Perceptions & Misperceptions of Fiscal Inflation

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Fiscal Policy after the Financial Crisis
Era of Fiscal Stress

- Short-run imbalances
Fiscal deficits and public debt are very high in many advanced economies. Although policy became much less stimulatory in 2010, real GDP growth picked up, suggesting a handoff from public to private demand. For 2011, fiscal consolidation is expected to be modest in advanced economies. As a result, the adjustment required to achieve prudent debt levels by 2030 remains very large. Fiscal adjustment will be larger in economies with high external surpluses than in economies with high deficits, which is consistent with widening global imbalances.

Shares of GDP. Source: IMF, WEO
Era of Fiscal Stress

- Short-run imbalances
- Long-run imbalances
U.S. “Unfunded Liabilities”

Percentage of GDP

Source: CBO Long-Term Budget Outlook
U.S. “Unfunded Liabilities”

Source: CBO Long-Term Budget Outlook
U.S. “Unfunded Liabilities”

Source: CBO Long-Term Budget Outlook
Debt-GDP. Source: BIS
Long-Run Fiscal Stress

Graph 4
Public debt/GDP projections
Austria France Germany
0
50
100
150
200
250
300
80 90 00 10 20 30 40
Baseline scenario
Small gradual adjustment
Small gradual adjustment with age-related spending held constant

Greece Ireland Italy
0
100
200
300
400
80 90 00 10 20 30 40

Japan Netherlands Portugal
0
200
400
600
800
0
100
200
300
400
500
80 90 00 10 20 30 40

Spain United Kingdom United States
0
100
200
300
400
500
600
0
100
200
300
400
500
600
700
80 90 00 10 20 30 40

Debt-GDP. Source: BIS

Sources: OECD; authors' projections.

Debt-GDP. Source: BIS
Message in Long-Run Projections

- These projections cannot happen
- Some assumptions underlying projections
  1. economies will grow out of projected deficits
  2. governments will default outright on debt
  3. fiscal policies will adjust surpluses to stabilize debt
  4. paths of inflation will turn out different from assumed
  5. some combination of the four
- Only Dr. Pangloss could believe 1
- Europe makes clear how onerous is 2
- Most central bankers hope for 3
Prospects for Entitlements Reform

The level of public fiscal discourse in Greece
Prospects for Entitlements Reform

The level of public fiscal discourse in U.S.
Message in Long-Run Projections

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- Only Dr. Pangloss could believe 1
- Europe makes clear how onerous is 2
- Most central bankers hope for 3
- We focus on ways that 4 might arise
Monetary & fiscal policy have two tasks: (1) control inflation; (2) stabilize debt

Two different policy mixes that can accomplish these tasks

**Regime M:** conventional assignment—MP targets inflation; FP targets real debt (called active MP/passive FP)

**Regime F:** alternative assignment—MP maintains value of debt; FP controls inflation (called passive MP/active FP)

**Regime M:** normal state of affairs

**Regime F:** can arise in an era of fiscal stress
Monetary-Fiscal Interactions: Regime M

- MP behavior completely familiar: target inflation by aggressively adjusting nominal interest rates
- FP adjusts future surpluses to cover interest plus principal on debt
- What is FP doing?
  - any shock that changes debt must create the expectation that future surpluses will adjust to stabilize debt’s value
  - people must believe adjustments will occur eventually
  - eliminates wealth effects from government debt
  - for MP to target inflation, fiscal expectations must be anchored on FP adjusting to maintain value of debt
- How firmly are expectations so anchored?
An Equilibrium Condition

\[
\frac{M_{t-1} + Q_t B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[ \tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right]
\]

= Expected present value primary surpluses + seigniorage

- In Regime M...
  - MP delivers equilibrium inflation process
  - taking inflation as given, FP must choose compatible surplus policy
  - “compatible” means: stabilizes debt
  - imposes restrictions on \( E_t PV \)
Primer on Monetary-Fiscal Interactions

- Monetary & fiscal policy have two tasks: (1) control inflation; (2) stabilize debt
- Beautiful symmetry: two different policy mixes that can accomplish these tasks

**Regime M:** conventional assignment—MP targets inflation; FP targets real debt (called active MP/passive FP)

**Regime F:** alternative assignment—MP maintains value of debt; FP controls inflation (called passive MP/active FP)

- **Regime M:** normal state of affairs
- **Regime F:** can arise in an era of fiscal stress
- **Regime F arises in two ways**
  1. Sargent & Wallace’s unpleasant monetarist arithmetic
Common Perception of Fiscal Inflation

