Discussion of

Rethinking Optimal Currency Areas

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Rethinking Optimal Currency Areas

• Intriguing message: tight correlation between countries may make currency union less desirable

• Currency union is costly because countries lose an instrument and cannot respond to idiosyncratic shocks

• But there are some shocks to which you do not want to respond
  — but cannot commit

• Loss of flexibility vs gain in commitment

• Currency union provides commitment ability
  — even for symmetric countries

• But how about free-riding (fiscal externality)?
  — Chari and Kehoe (2008), Amador et al. (2013)
  — loss of coordination (commitment)
Model

1. Small open economy with stochastic endowment

2. No sticky prices, no markup shocks, but...

3. One asset: nominal one-period bond
   \[ \rightarrow \text{ time inconsistency (and a state variable)} \]

4. Flow utility with exogenous cost of inflation:
   \[ u(c_t) - \psi(\pi_t), \]
   where, for example, \( \psi(\pi) = \frac{\psi}{2} \pi^2 \) and \( \psi'(\pi) = \psi\pi \)

5. Fisher equation:
   \[ 1 + i_{t+1} = (1 + r^*)(1 + \mathbb{E}_t \pi_{t+1}) \]
Ramsey Solution

\[ V^R(b_0) = \max \mathbb{E}_0 \tilde{V}(\{\pi_t\}; b_0) \]

where \[ \tilde{V}(\{\pi_t\}; b_0) \equiv \max_{\{c_t, b_{t+1}\}} \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t (u(c_t) - \psi(\pi_t)) \]

s.t. \[ c_t + \frac{1 + \mathbb{E}_{t-1}\pi_t}{1 + \pi_t} (1 + r^*) b_t \leq b_{t+1} + y_t \quad \text{and} \quad \pi_0 = \mathbb{E}_{-1}\pi_0 = 0 \]

• Ramsey solution satisfies:

\[ u'(c_t) = \beta (1 + r^*) \mathbb{E}_t \left\{ \frac{1 + \mathbb{E}_t\pi_{t+1}}{1 + \pi_{t+1}} u'(c_{t+1}) \right\} \]

\[ \psi'(\pi_t) = (1 + r^*) b_t \frac{1 + \mathbb{E}_{t-1}\pi_t}{1 + \pi_t} \left[ \frac{u'(c_t)}{1 + \pi_t} - \frac{\mathbb{E}_{t-1}u'(c_t)}{1 + \mathbb{E}_{t-1}\pi_t} \right] \]

• \[ \mathbb{E}_{t-1}\pi_t \approx 0 \text{ and } u'(c_t)/(1 + \pi_t) \approx \text{const} \text{ when } \psi'(\cdot) \text{ small} \]
Ramsey Solution
Currency Union

- Union central bank:

$$\max_{\{\pi_t\}} \mathbb{E}_0 \int_0^1 \tilde{V}^i(\{\pi_t\}; b_i^0) \, di$$

- Inflation satisfies:

$$\psi'(\pi_t) = (1 + r^*) \frac{1 + \mathbb{E}_{t-1}\pi_t}{1 + \pi_t} \int_0^1 b_i^t \left[ \frac{u'(c_t^i)}{1 + \pi_t} - \frac{\mathbb{E}_{t-1}u'(c_t^i)}{1 + \mathbb{E}_{t-1}\pi_t} \right] \, di$$

- $$\mathbb{E}_{t-1}\pi_t \approx 0$$, but no longer $$u'(c_t^i)/(1 + \pi_t) \approx \text{const}$$ for $$i$$

- Proposition: Currency union is strictly worse for every $$i$$, unless $$\left( b_i^0, \{y_t^i\} \right)$$ are identical for all $$i$$. 
Time Consistent Solution (MPE)

- Recursive formulation: \( \max_{\pi} \tilde{\nu}(\pi; b, y) \), where

\[
\tilde{\nu}(\pi; b, y) \equiv \max_{c, b'} \left\{ u(c) - \psi(\pi) + \beta \mathbb{E} v(b', y') \right\}
\]

\[
s.t. \quad c + \frac{1 + \tilde{\pi}(b)}{1 + \pi} (1 + r^*) b \leq b' + y
\]

