Understanding fiscal and monetary policy in 2008-2009.

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Fiscal + monetary policy – questions

- Questions:
  1. Why our current policies?
  2. Will they work?
  3. Is a huge inflation coming? If so, how, when?

Fiscal + monetary policy – analysis

- *Two* conditions in *all* monetary models.

$$\begin{aligned} \frac{M_t + B_t}{P_t} &= E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} \left[T_t - G_t + i_t \frac{M_t}{P_t} \right] d\tau \\ M_t V(\cdot_t) &= P_t Y_t \end{aligned}$$

- Why now? "Normal times" = "fiscal backing" is easy. Now is different.
  1. Money: $r = 0$ means M, B perfect substitutes, M vs. B is meaningless.
  2. Fiscal: Extreme budget situation
     1. At some point, Laffer = fiscal limit.
     2. The government may *choose* a fiscal limit much sooner.
     3. $\rightarrow$ How far off is the fiscal limit?

Fiscal review – aggregate demand

- The fiscal equation a bit more deeply

$$\begin{aligned} \frac{M_t + B_t}{P_t} &= E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau d\tau = E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t\to\tau}} s_\tau d\tau \\ s_t &= T_t - G_t + i_t \frac{M_t}{P_t} \end{aligned}$$

- Mechanism: Low s_{t+j}, will inflate $\longrightarrow$ sell M, B now $\longrightarrow$ inflation now. "Aggregate demand."
- AD = Demand for government debt. Household budget:

$$C + I + \frac{\dot{M} + \dot{B}}{P} = Y - T$$

Fiscal review – unusual effects

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau d\tau$$

- M vs. B is second order. (iM/P) At $i = 0$ quantitative easing (more M, less B) has *zero* efffect.
- Inside money does not matter. $M =$ base, not M1.
- "Real bills."
- $M_t = 0$ works too! "Stock in government"
- $>>$*Future* deficits, money can cause inflation *now*. "Flight from dollar" inflation that the Fed cannot control.
- M, B are "stock in the goverment."
- Derivatives are fun, but governments do not change B without s, or s without B.

Long term debt

- I assumed overnight (floating rate) debt to get to

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau d\tau$$

- Long term debt changes the timing.
  1. An extreme example: a perpetuity with coupon c, no new debt sold.

$$\frac{c}{P_t} = s_t$$

  2. PV equation still holds, but bond prices $Q_t^{(j)} = E_t\left(\frac{\Lambda_{t+j} P_t}{\Lambda_t P_{t+j}}\right)$ can change

$$\frac{B_t}{P_t} = \frac{\int_{j=0}^{\infty} Q_t^{(j)} B_t^{(j)} dj}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau d\tau,$$

  3. If $E_t s_{t+j}$ declines, first rates rise, then, P_{t+j} rises.
  4. In general: complex. Usually, rates rise (lower numerator), then π.
  5. US debt is relatively short so the simple model works ok at 1-2 year horizon.

Fiscal review – coordination and regimes

- Fiscal + monetary coordination

$$\begin{aligned} \frac{M_t + B_t}{P_t} &= E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau d\tau \\ M_t V_t(\cdot) &= P_t Y_t \end{aligned}$$

1. Regimes and reality.
2. *Not* about FTPL, "which equation". Both equations hold in every model, "regime."
3. ="Is the fiscal backing of monetary policy adequate to anchor (or loosen the anchor of) inflation expectations?"

Sargent and Wallace

- Sargent and Wallace "Unpleasant monetarist arithmetic". *Real* debt

$$JC \quad : \quad \frac{B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} \left(T_\tau - G_\tau + \frac{dM_\tau}{P_\tau} \right) d\tau,$$

