Multi-Dimensional Monetary Policy

Michael Woodford

Columbia University

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Common to view monetary policy as uni-dimensional:

- a single policy decision (operating target for an overnight interest rate)

— other aspects of policy (e.g., supply of reserves, interest rates paid on CB balances or at which CB lends) simply details of implementation
Monetary Policy Before the Crisis

- Common to view monetary policy as **uni-dimensional:**
  - a single policy decision (operating target for an **overnight interest rate**)
    - other aspects of policy (e.g., supply of reserves, interest rates paid on CB balances or at which CB lends) simply details of implementation
  - with a single end in view: control of **nominal aggregate demand** (key to both price stability and more stable economic activity)
New Dimensions of Policy

**New tools** of policy: much greater emphasis on *balance-sheet policy*

- balance sheet size much larger than required simply to implement interest-rate policy, manage payments system
- new tools for policy implementation (IOER, RRP facility at Fed) allow decoupling of balance-sheet size from interest-rate target
New Dimensions of Policy

- **New tools** of policy: much greater emphasis on balance-sheet policy
  
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- **New goals** as well: increased attention to possible consequences of monetary policy for financial stability
Is QE just an alternative way of achieving the same thing as cutting **short-term interest rates** — all that matters is effect on bond yields?
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Does an increase in CB liabilities stimulate AD by relaxing constraint on short-term debt issuance by banks
— so equivalent to relaxing reserve requirements, or other macro-prudential policy?
Goals

- Wish to develop a model that allows the separate roles of these dimensions of policy to be compared.
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Model needs to include:

- real effects of monetary policy
- endogenous term premia
- endogenous degree of financial fragility
- conventional interest-rate policy, CB balance sheet, and restrictions on short-term debt finance by banks as alternative policy levers, the effects of which can be compared
Modeling Approach

- Financial fragility: results from excessive reliance on **collateralized short-term debt** in capital structure of banks

  — recent crisis followed particular growth in importance of

  - overnight repo financing (investment banks)

  - asset-backed CP (SIVs)
Short-Term Liabilities

(Adrian and Shin, 2010)
Modeling Approach

- Financial fragility: results from excessive reliance on **collateralized short-term debt** in capital structure of banks

  — recent crisis followed particular growth in importance of

     - overnight repo financing (investment banks)
     - asset-backed CP (SIVs)

- This is dangerous, because it exposes banks to **funding risk**, which may require abrupt de-leveraging through a “fire sale” of assets
Why fragile financial structures are tempting:

— owing to shortage of alternative safe assets, investors will pay a premium for private liabilities with this feature ("money premium") (Greenwood et al., 2010; Krishnamurthy and Vissing-Jorgensen, 2012)
Modeling Approach

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But this means that public supply of safe assets should be an important determinant of the strength of such incentives

— evidence: increased supply of T-bills reduces private issuance of CP (Carlson et al., 2014)
Effect of Increased T-Bill Supply  (Carlson et al., 2014)

Figure 1: Growth of Treasury bills and of all financial CP (No controls)

Note: This figure presents the impulse-response function obtained from a VAR of the growth of Treasury bills and the growth of all financial commercial paper (CP). The top (bottom) panels display the response of the growth of Treasury bills outstanding (growth of all financial CP) to a one-standard-deviation shock to each of the VAR endogenous variables. The dotted lines are 95 percent confidence bands. The VAR is estimated using monthly data for the period of 1976 to 2007.

Response of GRTH_ALL_FIN to GRTH_TBILLS

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Funding risk and possibility of “fire sale” of assets modeled as in Stein (2012)

— but embedded in an intertemporal monetary equilibrium model, in order to consider interaction with monetary policy
Modeling Approach

- **Funding risk** and possibility of “fire sale” of assets modeled as in Stein (2012)
  
  — but embedded in an intertemporal monetary equilibrium model, in order to consider interaction with monetary policy

- **Demand for safe assets** modeled using a “cash-in-advance” structure as in Lucas and Stokey (1987)
  
  — but here interpret the “cash” that can be used to satisfy CIA constraint as interest-earning short-term safe instruments such as T-bills, CB liabilities (reserves, reverse repos), or asset-backed CP
Elements of the Model: Agents

