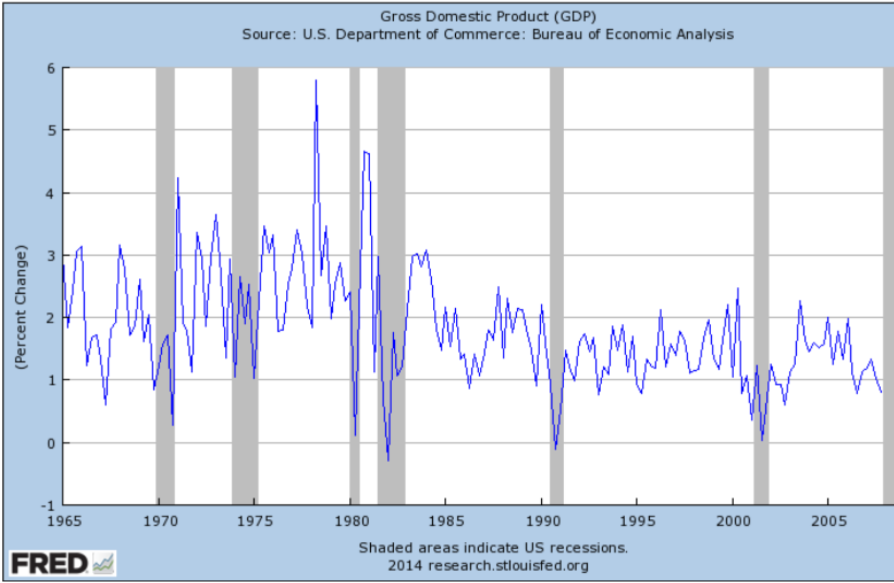
EC 831: Empirical Methods in Macroeconomics

Aeimit Lakdawala

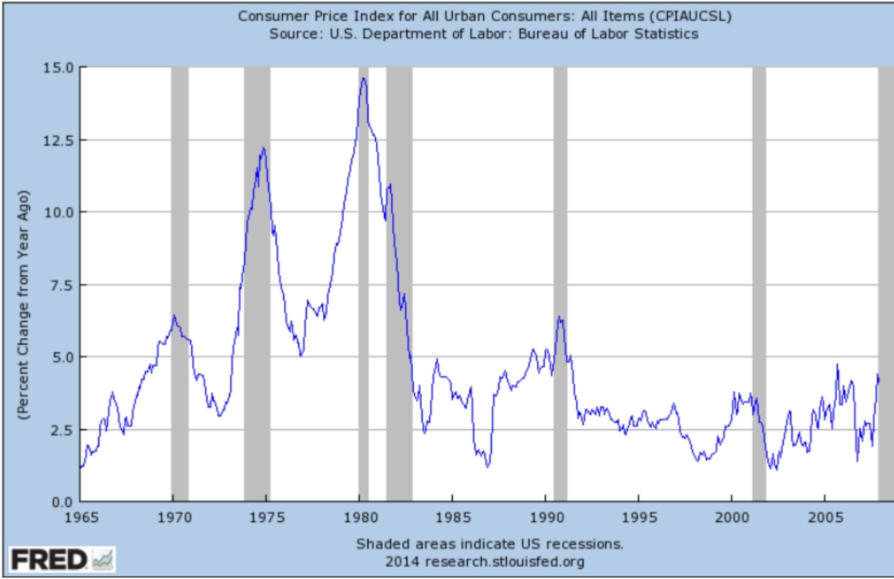
Michigan State University

Has Monetary Policy Become More Effective?

Growth Rate of GDP



Inflation


Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL)
Source: U.S. Department of Labor: Bureau of Labor Statistics
(Percent Change from Year Ago)
15.0
12.5
10.0
7.5
5.0
2.5
0.0
1965
1970
1975
1980
1985
1990
1995
2000
2005
Shaded areas indicate US recessions.
2014 research.stlouisfed.org
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The Great Moderation

Decline in volatility of real activity and inflation since early 1980s.

