A New Interpretation of the Volcker Disinflation, Money Growth Targeting, and the Monetarist Experiment

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The Monetarist Experiment

- Monetary policy during the period from October 1979 to October 1982 is labeled the Monetarist Experiment
- The stated purpose was to bring inflation down by means of improved control of money growth.
- This Paul Volcker disinflation was successful as inflation came down rapidly
- The consequent recession was in many respects the worst one since World War II, up to that point in time

Interest Rate Volatility

- Consistent with a policy of controlling money supply, interest rate volatility increased ... in fact quite dramatically ... and fell quickly at the end of the Monetarist Experiment period.

- Volatility figures below report time-varying standard deviations based on a 13-month centered window.

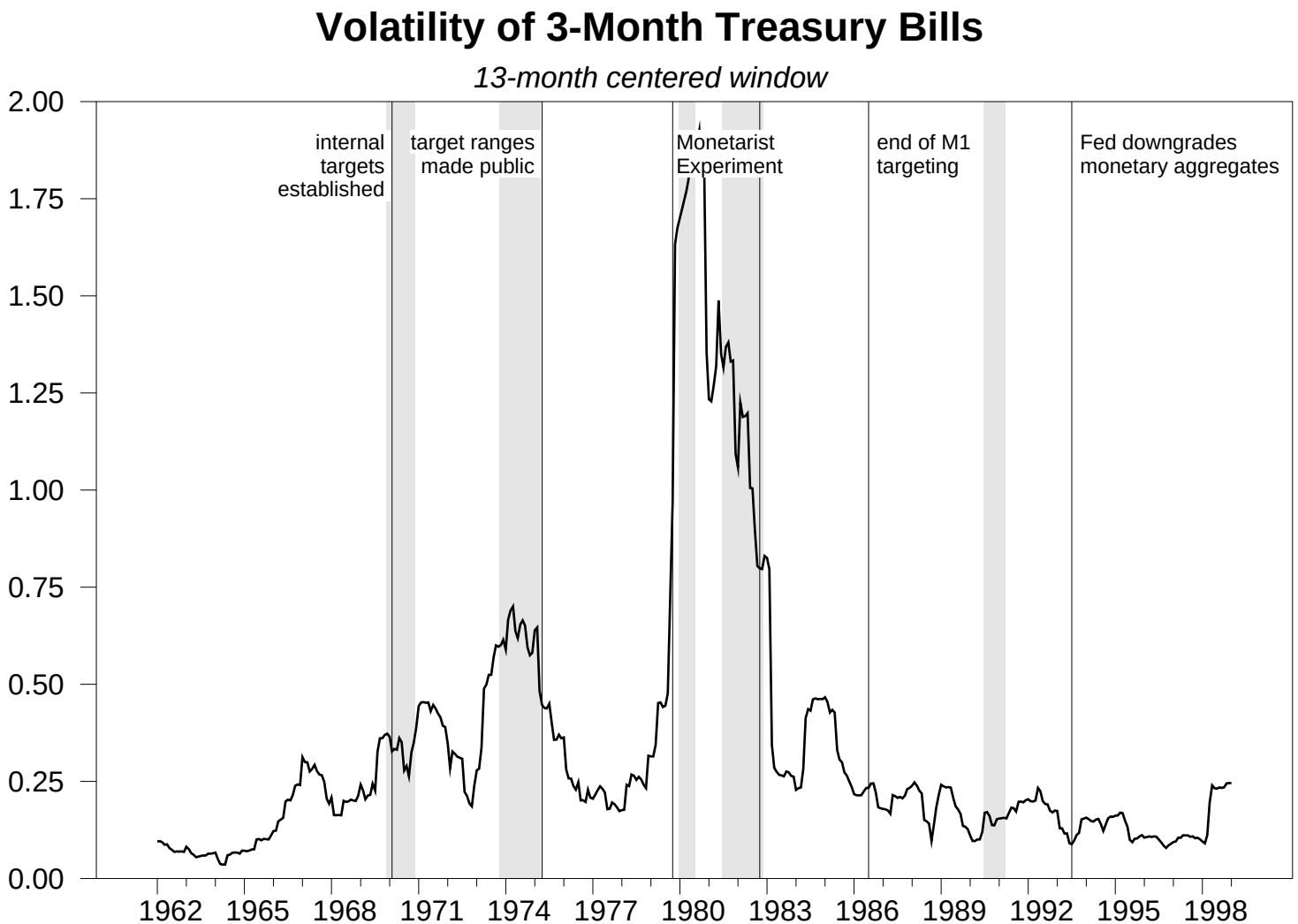


Figure: shaded areas are NBER-dated recession periods.

Other volatilities

- Volatilities of output and inflation also increased during the Monetarist Experiment ... not puzzling

- However, M1 growth volatility rises impressively at the the start of the Monetarist Experiment and stays high throughout
- This is puzzling ... If the Fed was targeting money growth how could it become more volatile?

