

# Monetary Policy in a Small Open Economy

Does openness matter for the cost of a disinflation

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# Introduction

- Significant progress in understanding monetary policy in the last 10 years both in closed and open economies. In fact there is as much consensus as can be hoped for among economists about how to model monetary policy (McCallum).
- Despite progress, no agreement on the price setting mechanism. Prices are sticky but why?
- Most models assume that firms can only infrequently adjust prices (Taylor, Calvo): however this leads to little persistence in the inflation rate.
- Most progress has been for policy “in equilibrium”, less interest in understanding regime shifts such as disinflations.
- Persistence matters more for “off equilibrium” analysis

# Empirical observations about disinflations in low inflation countries (e.g. Ball 94)

- Disinflation causes a negative response of output
- Credibility
- Flexible labour markets reduce the costs
- Speed reduces the costs
- Openness to trade?

# Openness to trade and Cost of Disinflation

- The traditional argument is that disinflation costs should be lower in economies that are more open to trade.
  - Inflation of domestic goods will exhibit inertia while the inflation of imported goods falls immediately with the impact of the policy change on the exchange rate.
  - Empirically Ball finds no link between openness and the cost of disinflations

# Theoretical Approach

- keep the formulation of the pricing kernel general to be able to compare the cost of disinflations under different pricing mechanisms.
  - Standard New Keynesian
  - Neo Classical
  - General partially backward and forward looking processes

# Wage and Price Dynamics

- CPI Inflation  $\pi$  depends on domestic inflation  $\pi$ , inflation of imported goods ( $\pi^* + \varepsilon$ ) and the weight of imports in the basket  $\omega$ .

$$\pi = \omega\pi + (1 - \omega)(\pi^* + \varepsilon)$$

- Domestic inflation in turn depends on “normal” wage inflation  $\pi_w$ , “normal” inflation of imported inputs and the relative share of the two  $\lambda$ .

$$\pi = \lambda(\pi_w - \gamma_L) + (1 - \lambda)(\pi^* + \varepsilon)$$

- Inflation of domestic wages finally depend on core inflation and labour market conditions  $u$ .

$$\pi_w = \gamma - \alpha u + \pi_c$$

==> Phillips Curve: 
$$\pi = \pi_c - \beta(u - u_n) + \delta\pi_\rho$$

# Measuring the Cost of a disinflation

- Measure of Cost of Inflation: Sacrifice ratio defined as the undiscounted sum of deviations of unemployment from the natural rate.
- We assume for simplicity that the disinflation has no long run impact on the real exchange rate.
- Need to specify core inflation processes
  - Neo classical case
  - Standard neo Keynesian (Infrequent adjustment of prices)
  - Partially forward, partially backward looking processes (sticky information, backward looking wage setting such as Fuhrer and Moore)

# Neo Classical World

- Core inflation equals the expectation of inflation a period before.  $\pi_{c,t} = E_{t-1} \pi_t$

- Rational expectations ensure that people get it at least in average right  $\pi_t = E_{t-1} \pi_t + v_t$  with  $E_{t-1} v_t = 0$

- The per period cost of reducing inflation is hence

$$u_t - u_n = -\beta^{-1} (v_t + \delta \pi_{\rho,t})$$

- The sacrifice ratio is zero since by assumption the long run real exchange rate is unaffected and the forecast error is zero in average. Management of the real exchange rate can influence the timing of the costs but not the total cost. Cold turkey seems attractive.



# Mixed Backward and Forward Looking Price Process

- Core inflation process:  $\pi_c = (1 - \theta)E_t \pi_{t+1} + \theta \pi_{t-1}$
- Phillips Curve:  $\pi_t = (1 - \theta)E_t(\pi_{t+1}) + \theta \pi_{t-1} - \beta(u_t - u_n) + \delta \pi_{\rho t}$
- Motivation
  - $\theta=0$  leads to standard New Keynesian Phillips Curve (derived for instance from Calvo pricing)
  - $\theta>0$  can be rationalised either through sticky information (Mankiw Reis) or explicitly partially backward looking processes (Fuhrer Moore)

# The solution for the mainly forward looking case ( $\theta < 1/2$ )

$$\pi_t = \left[ \frac{\theta}{1-\theta} \right] \pi_{t-1} - (1-\theta)^{-1} \beta \sum_{i=0}^{\infty} E_t [u_{t+i} - u_n] + (1-\theta) \delta \sum_{i=0}^{\infty} E_t \pi_{\rho, t+i} + \left[ \frac{1-2\theta}{1-\theta} \right] E_t \pi_{\infty}$$