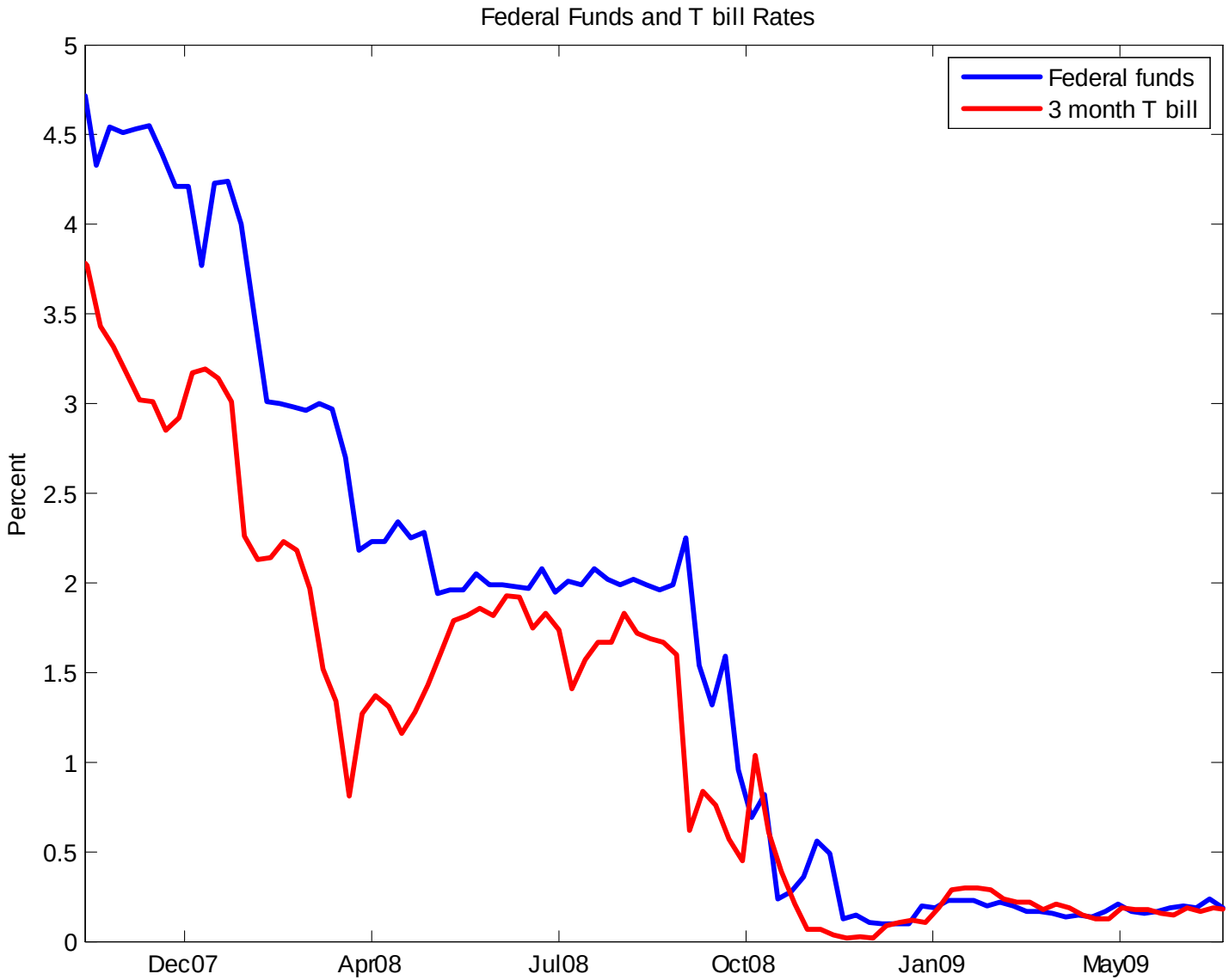
$$SW \quad : \quad b_t = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} \left(T_\tau - G_\tau + \frac{dM_\tau}{P_\tau} \right) d\tau,$$

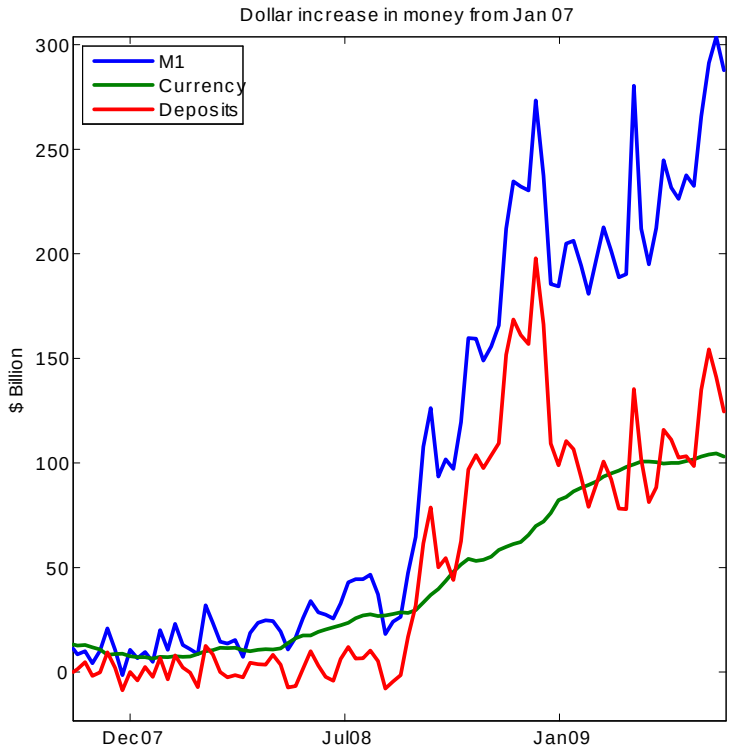
- SW: Seigniorage to pay budget, P_t from Cagan dynamics