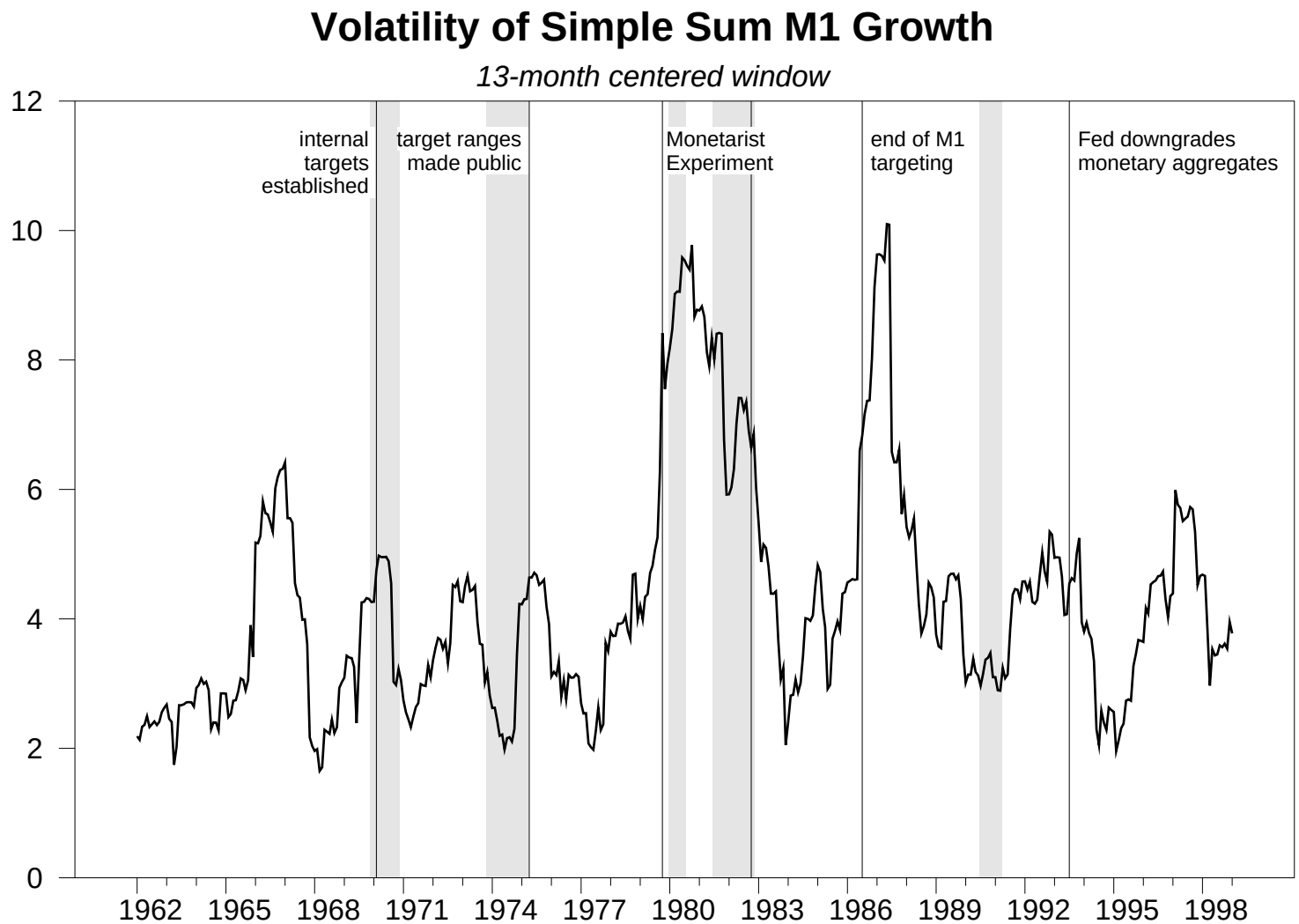


Figure: shaded areas are NBER-dated recession periods.

What to make of this evidence?

- Friedman (1982) concludes this evidence indicates the Fed was merely "paying lip service" to money growth targeting
- On the other hand, Volcker has strenuously argued policy at that time was based on Monetarist principles. See his 2001 interview in *Macroeconomic Dynamics*, for example.

In this paper we show:

- this dramatic rise in volatilities during the Monetarist Experiment can be explained by indeterminacy, which stems from the Fed trying to control simple sum monetary aggregates, which are inferior monetary aggregates
- if the Fed had targeted a more appropriate monetary aggregate, (a weighted aggregate like Barnett's Divisia aggregate) determinacy would have obtained.

A Fisherian Model

- Our model is related to Belongia and Ireland (2014).
- Lower case variables denote log-deviation from the non-stochastic steady state while upper case indicates variables in levels.
- This model consists primarily of 3 non-policy equations:

$$y_t = \mathbb{E}_t y_{t+1} - (r_t - \mathbb{E}_t \pi_{t+1}), \tag{1}$$

$$y_t = \rho_y y_{t-1} + \varepsilon_t^y, \tag{2}$$

$$m_t = y_t - \frac{1}{1+\chi} u_t + \upsilon_t \tag{3}$$

- Equation (1) is from the Euler Equation,
- Equation (2) is exogenous real output,
- Equation (3) is the demand for the monetary aggregate.

The Monetary Aggregate

A constant elasticity of substitution (CES) function:

