

# Lecture 6 in Monetary Economics

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## Empirical evaluation of the baseline NK model

It does not seem to do that well. It cannot be taken seriously as a laboratory for the study of the effects of monetary policy.

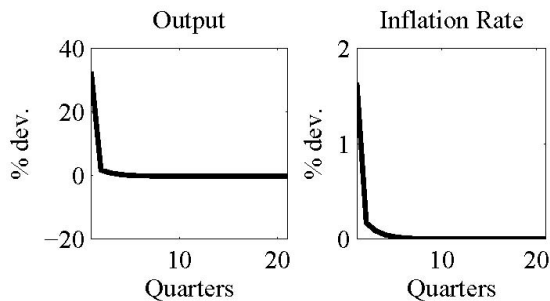
1. Implications for credible disinflation

$$\pi_t = \beta E_t \pi_{t+1} + \kappa \hat{y}_t \quad (1)$$

2. The dynamics of output and inflation following a monetary policy shock.

The absence of inertia.

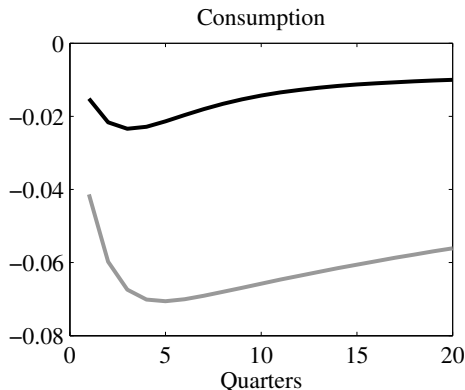
Figure: The baseline NK model



### 3. The effects of fiscal shocks on consumption

Consumption decreases with an increase in government spending

Figure: IRF to a Fiscal Shock under Fixed and Flexible Exchange Rates



Note: dark line: Benchmark flexible (Post-1980),

Gray line: Benchmark fixed (Pre-1980)

#### 4. Does the purely forward looking Phillips curve fit the data?

$$\pi_{t+1} - \pi_t = -\kappa x_t + e_{t+1}$$

where  $e_{t+1} = \pi_{t+1} - E_t \pi_{t+1}$ ,  $\beta \approx 1$ . GG estimate  $\kappa = -0.081(0.040)$  where  $x_t$  is detrended  $\log(\text{GDP})$ , a measure of the output gap.

A rise in unemployment (a decrease in the output gap) leads to higher inflation!

In general, a problem with the implied association between the current state of the business cycle and future inflation. A large output gap signals a deceleration of inflation!

GG (1999): The problem lies with the output gap measure. Using a better proxy of marginal cost ( (log) labor income share in the non-farm business sector) and estimating by GMM gives:

$$\pi_t = 0.023(0.012)x_t + 0.942(0.045)E_t\pi_{t+1}$$

Using detrended GDP instead

$$\pi_t = -0.016(0.005)x_t + 0.988(0.030)E_t\pi_{t+1}$$

But when trying to obtain direct estimates of the structural parameters, the estimated value of  $\kappa$  implies too much stickiness (5-6 quarters).

Figure: Phillips curve: CGG

Table 1  
Estimates of the new Phillips curve

	$\theta$	$\beta$	$\lambda$
GDP deflator			
(1)	0.829 (0.013)	0.926 (0.024)	0.047 (0.008)
(2)	0.884 (0.020)	0.941 (0.018)	0.021 (0.007)
Restricted $\beta$			
(1)	0.829 (0.016)	1.000	0.035 (0.007)
(2)	0.915 (0.035)	1.000	0.007 (0.006)
NFB deflator			
(1)	0.836 (0.015)	0.957 (0.018)	0.038 (0.008)
(2)	0.884 (0.023)	0.967 (0.016)	0.018 (0.008)

Note:  $\theta = 1 - \text{prob. of price resetting}$ ,  $\lambda = \text{coeff. on output gap}$ .

An additional problem:

Estimated Phillips curves that also allow for lagged inflation show a significant and substantial (often dominant) lagged inflation term (hybrids).

With standard measure of output gap (Rudenbusch: EJ April 2002): The lagged term is dominant (about 0.7).

With a proxy for marginal cost. Estimating the Phillips curve using the measure of marginal cost suggested by theory (CGG).



## Figure: Hybrid Phillips curve: CGG

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*J. Galí, M. Gertler / Journal of Monetary Economics 44 (1999) 195–222*

Table 2  
Estimates of the new hybrid Phillips curve

	$\omega$	$\theta$	$\beta$	$\gamma_b$	$\gamma_f$	$\lambda$
GDP deflator						
(1)	0.265 (0.031)	0.808 (0.015)	0.885 (0.030)	0.252 (0.023)	0.682 (0.020)	0.037 (0.007)
(2)	0.486 (0.040)	0.834 (0.020)	0.909 (0.031)	0.378 (0.020)	0.591 (0.016)	0.015 (0.004)
Restricted $\beta$						
(1)	0.244 (0.030)	0.803 (0.017)	1.000	0.233 (0.023)	0.766 (0.015)	0.027 (0.005)
(2)	0.522 (0.043)	0.838 (0.027)	1.000	0.383 (0.020)	0.616 (0.016)	0.009 (0.003)
NFB deflator						
(1)	0.077 (0.030)	0.830 (0.016)	0.949 (0.019)	0.085 (0.031)	0.871 (0.018)	0.036 (0.008)
(2)	0.239 (0.043)	0.866 (0.025)	0.957 (0.021)	0.218 (0.031)	0.755 (0.016)	0.015 (0.006)

Note:  $\theta$  = 1-prob. of price resetting,  $\lambda$  = coeff. on output gap,  $\omega$  = share of myopic agents,  $\gamma_b$  = coeff. on the backward,  $\gamma_f$  = coeff. on the forward component.

Still a substantial lagged term and also too much price stickiness!

Where could the lagged inflation come from? Is its presence spurious?

- ▶ Random coefficients (Tavlas and Swamy, 2006)
- ▶ Policy shifts (Cogley and Sbordone, 2005 )  
Trend inflation has been historically quite variable. If the measures of the inflation gap ignore this drift they may show an artificially high level of persistence, forcing a role for past inflation in the standard Calvo model. Once shifts in trend inflation are properly taken into account a purely forward looking version of the NKPC fits post WWII U.S. data very well.
- ▶ Aggregation problems