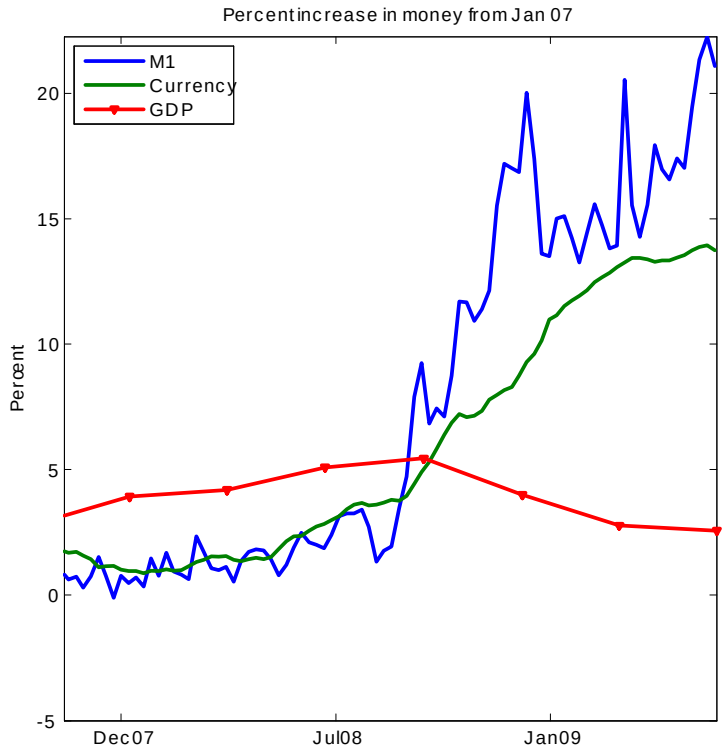
$$M_t V \left[E_t \left(\frac{P_{t+1}}{P_t} \right) \right] = P_t Y_t$$

- JC: Don't need seignorage, future $T - G$ affects P_t directly. P_t can devalue B_t, not with real debt.
- Real debt = debt. Nominal debt = equity.

2008-2009 – money.




Dollar increase in money from Jan 07
M1
Currency
Deposits
$ Billion
300
250
200
150
100
50
0
Dec07
Jul08
Jan09


Percent increase in money from Jan 07
M1
Currency
GDP
Percent
20
15
10
5
0
-5
Dec07
Jul08
Jan09