$$M_t = \left[\nu^{\frac{1}{\omega}} N_t^{\frac{\omega-1}{\omega}} + (1-\nu)^{\frac{1}{\omega}} D_t^{\frac{\omega-1}{\omega}} \right]^{\frac{\omega}{\omega-1}}$$

where N_t is non-interest bearing currency and D_t is interest bearing deposits.

- $\omega > 0$ is the elasticity of substitution between currency and deposits
- $0 < \nu < 1$ governs the steady-state shares of each asset.
- If $\omega = \infty$, then $M_t = N_t + D_t$. (for this case of perfect substitutes, growth rates of simple-sum, Divisia, and the true monetary aggregate would be identical)

A Money Market Equilibrium Condition

- Money demand is written in terms of the nominal bond rate, based on demand equations derived for N_t and D_t and an equilibrium condition on interest rates from a simple model of banking:

$$m_t = y_t - \eta_r r_t + \upsilon_t. \tag{4}$$

- υ_t is now an amalgamation of structural shocks, including money demand shocks and banking sector shocks.
- η_r is the interest semi-elasticity of this reformulated money demand, which depends on the shopping-time parameter χ and parameters governing the monetary aggregate and steady-state values for the bond and deposit rates.
- Therefore η_r is a function of the steady-state rate of inflation (also $\eta_r > 0$).

Targeting Measured or Simple Sum Money Growth

- As mentioned previously the simple sum money growth treats currency and deposits as perfect substitutes
- But if $\omega < \infty$, simple-sum money growth will track the growth rate of the true unobserved monetary aggregate with a time-varying endogenous error!

