

# Why Have Monetary Aggregates Lost Influence?

**“We didn’t abandon the monetary aggregates, they abandoned us.” Gerry Bouey, former governor of the Bank of Canada.**

**Recall instruments are used to influence intermediate targets which will determine the goals of monetary policy. There has been a complete breakdown between monetary aggregates and economic activity.**

**That the short term interest rate is the optimal instrument in today's economy was exactly the prediction by a famous analysis by William Poole.**

**As Blinder puts it: “..it is hard to think of an aspect of monetary policy in which theory and practice have interacted more fruitfully.”**

**So – what was Poole's analysis and why did it predict an interest rate instrument?**

**Poole analyzed the optimal choice of instrument using the theory of economic policy described in Chapter 1.**

**He starts off with a simple structural IS-LM model:**

**IS curve**       $Y = a_0 + a_1r + u$

**LM curve**     $M = b_0 + b_1Y + b_2r + v$

**The terms  $u$  and  $v$  denote shocks to the goods and money market.**

$$E(u) = 0, E(v) = 0, E(u^2) = \sigma_u^2, E(v^2) = \sigma_v^2, E(uv) = \sigma_{uv}$$

**And adds policymaker's preferences – a loss function**

$$L = E[(Y - Y_f)^2]$$

Under an interest rate instrument,  $r$  is exogenous.

Under a money supply instrument,  $M$  is exogenous

What are the steps?

1. Express  $Y$  in reduced form.
2. Use this in the loss function.
3. Take derivative with regard to instrument.
4. Find optimal setting of instrument.
5. Plug this into reduced form to get optimal  $Y$ .
6. Use this in the loss function to calculate loss.
7. Compare loss under interest rate target vs. money target.

Suppose  $r$  is the instrument. Go through the steps.

- Express  $Y$  in reduced form.

Since  $r$  is exogenous,  $Y$  is already in reduced form:

$$Y = a_0 + a_1 r + u$$

2. Use this in the loss function.

$$\min_r E \left\{ [(a_0 + a_1 r + u) - Y_f]^2 \right\}$$

3. Take derivative with regard to instrument.

$$E [2a_1 (a_0 + a_1 r + u - Y_f)] = 0$$

4. Find optimal setting of instrument.

$$r^* = \frac{Y_f - a_0}{a_1}$$

# Continuing Steps

5. Plug this into reduced form to get optimal  $Y$ .

IS curve: 
$$Y = a_0 + a_1 r + u$$

Optimal  $r^*$ : 
$$r^* = \frac{Y_f - a_0}{a_1}$$

$Y$ : 
$$Y_r = Y_f + u$$

(Note:  $E(Y^*) = \text{Full employment } Y$ .)

6. Use this in the loss function to calculate loss.

$$L_r = E [(Y_r - Y_f)^2] = E [u^2] = \sigma_u^2$$

## Repeating Steps for $M$ as instrument yields:

Optimal setting of  $M$ : 
$$M^* = \frac{Y_f(a_1b_1+b_2) - a_0b_2 + a_1b_0}{a_1}$$

Implication for  $Y$ : 
$$Y_M = Y_f + \frac{b_2u - a_1v}{a_1b_1 + b_2}$$

Loss : 
$$L_M = E [(Y_r - Y_f)^2] = E \left[ \left( \frac{b_2u - a_1v}{a_1b_1 + b_2} \right)^2 \right]$$
$$= (a_1b_1 + b_2)^{-2} [b_2^2\sigma_u^2 + a_1^2\sigma_v^2 - 2a_1b_2\sigma_{uv}]$$

## 7. Compare loss under interest rate target vs. money target.

$$\frac{LM}{L_r} = (a_1 b_1 + b_2)^{-2} \left[ b_2^2 + a_1^2 \frac{\sigma_v^2}{\sigma_u^2} - 2a_1 b_2 \frac{\sigma_{uv}}{\sigma_u^2} \right]$$

Assume  $\sigma_{uv} = 0$  and  $b_1 = 1$  (unitary income elasticity of money demand)

$$\frac{LM}{L_r} = (a_1 + b_2)^{-2} \left[ b_2^2 + a_1^2 \frac{\sigma_v^2}{\sigma_u^2} \right]$$

If the variance of LM shocks is small relative to IS shocks.

$\left( \frac{\sigma_v^2}{\sigma_u^2} \approx 0 \right)$  Then  $\frac{LM}{L_r} < 1$   $M$  is optimal instrument.

But, as we said at the beginning, central banks do NOT use  $M$  as instrument.

Why – LM shocks are very large.

Examine IS-LM graphs.