- Infinite-lived representative household can be thought of as made up of several “members” with separate budgets within the period, though all funds pooled at end of each period:
  - “worker”: supplies inputs used to produce all final goods; receives income available to household at end of period
  - “shopper”: buys “regular” final goods [both “cash goods” and “credit goods”]; cash must be set aside earlier
  - “investor”: buys “special” final goods, using line of credit set up earlier in period; can also bid for risky durables in “fire sale”
  - “banker”: buys risky durables, financed from equity investment by household and issuance of short-term debt
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Resolution of Within-Period Uncertainty

Period $t$ (state $\xi_t$)

- Asset trading
  - $p$
  - $1-p$

No crisis
  - $1$

No asset collapse

Crisis
  - $q$
  - $1-q$

Asset collapse

Period $t+1$
Preferences of the representative household:

\[ E_t \sum_{\tau=t}^{\infty} \beta^{\tau-t} \left[ u(c_{1\tau}, c_{2\tau}) + \tilde{u}(c_{3\tau}) + \gamma s_{\tau} - v(Y_{\tau}) - w(x_{\tau}) \right] \]

where

\[ c_{1t} = \text{consumption of "cash goods"} \]
\[ c_{2t} = \text{consumption of "credit goods"} \]
\[ c_{3t} = \text{consumption of "special goods"} \]
\[ s_{t} = \text{services from [intact] old durables} \]
\[ Y_{t} = \text{supply of "normal goods"} \]
\[ x_{t} = \text{supply of "special goods"} \]
purchases of “cash goods” subject to a “cash-in-advance constraint” (as in Lucas-Stokey, 1987)

\[ P_t c_{1t} \leq M_t \]
Elements of the Model: Demand for Liquidity

- purchases of “cash goods” subject to a “cash-in-advance constraint” (as in Lucas-Stokey, 1987)
  \[ P_t c_{1t} \leq M_t \]

- “cash” balances \( M_t \): assets of the buyer that can be transferred to the seller, and have a certain nominal value at end of period
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“cash” balances \( M_t \): assets of the buyer that can be transferred to the seller, and have a certain nominal value at end of period

cash includes riskless nominal liabilities of the government (Treasury bills)

can also be short-term debt issued by bankers, if collateralized to ensure completely riskless
  - but to be acceptable as cash, holders of debt must have right to force liquidation of the collateral, if necessary in order to ensure that banker can pay them in full
A banker can purchase shares $s_t$ of the risky asset, subject to budget constraint

$$Q_t s_t \leq equity_t + D_t$$

where $Q_t =$ price of asset in initial period-$t$ market, $D_t =$ issuance of short-term debt
A banker can purchase shares $s_t$ of the risky asset, subject to budget constraint

$$Q_t s_t \leq \text{equity}_t + \xi_t D_t$$

where $Q_t = \text{price of asset in initial period-}t \text{ market}$, $D_t = \text{issuance of short-term debt}$

More generally: may suppose that only fraction $0 \leq \xi \leq 1$ of the funds raised by issuing collateralized debt can be used to purchase risky asset

— allows an instrument of macro-prudential policy

— could be implemented by a reserve requirement, if reserves satisfying the requirement earn a below-market rate
A banker can purchase shares $s_t$ of the risky asset, subject to budget constraint

$$Q_t s_t \leq equity_t + \zeta_t D_t$$

where $Q_t =$ price of asset in initial period-$t$ market,
$D_t =$ issuance of short-term debt

Short-term debt can be marketed as riskless only if

$$D_t \leq \Gamma_t s_t,$$

where $\Gamma_t =$ price of asset in event of fire sale
Elements of the Model: “Fire Sale” Distortions

- If crisis state occurs, banker must offer $s^*_t$ units of the durable for sale, sufficient to allow redemption of short-term debt:

$$D_t \leq \Gamma_t s^*_t \leq \Gamma_t s_t$$
Elements of the Model: “Fire Sale” Distortions

- If crisis state occurs, banker must offer \( s_t^S \) units of the durable for sale, sufficient to allow redemption of short-term debt:

\[
D_t \leq \Gamma_t s_t^S \leq \Gamma_t s_t
\]

- Each investor bids for \( s_t^d \) units of the durables in the fire sale

- Investor’s purchases of “special” goods must then satisfy

\[
\tilde{P}_t c_{3t} + \eta_t \Gamma_t s_t^d \leq F_t
\]

where \( \tilde{P}_t \) is price of special goods, \( \eta_t \) is crisis indicator, and credit limit \( F_t \) has been pre-determined in real terms.
Investment demand at end of period: household purchases $I_t$ units of investment goods on credit, produces $F(I_t)$ units of new risky durables, which yield services in period $t + 1$.

