EXPECTATIONS AND THE IMPACTS OF MACRO POLICIES

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A Singular Economic Event?

- $11.2 Trillion loss of wealth last year
- 5.8% drop in GDP, 2008Q4; 3.1% drop in GDP, 2009Q1
- 8.9% unemployment rate in April
- $787 Billion stimulus package
THE JOINT POLICY RESPONSE

• Unusually aggressive monetary & fiscal policy response
  • federal funds rate near zero bound since Dec 2008
  • Fed’s balance sheet has exploded: from $800 billion to about $2.5 trillion at end of 2009
  • $125 billion tax refund in 2008 and $787 billion stimulus package in 2009
  • deficit is 13% of GDP now; debt will rise from 40% to 80% of GDP over the decade and may reach 277% in 2040
THIS TALK

• Establish the role of expectations in monetary policy
  • well understood with lots of research
• Establish the role of expectations in fiscal policy
  • understood conceptually, but perhaps not quantitatively
• Establish the need to study monetary & fiscal policy jointly
  • shall reveal a dirty little secret
  • well understood but widely denied
• Derive some new mantras for macro policy making
MANTRA I

• Central banking mantra:

  Monetary policy is about managing expectations

• Many features of modern central banking flow from this
  
  • adoption of explicit inflation targeting
  
  • prominent role for communication with public
    
    • publication of inflation/monetary policy reports
    
    • publication of detailed minutes
    
    • announcement of interest-rate paths

  • enhanced accountability for central bankers
GENESIS OF THE MANTRA

- Monetary policy making under rational expectations
- Example from new Keynesian model: demand given by

\[ y_t = E_t y_{t+1} - \sigma^{-1}(i_t - E_t \pi_{t+1} - r^n_t) \]

\( y \): output; \( i \): policy rate; \( \pi \): inflation; \( r^n \): natural interest rate
- A dynamic relation that implies

\[ y_t = - \sum_{j=0}^{\infty} E_t \sigma^{-1}(i_{t+j} - E_t \pi_{t+j+1} - r^n_{t+j}) \]

- When policy follows \( i_t = \alpha(z_t) \), function of state

\[ y_t = - \sum_{j=0}^{\infty} E_t \sigma^{-1}(\alpha(z_{t+j}) - E_t \pi_{t+j+1} - r^n_{t+j}) \]
EXPECTATIONS AND MONETARY POLICY

- Consider a simple model of inflation with $\alpha > 1$

\[
i_t = E_t \pi_{t+1} + r_t
\]

\[
i_t = \alpha \pi_t
\]

- Combine these to yield

\[
E_t \pi_{t+1} = \alpha \pi_t + r_t
\]

- Repeated substitution, assuming fixed policy rule

\[
\pi_t = -\frac{1}{\alpha} E_t \sum_{s=0}^{\infty} \left( \frac{1}{\alpha} \right)^s r_{t+s}
\]

**Big Assumption:** Policy over infinite future same as it is now: $\alpha_t = \alpha$ all $t$

- This ain’t what any central bank in the world is doing now
Expectations and Monetary Policy

- If monetary policy regime has changed, then regime can change
- Agents will form expectations over possible future regimes
- The current regime no longer completely determines effects of monetary policy
- Suppose there are two regimes: $i_t = \alpha(s_t)\pi_t$
  - Regime I: active policy—$\alpha > 1$
  - Regime II: passive policy—$0 < \alpha < 1$
- Effects of aggregate disturbances depend on expectations of current & future regimes
- Draws on Davig & Leeper
**Macro Shocks: Fixed Active Regime**

- **Demand** graph shows the relationship between inflation and demand with the fixed regime label.
- **Supply** graph shows the relationship between inflation and supply with the fixed regime label.
- **Output** graph shows the relationship between output and time with the fixed regime label.
- **Output** graph shows the relationship between output and time with the fixed regime label.

The graphs illustrate how inflation and output change over time in a fixed active regime model.
MACRO SHOCKS: SWITCHING REGIME

**Demand**

- Graph showing Inflation over time with a peak at around 25 time units and a steady decrease towards 0.

**Supply**

- Graph showing Inflation over time with a steady decrease towards 0.

**Output**

- Graph showing Output over time with a peak at around 25 time units and a steady decrease towards 0.
Expectations and Fiscal Policy

• Some results from a model estimated to U.S. data [Leeper, Plante, Traum (2009)]

• Standard neo-classical growth model with fiscal instruments
  • unproductive government spending
  • capital taxes
  • labor taxes
  • lump-sum transfer payments

• Estimate how each instrument has responded to government debt historically

• Yields estimates of the sources of fiscal financing
FISCAL FINANCING IN THE U.S.

