Monetary & Fiscal Policy & Inflation

Eric M. Leeper

Indiana University

Trinity Network, November 2015

What I'll Do

1. Describe how the policy environment has changed
   - deregulation, new Fed behavior, developments in credit markets central to this
2. The new reality implies the old story about price-level determination cannot hold
   - Are money and monetary policy still "special"?
3. Review conventional and fiscal theory explanations of price-level determination
   - employ a very simple analytical model to make points clear
4. Tomorrow Sims will focus on fiscal policy and deflationary traps

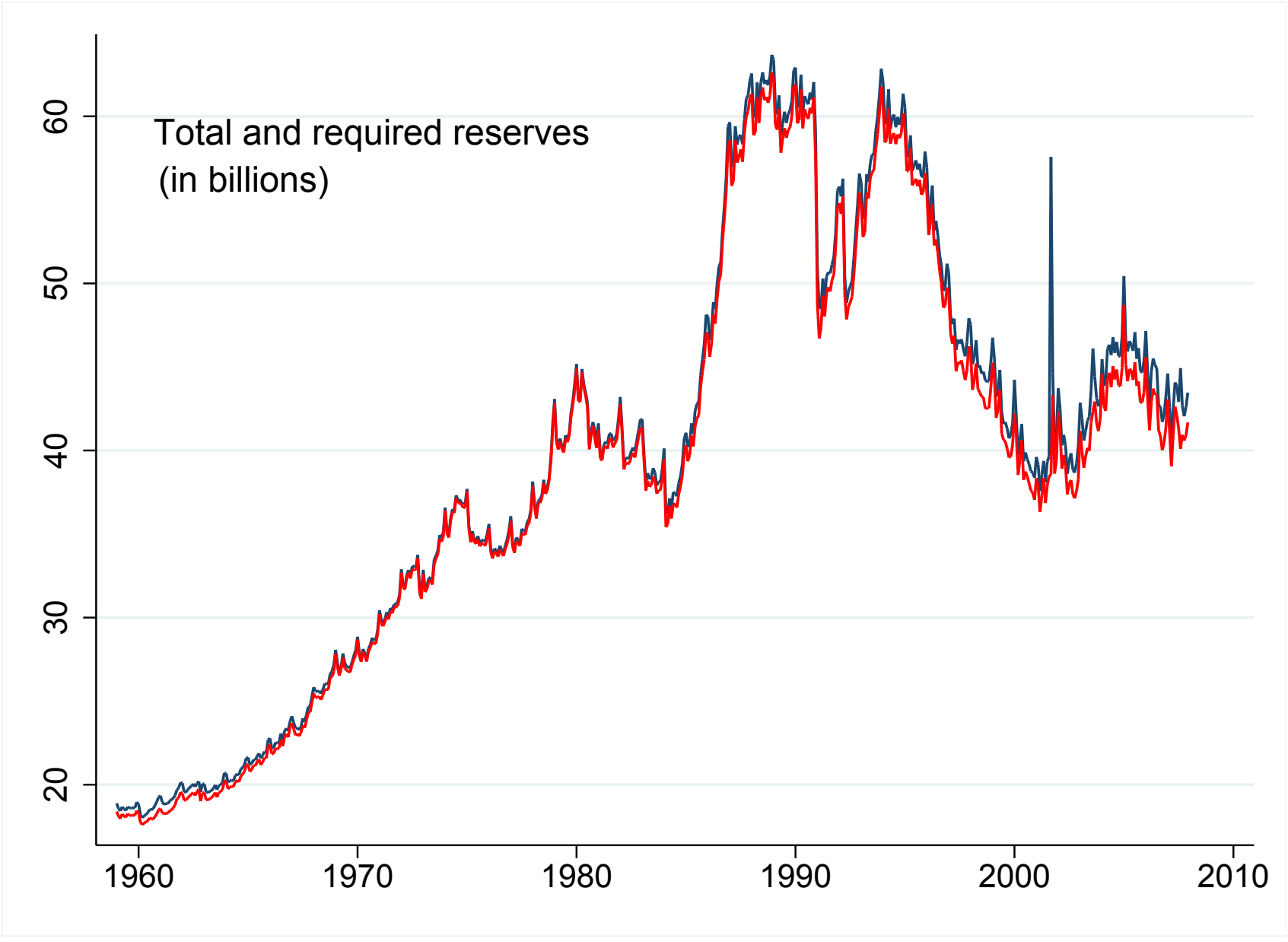
Why the Price Level?

- Why focus on price-level determination?
  - monetary & fiscal policies may have many other—and perhaps more important—effects on economy
- Price-level determination is first step
  - study price-level determination *before* studying more complicated things
  - permits use of simple models & derive sharp analytics
  - once we get price-level determination straight, can move onto study possible non-neutralities

The Old Story

- Money is “special”
- In the market for reserves:
  - frictions separate demand for “money” from demand for other assets
  - currency & reserves do not pay interest
  - banks’ problem: meet reserve requirement at minimum cost
  - federal funds rate the opportunity cost of reserves
  - demand for reserves: derived from intermediaries who use deposits to “produce” loans
    $TR^d = f(i^F, P, w, i^L, \ldots)$
  - open-market operations change “excess reserves”
  - changes in excess reserves affect bank loans & broad money

