Discussion of Eric Leeper's *"Fiscal backing for monetary policy: What if it ain't there?"*

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Overview

- Equilibrium price-level a joint monetary-fiscal phenomenon.
- Fiscal Backing necessary condition for successful IT Central Banks: if it ain't there, monetary policy loses control of inflation.
- Key role of Fiscal Backing in transmission of monetary policy actions.
- Fiscal Backing requires fiscal rules that internalize intrinsic monetary-fiscal interaction.
- This intrinsic interaction often overlooked in monetary policy models and in the design of monetary and fiscal institutions.

Discussion

- Set-up explicitly accounting for operational separation between CB and Treasury (Benigno and Nisticò, 2015)
- Implications for relevant definition of Fiscal Backing
- Implications for monetary-policy control of inflation
- Implications for transmission of monetary-policy actions
- Implications for central bank independence
- Conclusion

Set up

Simple endowment economy with CIA constraint

- Equilibrium in the money market:

$$\frac{M_t}{P_t} \geq Y_t; \tag{1}$$

- Euler Equation:

$$\frac{1}{1+i_t} = E_t \left\{ R_{t,t+1} \frac{P_t}{P_{t+1}} \right\}, \tag{2}$$

  where $R_{t,T} = \beta^{T-t} \frac{\xi_T U_c(Y_T)}{\xi_t U_c(Y_t)}$

- **Conventional monetary policy** specifies one between $\{i_t, M_t\}$ as a function of other variables: $\mathcal{I}(\cdot)$ or $\mathcal{M}(\cdot)$

Set up

- Use $R_{t,T}$ to price long-term securities (subject to exogenous default $\varkappa$)

$$Q_t = E_t \left\{ R_{t,t+1} \frac{(1-\varkappa_{t+1})(1+\delta Q_{t+1})}{\Pi_{t+1}} \right\} \tag{3}$$

with return

$$1 + r_{t+1} \equiv (1-\varkappa_{t+1})(1+\delta Q_{t+1})/Q_t. \tag{4}$$

- $\left\{\mathbf{Z}_t^*\right\} \equiv \{P_t^*,\, i_t^*,\, M_t^*,\, Q_t^*,\, r_t^*\}$: a collection of stochastic processes satisfying equations (1)–(4) consistently with the specification of *conventional monetary policy* and subject to $i_t \geq 0$, given exogenous processes $\{Y_t,\, \xi_t,\, \varkappa_t\}$

- what features does a monetary-fiscal regime need to support $\left\{\mathbf{Z}_t^*\right\}$ as a REE?

Set up

- Transversality condition for households:

$$\lim_{T \longrightarrow \infty} E_t \left[R_{t,T} \left(\frac{M_T}{P_T} + \frac{1}{1+i_T} \frac{B_T + X_T}{P_T} + \frac{Q_T D_T}{P_T} \right) \right] = 0 \tag{5}$$

where

- ✓ M_t : currency, carrying non-pecuniary return
- ✓ B_t : short-term treasury bills, carrying the risk-free rate i_t
- ✓ X_t : CB reserves, carrying the risk-free rate i_t
- ✓ D_t : long-term securities (private or public), bearing default risk

- Treasury's flow budget constraint

$$Q_t D_t^F + \frac{B_t^F}{1+i_t} = (1+r_t) Q_{t-1} D_{t-1}^F + B_{t-1}^F - T_t^F - T_t^C \tag{6}$$

where

- T_t^F : primary surplus
- T_t^C : remittances from CB

Set up

- CB's balance sheet:

$$N_t + M_t + \frac{X_t}{1+i_t} = Q_t D_t^C + \frac{B_t^C}{1+i_t} \tag{7}$$

- CB's profits:

$$\Psi_t = i_{t-1}(N_{t-1} + M_{t-1}) + (r_t - i_{t-1})Q_{t-1}D_{t-1}^C \tag{8}$$