- Formal Bayesian tests indicate that intertemporal fiscal adjustments are complex
  - best fit from a model that allows all instruments to adjust over time
  - debt dynamics important for impacts of fiscal policies
- Fiscal multipliers tend to be modest in size
- Modest multipliers a tentative finding: model does not include monetary policy
- Sources of fiscal financing very important
Government Spending Multipliers

Output Multipliers

All instruments adjust

Quarters After an Increase in Government Consumption
$1$ more government spending $\Rightarrow$ $0.65$ more GDP

All instruments adjust
**Government Spending Multipliers**

Output Multipliers

Only transfers adjust

Quarters After an Increase in Government Consumption
**Government Spending Multipliers**

Output Multipliers

Quarters After an Increase in Government Consumption

Only transfers adjust

If higher spending financed with lower transfers, GDP rises more
Government Spending Multipliers

Output Multipliers

Government spending adjusts
Government spending adjusts
If government spending financed by lower government spending, GDP falls after 2 years.
Output Multipliers

Quarters After an Increase in Government Consumption

Taxes adjust
If government spending financed by higher taxes, GDP soon begins to decline.
**Speed of Fiscal Adjustment**

- Obama administration has pledged to cut deficit in half within 4 years
- Done in response to outcries about fiscal “unsustainability”
- Use estimated model to answer: What are the implications for effectiveness of fiscal stimulus of slowing down or speeding up fiscal adjustments?
  - slowing down pushes adjustments into future
  - rational agents discount those more heavily
  - speeding up brings them forward
- Changes in the timing of fiscal adjustments can alter the government spending multipliers in important ways
Government Spending Multipliers

Output Multipliers

Historically Estimated Speed of Adjustment

Quarters After an Increase in Government Consumption
Government Spending Multipliers

Output Multipliers

Slower Speed of Adjustment

Quarters After an Increase in Government Consumption
Slower retirement of debt enhances fiscal stimulus for 6 years
Output Multipliers

Quarters After an Increase in Government Consumption

Faster Speed of Adjustment
Faster retirement of debt suppresses fiscal stimulus
**Expectations and Monetary & Fiscal Policy**

- The conventional wisdom

- An appropriate choice of policy behavior—the $\alpha(z_t)$ function—allows monetary policy to
  - target inflation
  - influence aggregate demand
  - stabilize the macro economy

- Monetary policy’s effectiveness depends on private sector’s beliefs about current & future monetary policy

- This would be wonderful . . . if it were true
**The Dirty Little Secret**

- The claims about monetary policy’s potency **fundamentally** depend on fiscal policy behavior.

- Consider an open-market sale to tighten monetary policy:

  \[ M_t \downarrow \quad B_t \uparrow \quad \Rightarrow \quad i_t \uparrow \]

- Higher \( B_t \) and higher \( i_t \) imply higher debt service.

- Fiscal policy *must* be expected to raise future surpluses.

- Without this fiscal response, it is not feasible to conduct the open-market sale.

- Also implies that exogenous MP contractions should predict higher surpluses: evidence?
• The dirty little secret leads to

    For monetary policy to manage expectations, fiscal policy must manage expectations appropriately

• This mantra is much less catchy and far less popular
Myth Bustng

Myth #1

Inflation is always & everywhere a monetary phenomenon.

- Monetary policy can control inflation only if fiscal behavior stabilizes debt

- Failure of fiscal policy to manage expectations appropriately can destabilize the economy

- Most (all?) countries have not established a fiscal framework compatible with monetary policy control of inflation

- Current circumstances may test if this is a practical problem as well as a theoretical one
Myth Busting

Myth #2
The “quantity theory of money” and the “fiscal theory of the price level” are alternative theories of price level determination.

- These are treated as dichotomous views: only $M$ matters vs. only $B$ matters

- There is only a single theory: the price level and inflation are always & everywhere joint monetary and fiscal phenomena

- So-called quantity and fiscal ‘theories’ emerge as special cases
Myth Busting

Myth #3

It is reasonable to study monetary policy and fiscal policy impacts separately.

- Every statement about monetary policy impacts is conditional on fiscal behavior
- Every statement about fiscal policy impacts is conditional on monetary behavior
- When we study monetary and fiscal policy separately, we do so by maintaining special assumptions about how the other policy behaves
- Every central bank models MP in isolation from FP
Myth Busting

Myth #4

Monetary approaches to price level determination are “standard” and fiscal approaches are “non-standard”.

- If “standard” means traditional/textbook, then this is correct

- If “standard” means more useful or widely applicable, then this is a myth

- This myth supports the common misperception that the fiscal approach applies only in extreme circumstances—hyperinflation or zero bound interest rates

- Fiscal approach useful in general; especially useful now
**Ubiquitous Equilibrium Conditions**

- Dynamic models include two equilibrium conditions:

\[ M_t V_t = P_t Y_t \]  \hspace{2cm} (QE)

\[ \frac{M_{t-1} + B_{t-1}}{P_t} = E_t \sum_{T=t}^{\infty} q_{t,T} S_T \]  \hspace{2cm} (IEC)

- These are both *equilibrium conditions*

- They are *not* constraints on policy choices

- No policy authority must choose instruments to be consistent with (QE) or (IEC)
Policy Interactions: Simple Example

- Endowment economy; log linearize

- Monetary policy rule
  \[ i_t = \alpha \pi_t + stuff \]

- Combine with Fisher equation to yield
  \[ E_t \pi_{t+1} = \alpha \pi_t + stuff \] (Inflation Dynamics)
**Policy Interactions: Simple Example**