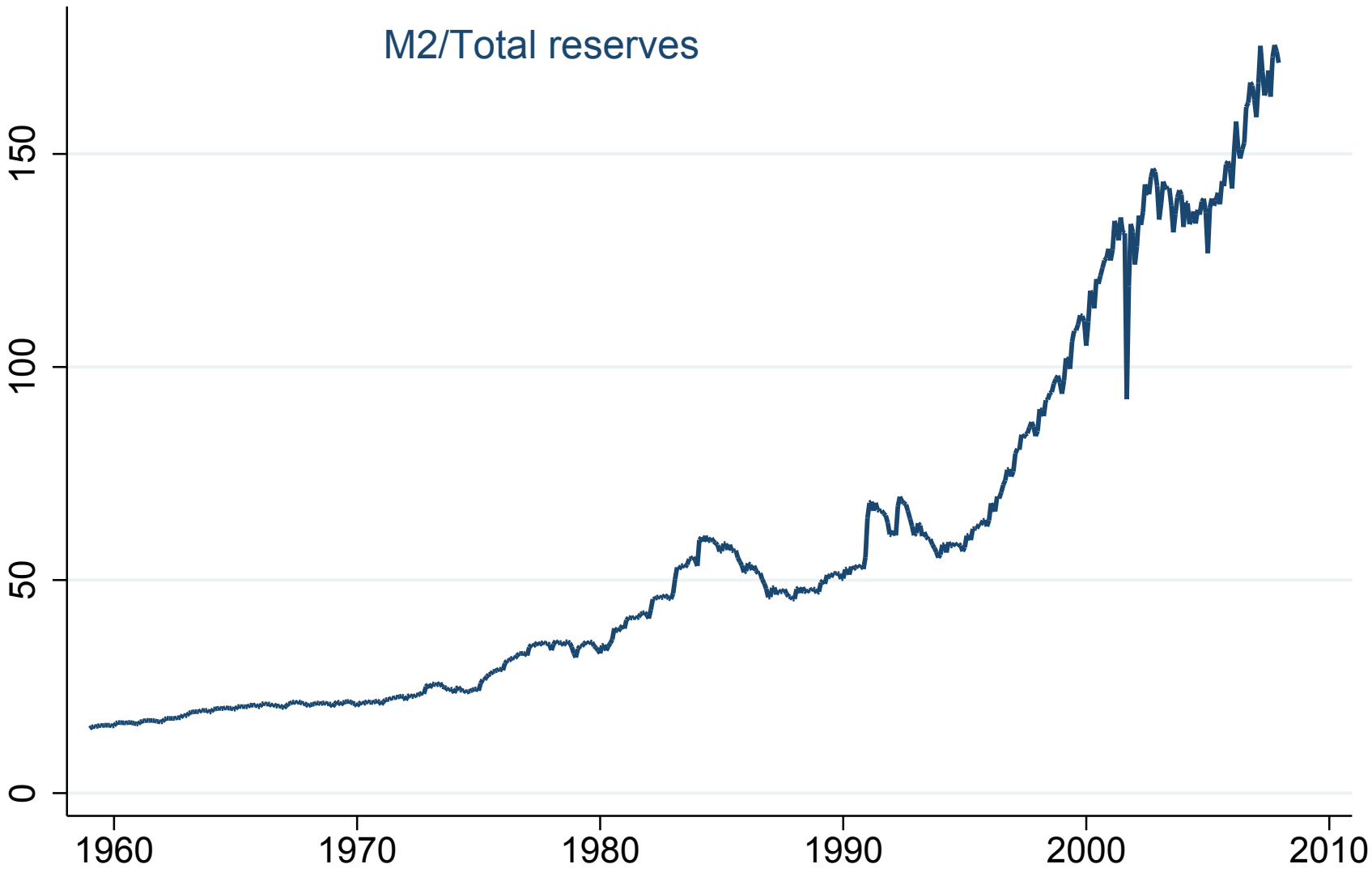
Reserves: Total & Required



The Old Story

- In the market for broad money:
  - monetary policy affects economy through supply of broad money
  - portfolio choice: how to allocate saving between "money" and interest-paying assets
  - nominal interest rate the opportunity cost of money
  - demand: $M^d = f(i^L, i^M, P, w, \ldots)$
  - equilibrium P makes supply $=$ demand
- The old story replies on "money" being special
  - narrow money pays no interest
  - broad money earns rate less than Treasuries
  - ensures well-defined demand for "money"