- For the the standard new Keynesian world ( $\theta=0$ )

$$\sum_{i=0}^{\infty} E_t [u_{t+i} - u_n] = \beta^{-1} [E_t \pi_{\infty} - \pi_t]$$

- Thus, any credible disinflation that reduces the current and the long run inflation rate by the same amount has no cost.
- The type of policy needed is a credible, un-anticipated drop in the monetary growth rate accompanied by a one off increase in the money stock that accommodates the increase in money demand.
- Again the management of the real exchange rate does only matter for the distribution of costs not for the total cost.

# The general forward looking case ( $0 < \theta < 1/2$ )

- The result that costless disinflation is possible carries through to all mainly forward looking price processes.
- The only difference in the general case is that inflation can only be brought down asymptotically to achieve a zero cost.
- Thus gradualism might be needed.
- In any case the management of the real exchange rate only matters for the distribution of costs.

# Mainly backward looking case

$$(\theta > 1/2)$$

$$\pi_t = \pi_{t-1} - (1-\theta)^{-1} \beta \sum_{i=0}^{\infty} \left[ \frac{1-\theta}{\theta} \right]^i E_t[u_{t+i} - u_n] + \theta^{-1} \delta \sum_{i=0}^{\infty} \left[ \frac{1-\theta}{\theta} \right]^i E_t \pi_{\rho, t+i}$$

- Suppose, inflation should come down by one percent
  - by concentrating the recession in a single period t the cost is

$$u_t - u_n = \theta \beta^{-1}$$

- by smoothing the recession for two periods

$$\pi_{t-1} - \pi_t = \frac{\beta}{\theta} [u_t - u_n] + \frac{\beta(1-\theta)}{\theta} [u_{t+1} - u_n]$$

$$\pi_t - \pi_{t+1} = \frac{\beta}{\theta} [u_{t+1} - u_n]$$

- the output cost would be (assuming a constant real exchange rate

$$\frac{2\theta}{1+\theta} \theta \beta^{-1} < \theta \beta^{-1}$$

Gradualism works because output gaps in the future matter for current inflation. (Time Consistency?)

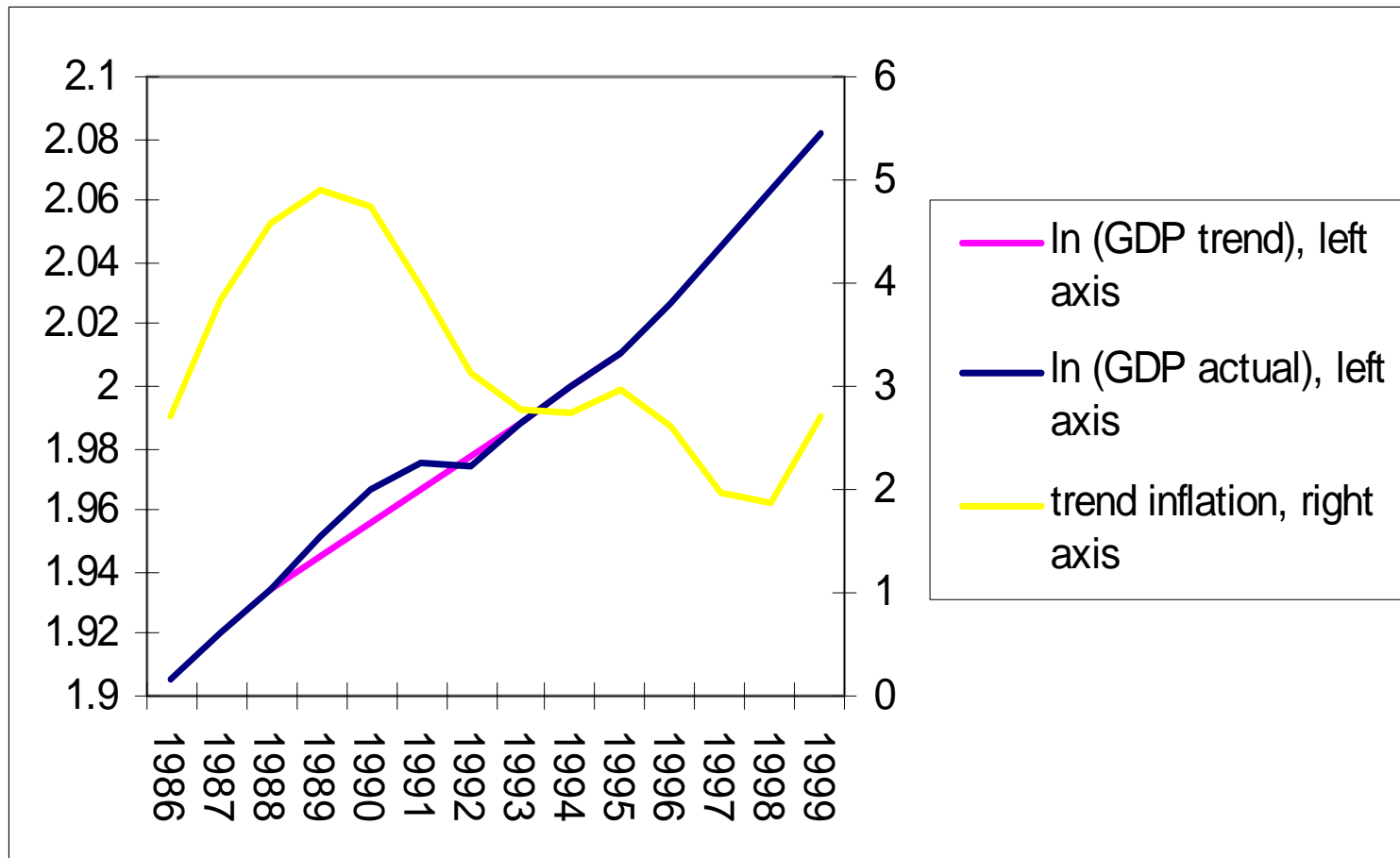
# Role of the real exchange rate in the mainly backward looking case

