Fiscal Stress & Inflation

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Aging populations in advanced economies putting ever-increasing demands on government spending. Governments have made substantially more promises of old-age benefits than they have made provisions to finance.
Aging Populations

Dependency ratio: population 65 or older relative to ages 15-64
1960: left; 2005: center; 2050: right
## Spending Commitments to the Aged

<table>
<thead>
<tr>
<th>Country</th>
<th>Aging-Related Spending</th>
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</thead>
<tbody>
<tr>
<td>Australia</td>
<td>482</td>
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<tr>
<td>Canada</td>
<td>726</td>
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<tr>
<td>France</td>
<td>276</td>
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<tr>
<td>Germany</td>
<td>280</td>
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<tr>
<td>Italy</td>
<td>169</td>
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<tr>
<td>Japan</td>
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<tr>
<td>Korea</td>
<td>683</td>
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<tr>
<td>Spain</td>
<td>652</td>
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<tr>
<td>United Kingdom</td>
<td>335</td>
</tr>
<tr>
<td>United States</td>
<td>495</td>
</tr>
<tr>
<td>Advanced G-20 Countries</td>
<td>409</td>
</tr>
</tbody>
</table>

Worldwide “Unfunded Liabilities.” Net present value of impact on fiscal deficit of aging-related spending, in percent of GDP. Source: IMF
U.S. Era of Fiscal Stress: Accounting

U.S. federal debt. Source: CBO Long-Term Budget Outlook
Gross Debt as Share of GDP

Source: Korean Institute of Public Finance, 2009
Unresolved Fiscal Stress

- Spending promises without financing plans create unresolved fiscal stress

- Raises possibility economy will hit its fiscal limit—point at which, for economic or political reasons, surpluses can no longer adjust to stabilize debt

- Natural questions to ask:
  1. What are the effects of unresolved fiscal stress?
  2. What are the impacts of alternative possible resolutions?
  3. Even if we knew long-run policies, what might happen along the transition to the long run?
Usual Approach to Fiscal Stress
A Constructive Approach

- Posit beliefs about future monetary & fiscal policy regimes
- Superimpose probability distributions over those possibilities
- Insert policy environment into variety of conventional models
- Compute rational expectations equilibrium
- Derive macroeconomic implications of alternative beliefs
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.

**Regime F:** alternative assignment—MP maintains value of debt; FP controls inflation.

**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
2. Fiscal theory of the price level
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
- adjustments need not be instantaneous
- people must believe adjustments will occur eventually
- for MP to target inflation, fiscal expectations must be anchored on FP adjusting to maintain value of debt
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 (as it’s now doing)

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
Market value government liabilities =
Expected present value primary surpluses + seigniorage
from period $t$ onward

- 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 $\Leftrightarrow$ aggregate demand (Cochrane)
Surprising Implications: Flight to Quality

Market value government liabilities =
Expected present value primary surpluses + seigniorage from period t onward

▶ “Flight to quality”
  ▶ shift from risky assets to government bonds
  ▶ sharp reduction in real discount rates
  ▶ increase in E PV(Surpluses)
  ▶ large & sudden revaluation in debt
  ▶ drop in aggregate demand
  ▶ lower inflation & economic activity now and in future

▶ Possible source of deflation fears?

▶ Ultimate source of demand is fiscal news—beyond central bank’s control
Model 1

- Neo-classical growth, capital & labor income taxes
- Calibrated at an annual frequency w/ costly price adjustment

Monetary Policy: \[ R_t = R^* + \alpha (\pi_t - \pi^*) \]

Taxes: \( \tau_t = \begin{cases} \tau^* + \gamma \left( \frac{B_{t-1}}{P_{t-1}} - b^* \right) & (\text{Below Fiscal Limit}) \\ \tau_{\text{max}} & (\text{Fiscal Limit}) \end{cases} \)

Transfers: \( z_t = \begin{cases} (1 - \rho_z) \bar{z} + \rho_z z_{t-1} + \varepsilon_t & 0 < \rho_z < 1 \\ \mu z_{t-1} + \varepsilon_t & \mu \beta < 1, \mu > 1 \end{cases} \)

Government Budget Constraint:

\[ \frac{B_t}{P_t} + \frac{M_t}{P_t} + \tau_t \left( \frac{W_t}{P_t} N_t \right) = G_t + \lambda_t z_t + \frac{R_{t-1} B_{t-1}}{P_t} + \frac{M_{t-1}}{P_t} \]

“Entitlements Reform”
Unfolding of uncertainty about policy
Modeling the Fiscal Limit

- Political economy of debt stabilization
- Probabilistic fiscal limit:
  1. reflects *willingness* to raise taxes, rather than *ability*
  2. depends on both economic conditions and political choices unrelated to economy
  3. captures uncertainty about *when* or *if* economy will hit fiscal limit
- Further uncertainty: where will policy go at the limit?
Modeling the Fiscal Limit

