The Risk Management Approach of the Federal Reserve System - A Model for the European Central Bank?

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└─Overview

Overview

1. Idea and Results

2. The Risk Management Approach

3. Inflation Expectations

4. Results

5. Conclusion

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└─ Idea

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└─ Idea

Idea and Results

Motivation:

Crisis situations need decided / radical policy approaches

However:

Similar intervention may have different results in different countries

Focus:

The risk management approach of Alan Greenspan conducted in 2003-2004 in the US

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└─Idea

Idea and Results

Objective:

Can the risk management approach be sucessfully implemented by the ECB?

Procedure:

1. The risk management approach - consequences for policy

2. Conditions for successful implementation

3. Does the Fed/ECB fulfill them?

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└─Idea

Idea and Results

Results:

1. RMA results in loose monetary policy in certain states

2. Loose policy can be successful only if inflation expectations do not increase permanently

3. Reason for constant low π^e: commitment of the central bank to correct past errors (price level targeting)

4. The Fed puts weight on the price level, ECB does not

5. Historically: shifts towards high π^e observed for the Fed were transitory; no shifts for the ECB

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└─ The Risk Management Approach

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└─ The Risk Management Approach

The Risk Management Approach, Greenspan (2004)

Motivation:

Uncertainty of the central bank about the economy while setting the interest rates (e.g. unknown state of the business cycle)

Objective of the policy maker:

Avoid scenarios defined as particulary disruptive for the economy

Consequence:

Aggressive policy in certain states

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└─The Risk Management Approach

Policy Implications

Example:

1. Assume that the central bank can decide between expansion and no change of interest rates

2. The latest known state of the economy: moderate output growth, low inflation; baseline model forecast: increasing y, π

3. Consequently: no change of interest rates

4. If slowdown maintains (low-probability state), this decision may result in deflation

5. Since the cost of deflation is asymmetrically high: the central bank chooses expansion

Policy Implications - Fed 2003-2004

Greenspan (2004):

The Fed applied the RMA in 2003-2004 to avoid deflation

Observation:

Expansive policy in comparison to other periods and other central banks

Examples:

1. Taylor rule with assumed parameters (official interest rates)
2. Taylor rule with estimated parameters (3-month interest rates)
3. Forecasts of future rates based on the estimated Taylor rule

Policy Implications - Fed 2003-2004

Example 1: Taylor rule with assumed parameters

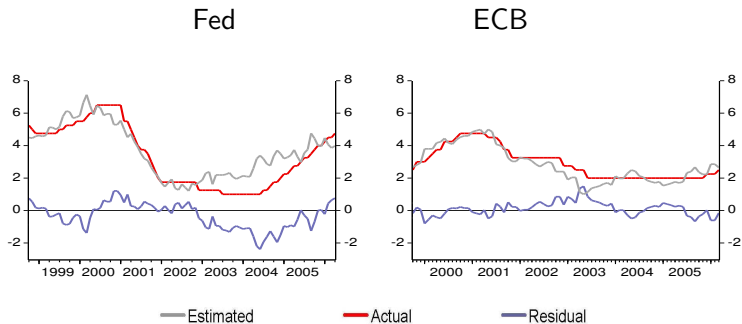$$i_t^* = r + \pi_{t-1} + \alpha(\pi_{t-1} - \pi^*) + \beta(x_{t-1} - x_{t-1}^p)$$
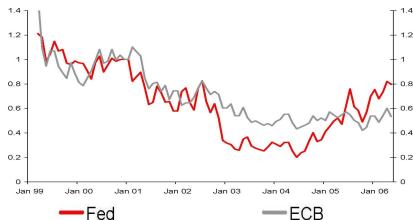
* Fed's policy is far below the neutral interest rates in 2003-2004

Policy Implications - Fed 2003-2004

Example 2: Taylor rule with estimated parameters

$i_t = c + f_\pi \pi_t + f_y y_t + \epsilon$

* Large estimation error for the Fed in 2003-2004

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└─Inflation Expectations

Inflation Expectations

Question:

When can expansive policy be successful?

Condition:

No permanent expectation shifts towards inflation

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└─Inflation Expectations

Inflation Expectations

Question:

When is the risk management approach successful?

Condition:

No permanent expectation shifts towards inflation

Question:

When is loose monetary policy followed only by transitory (or no) expectation shifts?

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Inflation Expectations

Hypotheses

H1: Price level targeting

The price gap coefficient in the reaction function of the Fed (ECB) is positive and significant

H2: Historical inflation expectation shifts

The increases of the inflation expectations for the Fed (ECB) were transitory

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└─Inflation Expectations

Price Level Targeting

Goals:

$$i_t = f_p \tilde{p}_t + f_\pi (\pi_t - \pi_t^*) + f_y y_t + f_i i_{t-1} \qquad \text{with } \tilde{p}_t = p_t - p_t^*$$

Intuition:

1. The central bank is committed to keep certain price level stable

2. Even after policy mistakes (like $\pi > \pi^*$), it would correct them to return to the desired price level (error correction)

3. The market interprets loose monetary policy not as the willingness of the central bank to cause surprise inflation

Consequence:

Only transitory expectation shifts after loose policy

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└─ Results

Price Level Targeting: Estimation Results

$i_t = c + f_p p_t + f_\pi \pi_t + f_y y_t + f_i i_{t-1} + \epsilon$ (3-month interest rates)

