Short Run:
Dealing with Depression

A Tale of Unconventional Policy at the Coalface

T. Kam

File: 08-cycles_as-ad_greatrecession.tex
Read: Mishkin, Ch. 14-15

Australian National University

Outline of Talk

1. Objectives
2. Motivation
3. Financial Factor: risk premium
   - Rising risk premium and IS-MP
   - Zero Lower Bound and Deflation
4. Unconventional Monetary Policy
5. Mental Stickers

Learning Objectives

- Financial factors in short-run model
  - risk premium
    - what it stands for
  - how it trasmits to the macroeconomy (AS-AD perspective)
- Case Study: U.S. Great Recession
  - deflation, bubbles, and the Federal Reserve's balance sheet
  - some understanding of the financial crisis
  - various actions that policymakers have taken in response to recent events

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- Why look at the U.S. Subprime Mortgage Market collapse/Financial Crisis and Great Recession as case study?
  - Origin of Global Financial Crisis (a.k.a. GFC)
- Why not Australian case study?
  - nothing exciting happened here!

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Background: original sin

- Northern-hemisphere, Autumn of 2008
  - collapse in mortgage-backed securities
    - (financial assets as insurance/derivatives of underlying mortgage assets)
  - contagion to overall U.S. Stock Market-
    - stock market value fell by 1/3 in a month
  - resulting recession:
    - U.S. unemployment rate $> 10\%$
    - collapse of financial institutions and recession as well: Europe, elsewhere

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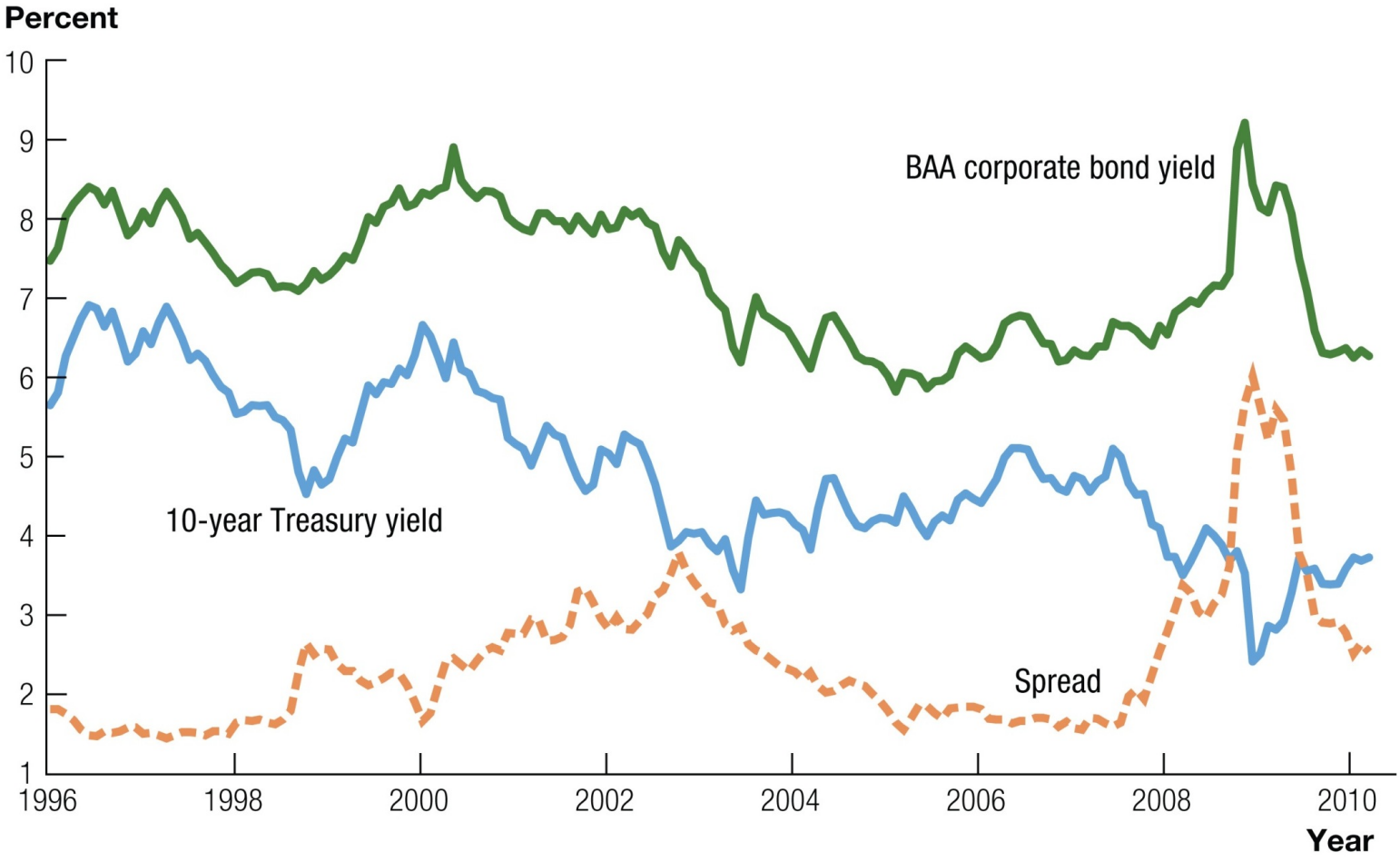

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Motivation

Macro Repercussion: two contributors to AD collapse

1. The wedge/spread between the fed funds rate and the prevailing interest rates: measure of financial risk premium
   - firms cannot borrow easily to invest; lenders reluctant to provide liquidity unless compensated by premium for high default risk;
   - liquidity hold-up in financial system — spilllover to investment demand collapses
2. Wealth effect on consumption:
   - large negative "real wealth effect" on households
     - real asset value fell, but mortgage liabilities remain
     - so further shock to consumption