Money Multiplier

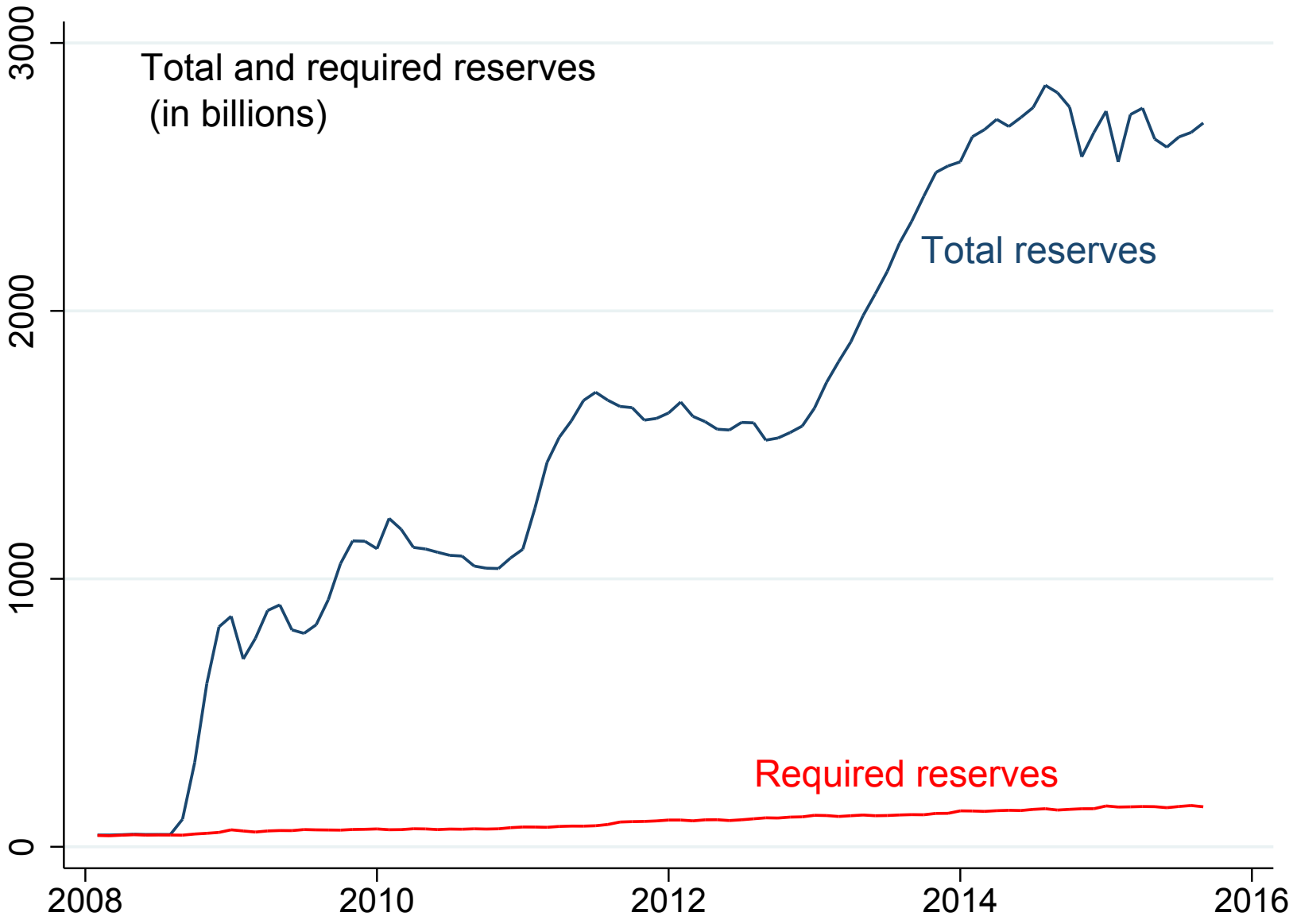


The New Reality

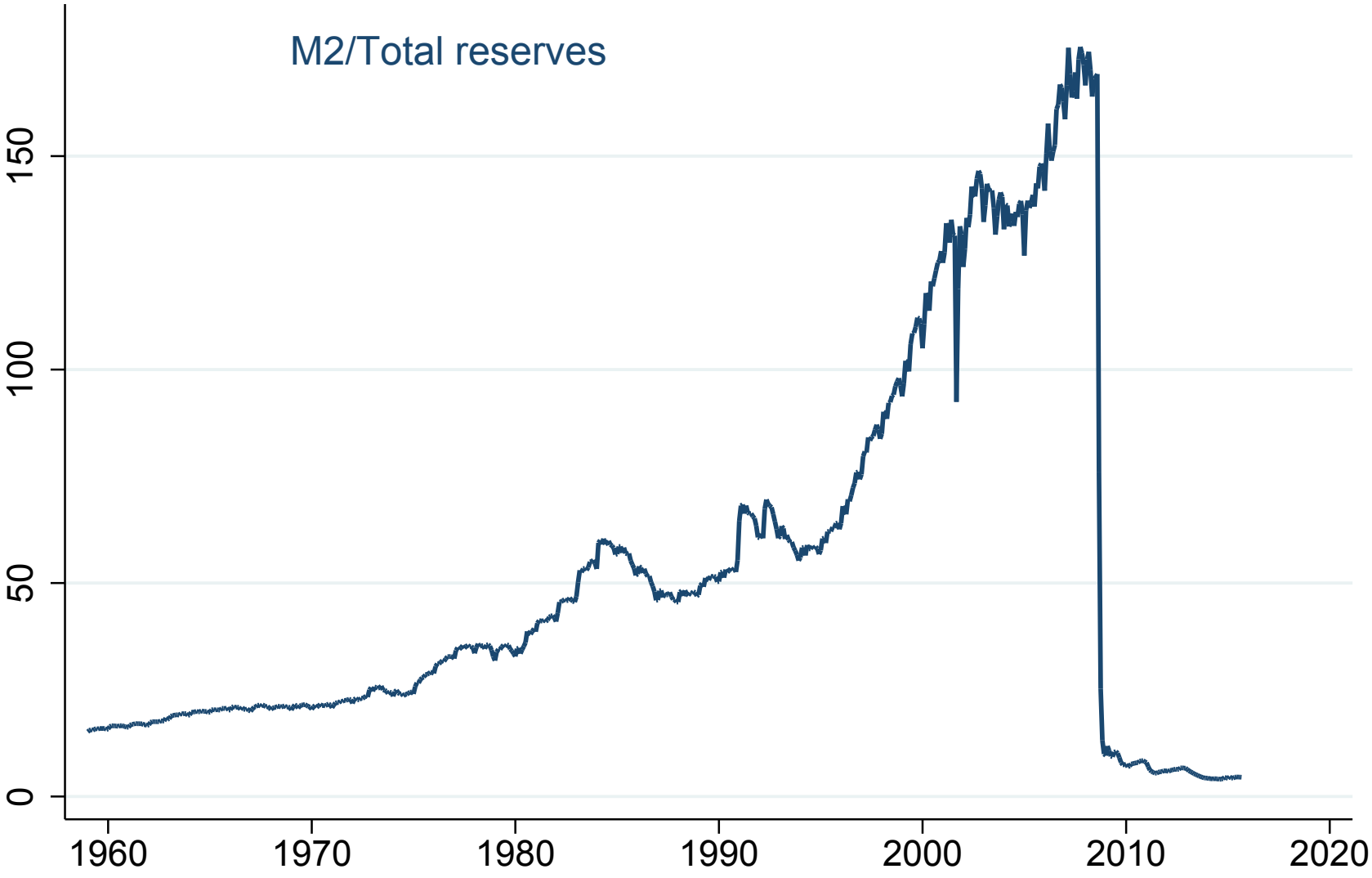
- Post-2008, Fed's balance sheet exploded from large-scale asset purchases
- LSAPs paid for primarily by creating reserves
- Oct. 2008, Fed begins to pay interest on reserves
- IOR higher than funds rate over period
- Reserves demand not simply a derived demand
- Banks now hold massive reserves
- Makes reserve requirements non-binding
- Old story of ΔReserves $\Rightarrow$ ΔMoney $\Rightarrow$ ΔP falls apart

	Total	Required	Excess
Aug. 2008	\$46 B	\$44 B	\$2 B
Aug. 2009	\$829 B	\$63 B	\$766 B
Sept. 2015	\$2.7 T	\$149 B	\$2.55 T