- Arises from unpleasant arithmetic mechanism
  - hit fiscal limit; surpluses unresponsive to debt
  - seigniorage adjusts to stabilize debt

- A central banker’s take on this:

  “...the proposition is of little current relevance to the major industrial countries. This is for two reasons. First, seigniorage—financing the deficit by issuing currency rather than bonds—is very small relative to other sources of revenues. Second, over the past decade or so, governments have become increasingly committed to price stability.... This sea change in the conventional wisdom about price stability leaves no room for inflation to bail out fiscal policy.”

  —Mervyn King (1995)

We agree
Policy Separation Principle

- A deeply ingrained misperception: CB independence & inflation targeting insulate inflation from FP
- Policies are conducted by separate institutions
- Principle underlies monetary reforms without corresponding fiscal reforms
  - assumes MP reform can force FP reform
  - we’re seeing how well that works
- System may work in normal times, but creates uncertainty or worse during fiscal stress
- Central bank models build in separation principle
  - inflation & government debt dynamics decoupled
Separation in CB Model Schematic

- Fisher relation
  \[ R_t = r_t + E_t \pi_{t+1} \]

- Government budget
  \[ \frac{B_t + M_t}{P_t} + s_t = \frac{R_{t-1}B_{t-1} + M_{t-1}}{P_t} \]

- Monetary policy
  \[ R_t - R^* = \alpha(\pi_t - \pi^*) \]

- Fiscal policy
  \[ s_t - s^* = \gamma \left( \frac{B_{t-1}}{P_{t-1}} - b^* \right) \]

- MP feeds directly into inflation, but debt does not feed directly into inflation
- Yet as we see... fiscal policy can determine inflation
Misperception of Fiscal Inflation

- King reflects the common perception of fiscal inflation that is embedded in the separation principle
  - arises if and only if monetary policy monetizes deficits

- But it is a *misperception* that monetizing deficits is the *only* channel for fiscal inflation

- Let’s take direct monetization off the table and equate Regime F to the fiscal theory
Primer on Monetary-Fiscal Interactions

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**Regime M:** conventional assignment—MP targets inflation; FP targets real debt (called active MP/passive FP)

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  1. Sargent & Wallace’s unpleasant monetarist arithmetic
  2. fiscal theory of the price level
Governments issue mostly nominal bonds

- 90% U.S. debt; 80% U.K. debt; 95% Euro-area debt; most of Australian, Japanese, Korean, New Zealand, & Swedish debt

In Regime F:

- FP sets primary surpluses independently of debt
- MP prevents interest payments on debt from destabilizing debt

Nominal debt is revalued to align its value with expected surpluses

Lower current or expected surpluses reduce value of outstanding debt: raises aggregate demand ⇒ higher current and expected inflation
Using an Equilibrium Condition: Regime F

\[
\frac{M_{t-1} + Q_t B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[ \tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right]
\]

- Increase in current or expected transfers
  - no offsetting taxes expected, household wealth rises
  - lower expected path of surpluses reduces “cash flows,” lowers value of debt
  - individuals shed debt in favor of consumption, raising aggregate demand
  - higher current & future inflation and economic activity
  - long bonds shift inflation into future

- Demand for debt ⇔ aggregate demand (Cochrane)
An Equilibrium Condition

\[ \frac{M_{t-1} + Q_tB_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[ \tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right] \]

▶ In Regime F . . .

▶ FP delivers equilibrium inflation process
▶ taking inflation as given, MP must choose compatible interest rate policy
▶ “compatible” means: stabilizes debt
▶ imposes restrictions on \( P_t \) & \( Q_t \)
Equilibrium conditions for nominal and real debt

Nominal:  \[ B_{t-1} = P_t \sum_{j=0}^{\infty} \beta^j E_t \left[ \tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right] \]

Real:  \[ v_{t-1} = \sum_{j=0}^{\infty} \beta^j E_t \left[ \tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right] \]

Hypothetical increase in \( P_t \), all else fixed

- raises *nominal* backing: support more nominal debt with no change in surpluses or seigniorage
- lowers *real* backing: reduces seigniorage revenues