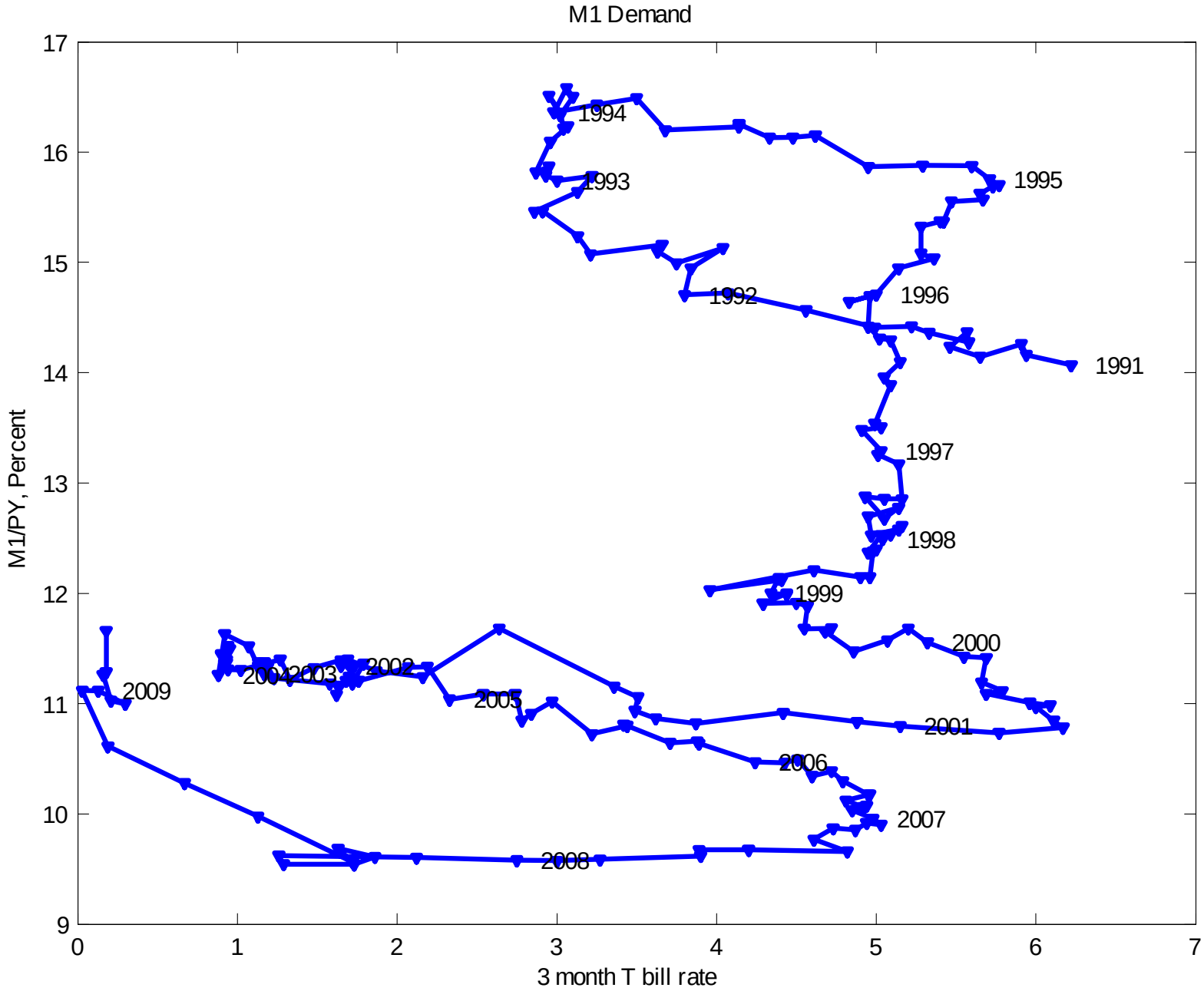
Money stock

Money and Debt

- Conventional measures (M1, TB, FF) – very expansionary
- Interpretation

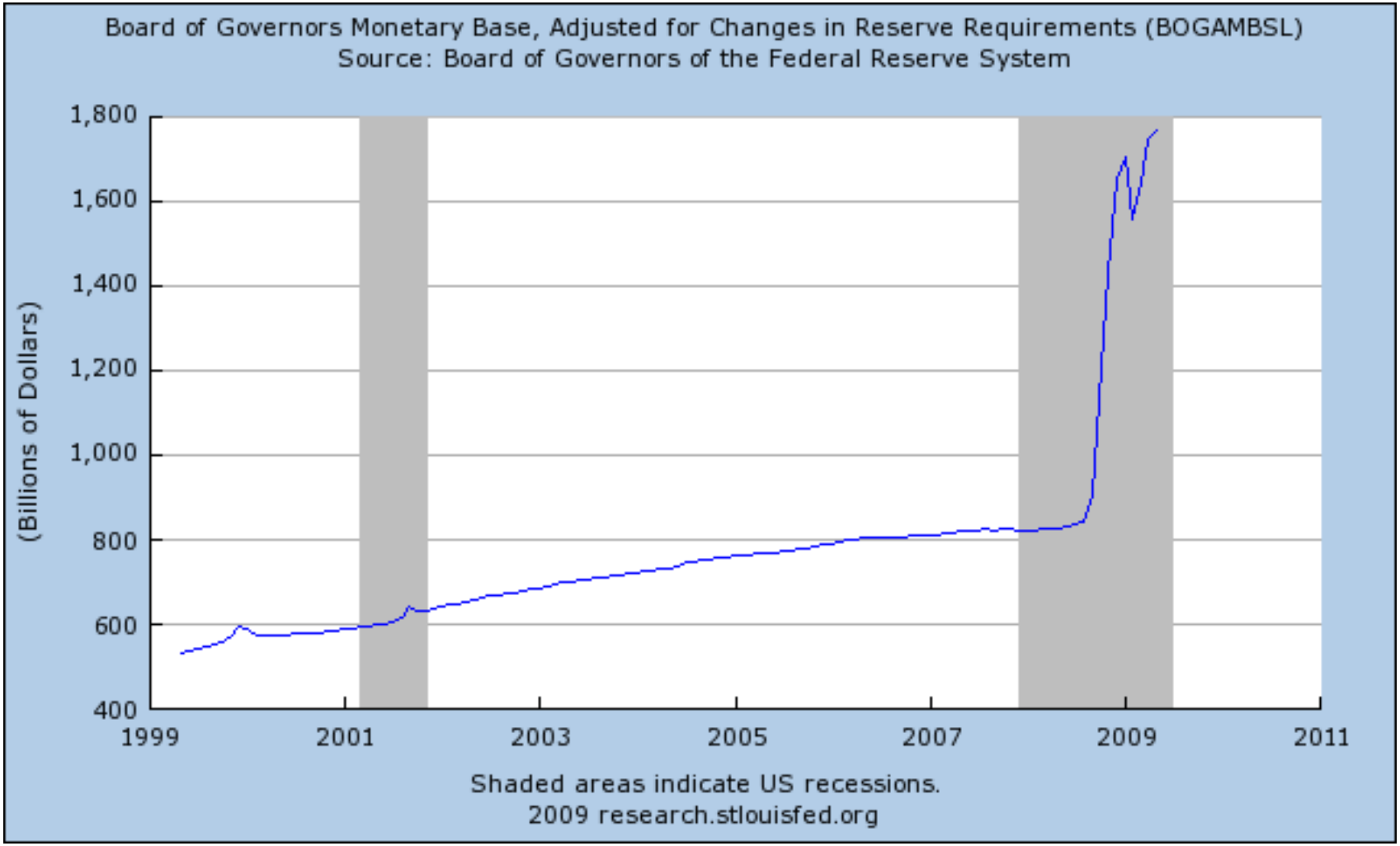
$$M_t V(\cdot_t) = P_t Y_t$$

1. Accomodate precautionary M^d rise? Firms borrow to hold cash.
2. "Stimulate"?

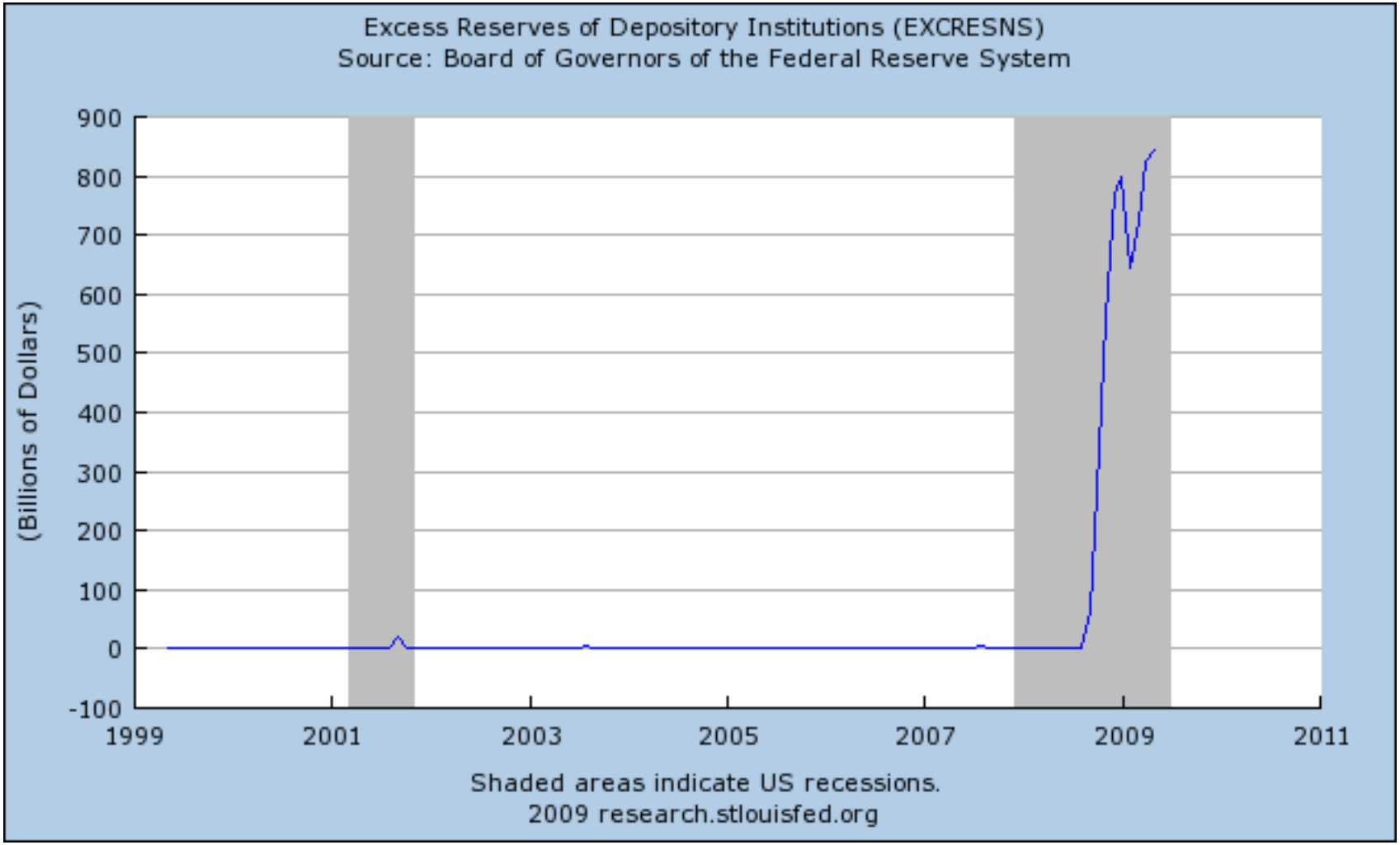

M1 Demand
M1/PY, Percent