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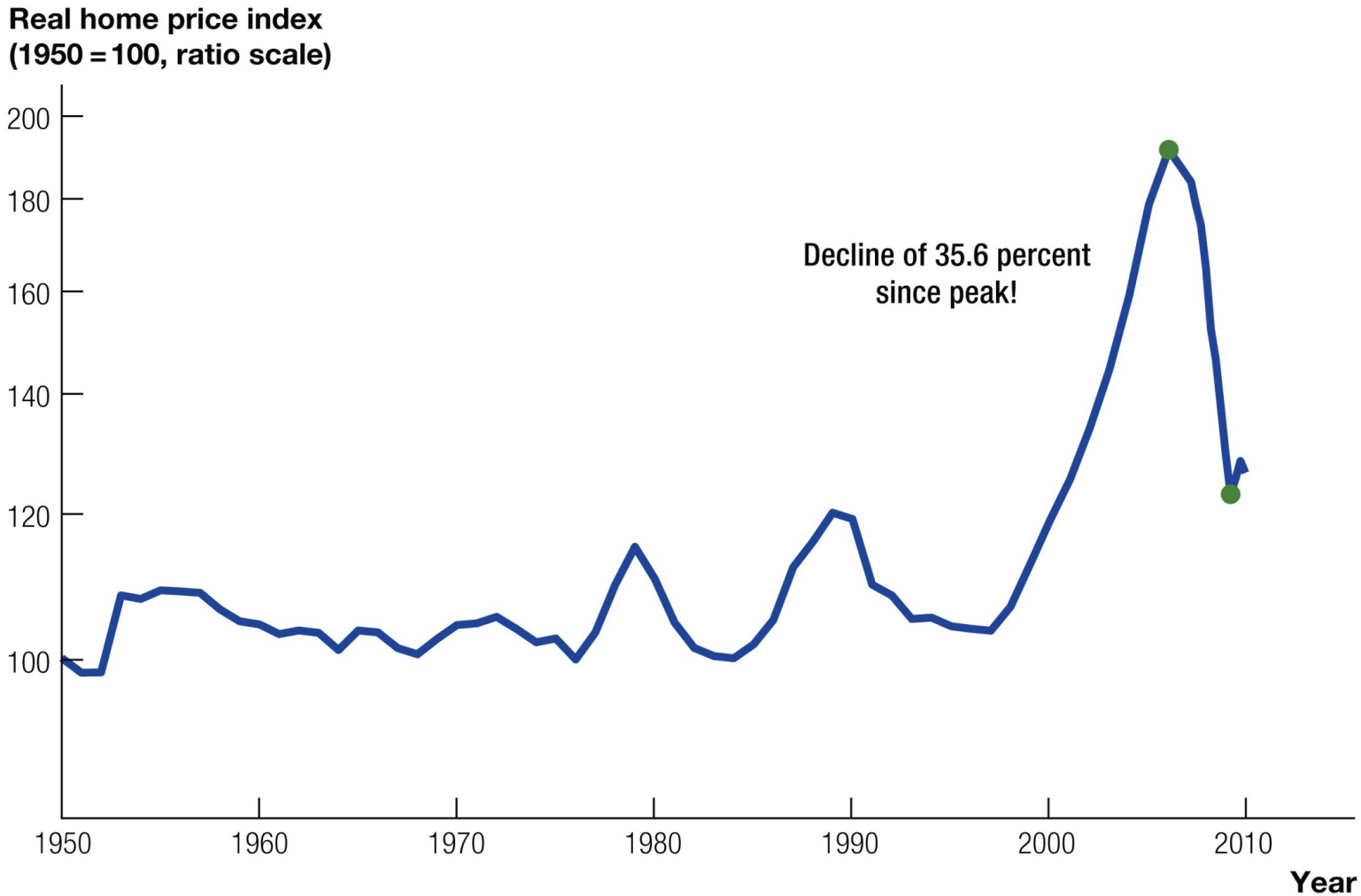
Collapse of real estate value (in real terms)



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Motivation

Policy Responses: using your magic wands wisely

- Exhausted *conventional monetary policy*:
  - Fed Funds rate hits zero lower bound (ZLB)
- The Fed has turned to *unconventional policies*:
  - Troubled Asset Relief Program
  - Quantitative Easing
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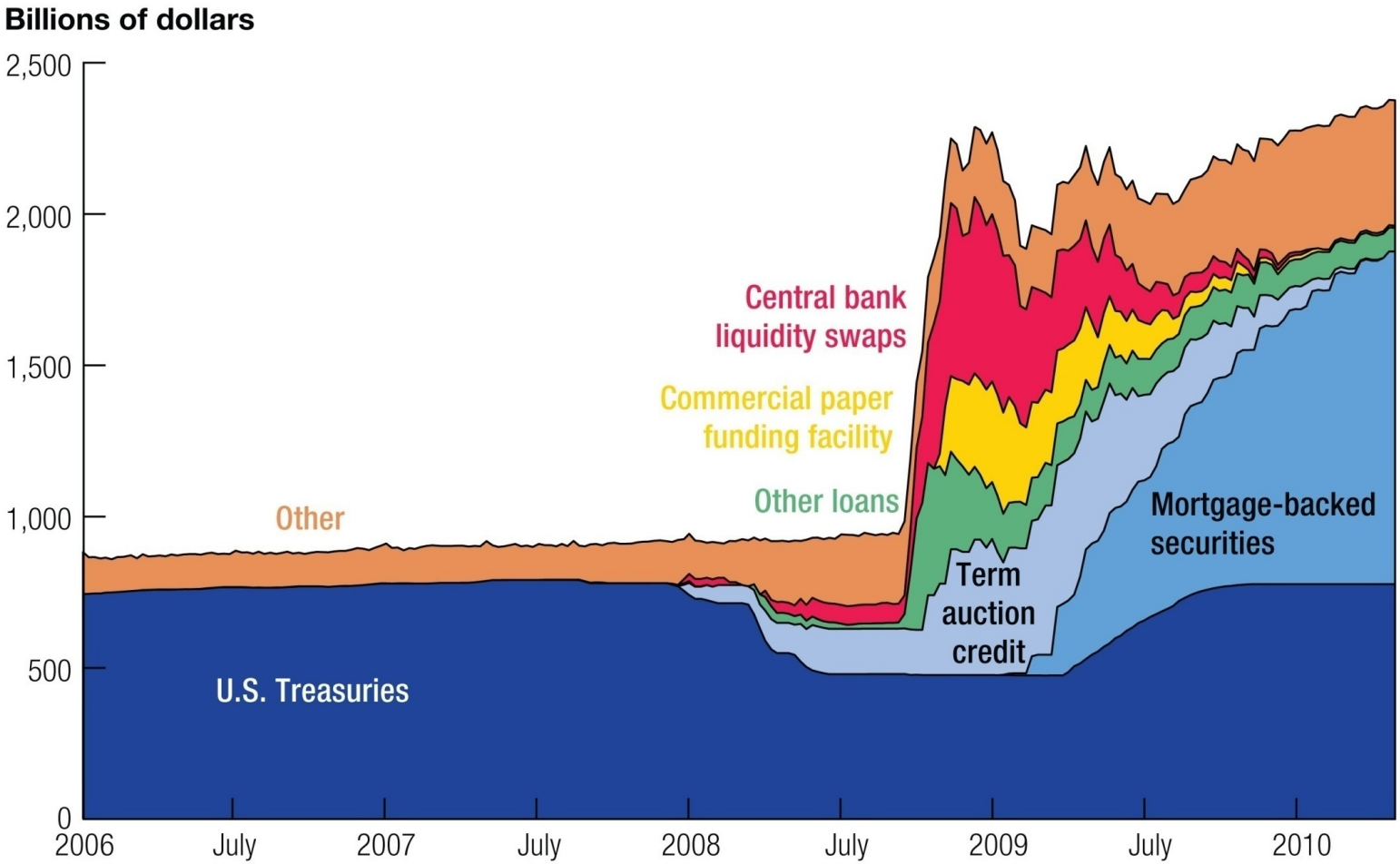
Unconventional policies and The Fed's Assets