- Law of motion of net worth:

$$N_t = N_{t-1} + \Psi_t - T_t^C \tag{9}$$

- Asset markets equilibrium:

$$B_t^F = B_t + B_t^C \tag{10}$$

$$D_t^F = D_t + D_t^C \tag{11}$$

Set up

Equations (6)–(11) can determine

$$\left\{\mathbf{K}_t\right\} \equiv \left\{B_t, B_t^F, B_t^C, D_t, D_t^F, D_t^C, T_t^F, T_t^C, X_t, N_t, \Psi_t\right\}$$

given $\left\{\mathbf{Z}_t^*\right\}$ and exogenous processes $\left\{Y_t,\, \xi_t,\, \varkappa_t\right\}$, if we specify *appropriately*:

1. **Transfer Policies (TP)**

   specify $\left\{T_t^F,\, T_t^C\right\}$ as functions of other variables: $\mathcal{T}(\cdot)$

2. **Balance-sheet Policies (BSP)**

   specify $\left\{B_t^C,\, D_t^C,\, D_t^F\right\}$ as functions of other variables: $\mathcal{B}(\cdot)$

Implications of TVC: the case of consolidated BC

- $\left\{\mathbf{Z}_t^*\right\}$ is a REE if it satisfies

$$\frac{X_{t-1}}{P_t^*} + \frac{M_{t-1}^*}{P_t^*} + \frac{B_{t-1}}{P_t^*} + (1+r_t^*)\frac{Q_{t-1}^* D_{t-1}}{P_t^*} = E_t \sum_{T=t}^{\infty} R_{t,T} \left[\frac{i_T^*}{1+i_T^*} \frac{M_T^*}{P_T^*} + \frac{T_T^F}{P_T^*} \right], \quad (12)$$

$\Rightarrow$ Critical for Fiscal Backing is the specification of the **fiscal rule** determining $\left\{T_t^F\right\}$.

- A **passive fiscal policy** ensures solvency of the government, for any $\left\{\mathbf{Z}_t^*\right\}$ and any BSP. In this class:

$$\frac{T_t^F}{P_t} = \bar{T}^F + \phi \left[\frac{(1+r_t)Q_{t-1}D_{t-1} + B_{t-1}}{P_t} \right] - \gamma \left[\frac{M_t - M_{t-1}}{P_t} + \frac{\frac{X_t}{1+i_t} - X_{t-1}}{P_t} \right] \quad (13)$$

for $\phi \in (0,2)$ and $\gamma = 1$.

Implications of TVC: the case of consolidated BC

- Note: fiscal rule (13) implies

$$\lim_{T\longrightarrow\infty} E_t\left[R_{t,T}\left(\frac{Q_T^* D_T}{P_T^*}+\frac{1}{1+i_T^*}\frac{B_T}{P_T^*}\right)\right]=0$$

and the TVC that, at equilibrium,

$$\lim_{T\longrightarrow\infty} E_t\left[R_{t,T}\left(\frac{M_T^*}{P_T^*}+\frac{1}{1+i_T^*}\frac{X_T}{P_T^*}\right)\right]=0$$

- this, however, does not rule out ponzi schemes bwn Treasury and Central Bank:

$$\lim_{T\longrightarrow\infty} E_t\left[R_{t,T}\left(\frac{Q_T^* D_T^{F}}{P_T^*}+\frac{1}{1+i_T^*}\frac{B_T^{F}}{P_T^*}\right)\right]$$
$$=\lim_{T\longrightarrow\infty} E_t\left[R_{t,T}\left(\frac{Q_T^* D_T^{C}}{P_T^*}+\frac{1}{1+i_T^*}\frac{B_T^{C}}{P_T^*}\right)\right]=\lim_{T\longrightarrow\infty} E_t\left[R_{t,T}\left(\frac{N_T}{P_T^*}\right)\right]\neq 0$$

$\Rightarrow$ Public debt and CB's net worth can grow arbitrarily large/negative

On the assumption of nominally risk-free Treasury's debt

- Key assumption: BOTH CB's and Treasury's liabilities are nominally risk free
- Consolidated budget constraint supports this assumption *"because the government can print the money the debt promises"* (Sims, 2016)
- Money and debt are perfect substitutes as a liability of the government
- However, cases of default on debt are historically non-negligible as opposed to much rarer currency reforms