3 month T bill rate
17
16
15
14
13
12
11
10
9
0
1
2
3
4
5
6
7
1994
1993
1995
1992
1996
1991
1997
1998
1999
2000
2004
2003
2002
2009
2005
2001
2006
2007
2008

Deeper measures – more dramatic.

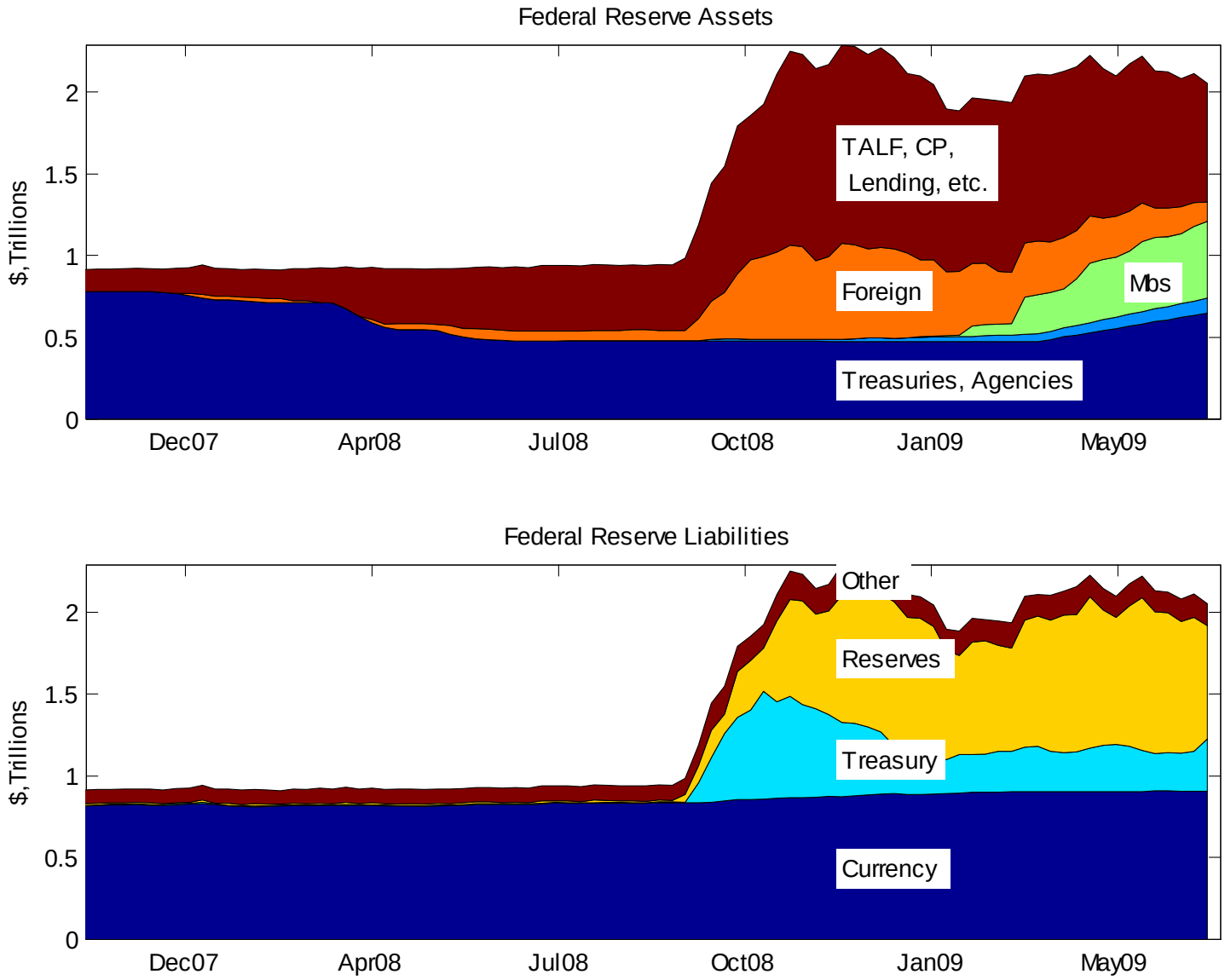
- Monetary base



Excess reserves



Fed balance sheet H.4.1



Money and Debt

- Monetary policy: More money, *less* bonds. In fact, a huge demand for *both M, B.* "Flight to quality."
  1. All Government rates decline, large liquidity spread, Dollar rises.
  2. T bills become the only repo. If you have a bond, you can borrow a dollar.
  3. The *distinction* between M, B is meaningless. Banks, financial institutions *wanted more of both.*
  4. Demand for "liquidity," no credit risk, not "transactions services"