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Questions we can address

1. How does the initial financial crisis (a.k.a. "GFC") translate to a recession?
   - low short run output (or high short run unemployment)
   - deflation
2. Why did conventional monetary policy eventually stopped working?
   - The nominal interest rate "ZLB" constraint. (What is this?)
3. What other policy avenue was used instead?
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Financial Factor: risk premium

Risk Premium

and IS-MP model component

Look Out!

- Our Workhorse Model is still IS-PC-MP or AS-AD.
- But to deal with the original sin—financial collapse:
  - Introduce a "risk-premium" on return to assets.
  - "Assets" refer to financial claims on physical capital.

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We add the risk premium component into our short run model:

$$\underbrace{r_t}_{\text{Real interest rate}} = \underbrace{r_t^{ff}}_{\text{(Real) Fed Funds Rate}} + \underbrace{\bar{p}}_{\text{Risk premium}}$$

- r_t: what firms faces when borrowing in financial markets
- r_t^{ff} : the (effective) real interest rate controlled by (conventional) monetary policy
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$$\bar{p} \geq 0$$

- Risk premium *assumed* exogenous (simplicity)
- Interpretation:
  - $\bar{p} = 0$ during normal times; implies $r_t = r_t^{ff}$.
    - Meaning in words?
  - Deeper models:
    - Bernanke-Gertler-Gilchrist's *Financial Accelerator*: Agents with information asymmetry, endogenous risk premium. We create theory/empirics.
    - Geanakoplos' "Leverage Cycles"
    - Fisher's 1933 (Econometrica) idea of debt-deflation

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Risk Premium

a first pass

$$\bar{p} \geq 0$$

- Risk premium *assumed* exogenous (simplicity)
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  - $\bar{p} = 0$ during normal times; implies $r_t = r_t^{ff}$.
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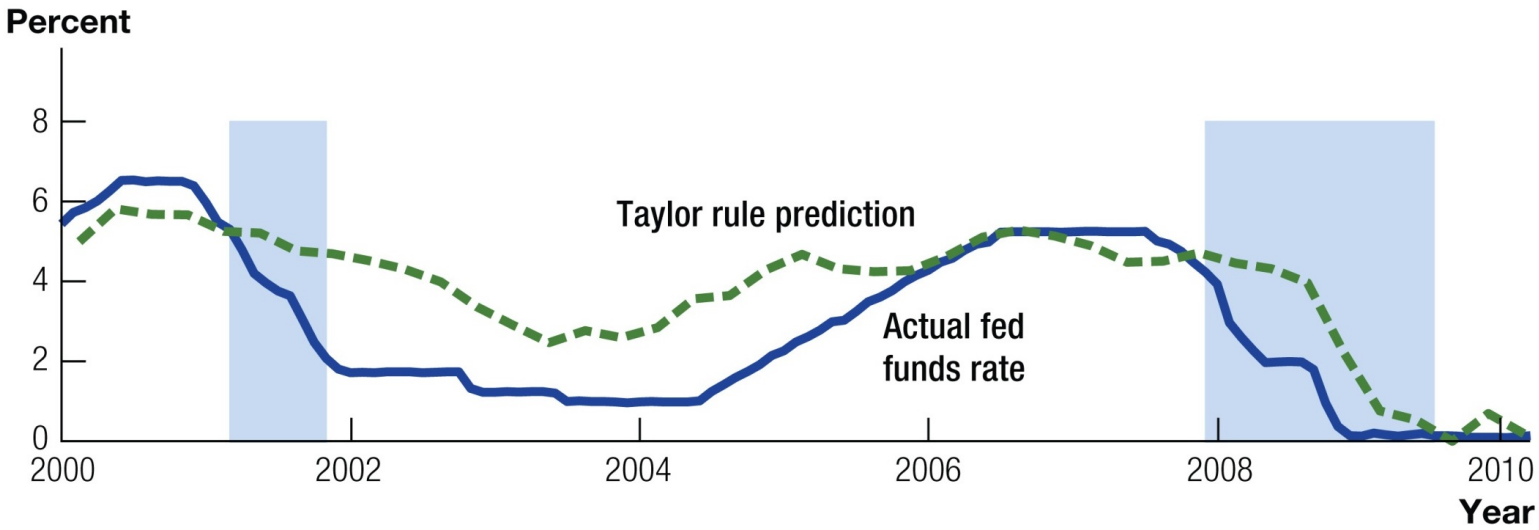

Fed Funds Rate: at zero lower bound (ZLB) by 2009.