- Fiscal policy rule

\[ \tau_t = \gamma \frac{B_{t-1}}{P_{t-1}} + stuff \]

- Combine with government's flow budget constraint to yield

\[ \frac{B_t}{P_t} = \left[ \beta^{-1} - \gamma (\beta^{-1} - 1) \right] \frac{B_{t-1}}{P_{t-1}} + stuff \]  
  \( \text{(Debt Dynamics)} \)
Dynamics of Price Determination

\[ E_t \pi_{t+1} = \alpha \pi_t + \text{stuff} \quad \text{(Inflation Dynamics)} \]

\[ \frac{B_t}{P_t} = [\beta^{-1} - \gamma(\beta^{-1} - 1)] \frac{B_{t-1}}{P_{t-1}} + \text{stuff} \quad \text{(Debt Dynamics)} \]

- Unique stationary equilibrium requires one equation to be stable and one to be unstable

- Properties of equilibrium very different in different regions of policy parameter space—\((\alpha, \gamma)\)
## Joint Monetary-Fiscal Behavior

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<th>Region</th>
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**Active Monetary/Passive Fiscal**

**Equilibrium**

- (Inflation Dynamics) explosive ($\alpha > 1$), so only stable solution makes $\pi_t$ depend on expected future stuff
- Impacts of shocks on $\pi_t$ mitigated by MP behavior
  - larger is $\alpha$, more the impacts are eliminated
- (Debt Dynamics) stable ($\gamma > 1$)
  - wealth effects from higher $B_t$—arising from monetary or fiscal actions—are eliminated by higher expected $\tau_{t+k}$
- If FP were not stabilizing debt, MP would not be able to target inflation (or conduct open-market operations)
- FP behavior important even though, *in equilibrium*, fiscal shocks do not affect inflation
- Almost all MP analysis assumes this regime
### Joint Monetary-Fiscal Behavior

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Passive Monetary/Active Fiscal

Equilibrium

- (Debt Dynamics) explosive \((\gamma < 1)\), so the only stable solution makes \(P_t\) depend on expected future net surpluses
  - debt-financed tax cut increases wealth because future taxes not expected to rise
  - increases aggregate demand \(\Rightarrow\) raises current & expected inflation and, if prices sticky, current and future GDP

- (Inflation Dynamics) stable \((\alpha < 1)\)
  - determines expected inflation

- If MP were to raise \(i\) with \(\pi\), debt would explode
  - by fixing \(i_t\), MP prevents debt from exploding

- MP behavior important even though, \textit{in equilibrium}, monetary shocks do not affect inflation
## Joint Monetary-Fiscal Behavior

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Both policies try to stabilize debt; neither determines price level
### Joint Monetary-Fiscal Behavior

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Both policies trying to determine price level; neither stabilizes debt
### Joint Monetary-Fiscal Behavior

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- **Region II**: “Non-Standard”: “Fiscal theory of the price level”
- Quantitative implications of this broader perspective are contained in several of my papers
Simulate the impacts of American Recovery and Reinvestment Act’s plans for government spending

Feed ARRA’s path for $G$ into new Keynesian model with switching in monetary & fiscal policy rules

Trace out model’s implied paths for macro variables

Draws on Davig & Leeper
US Spending Stimulus: AM/PF

- **Output Gap**
- **Consumption**
- **Inflation**
- **Real Rate**
- **Gov Purchases**
- **Taxes (τₜ)**
- **Debt (Level)**
- **Primary Surplus**

Graphs showing the percentage deviation over time for various economic indicators.
When Fiscal Policy Does Not Cooperate

- What if, as inflation begins to rise, the Fed switches to an active stance (from PM/AF)?
- This is a very real possibility when there is no coordination between MP & FP
- Get a game of chicken
- Then there are two unstable relationships:
  - inflation due to the active MP
  - debt due to the active FP
- In a fixed AM/AF regime, there would be no equilibrium
- With switching, so long as you are sufficiently far from the "fiscal limit," there is a build up of debt
- And persistently higher inflation because MP has lost control of inflation
THE 2009 ARRA: ACTIVE/ACTIVE

Output Gap

Consumption

Inflation

Real Rate

Gov Purchases

Taxes ($\tau_t$)

Debt (Level)

Primary Surplus

% deviation

% deviation

% deviation

% deviation

% deviation

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New Mantras

• Because of Mantra III

Inflation is always & everywhere a monetary and fiscal phenomenon. . .

• We have a macro policy Mantra IV

Monetary and fiscal policy are about managing expectations

• How do we do this?
I NSTITUTIONALLY I NCONVENIENT T RUTHS

1. Essential to coordinate monetary & fiscal policies: maybe counterproductive to separate monetary & fiscal decision making

2. Choice of *joint* monetary-fiscal regime important for impacts of fiscal stimulus: politicized fiscal choices & independent monetary choices unlikely to deliver best results

3. Agents’ beliefs about current & future policy regimes determine impacts of stimulus: calls for enhanced monetary *and* fiscal transparency about both current and likely future policies

4. Accurate predictions of policy effects depend on entire future paths of policy choices: regime change should be the default modeling strategy