Separating Treasury and Central Bank

- $\left\{\mathbf{Z}_t^*\right\}$ is a REE if it satisfies

  1. "solvency" condition of central bank

$$\frac{X_{t-1}}{P_t^*} + \frac{M_{t-1}^*}{P_t^*} - \frac{B_{t-1}^{C}}{P_t^*} - (1+r_t^*)\frac{Q_{t-1}^* D_{t-1}^{C}}{P_t^*} = E_t \sum_{T=t}^{\infty} R_{t,T}^* \left[\frac{i_T^*}{1+i_T^*}\frac{M_T^*}{P_T^*} - \frac{T_T^C}{P_T^*}\right] \quad (14)$$

  2. solvency condition of the treasury

$$\frac{B_{t-1}^{F}}{P_t^*} + (1+r_t^*)\frac{Q_{t-1}^* D_{t-1}^{F}}{P_t^*} = E_t \sum_{T=t}^{\infty} R_{t,T}^* \left[\frac{T_t^F}{P_T^*} + \frac{T_T^C}{P_T^*}\right] \quad (15)$$

$\Rightarrow$ Critical for Fiscal Backing is the specification of BOTH **transfer policies** $\left\{T_t^F, T_t^C\right\}$

- Perhaps immaterial in normal times, but not under New-Style Central Banking

The two dimensions of Fiscal Backing

1. "Passive" **remittance policy**:

$$\frac{T_t^C}{P_t} = \bar{T}^C + \gamma_c \frac{\Psi_t^C}{P_t} + \phi_c \frac{N_{t-1}^C}{P_t} \tag{16}$$

for $\gamma_c \in (0,2)$ and $\phi_c \in (0,2)$

$\Rightarrow$ ensures CB's "solvency" for any $\left\{\mathbf{Z}_t^*\right\}$ and any BSP:

$$\lim_{T \longrightarrow \infty} E_t \left[R_{t,T} \left(\frac{N_T}{P_T^*} \right) \right] = 0$$

$\Rightarrow$ Note: (16) potentially requires Treasury's support (when $\Psi_t^C < 0$)

2. "Passive" **fiscal policy**:

$$\frac{T_t^F}{P_t} = \bar{T}^F - \gamma_f \frac{T_t^C}{P_t} + \phi_f \left[\frac{(1+r_t) Q_{t-1} D_{t-1}^F + B_{t-1}^F}{P_t} \right] \tag{17}$$

for $\gamma_f = 1$ and $\phi_f \in (0,2)$.

$\Rightarrow$ ensures Treasury's solvency for any $\left\{\mathbf{Z}_t^*\right\}$, any remittance policy T_t^C, and any BSP:

$$\lim_{T \longrightarrow \infty} E_t \left[R_{t,T} \left(\frac{Q_T^* D_T^F}{P_T^*} + \frac{1}{1+i_T^*} \frac{B_T^F}{P_T^*} \right) \right] = 0$$

On the assumption of nominally risk-free Treasury's debt

- BC separation emphasizes key difference bwn Treasury's and CB's liabilities

$\Rightarrow$ Unique role of CB's liabilities as "unit of account", truly nominally risk free

- To support the assumption of nominally risk-free Treasury's debt *"because the government can print the money the debt promises"*, need to specify Balance-Sheet policy of Central Bank appropriately

$\Rightarrow$ In general, Treasury's debt defaultable, (15) true IBC (Benigno, 2017, Buiter, 2017)

- Only equilibrium restriction remains (14): FTPL-type of logic still at work through CB's "solvency" condition and key is specification of **remittance policy** (Benigno, 2017)

Implications of active remittance policies ($T_t^C \geq 0$)

- Consider a passive fiscal rule and a CB with a portfolio of long-term risky assets
- Negative profits translate into declining net worth:

$$N_t = N_{t-1} + \Psi_t^C - T_t^C < N_{t-1}.$$

- Rewrite "solvency" condition of CB as

$$\underbrace{\frac{N_t}{P_t^*} + E_t \sum_{T=t}^{\infty} R_{t,T}^* \left(\frac{i_T^*}{1+i_T^*} \frac{M_T^*}{P_T^*} \right)}_{\text{real net worth + expected PV of future seigniorage revenue (value of CB)}} = \underbrace{E_t \sum_{T=t+1}^{\infty} R_{t,T}^* \left(\frac{T_T^C}{P_T^*} \right)}_{\text{expected PV of real transfers to and from the Treasury (dividends)}}.$$