Financial Factor

Rising risk premium and IS-MP

Risk Premium and IS-MP

- Let's use this risk premium story, $\bar{p}$
- ... to interpret what happened using our IS-MP-PC model
- **IS curve**

$$r_t = -\frac{1}{b}\left(Y_t - \bar{a}\right)$$

- **MP $\circ$ Risk Premium**

$$\underbrace{r_t - \bar{p} - \bar{r}}_{\text{Real interest rate gap}} = \underbrace{\lambda}_{\text{Sensitivity of policy to ...}} \times \underbrace{\left(\pi_t - \bar{\pi}\right)}_{\text{current inflation gap from target}}$$

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How does this look like in our equivalent AS-AD model?

- Recall that the IS-MP structure *implies* the AD curve.
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  - Works through investment, consumption and net exports (why?) in the IS curve—It shifts the AD curve inward,
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- **AS curve**: *is* Phillips Curve, *but* in $(\tilde{Y}_t, \pi_t)$-space.

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ExerciseShow that you can derive AD from IS and the MP with risk premium:

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ExerciseShow that this AD curve is just the basic textbook setup if we shut down risk premium $(\bar{p} = 0)$ and (arbitrarily) normalize long run inflation to zero $(\bar{\pi} \equiv 0)$.

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Let's get back to our story told in terms of AS-AD ...

AD side:

- The current situation has two related shocks that shift the AD curve down and to the left
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    approaches/hits its $zero$ lower bound.
  - (Think: Why can't nominal interest rate go below zero?)
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Financial Factor

Zero Lower Bound and Deflation

Perils of Deflation

Zero lower bound on nominal interest rate

- Deflation was essentially responsible for the Great Depression.
- Recall the short run Fisher equation:

$$i_t = r_t + \pi_t^e \iff r_t = i_t - \pi_t^e$$

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Two situations in which problems arise.

- The first took place during the *Great Depression* of the 1920s
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Exercise

Why is zero a lower bound on nominal interest rates? Why can they be negative? Explain.

Perils of Deflation

Zero lower bound on nominal interest rate

So by 2009, due to

- nominal interest rates were at zero
- negative inflation (deflation) spiral

real interest rates were rising.

... Why is this not desirable?

Perils of Deflation

Zero lower bound on nominal interest rate

So by 2009, due to

- nominal interest rates were at zero
- negative inflation (deflation) spiral

real interest rates were rising.

... Why is this not desirable?

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Why is this not desirable?

- In our model, when the real interest rate exceeds long-run MPK, $(R_t - \bar{r}) > 0$:
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  - i.e. deflation curtails the ability of monetary policy to stimulate the economy.

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Unconventional Monetary Policy

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Policy Responses to the Financial Crisis

- Looking at current monetary policy, it appears expansionary (i.e. a low/near-zero FFR).
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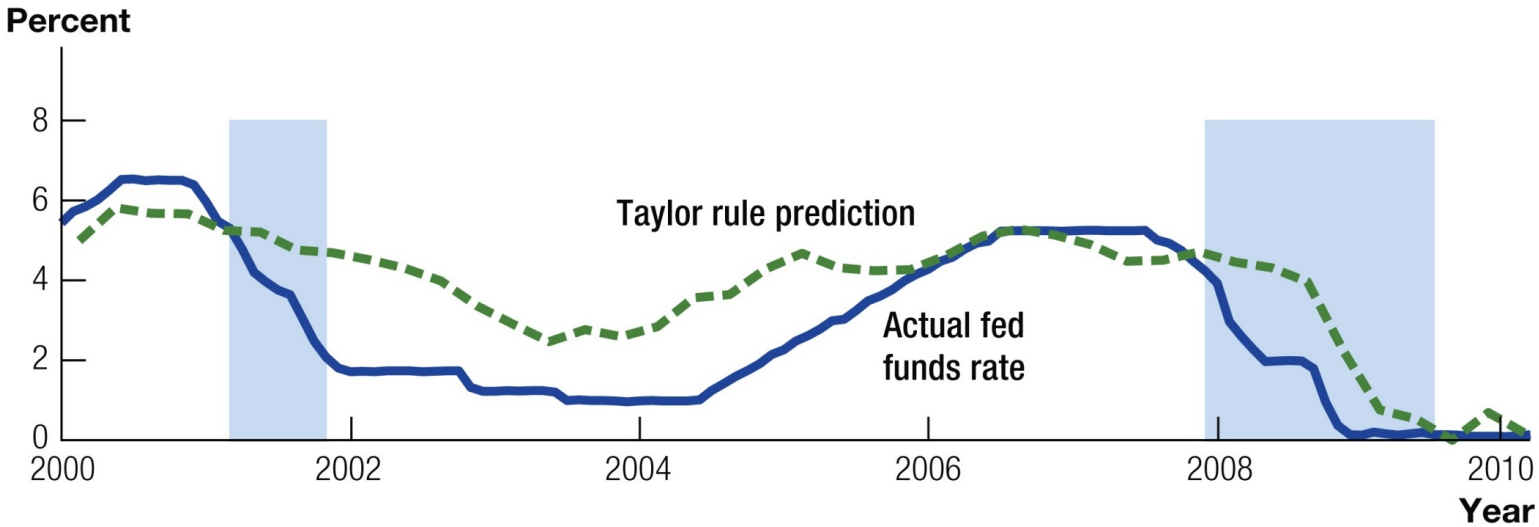
ZLB limit on conventional monetary policy



