Advanced economies have chosen to maintain strict separation between monetary & fiscal policy
The Great Wall of Policy

Monetary Policy

Fiscal Policy
Policy Institution Arrangements

- Separation stems from fears government will pressure central bank to monetize

- Also relies on two highly questionable assumptions
  1. fiscal policy has little effect on inflation determination
  2. impacts of monetary policy on fiscal choices are small

  1. is simply false
     - FP at least an equal partner with MP in determining inflation—a key insight of policy interactions literature

  2. ignores effects of price level and bond prices on value of nominal debt
     - both theoretically & empirically significant
Hall & Sargent: Importance of Inflation

- **U.S. high-debt era**
  - 1945 to 1974: debt-GDP fell from 97.2% to 16.9%
    - of that 80.3%, 15.8% due to negative real returns via inflation
    - primarily hit long-term bondholders

- **U.S. low-debt era**
  - 1974 to 1981: debt-GDP rose from 16.9% to 19.9%
    - long-term bondholders got negative returns
    - but average maturity much shorter & magnitudes small

- **U.S. moderate-debt era**
  - 1981 to 1993: debt-GDP rose from 19.9% to 48.2%
    - real returns high due to surprisingly low inflation
    - drove debt growth
Surprise gains & losses to holders of U.S. government bonds, as share of GDP. Source: Sims (2013)
Consensus Assignment

- Research yields consensus on assigning policy authorities separate tasks:
  - monetary policy: control inflation & demand
  - fiscal policy: stabilize debt
- Several optimal policy studies find: to maximize welfare adopt
  - active monetary policy (Taylor principle)
  - passive fiscal policy (adjust taxes to debt)
- Independent central bank with inflation target
- Government must adjust taxes & spending to ensure solvency
- No role for revaluations of debt via inflation
  - cannot reconcile facts about fiscal financing
Infeasible Assignment?

- Last 5 years have turned assignment on its head
  - MP hit zero lower bound
  - MP undertaken unconventional asset purchases that look like FP
  - Central bank balance sheets grown riskier, endangering independence
  - FP aggressively trying to stimulate economies in 2008 & 2009
  - It is politically difficult for FP to change direction

- Long-run difficulties pursuing passive fiscal policy will grow in coming decades
  - Aging populations & “unfunded liabilities”
  - Old people vote: will they cut their benefits?

- No reason to expect a return to the consensus assignment
Questioning the Consensus

- Cochrane, Sims, Woodford argue that with nominal government debt...
  - ...adjustments in current & future price levels can revalue debt...
  - ...absorb fiscal disturbances

- And these adjustments may be part of an *optimal policy*
  - converts nominal debt into state-contingent real debt
  - permits less reliance on distorting taxes
  - long debt allows inflation to be smoothed over term of debt
Our Findings

- In new Keynesian Calvo-Yun model with distorting labor taxes & geometric maturity structure we compute optimal monetary-fiscal policy mix.

1. always a role for current & future inflation surprises to revalue debt

2. role of inflation in optimal fiscal financing increases with average maturity of debt

3. inflation is relatively more important as fiscal cushion in high-debt than in low-debt economies

4. in calibrations to U.S. data, welfare is higher under fully optimal monetary-fiscal policies than under conventional optimal monetary policy with passively adjusting lump-sum taxes
The Policy Problem

- Departures from optimality
  1. Nominal rigidities create price dispersion
  2. Taxes distort
  3. Inefficient steady state—a time-varying gap between flexible-price level of output and efficient level of output
  4. Exogenous disturbances to technology & fiscal expenditures

- Optimal policy aims to offset these
- Tries to achieve the efficient allocation
Fully Optimal Policies: Problem

- Linear-quadratic framework of Benigno-Woodford
  - distorted steady state
  - commitment solution, timeless perspective
- Quadratic approximation to welfare function

\[
\frac{1}{2} E_0 \sum_{t=0}^{\infty} \beta^t \left( q_\pi \pi_t^2 + q_x x_t^2 \right)
\]

\[x_t \equiv y_t - y^e_t, \ q_\pi, q_x \text{ functions of deep parameters}\]

- Policy chooses \(\{i_t, \tau_t\}\) to maximize welfare
  - taking as given productivity, \(\{A_t\}\), government purchases, \(\{G_t\}\), government transfers, \(\{Z_t\}\)
  - these produce three composite shocks, \(\{u_t, v_t, f_t\}\)
  - subject to 3 constraints
  - \(\rho\) indexes average maturity of government debt
Fully Optimal Policies: Constraints

1. Phillips curve

\[ \pi_t = \beta E_t \pi_{t+1} + \kappa x_t + \kappa \psi (\tau_t - \tau_t^*) , \quad \tau_t^* \equiv -(1/\kappa \psi) u_t \]