— durables produced in period $t - 1$ depreciate completely at end of period $t$
Equilibrium

Requirements for *equilibrium*:

- household choices maximize expected utility subject to the sequence of budget constraints, and
Equilibrium

Requirements for equilibrium:

- household choices maximize expected utility subject to the sequence of budget constraints, and

- markets clear:

\[ M_t = \tilde{M}_t + D_t \]
\[ s_t = F(I_{t-1}) \]
\[ s_{t}^{*d} = s_{t}^{*s} \]
\[ c_{1t} + c_{2t} + I_t = Y_t \]
\[ c_{3t} = x_t \]

\[ \tilde{M}_t = \textbf{outside} \] supply of safe instruments: T-bills in hands of public + safe liabilities of CB
1 **Conventional policy** (interest-rate policy): CB chooses $R^m_{t+1}$, the nominal yield on cash over period $t + 1$, by setting interest on CB liabilities.
Conventional policy (interest-rate policy): CB chooses $R_{t+1}^m$, the nominal yield on cash over period $t + 1$, by setting interest on CB liabilities.

Balance-sheet policy (quantitative easing): CB chooses $\tilde{m}_{t+1}$, the real outside supply of cash in period $t + 1$, through open-market purchases or sales of longer-term bonds.
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3 **Macroprudential policy** (reserve requirement): CB chooses $\zeta_{t+1}$, effective tax rate on short-term debt issuance by banks.
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Macroprudential policy (reserve requirement): CB chooses $\xi_{t+1}$, effective tax rate on short-term debt issuance by banks

[each of the above variables is set in subperiod 2 of period $t$]
Two Versions of the Model

- **Flexible-price model:** voluntary supply of “normal goods” by price-taking households, $P_t$ (along with other prices) endogenously determined so as to ensure that

\[ c_{1t} + c_{2t} + I_t = Y_t \]
Two Versions of the Model

- **Flexible-price model**: voluntary supply of “normal goods” by price-taking households, $P_t$ (along with other prices) endogenously determined so as to ensure that

  $$c_{1t} + c_{2t} + l_t = Y_t$$

- **Sticky-price model**: $P_t$ fixed in advance [end of period $t - 1$], households supply equal share of aggregate demand $c_{1t} + c_{2t} + l_t$ at that price
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  — price $P_t$ fixed at level that is **expected** to clear market as of end of period $t - 1$, but may not ex post

  — other prices all determined in competitive spot markets
Consider a stationary policy regime in which:

- Conventional policy is used to ensure that $P_{t+1}/P_t = \Pi$ each period [constant inflation target]

Balance-sheet policy maintains $\tilde{m}_t + 1 = \tilde{m}$ each period

Assume (for now) $\xi_t + 1 = 1$ each period [no macropru policy]

Stationary values of real variables are independent of $\Pi$
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Consider a stationary policy regime in which:

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- Assume (for now) \( \zeta_{t+1} = 1 \) each period [no macropru policy]

Stationary values of real variables are independent of \( \Pi \)

One-parameter family of stationary equilibria indexed by \( \tilde{m} \)
Greater scarcity of safe assets (lower \( \tilde{m} \)) implies

- lower real return \( R^m / \Pi \) on cash
- larger "\textit{money premium}"
- smaller share of "cash goods" in normal goods consumption
Stationary Equilibrium

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- larger share of short-term debt in banks’ capital structure
- increased over-valuation of durables at time of production
- increased share of durables in normal goods supply
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- larger share of short-term debt in banks’ capital structure
- increased over-valuation of durables at time of production
- increased share of durables in normal goods supply
- greater under-valuation of durables in "fire sale"
- greater under-production of special goods in crisis state
Lessons

- QE and conventional policy **not** equivalent in their long-run effects: **no** real effects of long-run inflation target, while (real) size of CB balance sheet **does** have long-run real effects
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- QE and conventional policy **not** equivalent in their long-run effects: **no** real effects of long-run inflation target, while (real) size of CB balance sheet **does** have long-run real effects

- Larger balance sheet **reduces long-run distortions** in each of 3 respects:
  - less under-production of cash goods (**as share of nondurable normal goods**)  
  - less over-production of durables  
  - less under-production of special goods in crisis state, less over-production in non-crisis state
Can also consider alternative stationary values for $\xi$