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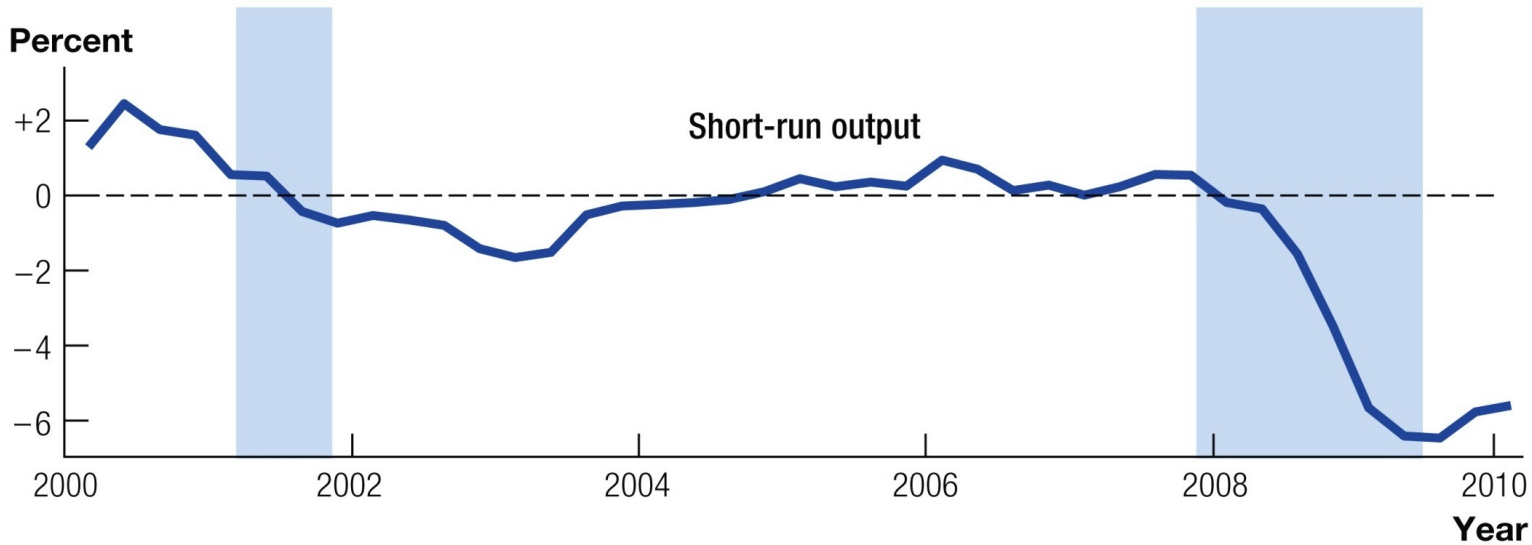

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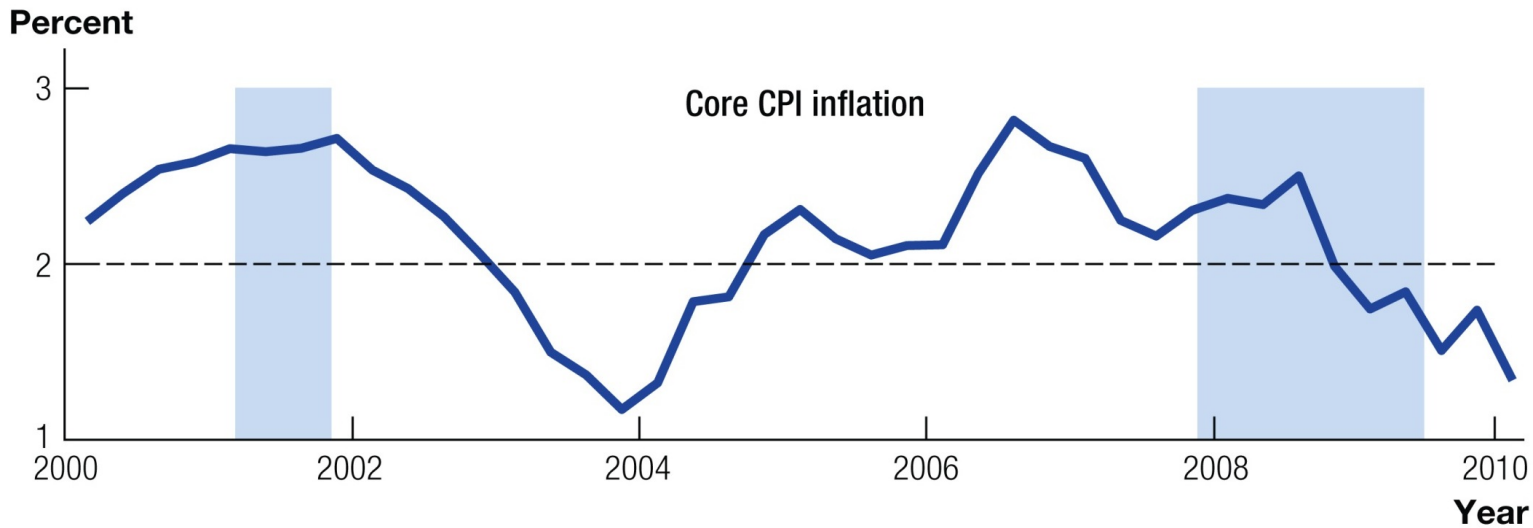

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Monetary and Fiscal Responses

- When conventional monetary policy failed,
  - the Federal Reserve and the Treasury created new policies.
  - Goal: *provide liquidity and capital to financial institutions to unclog the liquidity problem in financial lending/borrowing.*
- The Fed has dramatically reshaped its balance sheet.
  - The *size* of the balance sheet *more than doubled*, growing by more than $1 trillion.
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The Fed's Balance Sheet: snapshots