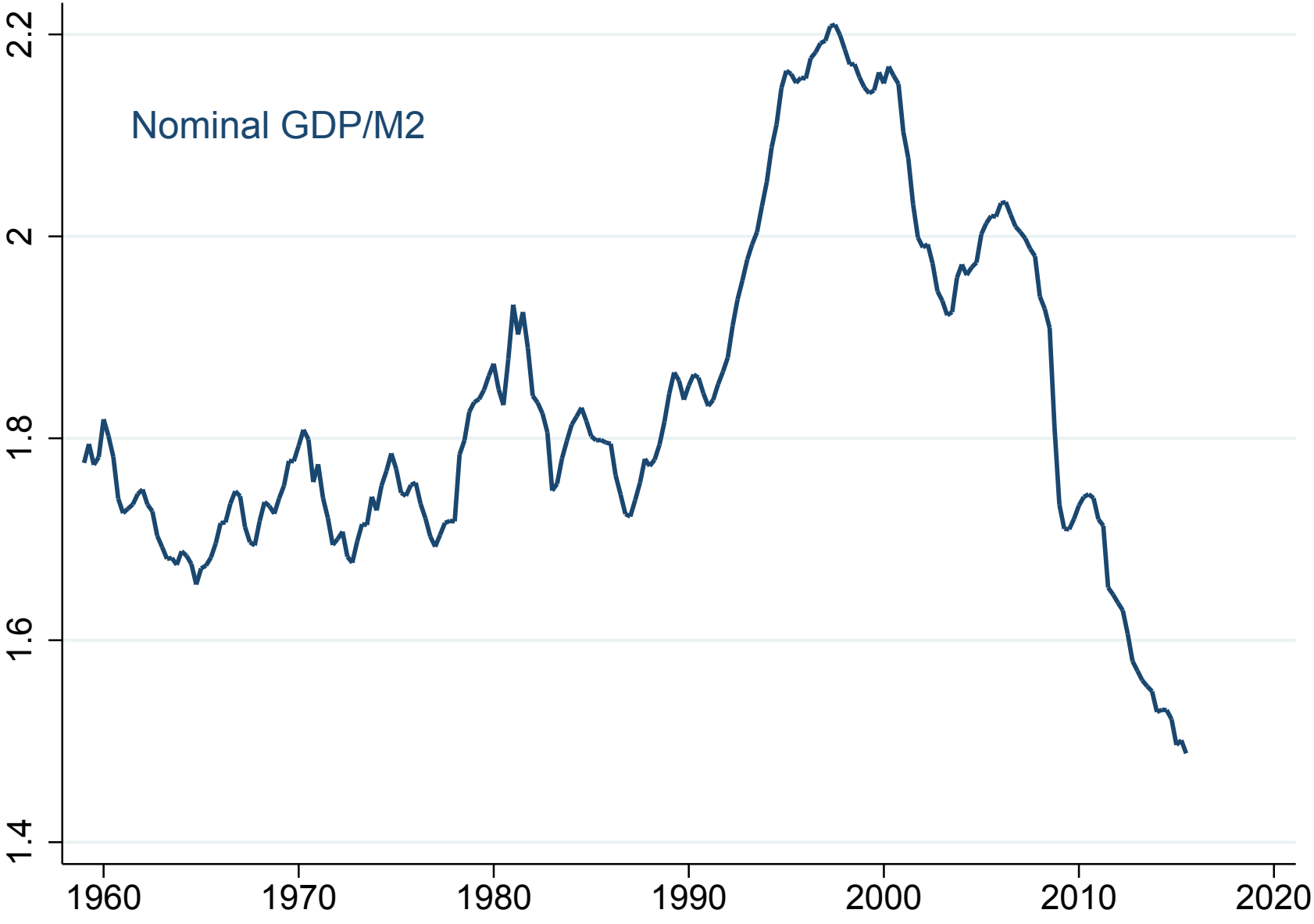
Reserves: Total & Required



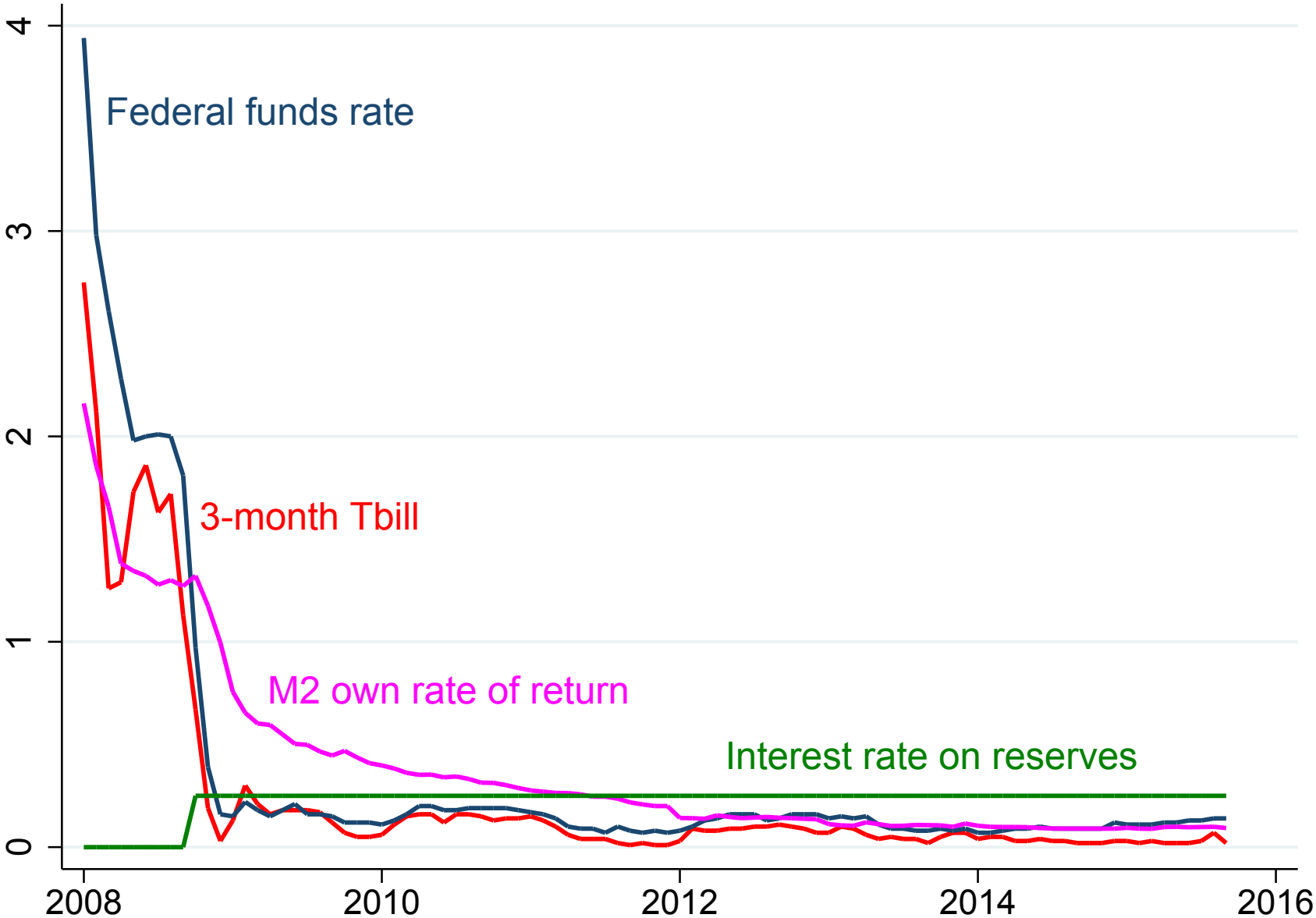
Money Multiplier



Velocity



Four Interest Rates



Recent rates: $i^R > i^M \approx i^F > i^T$

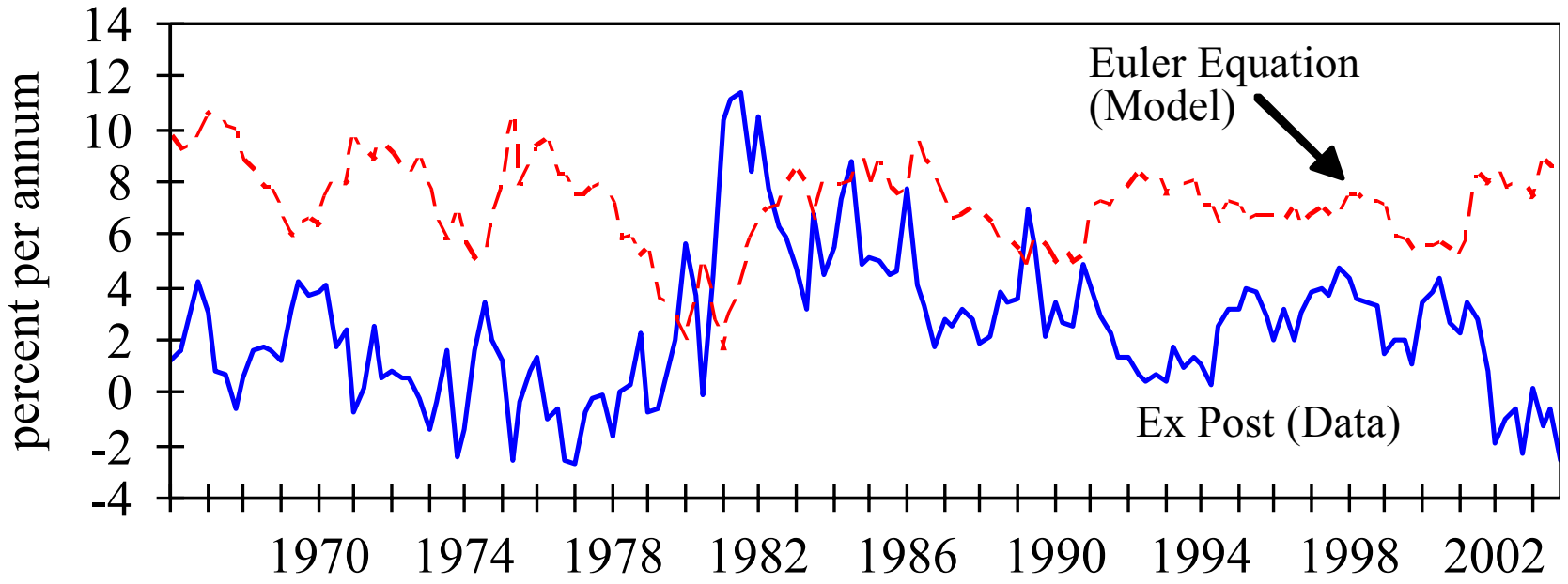
Has Money Lost Its Specialness?

- With IOR, monetary policy lost the margin on which reserves operates
  - with $2.55 trillion in excess reserves, do impacts of open-market operations on reserves matter?
  - not obvious if monetary policy can affect *any* quantity margin
- Reserves & treasuries are distinct
  - reserves usable only for clearing transactions among Fed member banks
  - treasuries serve as collateral in repo market
- $i^T <$ other i is a sign of the "specialness" of Treasuries
  - how does demand for Treasuries affect transmission of monetary policy?
  - what does demand tell us about credit market conditions?

Has Monetary Policy Lost Its Specialness?

- New Keynesian response: we don't need to pay attention to money
- Modern analysis abstracts completely from all Ms
- Monetary policy is all about controlling short-term nominal interest rate
- Which interest rate?
  - the rate in the consumption Euler equation
  - funds rate? rate on reserves? repo rate? Tbill rate?
  - most new Keynesian models use funds rate in Euler equation
- Do either i^F or i^R matter for economic behavior?
  - can changes in i^F or i^R shift spectrum of interest rates (as the Fed seems to believe)?

Real Interest Rates



U.S. data and CRRA Euler equation
Mismatch holds across many model specifications
Source: Canzoneri, Cumby, Diba (2007)

How is Price Level Determined?