Then a two-parameter family of stationary real allocations, indexed by $\tilde{m}, \xi$

— long-run effects again independent of $\Pi$
Can also consider alternative stationary values for $\zeta$

Then a two-parameter family of stationary real allocations, indexed by $\tilde{m}, \zeta$

— long-run effects again independent of $\Pi$

Effects of tightening macro-pru policy (e.g., increasing reserve requirement) NOT equivalent to shrinking monetary liabilities of CB

— in some ways, more similar to effects of increasing $\tilde{m}$
Macroprudential Policy in the Long Run

Effects of tightening macro-pru policy (for fixed $\tilde{m}$):

- In some ways, more similar to effects of increasing $\tilde{m}$:
  - reduced incentive for private issuance of safe instruments $\Rightarrow$ smaller fire-sale distortions
  - less undervaluation of durables in fire sale, less overvaluation at time of production
  - less distortion of production/consumption of special goods; less over-supply of durables
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- But like a reduction of $\tilde{m}$ in that supply of cash is reduced
  - increasing money premium, reducing steady-state $R^m/\Pi$
  - greater distortion of cash/credit composition of demand
Macroprudential Policy in the Long Run

- Hence for fixed $\tilde{m}$ [below the satiation level], the optimal stationary value of $\tilde{\xi}$ is an interior value.

- Contrary to either of two familiar (extreme) proposals:
  1. should tax “outside money” creation out of existence (Simons)
  2. should eliminate taxation of outside money creation (Friedman)
Short-Term Policy Tradeoffs

- Simple case analyzed here: **one-time shock** (e.g., shock to aggregate demand) in some period $t$, with constant fundamentals thereafter

  — shock is completely **unexpected**: prior to subperiod 2 of period $t$ (and when $P_t$ is set), stationary eq’m (constant inflation rate $\Pi$, constant values $R^m, \tilde{m}, \xi$) is expected to continue

  — after shock occurs, no further such shocks expected $\Rightarrow P_\tau$ still expected to clear market in all periods $\tau > t$
Simple case analyzed here: **one-time shock** (e.g., shock to aggregate demand) in some period $t$, with constant fundamentals thereafter

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— after shock occurs, no further such shocks expected $\Rightarrow P_\tau$ still expected to clear market in all periods $\tau > t$

Consider **only** effects of possible responses of $R^m_{t+1}, \tilde{m}_{t+1}, \xi_{t+1}$ to shock in period $t$

— policy thereafter in accordance with previous steady state
Two key measures of financial conditions:

- expected one-period real return on longer-term bonds:

\[ 1 + \bar{r}_{t+1}^b \equiv E_{t+1} \left[ R_{t+1}^b \frac{P_t}{P_{t+1}} \right] = \frac{\lambda_t}{\beta \bar{\lambda}} \]

[the measure of financial conditions that is relevant for aggregate demand for non-durable normal goods]
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  [the measure of financial conditions that is relevant for aggregate demand for non-durable normal goods]

- “money premium” earned by cash:
  \[ \frac{E_{t+1}[R_{t+1}^b]}{R_{t+1}^m} = \tilde{\phi}_{1,t+1} \]

Lagrange multiplier assoc. to subperiod-1 budget constraint

[measure of financial conditions that determines incentive for short-term debt issuance by banks]
Short-Run Equilibrium

- Financial conditions and **aggregate demand** for “normal goods”:

\[ Y_t = c(\lambda_t) + l(\lambda_t; \tilde{m}_{t+1}) \]
Short-Run Equilibrium

- Financial conditions and aggregate demand for “normal goods”:
  \[ Y_t = c(\lambda_t) + I(\lambda_t; \tilde{m}_{t+1}) \]

- \( c(\lambda) \) is demand for “normal” consumer goods \([c_{1t} + c_{2t}]\)
  — decreasing function of \( \lambda_t \)
Short-Run Equilibrium

- Financial conditions and **aggregate demand** for “normal goods”:

  \[ Y_t = c(\lambda_t) + I(\lambda_t; \tilde{m}_{t+1}) \]

- \( c(\lambda) \) is demand for “normal” consumer goods \([c_{1t} + c_{2t}]\)
  - decreasing function of \( \lambda_t \)