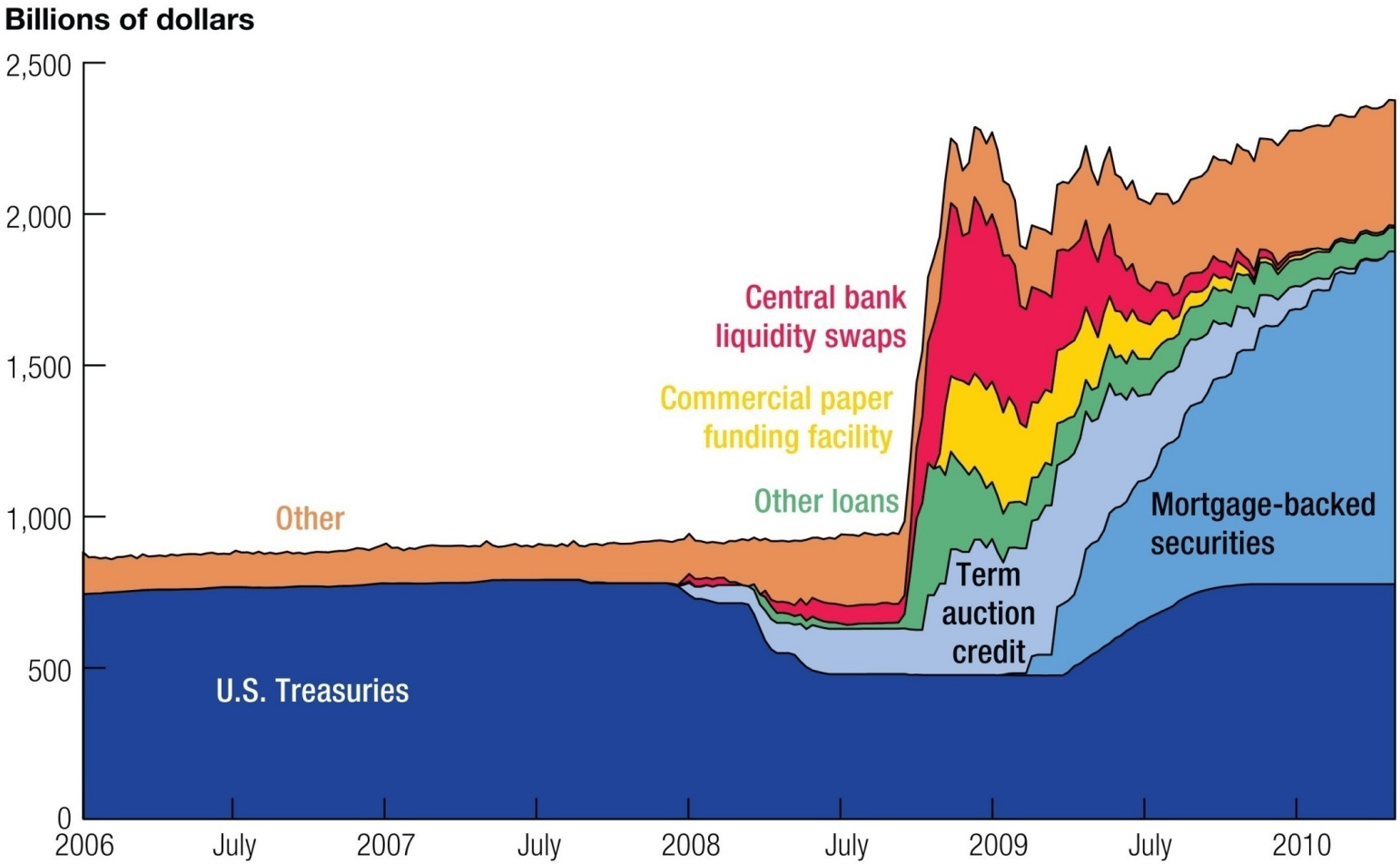
Assets			Liabilities		
	May 2007	*May 2009*		*May 2007*	*May 2009*
U.S. Treasuries	790	569	Currency	814	905
Loans	0	553	Treasury accounts	5	276
Other	116	1,050	Reserves	7	858
			Other	80	133
Total assets	906	2,172	*Total liabilities*	906	2,172

Note: in billions U.S. dollars.

Updates: `http://www.federalreserve.gov/monetarypolicy/bst_recenttrends.htm`

Unconventional Monetary Policy

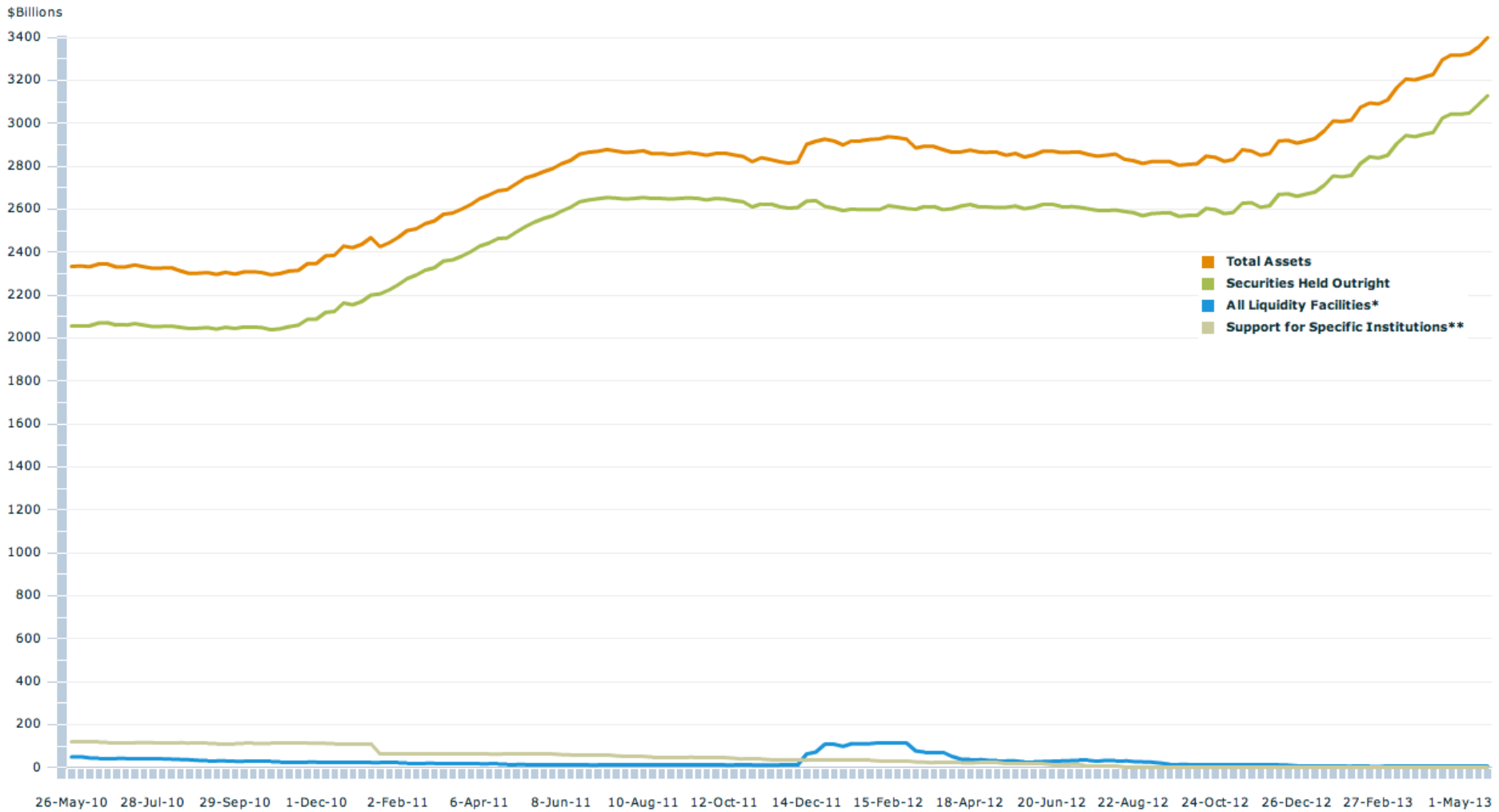
The Fed's Balance Sheet: Assets 2006-2010



