Presentation to CBO on Fed's New Monetary Framework

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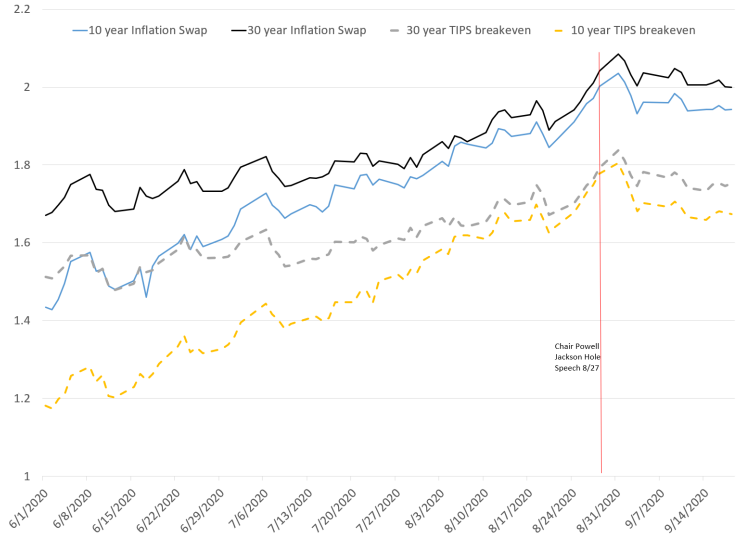
Outline

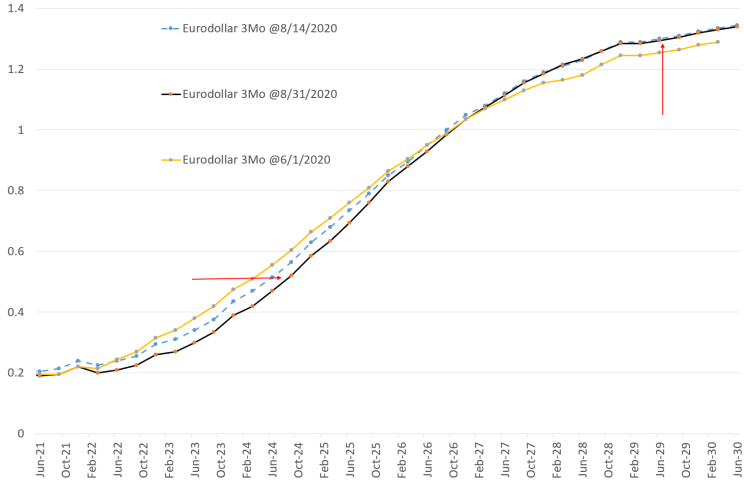
1. Mean scenario as reflected by asset markets and in response to Fed communication regarding new framework
   - I read the new framework as average inflation targeting, with a longer averaging period than current, but ambiguity over the period length.
   - Asymmetry: switch back to flexible inflation targeting if inflation runs above target
   - Experimentation: review and revise plan based on what the Fed learns
2. Tail scenarios interacting with high level of debt

Extra graphs at end.
Data from Bloomberg unless otherwise specified.

Expected Inflation Measures



Path of Short Rate from Eurodollar Futures



Present Value Budget Constraint

$$\sum_{n=1}^{N} Q_{t,n} P_{t,n} \equiv B_t = \sum_{j=0}^{\infty} M_{t,t+j} S_{t+j} \tag{1}$$

In riskless environment where debt is riskless, the discount factor is the one-period interest rate set by the Fed (r_t) minus liquidity services on Treasury debt, cy_t

$$M_{t,t+j} = \prod_{j=0}^{\infty} \frac{1}{1 + r_{t+j} - cy_{t+j}} \tag{2}$$

Fix future surpluses at S_{t+j}. Impact of a change in the path of the policy rate, r_{t+j}, depends on

$$\frac{\partial}{\partial\, Path} \left[\sum_{n=1}^{N} Q_{t,n} P_{t,n} - \sum_{j=0}^{\infty} M_{t,t+j} S_{t+j} \right] \tag{3}$$

