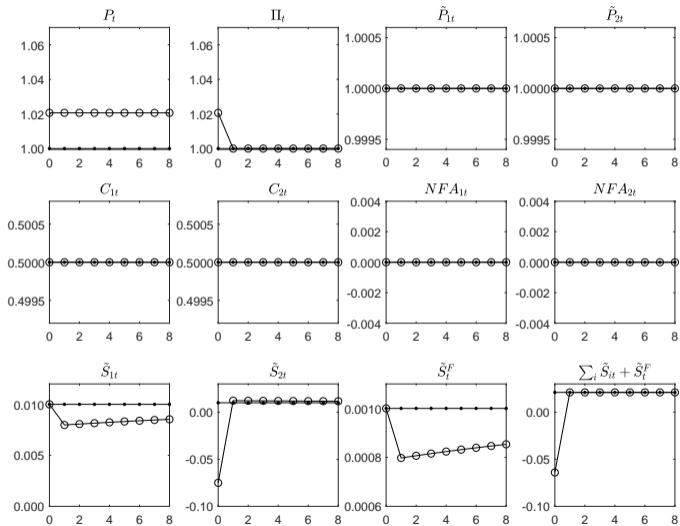
$$\tilde{S}_{it}^F = n_i \tilde{S}_t^F, \quad \tilde{S}_t^F = \phi_t^F - \phi_B \frac{\sum_i Q_{it-1} B_{it-1}}{P_{t-1}}$$

- $\sum_i \tilde{S}_{it} + \tilde{S}_t^F$ is independent of debt, because the common authority “leans against” the response of the national authorities to their own debt.
- The fluctuations in \tilde{S}_t^F need not be large (ϕ_B is typically small).
- We assume that in steady state \tilde{S}^F equals 5% of the sum of the national surpluses.

Asymmetric fiscal expansion with Eurobonds



Asymmetric fiscal expansion with Eurobonds



Model with Eurobonds: Summary

- The national fiscal policies are standard and passive, and a modestly-sized common fiscal authority leans against the national policies appropriately.
- This yields price level determinacy.
- Asymmetric deficits or surpluses do not produce cross-country wealth transfers or shift relative price levels.
- Fiscal policy can produce inflationary or deflationary impulses, as may be appropriate in response to non-policy disturbances.

Additional analysis in the paper

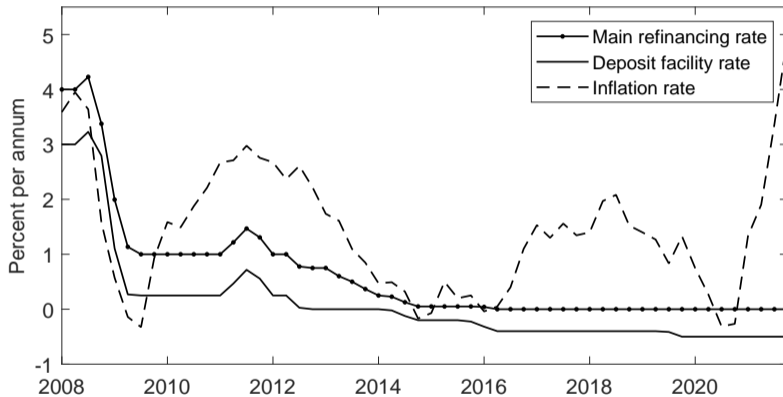
Extensions:

- The central bank follows a passive feedback rule for interest rate setting.
- The central bank holds private debt instead of government debt.
- The monetary base consists of reserves and currency that provides liquidity services.
- The national fiscal authorities may partially default on bonds. [▶ details](#)
- There are non-traded goods.

Conclusion

- We extended the fiscal theory of the price level to the case of a heterogenous monetary union.
- In a monetary union, there are different ways to implement active fiscal policy and the effects of fiscal policy can be very different depending on how active fiscal policy is implemented.
- A key question for policy becomes *which configuration* of active fiscal policy to choose.
- We proposed a configuration where national policies are standard and passive and a modestly-sized common fiscal authority leans against the national policies appropriately.