Australian National University

Unconventional Monetary Policy

The Fed's Balance Sheet: update



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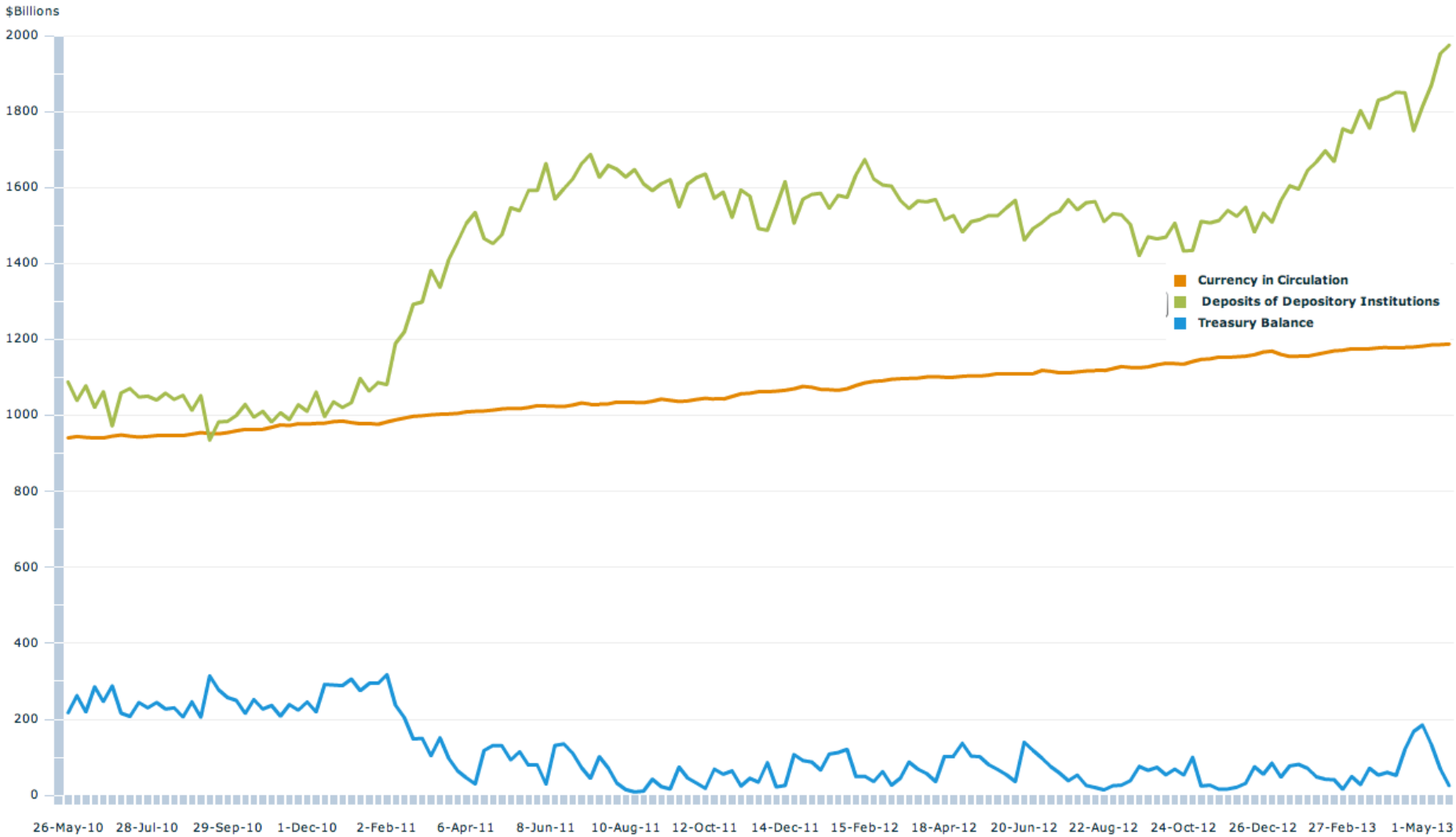