Debt and AD

- Interpretation? R decreased dramatically. "Liquidity" "special" demand for *all* US government debt = less "AD."

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{1}{\rightarrow R_{t,\tau} \leftarrow} s_\tau$$

- + Choose your favorite non-neutrality so "aggregate demand" fall (demand for more treasury debt) means lower Y as well as lower P.
- Understand "aggregate demand" fluctuations as demand for US debt, unrelated to $E_t s_{t+j}$?

M and B Accommodation

- Response: Accommodated. *More of both M, B.*
  1. Issued M, B, took in private assets. Fed balance sheet doubles, exchange *Treasuries* for *private debt*.
  2. Massive B issue.
  3. Government guarantees change private to public debt.
- How does it work? "More of both" raises "AD" by lowering the liquidity premium.

$$\begin{aligned} D_t &= \text{Private debt owned by the Government} \\ \frac{M_t + B_t - D_t}{P_t} &= E_t \int_{\tau=t}^{\infty} \frac{1}{\rightarrow R_{t,\tau}(M+B) \leftarrow} s_\tau \end{aligned}$$

- Friedman/Schwartz advice applied to *debt*
- CP, MBS, long-term Treasury purchases to drive down specific rates. Fed sees money-like liquidity, segmented markets, everywhere!

Fiscal stimulus

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t,\tau}} s_\tau d\tau$$

- Trillions/year higher M, B, lower s_τ
- Can "fiscal policy stimulate aggregate demand?"
  1. If expected *future* s_τ rises with higher B_t, lower s_t, no.
  2. If promised future s_τ does not rise, yes.
  3. It's ok to have "non-Ricardian" expectations for *nominal* debt.
- Implication: Reading history / estimating multipliers lacks identification.

Will it stimulate? – current debates

- Expected future deficits matter, not current flows.

$$\frac{M_t + B_t}{P_t} = E_t \int_t^\infty \frac{1}{R_{t,\tau}} s_{t+j}$$

  It does *not* matter (here) that "the spending will come too late." Convincing us of long future s *does* matter

- Fiscal-monetary stimulus is really hard to do.

$$\text{Real revenue } = (E_{t+\Delta} - E_t) \left(\int_{\tau=t}^\infty \frac{1}{R_{t,\tau}} s_\tau \right).$$

1. Bond sales *are set up* to convey $E_t s_\tau$, raise revenue.
2. Contrast with currency reform – $E_t s_\tau$ is the only difference!

Fiscal-monetary stimulus is hard to do

- Helicopter drop

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t,\tau}} s_\tau$$

1. A drop is *fiscal* – transfer payment.
2. Option 1: Issue B, spend s, Fed buys B for M. Option 2: Drop M
3. If there is no change in s_τ, ("Fed will soak up the money tomorrow") *neither* will work.
4. "Helicopter" is about *expectations of future s.*
5. You can't *inflate* (especially at $r = 0$) without (lack of) fiscal backing, changing long term s expectations (Japan?)

Will it stimulate – what are s expectations?

1. Long-term budget says "no T, spend it now."
2. Newfound budget concern. No clear commitment to a fiscal inflation (good!)
3. *Revenue and interest rates from bond sales can* **measure** *"Ricardian" expectations.* Revenue, low rates $\longrightarrow$ "Ricardian" expectations.
4. Summary: $E(s)$ not bad. Yet. This means little stimulus.

Inflation outlook / Exit strategy

- *Will* the Fed soak up the extra cash? – Trade M for B? $(MV = PY)$
- *Can* the Fed soak up extra cash? A: Yes *if* it can sell treasuries.
- Will doing so make any difference? A: Not at the fiscal limit.

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} s_\tau d\tau$$

- Q: Where is the fiscal limit? A:$3 trillion closer than last year!
- Fiscal limit novelties
  1. Flight happens quickly, unpredictably
  2. P does not wait for seigniorage (all)
  3. Credit guarantees and the dynamic Laffer limit...