As debt rises, tax rates rise to stabilize debt. Higher tax rates make electorate more disgruntled. Unhappy constituents raise probability taxes will stop rising.
“Promised” transfers grow as a share of GDP (CBO projections)

Initially transfers are debt financed

Higher debt $\Rightarrow$ higher tax rates

Higher tax rates $\Rightarrow$ higher probability of fiscal limit

Fiscal limit $\Rightarrow$

- either Regime F
- or Regime M with reneging

Entitlements reform (“reneging”) a permanent regime
Before the fiscal limit: 10-year expected inflation in Regime M
Higher Inflation When Regime F More Likely

Before the fiscal limit: 10-year expected inflation in Regime M
Tail Inflation Events

Right tail of average inflation distribution: upper .005 percentile
Alternative Policy Assumptions

- Each regime stabilizes debt in some fashion
  - through taxes
  - through transfers
  - through Regime F to revalue debt

- What if there is a period of political gridlock (or "chicken")?
  - no policy authority stabilizes debt
  - cannot happen indefinitely without defaulting
  - can happen if bondholders believe policies will eventually adjust

- Allow for political gridlock at the fiscal limit

- Employ a simplified model
Model 2

- Conventional: elastic labor supply, labor income tax
- Calibrated at an annual frequency w/ flexible prices
- Same policy assumptions as before except
  - at the fiscal limit, gridlock occurs for some time
  - during gridlock no policy behaves to stabilize debt
  - debt accumulates rapidly
  - eventually move to a regime that stabilizes debt
Modeling Policy Uncertainty

Unfolding of uncertainty about policy regimes
Close Cousin to Sargent-Wallace

► “Unpleasant Monetarist Arithmetic” logic:

1. all debt perfectly indexed to inflation
2. fiscal limit a maximum debt level
3. before limit, neither MP nor FP stabilize debt
4. at fiscal limit, FP exogenous & MP creates seigniorage to stabilize debt
5. inflation determined by interaction of money supply & demand
6. long-run expectations anchored on MP stabilizing debt by printing money

► MP loses control of inflation... not too surprising, given long-run policy
This paper’s logic:

1. fiscal limit a political choice with uncertain timing
2. before limit, MP targets inflation, promised transfers honored, taxes stabilize debt
3. at fiscal limit, temporarily no policy stabilizes debt (political gridlock)
4. then 5% probability MP stabilizes debt; 95% probability transfers stabilize debt
5. inflation determined by equating market value of debt to expected surpluses
6. long-run expectations anchored on transfers stabilizing debt

More subversive: MP loses control of inflation... small chance of Regime F & long-run policies are Regime M (monetarist’s dream)
Relentless Growth in Promised Transfers

Before the fiscal limit & during gridlock: Regime M
Fixed Probability of Fiscal Limit

Before the fiscal limit & during gridlock: Regime M
Before the fiscal limit & during gridlock: Regime M
A Tea Party Shock

- News about future surpluses can discretely shift probability of fiscal limit
  1. continuing bad news about Greek/Irish/Portugese/Spanish/Italian/... fiscal situation
  2. surprisingly soon UK fiscal consolidation
  3. desire of foreign bond holders to dump US treasuries
  4. unexpected clout of US tea party

- Learn maximum tax rate is $\tau_{low}^{max} < \tau^{max}$
  1. news arrives with probability $p_N$
  2. expect to hit fiscal limit sooner
  3. reduces expected present value of surpluses
  4. raises aggregate demand & inflation
Tea Party Shock & Probability of Fiscal Limit

News shock hits in 2019 that future taxes will be lower

Tea Party News

No News
Evolution of Economy: No Fiscal News

Before the fiscal limit: Regime M
Evolution of Economy: Bad Fiscal News

Before the fiscal limit: Regime M
Take Aways

1. With nominal government debt, fiscal policy’s potential effects on inflation are more subtle than in Sargent-Wallace’s unpleasant arithmetic
   - even if Regime M an absorbing state, along transition path MP can spectacularly lose control of inflation

2. Effect of fiscal limit on inflation can be small & gradual or large & sudden, depending on
   - how likely Regime F is in future
   - whether there are periods when debt is unstable (no policy stabilizes debt)
   - how much debt rises before it is stabilized
   - whether probability of fiscal limit can jump discretely (fiscal expectations feebly anchored)
Monetary policy cannot control inflation because.

Fiscal expectations are not anchored on policies that stabilize debt:
- in these models, as in reality, fiscal anchoring is fragile

Countries that assign central bank to target inflation.

Must establish the necessary fiscal infrastructure:
- central banks are a model for that infrastructure
- clear objectives, systematic analysis, transparency, communication

In short... fiscal policy should mimic the *science* of monetary policy.
Will Science Prevail?

- Reason for skepticism in the United States
Will Science Prevail?

The level of public fiscal discourse in U.S.