$\Rightarrow$ With passive remittance policies: RHS always adjusts appropriately

$\Rightarrow$ With $T_t^C \geq 0$: lower bound on net worth (RHS ≥ 0)

- lower-bound on net worth may be violated for large enough losses

$\Rightarrow$ prices adjust to ensure "solvency" of CB through higher seigniorage revenues

Implications for monetary-policy control of inflation

Consider a case where CB's liabilities have special liquidity properties:

- QE can fill the shortage of safe assets that in a crisis drives nominal spending down (Benigno and Nisticò, 2017)
- Monetary policy control of inflation here requires BOTH:
  - ✓ **Passive fiscal policy**
    to transfer on PS the benefits of lower interest payments on public debt (fiscal expansion)
  - ✓ **Passive remmittance policy**
    to ensure the expected financial losses for CB are covered by Treasury (fiscal contraction)

$\Rightarrow$ Even under passive fiscal policy, monetary policy can lose control of inflation if remittance policy is active, especially in case of unconventional CB's balance sheets

$\Rightarrow$ Fiscal Backing required along BOTH relevant dimensions

Implications for transmission of monetary policy actions

Consider an increase in monetary-policy rate:

- higher interest rates imply higher interest payments on Treasury's liabilities
- if fiscal policy is **passive**, this implies higher expected primary surpluses

$\Rightarrow$ no (positive) wealth effects on nominal spending

$\Rightarrow$ intertemporal-substitution effects dominates and nominal spending contracts

HOWEVER

- higher policy rates also imply financial losses on CB's long-term portfolio
- if remittance policy is **active**, no real transfers from Treasury

$\Rightarrow$ positive wealth effects on nominal spending

$\Rightarrow$ intertemporal-substitution effects may be dominated and nominal spending expands

$\Rightarrow$ Even under passive fiscal policy, interest-rate increases can be inflationary if remittance policy is active, in case of unconventional CB's balance sheets

Implications for Central Bank's independence

Relevant dimensions of Central Bank's independence:

1. target independence (monetary-policy control of inflation)
2. financial independence
3. balance-sheet independence

"Impossible Trinity" in central banking (Benigno and Nisticò, 2015):

- Arbitrary BSP may require Treasury's support to grant target independence

$\Rightarrow$ no **financial independence**.

- Target and financial independence granted only by riskless portfolios

$\Rightarrow$ no **balance-sheet independence**.

- Arbitrary BSP without Treasury's support may imply no control of inflation

$\Rightarrow$ no **target independence**.

Targeting policies vs instrument rules

- Equations (14)–(15) clarify that key is EPDV of primary surpluses and remittances

$\Rightarrow$ if expectations are rational and planning horizons infinite, then it is enough to credibly commit to targets consistent with

$$\lim_{T \longrightarrow \infty} E_t \left[R_{t,T} \left(\frac{Q_T^* D_T^F}{P_T^*} + \frac{1}{1+i_T^*} \frac{B_T^F}{P_T^*} \right) \right] = 0 = \lim_{T \longrightarrow \infty} E_t \left[R_{t,T} \left(\frac{N_T}{P_T^*} \right) \right]$$

$\Rightarrow$ **temporary** deviations from instrument rules supporting those targets should be consistent with anchored fiscal and inflation expectations

UNLESS, perhaps

- Expect. are rational but no common knowledge (Angeletos and Lian, 2018)
- Planning horizons are finite (Woodford, 2018)
- General Equilibrium feedback is weak (Angeletos and Sastry, 2019)

Conclusion

- Fiscal Backing necessary condition for successful IT Central Banks: if it ain't there, monetary policy loses control of inflation.
- Two relevant dimensions of Fiscal Backing when Treasury and CB operationally separate (EuroArea case).
- Intrinsic monetary-fiscal interaction to be accounted for in general design of monetary-fiscal institutions (not simply fiscal rules).
- Institutional reforms in EuroArea (fiscal union/federal budget/EuroArea-debt) in this direction would be welcome and would likely expand the policy options, especially in a prolonged liquidity trap, and improve the necessary monetary-fiscal policy coordination.