

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

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- 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.

- 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

Simple endowment economy with CIA constraint

- Equilibrium in the money market:

$$\frac{M_t}{P_t} \geq Y_t; \quad (1)$$

- Euler Equation:

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

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 $\mathcal{M}(\cdot)$

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

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

with return

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

- $\{\mathbf{Z}_t^*\} \equiv \{P_t^*, i_t^*, M_t^*, Q_t^*, r_t^*\}$: 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 $\{\mathbf{Z}_t^*\}$ as a REE?

- Transversality condition for households:

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

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

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

where

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

Set up

- CB's balance sheet:

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

- CB's profits:

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

- Law of motion of net worth:

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

- Asset markets equilibrium:

$$B_t^F = B_t + B_t^C \quad (10)$$

$$D_t^F = D_t + D_t^C \quad (11)$$

Equations (6)–(11) can determine

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

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

1 Transfer Policies (TP)

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

2 Balance-sheet Policies (BSP)

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

Implications of TVC: the case of consolidated BC

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

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

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

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

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

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

Implications of TVC: the case of consolidated BC

- Note: fiscal rule (13) implies

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

and the TVC that, at equilibrium,

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

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

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

⇒ 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

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

- 1 “solvency” condition of central bank

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

- 2 solvency condition of the treasury

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

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

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

The two dimensions of Fiscal Backing

1 “Passive” remittance policy:

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

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

⇒ ensures CB's “solvency” for any $\{\mathbf{Z}_t^*\}$ and any BSP:

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

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

2 “Passive” fiscal policy:

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

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

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

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

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

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

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

⇒ With passive remittance policies: **RHS always adjusts appropriately**

⇒ 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

⇒ 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 remittance policy**
to ensure the expected financial losses for CB are covered by Treasury (fiscal contraction)
- ⇒ 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
- ⇒ 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
- ⇒ no (positive) wealth effects on nominal spending
- ⇒ 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
- ⇒ positive wealth effects on nominal spending
- ⇒ intertemporal-substitution effects may be dominated and nominal spending expands
- ⇒ 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
⇒ no **financial independence**.
- Target and financial independence granted only by riskless portfolios
⇒ no **balance-sheet independence**.
- Arbitrary BSP without Treasury's support may imply no control of inflation
⇒ no **target independence**.

Targeting policies vs instrument rules

- Equations (14)–(15) clarify that key is EPDV of primary surpluses and remittances
- ⇒ if expectations are rational and planning horizons infinite, then it is enough to credibly commit to targets consistent with

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

- ⇒ **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)

- 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.