Lemma 1

If $R_t > R_t^D > 1$ in steady state, then the gap between measured money growth and actual money growth varies positively with the change in nominal interest rates and is also a function of the shocks:

$$\mu_t^M - \mu_t = \psi_r \Delta r_t + \epsilon_t^M \tag{5}$$

where $\psi_r > 0$ and $\lim_{\omega \to \infty} \psi_r = \lim_{\omega \to \infty} \epsilon_t^M = 0$.

Interpreting the Simple Sum error

- The nominal interest rate is endogenous and so potentially may affect determinacy
- Note ψ_r is a complicated function of parameters and steady state nominal interest rates ... hence this coefficient is also a function of the steady state inflation rate

When Does Targeting Simple Sum Yield Indeterminacy?

Proposition 1

For any $\eta_r > 0$ and any $\psi_r > 0$, if the central bank follows the policy rule $\mu_t^M = 0$ then there exists a unique bounded rational expectations equilibrium if and only if $\psi_r < \eta_r + \frac{1}{2}$.

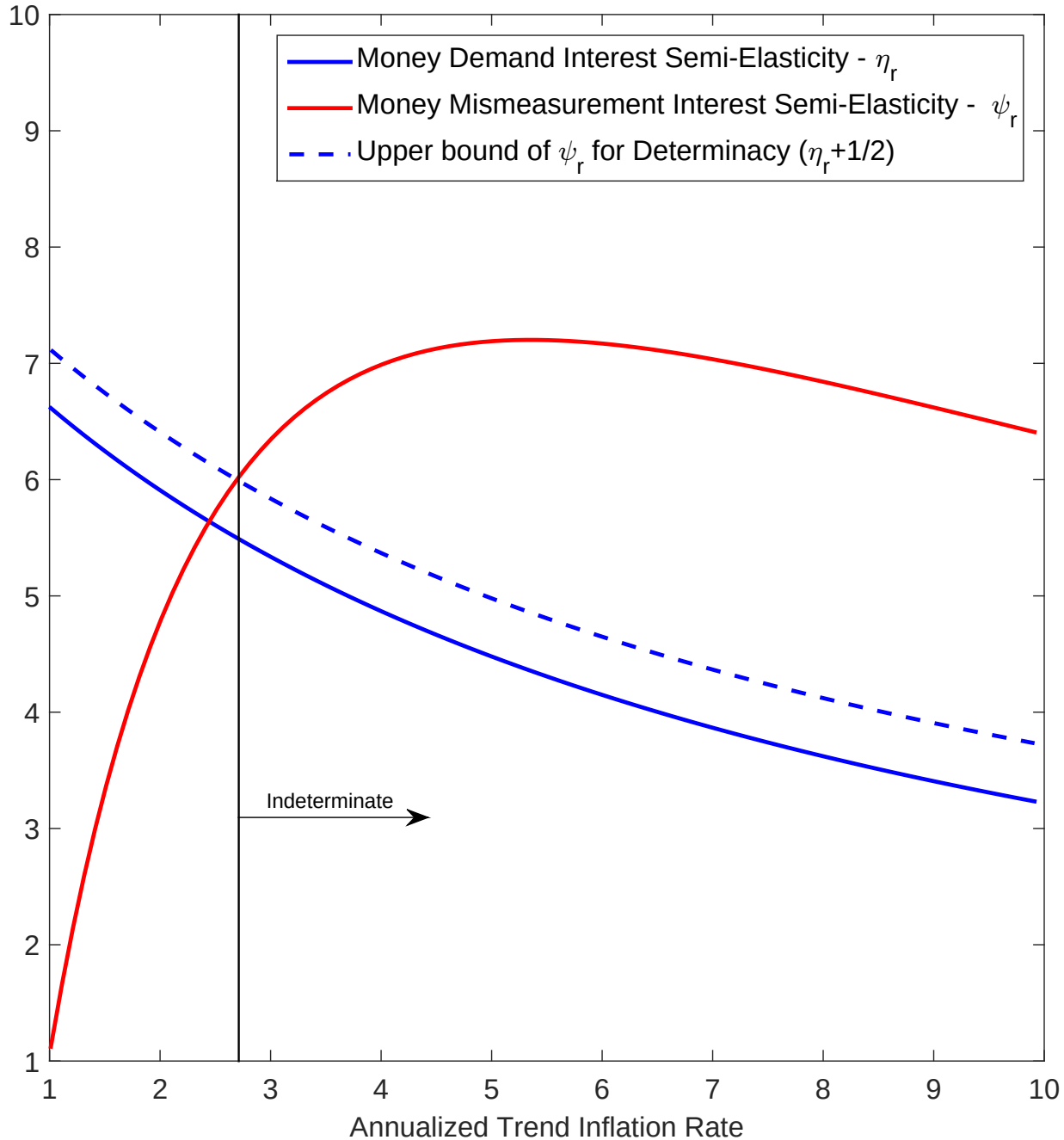
Did this condition hold during the Monetarist Experiment? Of course, this is an empirical question.