Credit guarantees

- Yes, debt/GDP is still low, and probably below 200% for several years.
- But credit guarantees (13 Trillion +) + ex-post bailouts mean
  1. Defaults give big shocks to s
  2. Temptation to inflate is larger

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{\Lambda_\tau}{\Lambda_t} s_\tau(P_\tau);\ s' > 0$$

(20% rise in P = 20% default on nominal debt = "solve" a lot of problems!)

- Lots of debt *before* future s news? Total required inflation is smaller. 1970s, not Argentina/Zimbabwe

Dynamic Laffer curve

1. Static Laffer curve

$$T_t(\tau_t) = \tau_t Y_t$$

$$\frac{\partial \log T_t}{\partial \log \tau_t} = 1 + \frac{\partial \log Y_t}{\partial \log \tau_t} < 1 \quad (< 0?)$$

If $\tau = 0.30$ to $\tau = 0.35$ lowers Y by 15%, $(\log(0.35/0.30) = 0.15)$ we're at the limit.

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2. Dynamic – if taxes lower growth it's much worse – a new term appears

$$\begin{aligned} T_t &= \tau Y_0 e^{gt} \\ PV &= \int \frac{1}{e^{rt}} T_t dt = \frac{\tau Y_0}{r-g} \\ \frac{\partial \log PV}{\partial \log \tau} &= 1 + \frac{\partial \log Y_0}{\partial \log \tau} + \frac{1}{(r-g)} \frac{\partial g}{\partial \log \tau} \end{aligned}$$

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- $r - g = 0.02$;if $\tau = 30\%$ to $\tau = 35\%$ lowers growth by 0.3%, we're at the limit.

$$\log(0.35/0.30) = 0.15;\ 0.02 \times 0.15 = 0.003$$

Will fiscal inflation "stimulate," or "stagflate?"

- Mankiw, Shapiro, etc.: "a little inflation would be a good thing" (Phillips boom, cancel nominal debts.) Krugman: Don't worry about inflation, no "demand" yet.
- Will fiscal inflation be stagflation? Inflation without "demand" / Phillips curve?
- Monetary examples: currency reform, supply shocks, rise in expectations "loss of anchoring" – all give inflation without a boom.
- Fiscal examples: Hyperinflations, currency collapses. Zimbabwe, Argentina?

Will fiscal inflation "stimulate," or "stagflate?"

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t,\tau}} s_\tau d\tau$$

- Four kinds of fiscal inflation – do they all have the same output effects?
  1. Unexpectedly printing money / short term debt (M_t, B_t) (Maybe)
  2. Selling debt $B_t^{(j)}$ w/o s_{t+j} causes expected future inflation P_{t+j}.
  3. Shocks to prospective deficits, bailouts (s) (Maybe not)
  4. Rise in premium (flight from currency/debt)(R) (Maybe not)
- Does a fiscal inflation (R, s) mean stagflation? Mechanism: try to buy other assets, not goods and services.
- Fiscal backing = "anchoring expectations." When that goes, you get stagflation not a boom.
- Moral: Inflation without "demand" *can* happen. It *has* happened 1970s, other countries.
- Needed: theory and experience of fiscal inflation + output effects.

Bottom line

$$\frac{M_t + B_t}{P_t} = E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t,\tau}} s_\tau d\tau$$

1. "Flight to quality" R raises demand for M, B, lowers "aggregate demand." We understand Gov't efforts to meet demand for *both* M, B
2. Stimulus, Non-Ricardian expectations are rational with nominal debt.
3. Explains loud announcements of future deficits. (But it's not clear they really want to inflate!)
4. Measure expectations? Still Ricardian!
5. Outlook
    1. Credit guarantees: more likely π.
    2. Dynamic Laffer curve – slow growth is the enemy.
6. All sources of inflation – M, B, s, R - do not have the same output effects. Currency collapses are not booms! Fiscal = "anchor" disappears, may shift the Phillips curve.

Forecast?

$$\begin{aligned} \frac{M_t + B_t}{P_t} &= E_t \int_{\tau=t}^{\infty} \frac{1}{R_{t,\tau}} s_\tau d\tau \\ M_t V_t(\cdot) &= P_t Y_t \end{aligned}$$

- The fiscal equation is surely at the center of events right now.
- Inflation? No forecast but scenario that takes a few years
  1. More bailouts, spending, no entitlement resolution.
  2. *Slow growth*, distorting taxes, expectations of decade + growth decline
  3. Flight from long bonds, dollar.
  4. Fed "models don't work" "shifting Phillips curve" like the 70s.

The End

- The end

Intellectual forecast

- $MV = PY$, constant V, hence worry about aggregates.
- Targets, "managing expectations" (other than by fiscal backing).
- Monetary policy without fiscal limits.

2008-2009 – money

- Money: Deposits, Reserves up!