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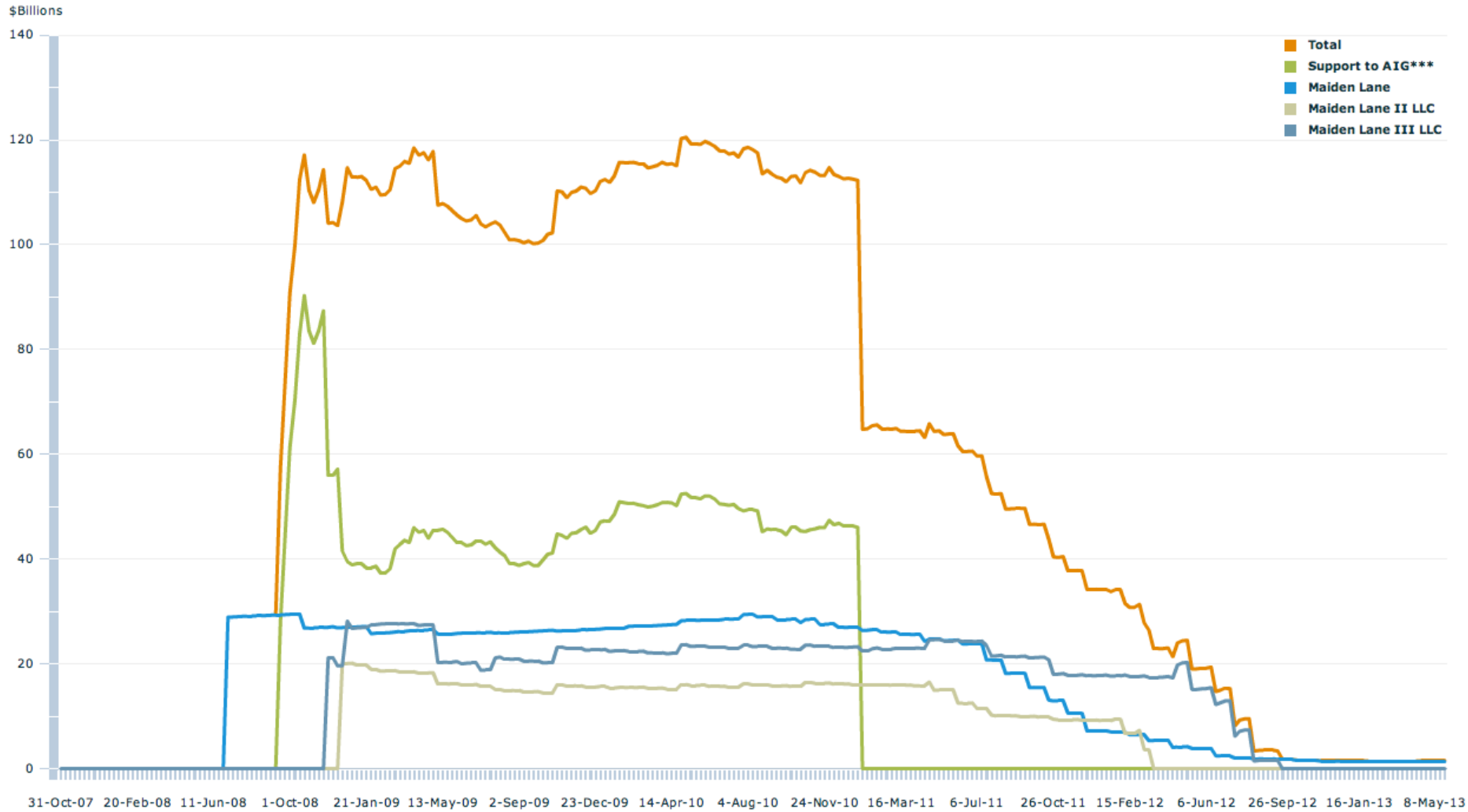

Targeted liquidity support.

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  - Lending was expanded to the rest of the economy.
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  - The funds have come from borrowing from the U.S. Treasury; and
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    - the Fed soaked up banking system's commercial paper or securitized loans from financial institutions;
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- Economists agree that restoring the financial system is crucial, but there is debate over what policy is best.
  - Purchases of "toxic" assets banks possess bad assets, which limits lending.
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    - $25 billion in each large financial institution
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- Suggests that high spending today must be financed by higher future taxes
- Reduces the current impact of the stimulus package

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- How do we prevent major problems?
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  - Taking *Microeconomics of Finance and Banking* seriously!
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- With bailouts, institutions may undertake excessively risky investments in the future.
- Analogy: What might happens if all automobile insurance were fully insured (no excess required if accident occurs)?

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- Description given to large financial institutions
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- Firm reorganization
- Debt written to zero
- Former debtholders given equity claims into newly reorganized firm

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Pro:

- This approach is appealing with the financial crisis.
- Stockholders and bondholders bear the brunt of the burden, not taxpayers.
- Banks should emerge with the ability to lend.

Con:

- Severely interferes with the functioning of financial markets

Pro seems to outweigh the con, taking into account that financial markets are not perfect—initial private information problems triggered the financial collapse.

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- Potential insights from
  - Models with richer microeconomic foundations;
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More general IS-MP-PC model: summary

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$$\underbrace{r_t - \bar{p} - \bar{r}}_{\text{Real interest rate gap}} = \underbrace{\lambda}_{\text{Sensitivity of policy to ...}} \times \underbrace{\left(\pi_t - \bar{\pi}\right)}_{\text{current inflation gap from target}}$$

where Fed Funds Rate (conventional policy instrument) is $r_t^{ff} = r_t - \bar{p}$.

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Re-expressed as AS-AD model

AD curve: Combined IS-MP is

$$\pi_t = -\frac{1}{\bar{b}\bar{\lambda}} Y_t + \frac{\bar{a} - \bar{b}(\bar{r} + \bar{p})}{\bar{b}\bar{\lambda}} + \bar{\pi}; \qquad \bar{a} \gtreqless 0, \bar{b} > 0, \bar{\pi} \geq 0, \bar{p} \geq 0$$

AS curve: *is* (Phillips Curve) $\circ$ (Okun's Law), with graph in (Y_t, π_t)-space.

$$\pi_t = \pi_{t-1} + \gamma(Y_t - \bar{Y}_t) + \bar{\rho}_t; \qquad \gamma = \frac{\omega}{2} > 0, \bar{\rho} \gtreqless 0.$$

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New dog, Old tricks ...

Remarks:

- Same tricks as before.
- Note we can get back textbook IS-MP-PC or AD-AS model by:
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... with your loved ones over dinner tonight

Key words:

- monetary policy rule and zero lower bound, bubbles, deflation
- deflation spiral
- Balance sheets: household, firms, the Fed
- fiscal stimulus, financial reform, liquidity injection
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