Inflation Affects the Determinacy Condition

- The determinacy condition under a constant simple sum money-growth rule depends on two parameters: ψ_r and η_r ... which are themselves functions of deeper structural parameters.

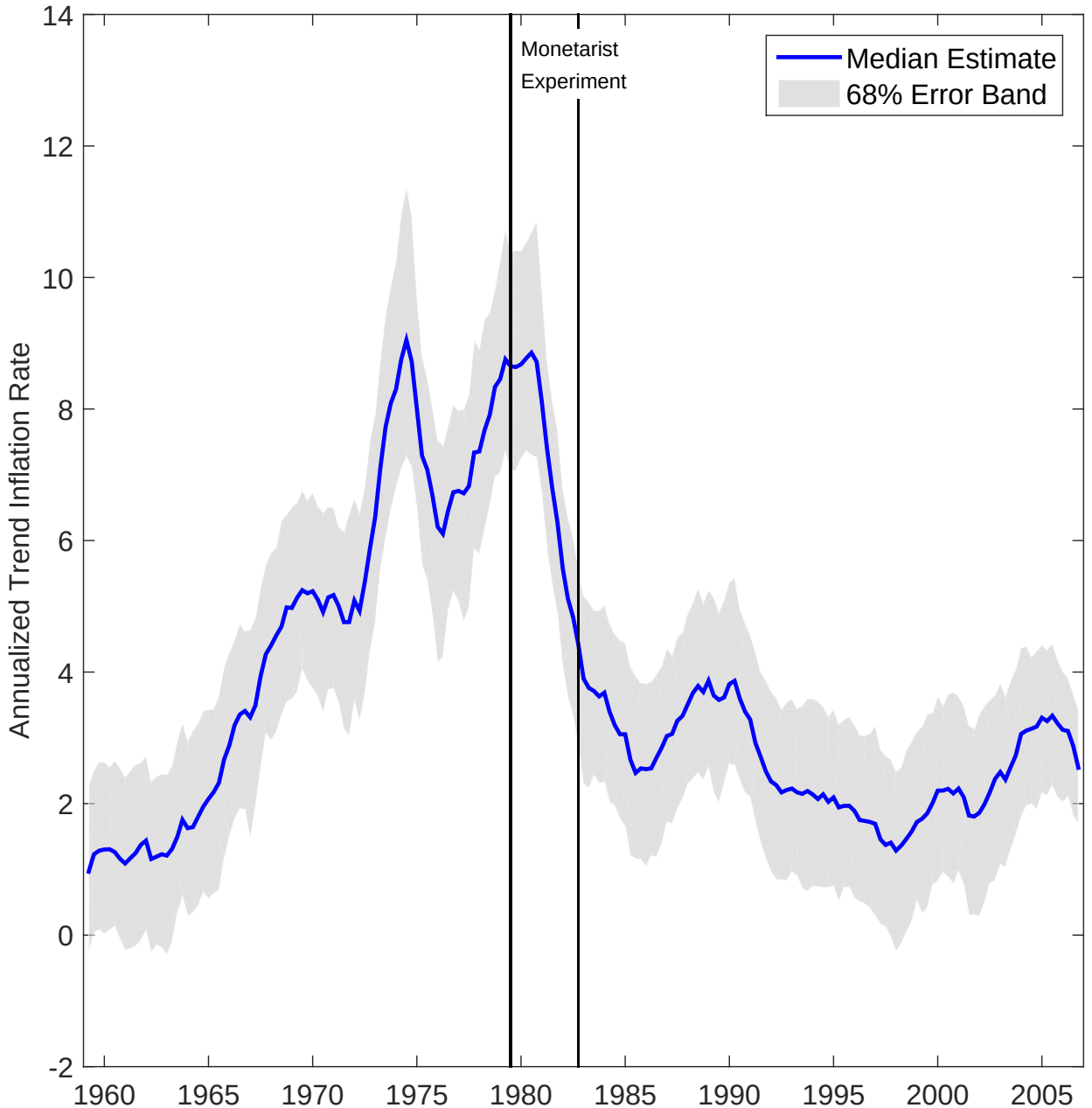
Deep parameters are obtained in two ways .