- Against this backdrop, reasonable to ask whether monetary & fiscal policies can determine P
- Let's review the two standard ways for thinking about P determination
  - focuses on monetary & fiscal policy
  - financial stability policy not integrated
- At the end, I return to raise several open questions

Policy Interactions: Big Picture

- Modeling convention
  - Canonical macro models assume

  1. MP can and does control inflation
  2. FP can and does ensure solvency

  1. MP optimal or obeys Taylor-type rule
     - unconstrained or “active”
  2. FP takes MP & private behavior as given and stabilizes debt
     - constrained or “passive”
- This modeling convention seemed to make sense in normal, pre-crisis times
  - embedded in textbooks (Walsh, Woodford, Galí)
- It makes MP omnipotent, FP trivial, and financial policy is assumed away

Policy Interactions: Big Picture

- Modeling convention a stretch since 2008
  - What have policies actually been doing?
  1. MP at or near zero lower bound
  2. major financial stability actions taken
  3. FP bouncing between stimulus & austerity
  1. Central banks aggressively pursuing growth
     - thrown Taylor principle out the window
  2. LSAPs and bailouts (private & public institutions)
     - dramatically altered initial conditions
  3. Recent fiscal advice from IMF:
     - 2008–2009: urgent need to stimulate
     - 2010–2011: urgent need to consolidate
     - 2012–now: urgent need for stimulative consolidation
- How can such policies anchor expectations on Fed's inflation target?
- How can such policies anchor expectations on debt stabilization?

Policy Interactions: Big Picture

- Policy responses to crisis deviated from convention

1. Recession & fiscal stimuli initiated sovereign debt troubles
2. Central banks took actions that look like fiscal policy
3. At the zero lower bound, fiscal impacts amplified
4. Banking crisis created sovereign debt crisis (Ireland)
5. Sovereign debt crisis begat deep recession (Greece)
6. Exploding central bank balance sheet raises question of fiscal backing (euro area)
7. Maturity structure of outstanding debt held by private sector heavily tilted toward short term (U.S.)

- Many of these actions have significant distributional consequences

Messages

1. Effects of monetary policy—open-market operations— depend on the sense in which fiscal policy is "held constant"
2. Effects of fiscal policy—bond-financed tax cuts—depend on the sense in which monetary policy is "held constant"
3. MP cannot uniquely determine inflation; FP can
4. MP can uniquely determine *bounded* inflation—if FP cooperates
5. If FP does not cooperate, MP cannot affect economy in usual ways
6. Without credible, enforceable fiscal rules that anchor expectations on appropriate FP behavior, fiscal disturbances *always* affect economy

General Points About Inflation

- Why does fiat currency have value?
- Because the government accepts currency—and only currency—in payment of taxes
- Inflation arises when government prints more currency than it eventually absorbs in taxes
  - people try to get rid of currency & buy things
  - pushes up prices & wages
- Government can soak up currency by selling bonds
  - does this when it spends more—handing out currency—than it taxes—soaking up currency
- Nominal bonds—like fiat currency—are promises to pay back more currency in future
- If government doesn't soak up bonds with taxes. . . inflation

General Points About Inflation

- Just as money gets its value from taxes. . .
- Monetary policy gets its power from fiscal backing
- When fiscal backing is assured, MP operates as taught in textbooks
  - MP can control inflation
  - higher interest rates—open-market sale of bonds—reduce consumption & inflation
- But only if future taxes rise to soak up bonds
  - higher taxes eliminate the wealth effects of higher interest payments on government debt
- Otherwise, higher rates. . .
  - raises wealth, reduce value of bonds, increase aggregate demand & inflation
- It's all about fiscal backing

Overview of Old & New Views

- Central to old view is

$$MV = PY$$

or

$$C_t = E_t C_{t+1} - \sigma(i_t - E_t \pi_{t+1})$$

- Central to new view is

$$\frac{(1 + i^M)M_{t-1} + Q_t B_{t-1}}{P_t} = E_t PV(surpluses_{t+k})$$

- All models embed both equilibrium relationships
- Differences emerge from causal links in two views
- Causal links require moving beyond equilibrium conditions

The Model

- Endowment economy at the cashless limit; complete financial markets, one-period nominal debt
- Representative household maximizes

$$E_0 \left\{ \sum_{t=0}^{\infty} \beta^t U\left(C_t\right) \right\}$$

subject to sequence of flow budget constraints

$$P_t C_t + P_t \tau_t + E_t[Q_{t,t+1} B_t] = P_t Y_t + P_t z_t + B_{t-1}$$

given $B_{-1} > 0$

- $Q_{t,t+1}$: nominal price at t of an asset that pays \$1 at $t+1$
- m_{t+1}: real contingent claims price
- $Q_{t,t+1} = \frac{P_t}{P_{t+1}} m_{t,t+1}$: no-arbitrage condition
- Nominal interest rate, R_t: $\frac{1}{R_t} = E_t[Q_{t,t+1}]$

The Model

- Can write HH's real intertemporal b.c. as

$$E_t \sum_{j=0}^{\infty} m_{t,t+j} C_{t+j} = \frac{B_{t-1}}{P_t} + E_t \sum_{j=0}^{\infty} m_{t,t+j} (Y_{t+j} - s_{t+j})$$

  $s_t \equiv \tau_t - z_t$
- $m_{t,t+j} \equiv \prod_{k=0}^{j} m_{t,t+k}$ is real discount factor, $m_{t,t} = 1$
- HH choices also satisfy the transversality condition

$$\lim_{T \to \infty} E_t \left[m_{t,T} \frac{B_{T-1}}{P_T} \right] = 0$$

- It is not optimal for HHs to overaccumulate assets

The Model

- Impose equilibrium, $C_t = Y$, and TVC to get two eqm conditions

$$\frac{1}{R_t} = \beta E_t \frac{P_t}{P_{t+1}} \equiv \beta E_t \frac{1}{\pi_{t+1}}$$

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t s_{t+j}$$

  $s_t \equiv \tau_t - z_t$ (We assume $0 < E_t PV(s) < \infty$)