Regime F is not about seigniorage: even if real money balances tiny, higher \( P_t \) raises backing of nominal debt but does nothing to backing of real debt
One- and two-period nominal debt: $B_t(t + 1), B_t(t + 2)$

Equilibrium condition

$$\frac{B_{t-1}(t)}{P_t} + \beta B_{t-1}(t+1)E_t \frac{1}{P_{t+1}} = E_tPV(\text{surpluses, seigniorage})$$

MP determines the timing of inflation

- stabilize expected inflation: forces adjustment in $P_t$
- lean against current inflation: forces adjustment in $E_t(1/P_{t+1})$
- tradeoff depends on maturity structure, $B_{t-1}(t + 1)/B_{t-1}(t)$
- richer maturity structure $\Rightarrow$ any pattern of inflation

Message: MP not impotent, but it cannot control both actual & expected inflation
Undermining Monetary Control of Inflation: I

- Policy starts in Regime M: active MP/passive FP
- Agents begin to doubt necessary fiscal adjustments will be forthcoming
  - consolidation progresses in fits & starts
  - domestic politics grow more polarized
- Simplest case: people believe at future date $T$ economy hits the fiscal limit and Regime F adopted
- From $T$ on, inflation determined by fiscal expectations
  - value of debt & price level at date $T - 1$ pinned down
- Forward-looking agents bring those effects into period before the fiscal limit
At a known date $T$ economy reaches fiscal limit

| Regime 1  |  
|---|---|
| $t = 0, 1, \ldots, T - 1$  |  

### Monetary Policy

\[
R^{-1}_t = R^{* - 1} + \alpha \left( \frac{P_{t-1}}{P_t} - \frac{1}{\pi^*} \right)
\]

### Tax Policy

\[
\tau_t = \tau^* + \gamma \left( \frac{B_{t-1}}{P_{t-1}} - b^* \right)
\]
At a known date $T$ economy reaches fiscal limit

<table>
<thead>
<tr>
<th></th>
<th>Regime 1 $t = 0, 1, \ldots, T - 1$</th>
<th>Regime 2 $t = T, T + 1, \ldots$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary Policy</td>
<td>$R_t^{-1} = R^<em>-1 + \alpha \left( \frac{P_{t-1}}{P_t} - \frac{1}{\pi^</em>} \right)$</td>
<td>$R_t^{-1} = R^*-1$</td>
</tr>
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<td>$\tau_t = \tau^* + \gamma \left( \frac{B_{t-1}}{P_{t-1}} - b^* \right)$</td>
<td>$\tau_t = \tau^{\max}$</td>
</tr>
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Undermining Monetary Control of Inflation: I

What happens before the fiscal limit?

- Regime M policies do not determine inflation
- Ricardian equivalence breaks down
- Lower expected surpluses reduce debt-output
- Regime M MP destabilizes expected inflation
  - leaning against inflation raises interest on debt, wealth, future inflation

Messages:

1. Price level determined by beliefs about policy in the long run
2. Inappropriate or uncertain FP makes MP unable to anchor inflation expectations

All this generalizes to more plausible scenarios
Government Debt Before the Fiscal Limit

Fluctuating Transfers: Always Regime F
Debt in Fixed Regime F
Passive Monetary/
Active Fiscal

Debt When
Fiscal Limit at T = 50

Debt–GDP Target

Fiscal Limit
T = 50

Fluctuating Transfers: Regime M Before Fiscal Limit
Inflation Before the Fiscal Limit

Fluctuating Transfers: Always Regime F

Fiscal Limit is Regime F
Passive Monetary/Active Fiscal

Inflation in Fixed Regime F
Passive Monetary/Active Fiscal

Inflation Target

Fiscal Limit
T = 50
Inflation Before the Fiscal Limit

- Inflation When Fiscal Limit at $T = 50$
- Inflation in Fixed Regime F
  - Passive Monetary/Active Fiscal
- Fiscal Limit is Regime F
  - Passive Monetary/Active Fiscal
- Fluctuating Transfers: Regime M Before Fiscal Limit
Fiscal limits introduce sovereign debt risk

Simplest case: exogenous default rate on debt, $\delta_t \in [0, 1]$

MP controls interest rate on short government debt

Maintain policy in Regime M (active MP/passive FP) throughout
Undermining Monetary Control of Inflation: II

- **Bond-pricing equation**

\[
\frac{1}{R_t} = \beta E_t \left[ \frac{1 - \delta_{t+1}}{\pi_{t+1}} \right]
\]