- \( I(\lambda; \tilde{m}) \) is investment demand consistent with Euler equation
  - decreasing function of \( \lambda_t \)
  - also decreasing function of \( \tilde{m}_t \): less scarcity of liquidity reduces demand for collateral
Two relations to determine the money premium:

1. Money premium depends on **supply of safe assets**, which is increasing in both outside supply $\tilde{m}_{t+1}$ and supply by banks [dependent on available collateral]

   $$\tilde{\varphi}_{1,t+1} = \hat{\varphi}_1(l_t, \tilde{m}_{t+1})$$

   - decreasing in both $\tilde{m}_{t+1}$ and $l_t$

[“LM curve” with endogenous money supply]
Two relations to determine the money premium:

1. Money premium corresponds to spread between expected return on investment [decreasing function of $I_t$] and return on cash.

$$\tilde{\phi}_{1,t+1} = \tilde{\phi}_1(I_t, R_{t+1}^m)$$

- decreasing in both $R_{t+1}^m$ and $I_t$

[connection between money premium in “LM curve” and riskless rate]
Short-Run Equilibrium: Summary

Two relations between supply of durables and the money premium:

\[
\tilde{\varphi}_{1,t+1} = \hat{\varphi}_1(l_t, \tilde{m}_{t+1})
\]

\[
\bar{\varphi}_{1,t+1} = \bar{\varphi}_1(l_t, R^m_{t+1})
\]
Short-Run Equilibrium: Summary

Two relations between supply of durables and the money premium:

\[ \tilde{\phi}_{1,t+1} = \hat{\phi}_1(l_t, \tilde{m}_{t+1}) \]
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- Solve these for \( \phi_{1,t+1}, l_t \) for given \( R_{t+1}^m, \tilde{m}_{t+1} \)
Short-Run Equilibrium: Summary

Two relations between supply of durables and the money premium:

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\phi_{1,t+1} = \hat{\phi}_1(l_t, \tilde{m}_{t+1})
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\phi_{1,t+1} = \bar{\phi}_1(l_t, R_{t+1}^m)
\]

- Solve these for $\phi_{1,t+1}, l_t$ for given $R_{t+1}^m, \tilde{m}_{t+1}$

- Then LT real rate $\lambda_t$ and aggregate demand $Y_t$ determined by

\[
l_t = l(\lambda_t; \tilde{m}_{t+1})
\]
\[
Y_t = c(\lambda_t) + l_t
\]
Effects of Quantitative Easing

\[ \tilde{\phi}_1 \]

\[ \phi_1 \]

\[ \lambda(I) \]

\[ \lambda_1 \]

\[ \lambda_3 \]

\[ I_1 \]

\[ I_2 \]
Comparing Alternative Policy Tools

- QE vs interest-rate policy: for policies that increase $I_t$ by same amount, QE **lowers LT real rate more**
  - ⇒ smaller fraction of AD increase is financed by safe debt issuance
  - ⇒ less increase in risk to financial stability
Comparing Alternative Policy Tools

- QE vs interest-rate policy: for policies that increase $I_t$ by same amount, QE **lowers LT real rate more**
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- Macro-prudential policy: relaxing reserve reqs has similar effects on $\tilde{\phi}_1 - I$ determination as an interest-rate cut [reduced cost of financing by issuance of safe debt ⇒ shifts down $\tilde{\phi}_1$ schedule]
Comparing Alternative Policy Tools

- QE vs interest-rate policy: for policies that increase $I_t$ by same amount, QE lowers LT real rate more

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  — but the $\lambda - I$ schedule shifts up [a given value of $\lambda_t$ associated with greater investment demand]

  — so that in this case an even larger fraction of AD increase is financed by safe debt issuance, than in the case of an interest-rate cut
All three policies

- reducing $R^m_{t+1}$
- increasing $\tilde{m}_{t+1}$
- increasing $\xi_{t+1}$

are ways to increase aggregate demand in short run:

- relax financial conditions (lower $\lambda_t \iff$ lower $\bar{r}^b_{t+1}$)
- increase demand for credit goods
- increase investment demand
All three policies

- reducing $R_{t+1}^m$
- increasing $\tilde{m}_{t+1}$
- increasing $\zeta_{t+1}$

are ways to increase aggregate demand in short run:
- relax financial conditions (lower $\lambda_t \Leftrightarrow$ lower $\bar{r}^b_{t+1}$)
- increase demand for credit goods
- increase investment demand