- The time path for the real exchange rate matters not only for the distribution of the costs but also for the total costs.
- An early real appreciation such as through overshooting raises the total cost, even though it brings down inflation more quickly.

# What determines the cost of disinflation again

- Extension of the Ball 1994 data set to include the disinflations since 1986.
- Ball found that the cost of disinflations is falling in its speed while the openness did not matter.
- Disinflations are identified by trend inflation falling by more than 1.5 %.
- Output costs during disinflations are measured by the difference of actual output from the trend.
- The sacrifice ratio is calculated as the sum of the output costs over the disinflation incident divided by the change in trend inflation.

# Example (US 1989-93)



# Choosing the data

- Only episodes post 1972 are chosen (flexible rates) and only OECD countries that were included in the Ball 1994 study plus the Visegrad countries for the last five years.
- This procedure identifies 66 disinflations in 21 countries.



# Cost of disinflations reexamined

	1960-1985 (Ball)	1972-2003
Openness	-0.0109 (0.0344)	-0.056 (0.024)
dpi	-0.0049 (0.0024)	0.0016 (0.0019)
length	0.0041 (0.0010)	0.0047 (0.0022)
Duration	-0.0066 (0.0056)	
Nineties		-0.032 (0.009)
ERM		-0.024 (0.0013)
Constant	0.019	0.023
R2/No of obs	0.22/61	0.32/66

# Cost of disinflations re-examined

	1960-1985	1972-2003
Openness		-0.059 (0.027)
speed	-0.0672 (0.0256)	-0.0022 (0.0041)
Nineties		-0.033 (0.010)
ERM		-0.021 (0.013)
Constant	0.0605	0.053
R2/No of obs	0.085/65	0.18/66

# The Real Exchange Rate and Openness

	Dependent variable is real appreciation in first year
Openness	-0.11 (0.05)
Speed	0.023 (0.008)
Constant	0.008
R2/no of obs	0.13/42

# Conclusion

- There is empirical support for inflation dynamics to be mainly backward looking. This is ad odds with both standard New Keynesian assumptions and neo classical assumptions. Disinflations appear to be costly and that the effect of speed of disinflation on the cost is far from clear.
- If the inflation dynamics is sufficiently backward looking, there is an argument for gradualism over cold turkey. However this depends crucially on credible commitments.
- The management of the exchange rate only matters if the inflation process is sufficiently backward looking. In all other cases the management of the real exchange rate only matters for the distribution of the costs over time.
- Unlike in earlier studies, openness to trade reduces the cost of disinflations significantly.