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.
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:
  \[
  \frac{M_t}{P_t} \geq Y_t;
  \]
  (1)

- Euler Equation:
  \[
  \frac{1}{1 + i_t} = E_t \left\{ R_{t,t+1} \frac{P_t}{P_{t+1}} \right\},
  \]
  (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: \( I(\cdot) \) or \( M(\cdot) \)
Set up

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

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

with return

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

- $\{Z_t^*\} \equiv \{P_t^*, i_t^*, M_t^*, Q_t^*, r_t^*\}$: 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 $\{Y_t, \xi_t, \kappa_t\}$

- what features does a monetary-fiscal regime need to support $\{Z_t^*\}$ as a REE?
Set up

Transversality condition for households:

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

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

\[
Q_tD_t^F + \frac{B_t^F}{1 + i_t} = (1 + r_t)Q_{t-1}D_{t-1}^F + B_{t-1}^F - T_t^F - T_t^C \tag{6}
\]

where

- \( T_t^F \): primary surplus
- \( T_t^C \): remittances from CB
Set up

- CB’s balance sheet:
  \[ N_t + M_t + \frac{X_t}{1 + i_t} = Q_t D_t^C + \frac{B_t^C}{1 + i_t} \]  
  \[ (7) \]

- CB’s profits:
  \[ \Psi_t = i_{t-1}(N_{t-1} + M_{t-1}) + (r_t - i_{t-1})Q_{t-1}D_{t-1}^C \]  
  \[ (8) \]

- Law of motion of net worth:
  \[ N_t = N_{t-1} + \Psi_t - T_t^C \]  
  \[ (9) \]

- Asset markets equilibrium:
  \[ B_t^F = B_t + B_t^C \]  
  \[ (10) \]
  \[ D_t^F = D_t + D_t^C \]  
  \[ (11) \]
Equations (6)–(11) can determine

\[
\{K_t\} \equiv \{B_t, B_t^F, B_t^C, D_t, D_t^F, D_t^C, T_t^F, T_t^C, X_t, N_t, \Psi_t\}
\]

given \{Z_t^*\} and exogenous processes \{Y_t, \xi_t, \kappa_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: \(\mathcal{B}(\cdot)\)
\{Z_t^*\} is a REE if it satisfies

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

(12)

⇒ 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 \{Z_t^*\} and any BSP. In this class:

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

(13)

for \(\phi \in (0, 2)\) and \(\gamma = 1\).
Implications of TVC: the case of consolidated BC

- Note: fiscal rule (13) implies

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

and the TVC that, at equilibrium,

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

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

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

⇒ Public debt and CB’s net worth can grow arbitrarily large/negative
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

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

1. "solvency" condition of central bank

$$\frac{X_{t-1}}{P^*_t} + \frac{M^*_{t-1}}{P^*_t} - \frac{B^{C}_{t-1}}{P^*_t} - (1 + r^*_t) \frac{Q^*_{t-1}D^C_{t-1}}{P^*_t}$$

$$= E_t \sum_{T=t}^{\infty} R^*_{t,T} \left[ \frac{i^*_T}{1 + i^*_T} \frac{M^*_T}{P^*_T} - \frac{T^C_T}{P^*_T} \right]$$  (14)

2. solvency condition of the treasury

$$\frac{B^F_{t-1}}{P^*_t} + (1 + r^*_t) \frac{Q^*_{t-1}D^F_{t-1}}{P^*_t} = E_t \sum_{T=t}^{\infty} R^*_{t,T} \left[ \frac{T^F_T}{P^*_T} + \frac{T^C_T}{P^*_T} \right]$$  (15)

⇒ Critical for Fiscal Backing is the specification of BOTH transfer policies $\{T^F_t, T^C_t\}$

- Perhaps immaterial in normal times, but not under New-Style Central Banking
The two dimensions of Fiscal Backing

1 “Passive” remittance policy:

\[ \frac{T^C_t}{P_t} = \bar{T}^C + \gamma_c \frac{\Psi^C_t}{P_t} + \phi_c \frac{N^C_{t-1}}{P_t} \]  

(16) 

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

⇒ ensures CB’s “solvency” for any \( \{Z^*_t\} \) and any BSP:

\[ \lim_{T \to \infty} Et \left[ R_{t,T} \left( \frac{N_T}{P^*_T} \right) \right] = 0 \]

⇒ Note: (16) potentially requires Treasury’s support (when \( \Psi^C_t < 0 \))

2 “Passive” fiscal policy:

\[ \frac{T^F_t}{P_t} = \bar{T}^F - \gamma_f \frac{T^C_t}{P_t} + \phi_f \left[ \frac{(1 + r_t)Q_{t-1}D^F_{t-1} + B^F_{t-1}}{P_t} \right] \]  

(17) 

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

⇒ ensures Treasury’s solvency for any \( \{Z^*_t\} \), any remittance policy \( T^C_t \), and any BSP:

\[ \lim_{T \to \infty} Et \left[ R_{t,T} \left( \frac{Q^*_T D^F_T}{P^*_T} + \frac{1}{1 + \i^*_T} \frac{B^F_T}{P^*_T} \right) \right] = 0 \]
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 \( (T^C_t \geq 0) \)

- Consider a passive fiscal rule and a CB with a portfolio of long-term risky assets
- Negative profits translate into declining net worth:
  \[
  N_t = N_{t-1} + \Psi^C_t - T^C_t < N_{t-1}.
  \]
- Rewrite “solvency” condition of CB as
  \[
  \frac{N_t}{P^*_t} + E_t \sum_{T=t}^{\infty} R^*_t,T \left( \frac{i^*_T}{1+i^*_T} \frac{M^*_T}{P^*_T} \right) = E_t \sum_{T=t+1}^{\infty} R^*_t,T \left( \frac{T^C_T}{P^*_T} \right). 
  \]
  - real net worth + expected PV of future seigniorage revenue (value of CB)
  - expected PV of real transfers to and from the Treasury (dividends)

⇒ With passive remittance policies: RHS always adjusts appropriately
⇒ With \( T^C_t \geq 0 \): lower bound on net worth (RHS \( \geq 0 \))
- 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

$$\lim_{T \to \infty} E_t \left[ R_{t,T} \left( \frac{Q^*_T D^F_T}{P^*_T} + \frac{1}{1 + i^*_T} \frac{B^F_T}{P^*_T} \right) \right] = 0 = \lim_{T \to \infty} E_t \left[ R_{t,T} \left( \frac{N_T}{P^*_T} \right) \right]$$

⇒ 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.