But all also increase risks to financial stability:
- increase short-term debt issuance by banks
- increase $Q_{t+1}$, lower $\Gamma_{t+1}$
- increase suboptimality of special goods consumption
However, they can be **ordered**: for a given size increase in aggregate demand $Y_t$,

- among the 3 policies, QE (increasing $\tilde{m}_{t+1}$) increases demand for durables and short-term debt issuance by banks **the least**, 
- interest-rate policy (reducing $R^m_{t+1}$) does so to an intermediate extent, and 
- relaxation of macroprudential policy (raising $\tilde{\zeta}_{t+1}$) increases demand for durables and risks to financial stability **the most**
Interest-rate policy and QE *not equivalent*, even if both can be used to relax financial conditions and increase AD.
How to Use Multiple Dimensions?

- Interest-rate policy and QE **not equivalent**, even if both can be used to relax financial conditions and increase AD

- Hence QE may be useful, even when interest-rate policy not **constrained by ZLB**
  
  — may be useful to act on **multiple** dimensions, to better achieve **multiple goals** simultaneously
How to Use Multiple Dimensions?

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- Hence QE may be useful, even when interest-rate policy not **constrained by ZLB**

  — may be useful to act on **multiple** dimensions, to better achieve **multiple goals** simultaneously

- Large CB supply of safe liabilities desirable in steady state [*in absence of other costs*], to minimize risk to financial stability

  — then allowing interest-rate policy to be used purely for traditional stabilization objectives
But there may be good reasons [not modeled above] not to expand CB balance sheet as far as would be necessary to fully satiate economy with liquidity

— political economy problems if CB balance-sheet risk too great
How to Use Multiple Dimensions?

- But there may be good reasons [not modeled above] not to expand CB balance sheet as far as would be necessary to fully satiate economy with liquidity
  
  — political economy problems if CB balance-sheet risk too great

- Can still ask how to optimally use balance-sheet policy in this second-best case

- Should assign a shadow cost of increasing balance sheet [not a simple cap on feasible size]

  — then optimal balance-sheet size will vary depending on the urgency of stabilization objectives

  — active use of balance-sheet policy appropriate
How to Use Multiple Dimensions?

Should one conclude that with two (or more) independent dimensions of policy, one should

- use interest-rate policy for aggregate demand management
- while using balance-sheet policy and/or macroprudential policy to contain financial stability risk?

Not necessarily! if can freely adjust effective macroprudential instrument, and this plus interest rate are the two available instruments, then this assignment of targets makes sense but not if the two dimensions of policy are interest-rate policy and balance sheet
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  — the unique policy mix that achieves this is to lower riskless interest rate while tightening macro-pru enough to offset effect on private issuance of STSIs.
How to Use Multiple Dimensions?

Suppose that a shock occurs that leads one to **seek to increase AD**, but one wishes to do so **without increasing risk to financial stability**

If instruments are $R^m$ and $\zeta$:

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But if instruments are $R^m$ and $\tilde{m}$:

— the unique policy mix that achieves it is instead to **expand balance sheet** while **raising riskless interest rate** enough to offset effect on private issuance of STSIs
A similar conclusion if the goal of policy is to **reduce risk to financial stability** [by reducing investment financed by private money issuance], but **without contracting AD**:

— if instruments are $R^m$ and $\tilde{m}$, unique policy mix that achieves this is to **raise riskless interest rate** while **expanding balance sheet** enough to offset effect on AD.
A similar conclusion if the goal of policy is to **reduce risk to financial stability** [by reducing investment financed by private money issuance], but **without contracting AD**:

— if instruments are $R^m$ and $\tilde{m}$, unique policy mix that achieves this is to **raise riskless interest rate** while **expanding balance sheet** enough to offset effect on AD

**The policy US needed in the mid-2000s?**
Lessons

- To the extent that there remains a “money premium” associated with STSIs [which can still be true when at the ZLB!], QE can be an effective tool for increasing aggregate demand.
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- **Not equivalent** to interest-rate policy in its effects: hence a potential role in stabilization policy even when not at the ZLB.

- Ideal use of balance-sheet policy is furthermore not simply to amplify whatever one is also trying to achieve through interest-rate policy.

— under some circumstances, should adjust the two instruments in **opposite** directions, to simultaneously achieve goals for aggregate demand management, control of financial cycle.