Explanations:

1. Good Luck: Stock & Watson (2003)
    - Smaller and more infrequent shocks
2. Structural Change: Ramey (2006), McConnell and Perez-Quiros (2000)
    - Better inventory management
    - Other institutional changes
3. Good Policy: Clarida, Gali & Gertler (2000), Boivin & Giannoni (2006)
    - Improved monetary policy

Start with a VAR

$$\begin{pmatrix} Z_t \\ R_t \end{pmatrix} = a + A(L) \begin{pmatrix} Z_{t-1} \\ R_{t-1} \end{pmatrix} + u_t$$

Z_t: Output, Inflation and commodity prices

R_t: Fed Funds Rate

Recursive identification assumption:
Variables in Z_t respond with a lag to changes in R_t.

- Uncover structural monetary policy shock

$\Rightarrow$ Construct a DSGE model that can match these facts

Response to Contractionary Monetary Policy Shock

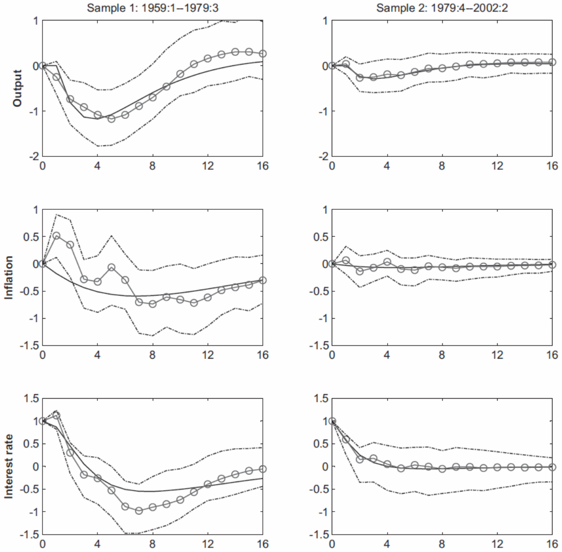


Figure: Solid line: DSGE Model, Dashed line: VAR

DSGE Model: Very similar to CEE (2005)

Key Equations:

$$
\begin{aligned}
\widehat{Y}_t &= \eta \widehat{Y}_{t-1} + \beta\eta E_{t-2}\widehat{Y}_{t+1} - \psi E_{t-2}\widehat{r}_t^L + g_t \\
\pi_t - \gamma\pi_{t-1} &= \xi E_{t-1}\widehat{s}_t + \beta E_{t-1}\left(\pi_{t+1} - \gamma\pi_t\right) \\
\widehat{s}_t &= \omega \widehat{Y}_t - \widehat{r}_t^L - q_t \\
\widehat{R}_t &= \phi_\pi E_t \pi_{t+h_\pi} + \phi_y E_t \widehat{Y}_{t+h_y} + \rho_1 \widehat{R}_{t-1} + \rho_2 \widehat{R}_{t-2} + \varepsilon_t
\end{aligned}
$$

$\widehat{Y}_t$: Output
$\widehat{r}_t^L$ long-term real interest rate
g_t: Demand shock
π_t: Inflation rate
$\widehat{s}_t$: Real marginal cost
q_t: Supply shock
$\widehat{R}_t$: Nominal interest rate
ε_t: Monetary Policy shock

Parameter Estimates

TABLE 2.—ESTIMATES OF STRUCTURAL PARAMETERS

Parameter	Sample 1	Sample 2
Calibrated		
β	0.99	0.99
ω	0.47	0.47
Estimated		
ψ	0.495	0.662
	(0.048)	(0.115)
η	0.502	0.500
	—	(0.035)
ξ	0.011	0.008
	(0.001)	(0.002)
γ	1	1
	—	—
ϕ_π	0.276	0.508
	(0.007)	(0.050)
ϕ_y	0.000	0.000
	(0.004)	(0.038)
ρ_1	1.011	0.602
	(0.017)	(0.015)
ρ_2	−0.274	−0.055
	(0.015)	(0.016)

Note: Results based on the minimum distance estimation described in the text. Standard errors are in parentheses.—denotes that the standard error is not available because the parameter is hitting the boundary of the parameter space.