2. Euler equation

\[ x_t = E_t x_{t+1} + s_c \sigma^{-1} E_t \pi_{t+1} - s_c \sigma^{-1} (i_t - i_t^*) , \quad i_t^* \equiv \sigma s_c^{-1} v_t \]

- If these were the only constraints, can achieve bliss: set \( \tau_t \equiv \tau_t^* , i_t \equiv i_t^* \Rightarrow x_t = \pi_t \equiv 0 \)
  - two instruments & two targets
- To achieve bliss requires access to
  - non-distorting taxes to ensure government solvency
  - distorting taxes to offset Phillips curve shock
  - can achieve solvency without additional restrictions on \( x_t \) & \( \pi_t \)
A Dose of Realism

- We assume that only distorting taxes are available to ensure solvency.
- This makes the government solvency condition binding.
- Creates a tradeoff between output and inflation stabilization.
- Maturity structure of debt affects the available tradeoffs.
Fully Optimal Policies: Constraints

1. Phillips curve

\[ \pi_t = \beta \mathbb{E}_t \pi_{t+1} + \kappa x_t + \kappa \psi (\tau_t - \tau^*_t), \quad \tau^*_t \equiv -(1/\kappa \psi) u_t \]

2. Euler equation

\[ x_t = E_t x_{t+1} + s_c \sigma^{-1} E_t \pi_{t+1} - s_c \sigma^{-1} (i_t - i^*_t), \quad i^*_t \equiv \sigma s_c^{-1} \nu_t \]

3. Government solvency (embeds term structure)

\[ b^M_{t-1} + F'_t = \pi_t + \frac{\sigma}{s_c} x_t + (1-\beta) \mathbb{E}_t \sum_{k=0}^{\infty} \beta^k [b_T (\tau_{t+k} - \tau^*_{t+k}) + b_x x_{t+k}] + E_t \sum_{k=0}^{\infty} (\beta \rho)^{k+1} (i_{t+k} - i^*_{t+k}) \]

where \( F'_t \) is exogenous fiscal stress

\[ F'_t = E_t \sum_{k=0}^{\infty} \beta^k f_{t+k} - (1-\beta) \frac{\bar{T}}{s_d} E_t \sum_{k=0}^{\infty} \beta^k \tau^*_{t+k} + E_t \sum_{k=0}^{\infty} [\beta^{k+1} - (\beta \rho)^{k+1}] i^*_{t+k} \]

\[ \blacktriangleright \quad x_t = \pi_t \equiv 0 \text{ not achievable} \quad \& \quad \tau_t \equiv \tau^*_t, \quad i_t \equiv i^*_t \text{ not optimal} \]
Some General Results

- Use Phillips curve & Euler equation to substitute $\tau_t - \tau_t^* \text{ & } i_t - i_t^*$ into solvency

\[
b_{t-1}^M + F'_t = [1 + (1 - \beta)b_\tau(\kappa \psi)^{-1}]\pi_t - (1 - \beta)(b_\tau \psi^{-1} - b_x)E_t \sum_{k=0}^{\infty} \beta^k x_{t+k}
\]

\[
+ E_t \sum_{k=1}^{\infty} (\beta \rho)^k \pi_{t+k} + \sigma s_c^{-1}(1 - \beta \rho)E_t \sum_{k=0}^{\infty} (\beta \rho)^k x_{t+k}
\]

- $b_{t-1}^M + F'_t$ summarizes exogenous reasons cannot completely stabilize inflation & output
1. Improves tradeoff between inflation & output via $F'_t$

$$F'_t = E_t \sum_{k=0}^{\infty} \beta^k f_{t+k} - (1 - \beta) \frac{\bar{\tau}}{s_d} E_t \sum_{k=0}^{\infty} \beta^k \tau_{t+k}^* + E_t \sum_{k=0}^{\infty} [\beta^{k+1} - (\beta \rho)^{k+1}] i_{t+k}$$

- Longer maturity—larger $\rho$—reduces fiscal stress—$F'_t$—by reducing impacts of demand-side shocks
What Do Long Bonds Do?

2. Permits inflation smoothing

\[
b_{t-1}^M + F'_t = \left[ 1 + (1 - \beta) b_T (\kappa \psi)^{-1} \right] \pi_t - (1 - \beta) (b_T \psi^{-1} - b_x) E_t \sum_{k=0}^{\infty} \beta^k x_{t+k} \\
+ E_t \sum_{k=1}^{\infty} (\beta \rho)^k \pi_{t+k} + \sigma s_c^{-1} (1 - \beta \rho) E_t \sum_{k=0}^{\infty} (\beta \rho)^k x_{t+k}
\]