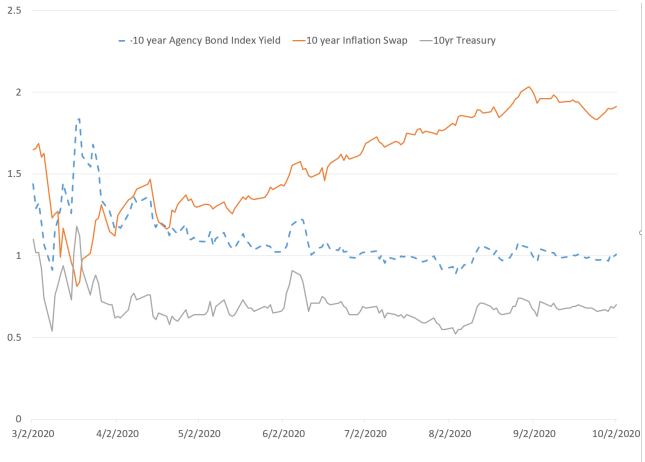
i.e., if the derivative is negative, then future surpluses can adjust down to satisfy budget constraint

- Duration of current debt vs duration of future surplus?
- Impact of path on future surpluses, via impact on GDP

Portfolio Math

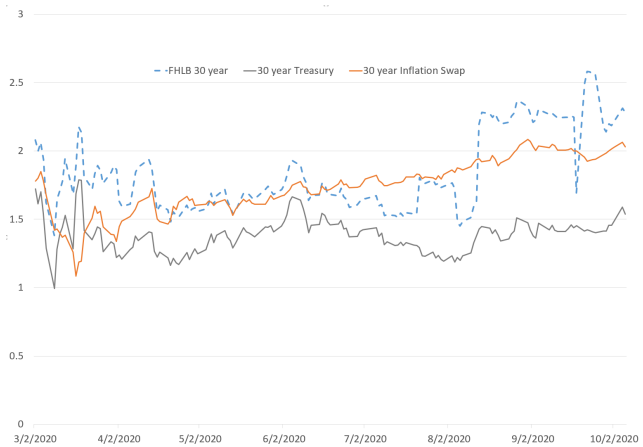
- Current debt (publicly held and counting excess reserves as 1 day debt) is 3.5 years. (Massive) Treasury issuance plus Fed purchases have led to shortening
- Surplus claim is a long-duration asset.
  - For next decade(s?) surpluses are negative; negative duration
  - Presumably far into the future, surpluses are positive, and look proportional to GDP; positive duration
- Government is net long duration (lower rates benefit fiscal position), while running a long/short carry position
- Exposure is to path of rates from say 3.5 to 10-15 years

10-year Real Interest Rates



QE of $120bn per month (plus future expectations of QE) driving up convenience yields

30-year Real Interest Rates



QE of $120bn per month (plus future expectations of QE) driving up convenience yields

Tail: It is Hard to Maintain Risk-Free Debt when Debt is High

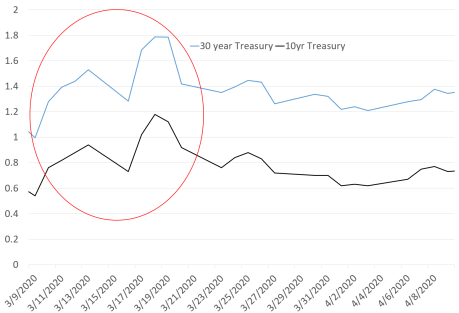
$$B_t = E_t \left[\sum_{j=0}^{\infty} M_{t,t+j} S_{t+j} \right] \tag{4}$$

- Suppose output is a random walk with drift

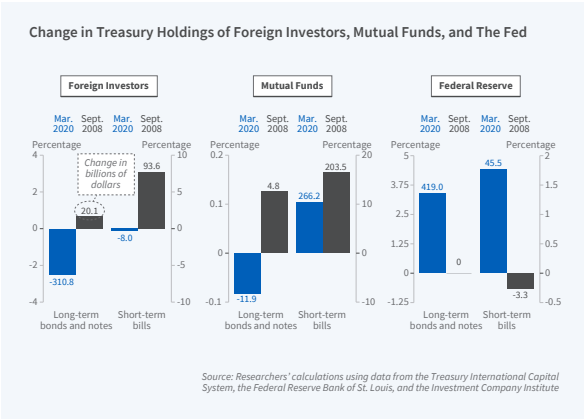
$$\Delta log Y_t = g + \epsilon_t \tag{5}$$