Euro area interest rates and inflation, 2008Q1-2021Q4 [▶ back](#)



Definition of perfect foresight equilibrium ▶ back

A perfect foresight equilibrium is a sequence of allocations $\{C_{it}\}$ and prices $\{P_t, \tilde{P}_{it}, \tilde{W}_{it}, Q_{it}\}$, $i = 1, 2$, $t \geq 0$, that solves the following system of equations:

$$\frac{\sum_j (1 + \rho_j Q_{j0}) \left(\sum_i B_{ij,-1}^H \right) + R_{-1} \sum_i H_{i,-1}}{P_0} = \sum_{k=0}^{\infty} \beta^k \left(\sum_i \tilde{S}_{ik} \right)$$

$$\frac{\sum_j (1 + \rho_j Q_{j0}) B_{ij,-1}^H + R_{-1} H_{i,-1}}{P_0} = \sum_{k=0}^{\infty} \beta^k (\tilde{P}_{ik} C_{ik} - \tilde{W}_{ik} Y_i + \tilde{S}_{ik}), \quad i = 1, 2$$

$$Y_j = \sum_i \gamma_{ij} \left(\frac{\tilde{W}_{jt}}{\tilde{P}_{it}} \right)^{-\theta} C_{it}, \quad j = 1, 2$$

$$1 = \beta R_t \frac{P_t}{P_{t+1}}$$

$$\frac{Q_{it}}{P_t} = \beta \frac{1 + \rho_i Q_{it+1}}{P_{t+1}}, \quad i = 1, 2$$

$$\tilde{P}_{it} = \left(\gamma_{i1} \tilde{W}_{1t}^{1-\theta} + \gamma_{i2} \tilde{W}_{2t}^{1-\theta} \right)^{\frac{1}{1-\theta}}, \quad i = 1, 2$$

$$1 = \tilde{P}_{1t}^{n_1} \tilde{P}_{2t}^{n_2}$$

given policy rules for $\{R_t, \tilde{S}_{it}\}$, endowments Y_i , and initial conditions $B_{ij,-1}^H, R_{-1} H_{i,-1}$, $i, j = 1, 2$.

Balance of payments identity [▶ back](#)

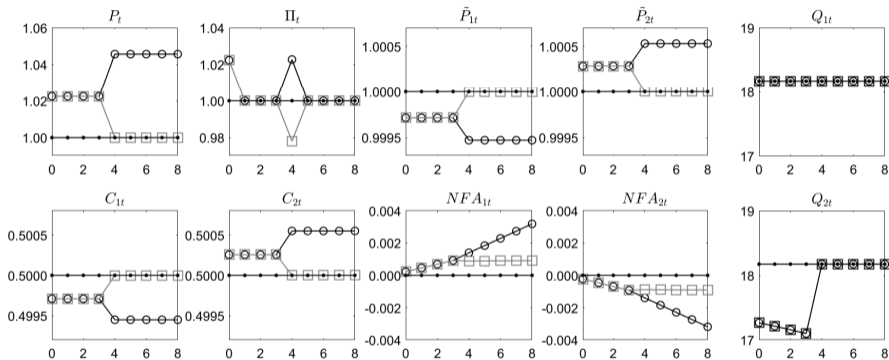
Solving forward the balance of payments identity of country 1, assuming for simplicity that $B_{ijt}^{CB} = 0$ for $j \neq i$ and $t \geq 0$ (NCB i holds only debt of fiscal authority i), we obtain:

$$\frac{(1 + \rho_2 Q_2) B_{12t-1}^H + RT_{12t-1} - (1 + \rho_1 Q_1) B_{21t-1}^H}{P_t}$$
$$= \sum_{k=0}^T \beta^k (\tilde{P}_{1t+k} C_{1t+k} - \tilde{W}_{1t+k} Y_1) + \beta^T \left(\frac{Q_2 B_{12t+T}^H + T_{12t+T} - Q_1 B_{21t+T}^H}{P_{t+T}} \right).$$

Extension with default on bonds in equilibrium

- The policy mix is the benchmark passive-money active-fiscal configuration, but we abandon perfect foresight.
- In period 0, agents learn that in period $T \geq 1$ country 2 will run a deficit. With probability d the country will default, with probability $1 - d$ the deficit will be “accepted.” In period T , all uncertainty is resolved.
- The news triggers union-wide inflation *in period zero*; relative prices and consumption levels change; a bond spread appears.
- In period T , there is further inflation if default is avoided, and there is deflation if default occurs.
- Default triggers a cross-country wealth transfer, but if default is avoided there is *also* a cross-country wealth transfer.

Asymmetric fiscal expansion with default risk



Lines with points: baseline, no shocks. Lines with circles: expansion in country 2 with no default. Lines with squares: same expansion with default.