- Many of the parameters are inferred by comparing the model's implied steady state with means in the data.
- Some parameters must be estimated: ω, χ, and Π (steady state inflation).


Money Demand Interest Semi-Elasticity - η_r
Money Mismeasurement Interest Semi-Elasticity - ψ_r
Upper bound of ψ_r for Determinacy (η_r+1/2)
Indeterminate
Annualized Trend Inflation Rate
1
2
3
4
5
6
7
8
9
10

Trend Inflation Estimates

- Based on the method of Stock and Watson (2007)
- We see that trend inflation was clearly high enough for indeterminacy


Monetarist
Experiment
Median Estimate
68% Error Band
Annualized Trend Inflation Rate
14
12
10
8
6
4
2
0
-2
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

A Probabilistic Approach to Determinacy

- Point estimates for ω, χ, and Π shape the determinacy region and are uncertain.
- Values of ω and χ are drawn from their asymptotic distributions
- Values for Π come from its posterior distribution.
- For each draw of ω, χ, and Π we check whether the determinacy condition $\psi_r < \eta_r + 1/2$ is satisfied.

- We see the probability of indeterminacy was high!

Figure: Probabilistic Evaluation of Determinacy During the Monetarists Experiment

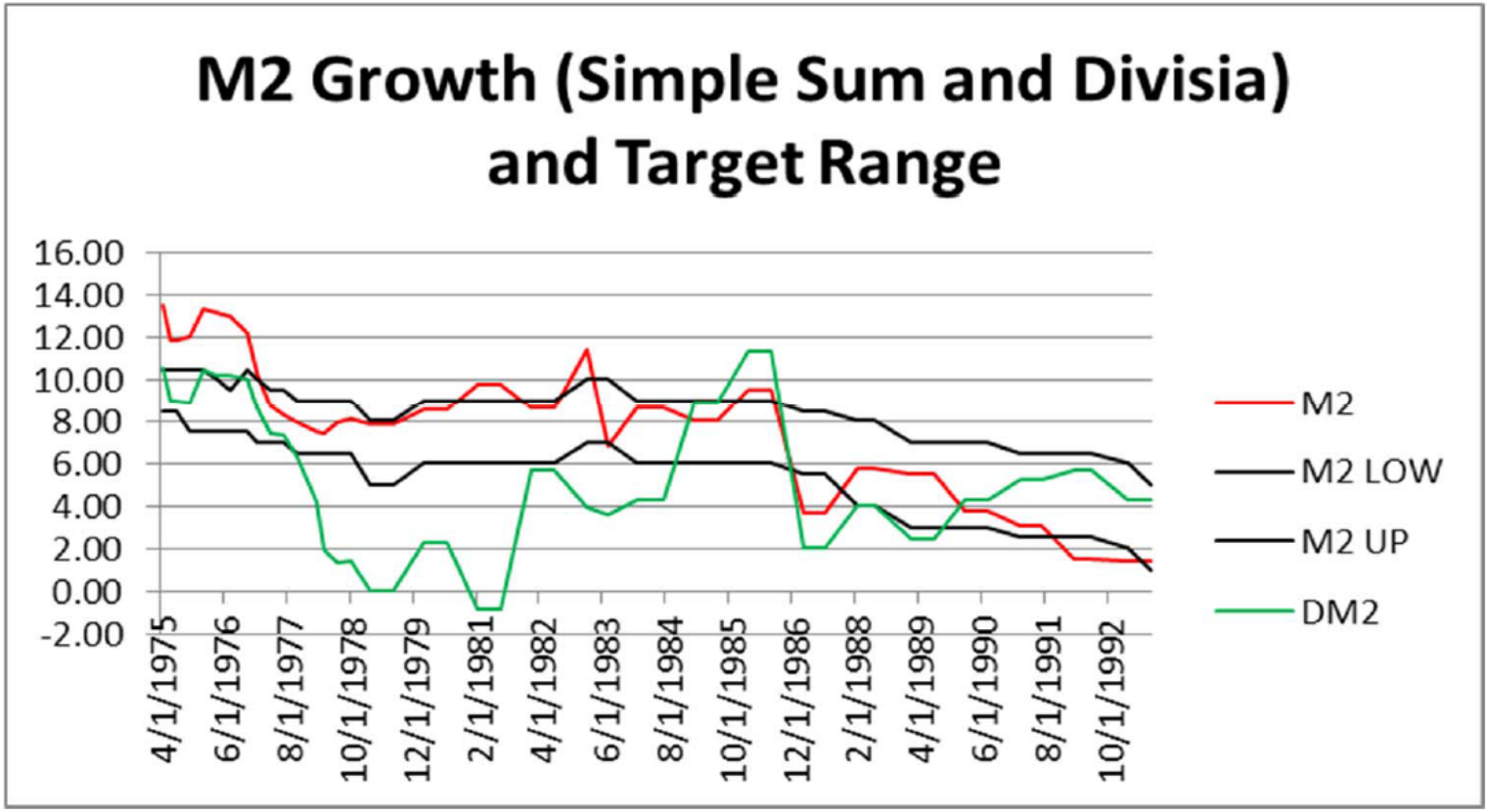
Date	Estimated Trend Inflation Rate	Determinate at Point Estimates?	Probability of Determinacy
1979-Q4	8.73	No	17.8
1980-Q1	8.87	No	17.2
1980-Q2	8.97	No	16.5
1980-Q3	9.05	No	17.0
1980-Q4	9.04	No	17.0
1981-Q1	8.41	No	17.0
1981-Q2	7.41	No	20.0
1981-Q3	6.78	No	20.3
1981-Q4	6.25	No	24.0