- Price sequence $\{P_t\}$ must satisfy these to be an eqm (markets clear & HH's optimization problem solved)
- Without additional restrictions from policy behavior, there are many possible eqm $\{P_t\}$ sequences
- Note: we do not distinguish money & credit markets
  - no financial frictions

The Model

- Specify policy rules & government budget constraint

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

$$s_t = s^* + \gamma\left(\frac{B_{t-1}}{P_t} - b^*\right)$$

$$\frac{E_t[Q_{t,t+1}B_t]}{P_t} + s_t = \frac{B_{t-1}}{P_t}$$

- Steady state

$$\frac{B_{t-1}}{P_t} = b^*, \quad s^* = (1-\beta)b^*, \quad R^* = \frac{\pi^*}{\beta}, \quad m^* = \beta$$

The Model

- Combine MP rule w/ Fisher equation
- Combine FP rule w/ government budget constraint
- Dynamical system in inflation, π_t, and real debt, b_t, after imposing asset-pricing relations and market clearing

$$E_t\left(\frac{1}{\pi_{t+1}}-\frac{1}{\pi^*}\right)=\frac{\alpha}{\beta}\left(\frac{1}{\pi_t}-\frac{1}{\pi^*}\right)$$

$$\frac{B_t}{P_{t+1}}-b^*=\frac{1-\gamma}{\beta}\left(\frac{B_{t-1}}{P_t}-b^*\right)$$

where $\frac{B_t}{P_{t+1}}\equiv b_t$ and $b^*=\frac{B_t}{P_{t+1}}$ in steady state and in equilibrium $m_{t,t+1}=\beta\frac{U'(C_{t+1})}{U'(C_t)}=\beta\frac{U'(Y)}{U'(Y)}=\beta$

Two Tasks of Policy

- 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:** conventional new Keynesian
- **Regime F:** fiscal theory of price level

Regime M Policy Behavior

- MP behavior completely familiar: target inflation by aggressively adjusting nominal interest rates
- FP adjusts future surpluses to cover interest plus principal on debt
- In terms of policy rules

Regime M: $\alpha/\beta > 1$ & $\gamma > 1 - \beta$

- Taylor principle
- Taxes adjust to service & retire debt

Regime M Equilibrium

- Unique *bounded* equilibrium is

$$\pi_t = \pi^*$$

- And expected evolution of government debt is

$$E_t\left(\frac{B_t}{P_{t+1}} - b^*\right) = \frac{1-\gamma}{\beta}\left(\frac{B_{t-1}}{P_t} - b^*\right)$$

  which ensures $E_t b_T \to b^*$ as $T \to \infty$
- But. . . also a continuum of equilibria with

$$\lim_{T\to\infty} \pi_T = \infty$$

- Neither MP nor private behavior rules out equilibria with $\pi_t = \infty$ or deflationary traps
- This can be resolved only by fiscal policy (Sims tomorrow)

Regime M Fiscal Policy

- What is FP doing in Regime M?
  - 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
- An aside: Can rule out equilibria with $\pi_t \to \infty$ where $b_t \to 0$, so $s_t \to 0$
  - FP commits to a fixed floor value of debt, $\underline{b}$
  - surplus rule becomes $\underline{s} = (1-\beta)\underline{b}$
  - this requires a switch in fiscal regime
  - ironically, by "passively" supporting MP, FP permits explosive inflation

An Equilibrium Condition

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[s_{t+j} \right]$$

- 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 $E_t PV(s)$

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:** conventional NK
- **Regime F:** FTPL
- Regime F arises in two ways
  1. Sargent & Wallace's unpleasant monetarist arithmetic

Primer on Monetary-Fiscal Interactions

- Unpleasant monetarist arithmetic
  - economy hits the fiscal limit
  - surpluses unresponsive to debt
  - seigniorage adjusts to stabilize debt
  - produces high & volatile inflation
- Many countries have guarded against this
  - central bank independence
  - clear mandate to control inflation—e.g., inflation targeting
- Designed to *force* FP to be passive
- Will focus on second way Regime F can arise

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:** conventional NK
- **Regime F:** FTPL
- Regime F arises in two ways
  1. Sargent & Wallace's unpleasant monetarist arithmetic
  2. fiscal theory of the price level

Monetary-Fiscal Interactions: Regime F

- Governments issue mostly nominal (non-indexed, local currency) bonds
  - 90% U.S. debt; 80% U.K. debt; 95% Euro-area debt; most of Australian, Japanese, Korean, New Zealand, & Swedish debt
  - increasing important in Latin America: Chile (92%), Brazil (89%), Colombia (77%), Mexico (75%)
- 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

Regime F Policy Behavior

- FP responds weakly (or not at all) to state of government indebtedness
- MP prevents nominal interest rate from reacting strongly to inflation
- In terms of policy rules

$$\textbf{Regime F: } 0 < \alpha/\beta < 1 \text{ \& } \gamma < 1 - \beta$$

- Focus on special case

$$\alpha = 0 \text{ \& } \gamma = 0$$

- Pegged nominal interest rate (e.g., ZLB)
- FP pursues objectives other than debt stabilization

Regime F Equilibrium

- Pegs expected inflation

$$E_t\left(\frac{1}{\pi_{t+1}}\right) = \frac{1}{\beta R^*} = \frac{1}{\pi^*}$$

- Price level determined by

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t\left[s_{t+j}\right]$$

- At t, B_{t-1} predetermined and $E_t s_{t+j}$ a number
- P_t must adjust to equate value of debt to expected cash flows

Regime F Transmission Mechanism

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[s_{t+j} \right]$$

- 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 $\Leftrightarrow$ aggregate demand

Regime F Determinacy

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[s_{t+j} \right]$$

- How do we know that no other $\{P_t\}$ sequence is an equilibrium (especially ones with $P_t \to \infty$)?
- Suppose P_t is "too low": debt over-valued relative to cash flows
  - agents substitute out of debt and into buying goods
  - higher aggregate demand drives up P_t until value of debt consistent with $E_t PV(s)$
- Symmetric argument if P_t is "too high"