- Equilibrium requirement: \( \tilde{\pi}(b) = \mathbb{E} \pi(b, y) \)

- Optimality conditions:

\[
u'(c_t) = \beta(1 + r^*) \mathbb{E}_t \left\{ \frac{1 + \mathbb{E}_t \pi_{t+1}}{1 + \pi_{t+1}} u'(c_{t+1}) \left[ 1 + \frac{\partial \log(1 + \mathbb{E}_t \pi_{t+1})}{\partial \log b_{t+1}} \right] \right\}
\]

\[
\psi'(\pi_t) = (1 + r^*) b_t \frac{1 + \mathbb{E}_{t-1} \pi_t}{1 + \pi_t} \left[ \frac{u'(c_t)}{1 + \pi_t} - \frac{\mathbb{E}_{t-1} u'(c_t)}{1 + \mathbb{E}_{t-1} \pi_t} \right]
\]
Time Consistent Solution (MPE)

- Recursive formulation: \( \max_{\pi} \tilde{v}(\pi; b, y) \), where

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\]

s.t. \( c + \frac{1 + \tilde{\pi}(b)}{1 + \pi} (1 + r^*)b \leq b' + y \)

- Equilibrium requirement: \( \tilde{\pi}(b) = \mathbb{E}\pi(b, y) \)

- Optimality conditions:

\[
\begin{align*}
    u'(c_t) &= \beta (1 + r^*) \mathbb{E}_t \left\{ \frac{1 + \mathbb{E}_t \pi_{t+1}}{1 + \pi_{t+1}} u'(c_{t+1}) \left[ 1 + \frac{\partial \log(1 + \mathbb{E}_t \pi_{t+1})}{\partial \log b_{t+1}} \right] \right\} \\
    \psi'(\pi_t) &= (1 + r^*) b_t \frac{1 + \mathbb{E}_{t-1} \pi_t}{1 + \pi_t} \frac{u'(c_t)}{1 + \pi_t} \quad \Rightarrow \quad \pi_t > \pi_t^R
\end{align*}
\]
Time Consistent Solution (MPE)

Currency Union

• Union central bank: \( \max_\pi \int_0^1 \tilde{v}^i(\pi; b^i, y^i) \, di \)

• Inflation choice:

\[
\psi'(\pi_t) = \frac{1 + r^*}{1 + \pi_t} \left( \frac{1 + E_{t-1}\pi_t}{1 + \pi_t} \right) \int_0^1 b^i_t u'(c^i_t) \, di
\]

• Proposition: For symmetric countries upon entry into the currency union (i.e., same \( b^i_t \) and distribution of \( y^i_t \)),

\[
\pi^U_t \leq \pi^i_t \quad \text{and} \quad \text{var}(\pi^U_t) \leq \text{var}(\pi^i_t),
\]

with strict inequality if shocks not perfectly correlated.
Time Consistent Solution (MPE)

Currency Union

- Union central bank: \( \max_\pi \int_0^1 \tilde{v}^i(\pi; b^i, y^i) \, di \)

- Inflation choice:

\[
\psi'(\pi_t) = \frac{1 + r^*}{1 + \pi_t} \frac{1 + \mathbb{E}_{t-1}\pi_t}{1 + \pi_t} \int_0^1 b^i_t \cdot u'(c^i_t) \, di
\]

- Proposition: For symmetric countries upon entry into the currency union (i.e., same \( b^i_t \) and distribution of \( y^i_t \)),

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\]

with strict inequality if shocks not perfectly correlated.

- However, the choice of \( b^i_t \) is endogenous and affected by participation in currency union (fiscal externality):

\[
\frac{\partial \pi_t}{\partial b^i_t} = 0 \quad \Rightarrow \quad \text{higher } \{b^i_t\} \text{ and } \pi^U_t