- **Monetary policy rule**

\[
\frac{1}{R_t} = \frac{1}{R^*} + \alpha \left( \frac{1}{\pi_t} - \frac{1}{\pi^*} \right)
\]

- **Equilibrium inflation process**

\[
\frac{1}{\pi_t} = \frac{1}{\pi^*} \left( 1 - \frac{\beta}{\alpha} \right) \left\{ 1 + E_t \sum_{i=1}^{\infty} \left( \frac{\beta}{\alpha} \right)^i \prod_{j=1}^{i} (1 - \delta_{t+j}) \right\}
\]
Inflation rises with expected default rates

- higher default rate requires higher interest rate to attract bondholders
- if MP reacts only to inflation deviation from target, MP raises rate only if inflation rises
- bondholders shed debt, increasing aggregate demand, raising inflation
- higher inflation induces MP to raise interest rate

Message: Default risk can make inflation control more difficult
A monetary union (Sims, Bergin)

- CB pegs nominal rate (as ECB was)
- country 1 raises surpluses with debt
- country 2 sets surpluses independent of debt
- CB rebates portfolio earnings to countries, independent of their debt

Results

1. Union-wide inflation determined by country 2 (one with profligate FP)
2. News about country 2 surpluses affects inflation & value of debt in both countries
3. Requires adjustments in country 1’s surpluses
Undermining Monetary Control of Inflation: III

- A monetary union
- How can CB retain control of inflation?
  - rebates to countries depend on each nation’s debt in the right way
  - make MP active (ECB in normal times)
- Efforts by the CB to reduce inflation
  - raise value of debt in both countries
  - requires higher rebates from CB to country 2 (backs debt of profligate country)
  - rebates to country 1 may need to be negative (taxes)
  - gives CB power to tax and transfer

- **Message:** A fiscal union can support monetary union’s efforts to control inflation
Empirical Implications

- MP & FP shocks have very different effects in Regimes M & F
- Isn’t it easy to tell which regime generated observed data?
- No. For example, Regime F implies:
  - negative correlation between inflation & debt-GDP
  - positive correlation between inflation & money growth
  - any correlation between inflation & nominal debt growth
  - inflation can Granger-cause deficits
- Regime M can generate same pattern of correlations
- Are Regimes M & F observationally equivalent?
Suggestive Observational Equivalence

Consider the model

\[ E_t y_{1t+1} - \alpha y_{1t} = x_{1t} \]
\[ y_{2t} - \gamma y_{2t-1} + y_{1t} = x_{2t} \]
\[ x_{1t} = A_1(L)\varepsilon_{1t}, \quad x_{2t} = A_2(L)\varepsilon_{2t} \]

\( \varepsilon_{it} \) mutually, serially uncorrelated; \( \sum_{j=0}^{\infty} A_{ij}^2 < \infty, i = 1, 2 \)

**Proposition** For any stationary time series process for \( \{y_{1t}, y_{2t}\} \) that solves the model for \( \alpha_M > 1 \) and \( \gamma_M > 1 \) in Regime M, and given \( \{x_{M,t}\} \) processes, there exist \( \{x_{F,t}\} \) processes that generate the same process for the observables \( \{y_{1t}, y_{2t}\} \) using Regime F parameters, \( 0 \leq \alpha_F < 1 \) and \( 0 \leq \gamma_F < 1 \).
Solutions to Observational Equivalence

- Specifying exogenous processes $\Leftrightarrow$ specifying policy rule
- Need to think harder about valid exclusion restrictions for policy
- Break the decoupling of policy dynamics
- Integrate choice of maturity structure to affect inflation dynamics
- Avoid “testing” for Regime M vs. Regime F using equilibrium conditions alone
Take Aways

1. Conventional perceptions of inflation miss a channel for fiscal inflation
   - channel may be important in times of fiscal stress
2. Separation of M & FP maintains assumption that fiscal surpluses stabilize debt
   - when fiscal limit possible, assumption breaks down
3. Tenuously anchored fiscal expectations threaten ability of MP to control inflation
   - tenuous anchoring exposes economy to fluctuations caused by fiscal news
4. If inflation has fiscal roots, aggressive MP can exacerbate aggregate demand fluctuations
5. Existing monetary-fiscal frameworks largely silent on how tensions get resolved
   - needs resolution before the big fiscal stress hits