1982-Q1	5.46	No	24.1
1982-Q2	5.02	No	27.7
1982-Q3	4.75	No	27.8

Other results

- Targeting the true monetary aggregate yields determinacy
- Targeting a weighted monetary aggregate, such as Barnett's Divisia aggregate, would also yield determinacy

How did Simple Sum and Divisia Growth Rates Match-up with the Fed's Targets?

- Divisia M2 and simple sum measures often gave very different signals
- During the Monetarist Experiment, the Simple Sum suggests monetary policy was loose (at or above the upper target) while Divisia measures suggest monetary policy was extremely tight (well below the lower target).
- Given the rapid disinflation and severe recession that were associated with the Monetarist Experiment, Divisia tightness characterizes policy much better than simple sum looseness


M2 Growth (Simple Sum and Divisia) and Target Range
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
-2.00
4/1/1975
6/1/1976
8/1/1977
10/1/1978
12/1/1979
2/1/1981
4/1/1982
6/1/1983
8/1/1984
10/1/1985
12/1/1986
2/1/1988
4/1/1989
6/1/1990
8/1/1991
10/1/1992
M2
M2 LOW
M2 UP
DM2

Conclusion

- Targeting growth of a simple sum monetary aggregate yields an indeterminate outcome under certain conditions.
- We provide evidence that simple sum indeterminacy was likely a reason why the economy exhibited increased volatility during the Monetarist Experiment.
- Perhaps if the Fed had targeted an appropriate measure, money might NOT have fallen from grace for a majority of monetary economists and policymakers.