- Longer maturity—larger \( \rho \)—allows inflation in the more distant future to relieve fiscal stress
- Provides expected future monetary policy a role in relaxing government solvency condition
3. Permits output smoothing

\[ b^M_{t-1} + F_t' = \left[ 1 + (1 - \beta) b_{\tau}(\kappa \psi)^{-1} \right] \pi_t - (1 - \beta) (b_{\tau} \psi^{-1} - b_x) E_t \sum_{k=0}^{\infty} \beta^k x_{t+k} \]

\[ + E_t \sum_{k=1}^{\infty} (\beta \rho)^k \pi_{t+k} + \sigma s_c^{-1} (1 - \beta \rho) E_t \sum_{k=0}^{\infty} (\beta \rho)^k x_{t+k} \]

- Longer maturity allows more distant future output gaps to offset fiscal stress
Optimal Outcomes: A Beautiful Symmetry

- Only 1-period debt ($\rho = 0$)
  
  \[ E_t \pi_{t+1} = 0 \implies E_t p_{t+1} = p_t \]
  
  \[ E_t x_{t+1} = E_t x_{t+2} \]
  
  - complete smoothing of price level
  - no expected changes in output after $t + 1$

- Only consols or perpetuities ($\rho = 1$)
  
  \[ E_t \pi_{t+1} = E_t \pi_{t+2} \]
  
  \[ E_t x_{t+1} = x_t \]
  
  - no expected changes in inflation after $t + 1$
  - complete smoothing of output gap

- Intermediate maturities
  
  - natural generalization that varies with maturity parameter, $\rho$
Calibration

- U.S. data 1948Q1–2013Q1
- Fernald’s measure of total factor productivity
- Federal government fiscal variables
  - H-P filter and estimate AR(1) processes for the cyclical components of
    - total factor productivity
    - government purchases
    - government transfers
Inflation After Higher Transfers

Inflation After an Increase in Transfers

one-quarter:
\[ E_t \pi_{t+1} = 0 \]
Inflation After Higher Transfers

Consol:
$$E_t \pi_{t+1} = E_t \pi_{t+2}$$

one-quarter consol
Inflation After Higher Transfers

Inflation After an Increase in Transfers

- Consol
- One-quarter
- 5 years

$10^{-5}$
Output Gap After Higher Transfers

Output After an Increase in Transfers

\[ E_{t+1} = E_{t} \times (1 - \text{quarter}) \]
Output Gap After Higher Transfers

Output After an Increase in Transfers

Consol:

$E_{t+1} = x_t$

one-quarter

Consol: $x_{t+1} = x_t$
Output Gap After Higher Transfers
The Fiscal Cushion

▶ Government solvency condition

\[(1 - \beta)E_t \sum_{k=0}^{\infty} \beta^k \left[ \frac{s_z}{s_d} \hat{Z}_{t+k} + \frac{s_g}{s_d} \hat{G}_{t+k} \right] = -\hat{b}_{t-1}^M + \hat{\pi}_t \quad \text{current inflation} \]
\[+ E_t \sum_{k=1}^{\infty} (\beta \rho)^k \hat{\pi}_{t+k} \quad \text{PV(future inflation)} \]
\[+ (1 - \beta) \frac{\tilde{\tau}}{s_d} E_t \sum_{k=0}^{\infty} \beta^k (\hat{\tau}_{t+k} + \hat{\gamma}_{t+k}) \quad \text{PV(tax revenues)} \]
\[E_t \sum_{k=1}^{\infty} \left[ (1 - \beta) \beta^k - (1 - \beta \rho)(\beta \rho)^k \right] \sigma (\hat{c}_{t+k} - \hat{c}_t) \quad \text{PV(real interest rate)} \]

▶ Optimal fiscal financing varies with maturity & with level of government debt
Optimal Fiscal Financing

Financing Government Transfers

PV(Real Interest Rate)

Average Duration (Quarters)

PV(Tax Revenues)

Average Duration (Quarters)

PV(Future Inflation)

sb=20%
sb=49%
sb=100%

Average Duration (Quarters)

Current Inflation

PV(Real Interest Rate)
Comparing Optimal Outcomes

- Conventional optimal monetary policy—corresponds to separation of MP & FP
  - lump-sum taxes ensure government solvency
  - take distorting taxes as given

- Compare welfare under fully optimal policy to conventional optimal MP
  - compute difference in welfare
  - measure as fraction of steady state output
Provocative Conclusions

- Theory does not support Great Wall separation of monetary & fiscal policy tasks
- Optimal policy argues a role for inflation to revalue debt & reduce reliance on distorting taxes
  - even in conventional models used to justify complete separation
- Optimal policy can entail very persistent deviations of inflation from target
  - fiscal theory outcomes are not necessarily “bad”
- Calls for rethinking our policy institution arrangements
- Particularly important in the face of looming fiscal stress advanced economies face
Optimal Policy’s Institutional Arrangements

Monetary Policy

Fiscal Policy