- To maintain debt risk-free, the term $E_t \left[\sum_{j=0}^{\infty} M_{t,t+j} S_{t+j} \right]$ must be insulated against negative ϵ_t
  1. Financial markets drive up Treasury convenience yield after negative shocks, pushing up M (negative-β)
  2. Raise future surpluses
  3. Default/restructuring/inflation
- (1) Convenience yields diminish at high levels of debt.
- (2) Suppose $S_{t+j} = Y_{t+j} s_t$ with s_t chosen at time t after observing ϵ_t. Then -1% realization, with s_t fixed, means $E_t \left[\sum_{j=0}^{\infty} M_{t,t+j} S_{t+j} \right]$ falls by $\sim 1\%$
  - s_t must adjust so that future surpluses rise by $\sim 1\% \times B_t$

March 2020, Tail Event?



(a) LT Treasury Yields



(b) Sales

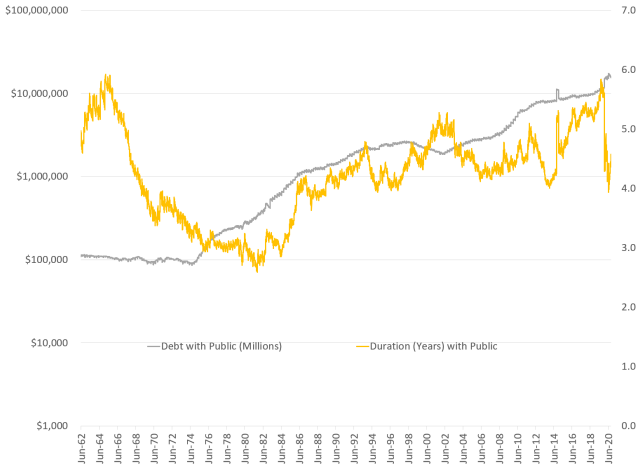
Source: He, Nagel, and Song (2020)

Tail Risk: The Bad Equilibrium

- Inflation. Fed tightens. Negative feedback loop.

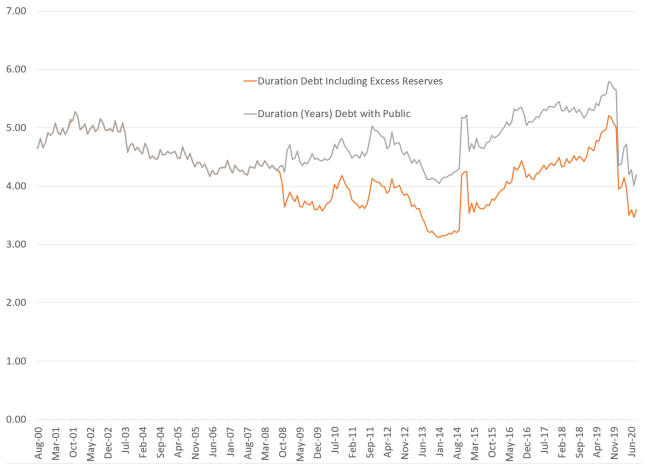
EXTRA SLIDES

Debt and Duration



Source: CRSP, Bloomberg, from Jiang, Lustig, Van Nieuwerburgh, and Xialan (2020)

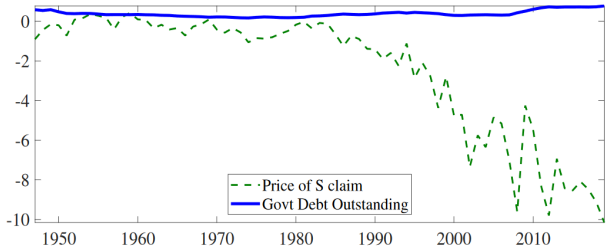
Duration including Reserves



Source: CRSP, Fed, Bloomberg, from Jiang, Lustig, Van Nieuwerburgh, and Xialan (2020)

Valuation under a Conventional SDF Calibrated to Equity Risk Premium

Figure 6: Present Value of Government Surpluses and Market Value of Government Debt



The solid line is the market value of government debt. The dashed line is the market value of the surplus claim. Both time series are scaled by the US GDP.

Source: Jiang, Lustig, Van Nieuwerburgh, and Xialan (2020)