Counterfactual

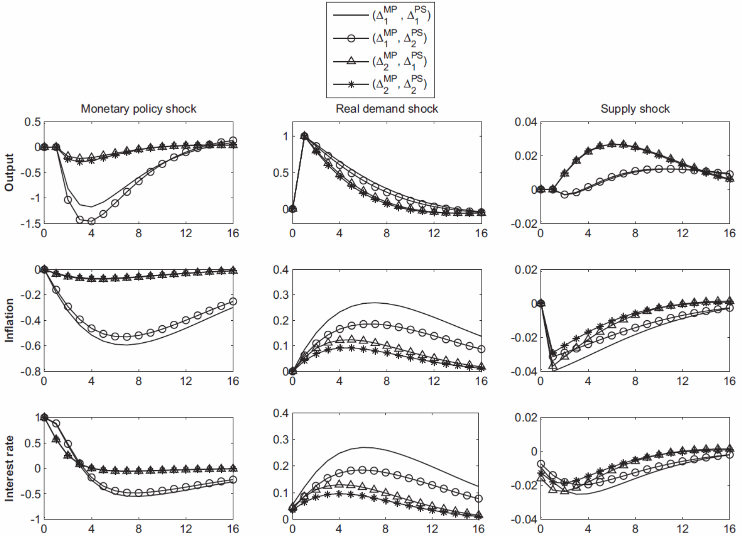
Monetary policy parameters

- $\Delta_s^{MP} = \{\phi_\pi, \phi_y, \rho_1, \rho_2\}$

Private sector parameters

- $\Delta_s^{PS} = \{\psi, \xi, \omega, \eta, \gamma\}$

Counterfactual



Interpretation of counterfactual experiment:

- " This counterfactual experiment thus suggests that the change in the estimated impulse responses to a monetary shock, is attributable almost entirely to a change in the systematic conduct of monetary policy."

- "it is the fact that monetary policy has been reacting more strongly to fluctuations in expected inflation that has helped stabilize the economy in response to monetary shocks"
- But output response to supply shocks is larger under the "new" monetary policy rule

TABLE 4.—STANDARD DEVIATIONS OF OUTPUT, INFLATION, INTEREST RATE, AND THE OUTPUT GAP IN COUNTERFACTUAL EXPERIMENTS

Row	Parameter combination	Sd ($\hat{Y}$)	Sd (π)	Sd ($\hat{R}$)	Sd $\{E(\hat{Y} - \hat{Y}^n)\}$
	Sample 1 shock process (pre-1980)				
1	$(\Delta_1^{MP}, \Delta_1^{PS})$	3.64	2.46	2.21	9.40
2	$(\Delta_1^{MP}, \Delta_2^{PS})$	2.84	5.13	4.69	11.65
3	$(\Delta_2^{MP}, \Delta_1^{PS})$	4.92	2.52	3.13	9.22
4	$(\Delta_2^{MP}, \Delta_2^{PS})$	2.90	1.32	1.82	11.30
	Sample 2 shock process (post-1980)				
5	$(\Delta_1^{MP}, \Delta_1^{PS})$	4.15	7.70	6.36	8.32
6	$(\Delta_1^{MP}, \Delta_2^{PS})$	10.46	12.61	11.45	13.29
7	$(\Delta_2^{MP}, \Delta_1^{PS})$	4.73	2.51	3.66	6.69
8	$(\Delta_2^{MP}, \Delta_2^{PS})$	1.71	0.93	1.78	8.02

Interpretation:

- "if the monetary policy of sample 2 had always been adopted, a change from shocks of period 1 to shocks of period 2 would have somewhat lowered the standard deviation of output and inflation"

- "if the monetary policy of sample 1 is maintained throughout,...,the volatility of output and inflation increase substantially as we move to the shocks of sample 2"

- In order to explain the decline in inflation and output volatility, it is crucial for the policy rule to have changed the way it has, along with the shocks.

Interpretation:

- "post-1980 policy rule is particularly well suited to reduce output and inflation volatility in the face of demand shocks, but that it exacerbates output fluctuations due to supply shocks."
- "Such a policy appears thus to have mitigated the effects of more important demand shocks in the post-1980 sample. At the same time, output volatility has remained contained, as a result of the smaller supply shocks."