An Equilibrium Condition

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[s_{t+j} \right]$$

- In Regime F. . .
  - FP delivers unique equilibrium price process
  - taking inflation as given, MP must choose compatible interest rate policy
  - "compatible" means: stabilizes debt
  - imposes restrictions on P_t (& on MP, if price level to remain stable)

More on the Equilibrium Condition

$$\frac{B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t \left[s_{t+j} \right]$$

- Ubiquitous: holds in *any* model, in *any* regime
  - cannot be used to "test" for regime
- It is not an "intertemporal government budget constraint"
  - have imposed market clearing, Euler equations, transversality (from private behavior)
- Government is *not* restricted to choose $\{s_t\}$ to satisfy it for any $\{P_t\}$ (but it is free to do so)
- Cochrane calls it a "debt valuation equation"
  - with only one-period debt, B_{t-1}/P_t is market value of debt

Why Fiscal Theory $\neq$ Unpleasant Arithmetic

- Equilibrium conditions for nominal and real debt

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

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

- 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
- Fiscal Theory is *not* about seigniorage: if M/P tiny, higher P_t raises backing of nominal debt but not of real debt
- Unpleasant Arithmetic *is* about seigniorage: growing real debt requires growing seigniorage & inflation

Role of Debt Maturity Structure: I

- Allow one- and two-period zero-coupon nominal bonds: $B_t(t+1), B_t(t+2)$; equilibrium condition is

$$\frac{B_{t-1}(t)}{P_t} + \beta B_{t-1}(t+1) E_t \frac{1}{P_{t+1}} = \sum_{j=0}^{\infty} \beta^j E_t s_{t+j}$$

- 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, $B_{t-1}(t+1)/B_{t-1}(t)$
  - shorter average maturity $\Rightarrow$ need larger $\Delta E_t(1/P_{t+1})$ to compensate for given $\Delta(1/P_t)$
- Message: MP not impotent, but it cannot control both actual & expected inflation

Role of Debt Maturity Structure: II

- Allow a consol: perpetuity that pays \$1 each period
- Government budget constraint

$$\frac{Q_t B_t}{P_t} + s_t = \frac{(1+Q_t)B_{t-1}}{P_t}$$

- Asset-pricing relation, in equilibrium

$$Q_t = \beta E_t \frac{P_t}{P_{t+1}}(1+Q_{t+1}) = \sum_{j=1}^{\infty} \beta^j E_t \frac{P_t}{P_{t+j}}$$

- Central bank controls R_t: $1/R_t = P_{St} = \beta E_t(P_t/P_{t+1})$
- Intertemporal equilibrium condition

$$\frac{(1+Q_t)B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t s_{t+j}$$

- FP determines the *present value* of inflation; MP determines the *timing* of inflation

Role of Debt Maturity Structure: II

$$Q_t = E_t \sum_{j=0}^{\infty} \left(\frac{1}{\prod_{i=0}^{j} R_{t+i}} \right) = E_t \sum_{j=1}^{\infty} \beta^j \left(\frac{1}{\prod_{i=1}^{j} \pi_{t+i}} \right)$$

$$\frac{(1+Q_t)B_{t-1}}{P_t} = \sum_{j=0}^{\infty} \beta^j E_t s_{t+j}$$

- Any path of $\{P_t\}$ consistent with these conditions is an equilibrium
- By choosing a (constrained) path for $\{R_t\}$, MP determines when inflation occurs
- Consider two pegged paths for R_t—$\dagger$ & $*$—with $R^\dagger > R^* \Rightarrow Q^\dagger < Q^*$
  - $\pi_t^\dagger < \pi_t^*$ but *future* $\pi^\dagger >$ *future* π^*
  - a higher nominal rate lowers *current* inflation, but raises *future* inflation

Generalizing

- Introduce maturity structure:
  - constant geometric decay at rate ρ so $B_{t-1}(t+j) = \rho^j B_{t-1}$
  - Q_t is price of bond portfolio, B_{t-1}
- Endogenous real interest rate: $r_{t,t+k}$ is k-period real discount rate
- High-powered money: M_t pays interest i_t^M
- Government liabilities valuation equation

$$\frac{(1+i_t^M)M_{t-1} + Q_t B_{t-1}}{P_t} = E_t \sum_{k=0}^{\infty} \frac{1}{r_{t,t+k}} S_{t+k}$$

S: primary surplus inclusive of seigniorage

Flight to Quality

$$\frac{(1+i_t^M)M_{t-1}+Q_tB_{t-1}}{P_t} = E_t\sum_{k=0}^{\infty}\frac{1}{r_{t,t+k}}S_{t+k}$$

- Demand for treasuries drove down i^T and $r_{t,t+k}$'s
- For given path of surpluses...
  - raises value of bonds, Q_t
  - reduces price level P_t
- Fed raised i^M from 0 to 0.25
  - LSAPs massively increased M
  - crisis also expanded nominal debt
- Tend to counter higher Q_t & lower P_t
- A very different perspective from conventional policy regime

Liftoff

$$\frac{(1+i_t^M)M_{t-1}+Q_tB_{t-1}}{P_t} = E_t\sum_{k=0}^{\infty}\frac{1}{r_{t,t+k}}S_{t+k}$$

- As interest rates "normalize"...
  - $r_{t,t+j}$'s rise toward historic levels
  - given path of surpluses $\Rightarrow$ much lower present value
  - bonds less attractive: substitute out of bonds into buying goods
  - raises aggregate demand & inflation
- Alternative is a large increase in surpluses
  - higher taxes eliminate wealth effects of higher debt service
  - ameliorates increase in aggregate demand
  - given high debt level, this calls for a large fiscal contraction in future

Open Questions

1. What are the service flows from government liabilities—reserves & debt at different maturities?
2. Are total reserves, the monetary base, or broad money relevant for the price level?
3. Which interest rate belongs in the consumption Euler equation?
4. Is the marginal unit of short-term cash still traded in the fed funds market?
5. Can the Fed affect interest rates on credit?

Open Questions

6. Can supply of treasuries affect interest rates on credit?
7. Can instability in credit markets undermine price stability?
8. Can instability in FP & value of government bonds affect credit flows?
9. Should the Fed consider moving to target the repo rate?