Variable	Fed		ECB	
c	-0.1497	*0.1632*	0.6192**	*0.2812*
Price gap ($\tilde{p}_t$)	11.4472***	*3.6245*	-21.9128	*25.519*
Inflation (π_t)	0.2146**	*0.0898*	0.2552*	*0.1288*
Output gap (x_t)	0.4333***	*0.1119*	0.9385**	*0.4657*
Interest rate (i_{t-1})	0.7922***	*0.0529*	0.6468***	*0.1001*
Adjusted R^2	0.9834		0.9816	
SE	0.2265		0.1392	
J-statistic	0.0395		0.0013	

The Fed puts weight on the price gap; the ECB does not

The market has a reason to expect error correction from the Fed

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└─ Results

Price Level Targeting: Estimation Results

$$i_t = c + f_p p_t + f_\pi \pi_t + f_y y_t + f_i i_{t-1} + \epsilon \quad \text{(official interest rates)}$$

Variable	Fed		ECB	
c	-0.1425	*0.1965*	0.6049^{**}	*0.1658*
Price gap $(\tilde{p}_t)$	8.7999^{**}	*3.6084*	-16.8934	*11.552*
Inflation (π_t)	0.2226^{**}	*0.0985*	-0.1181	*0.1202*
Output gap (x_t)	0.3625^{***}	*0.0971*	0.3459^{**}	*0.1679*
Interest rate (i_{t-1})	0.8357^{***}	*0.0422*	0.8679^{***}	*0.0595*
Adjusted R^2	0.9857		0.9773	
SE	0.2250		0.1511	
J-statistic	0.0371		0.0103	

The Fed puts weight on the price gap; the ECB does not

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└─ Results

Historical Expectations

Expectation shifts in the past: Actual vs. forecasted values

	1998	1999	2000	2001	2002	2003	2004	2005	2006
Fed									
Inflation	-0.5	0.2	0.9	0.4	-0.4	0.1	1.1	1.1	0.8
GDP growth	1.4	1.2	-0.1	-1.4	0.2	0.0	-0.7	-0.4	0.1
ECB									
Inflation	-	0.2	0.2	0.2	0.4	0.2	0.2	0.3	0.2
GDP growth	-	0.9	0.8	-0.7	-0.1	-0.1	0.6	-0.1	0.9

$Actual_t$ - Median $Forecast_t$ (Source: Survey of Professional Forecasters)

Fed: The shifts to high inflation expectations were transitory

ECB: No shifts to high inflation expectations have been observed

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└─Conclusion

Conclusion

1. The risk management approach means avoiding scenarios that are very costly for the economy. This may involve loose monetary policy.

2. Loose monetary policy is successful only if the market does not increase inflation expectations permanently

3. If the central bank is determined to correct past errors, expectation shifts are only transitory

4. The Fed, contrarily to the ECB, puts weight on the price gap

5. Historically, the periods of high inflation expectations in the US were transitory; no experience with expectations shifts for the ECB

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└─ Conclusion

Conclusion

Neither empirical analysis of the reaction function
nor historical experience allows to predict if a shift
towards inflationary expectations would be temporary
if the ECB conducted loose monetary policy

No guarantee that the risk management approach
would be successful in every state if applied by the ECB

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Discussion

1. Can it explain the differences in fighting the current crisis (at an early stage)?

2. Is the ECB now more experienced and thus able to react more aggressively?

3. The role of different preferences of private subjects in the US and Europe (inflation)

4. The role of different objectives of both central banks

5. A critical point where institutional actions have to be similar / coordinated

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└─ Conclusion

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Appendix

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Appendix

Barro/Gordon (1983)

Inflation expectations react to observed monetary policy $\Longrightarrow$

Commitment of a central bank to keep low inflation

Inflation expectations are constant and low $\Longrightarrow$

High gains of the central bank, especially for expansive policy

Inflation expectations are constant and high $\Longrightarrow$

High losses of the central bank, especially for tight policy

> Central bank's utility depends on how long
> loose policy is penalized ($\pi^e > 0$)

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└─ Appendix

Data

ECB

* ECB main refinancing rate (i).
* Inflation rate year over year calculated from the seasonally adjusted monthly HICP index (π).
* GDP deflated with the seasonally adjusted, not working day adjusted deflator.
* Hodrick-Prescott filter ($\lambda = 1600$) applied to the GDP series in order to compute potential GDP.

Fed

* Fed federal funds rate (i).
* Seasonally adjusted CPI index.
* Real GDP and real potential GDP.

In both cases, actual and potential GDP are on quarterly basis; monthly values assumed constant at $1/3$ of the corresponding quarterly values.

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└─Appendix

Estimation Results - Instruments

$i_t = c + f_\pi \pi_t + f_y y_t + \epsilon$

Variable	Fed		ECB	
c	1.8705***	*0.3925*	0.9310**	*0.4440*
Inflation (π_t)	0.9053***	*0.1565*	0.6785***	*0.2100*
Output gap (y_t)	1.4725***	*0.1370*	3.6585***	*0.2400*
Adjusted R^2	0.7804		0.7757	
SE	0.8851		0.4607	
J-statistic	0.0993		0.0813	

The numbers in italics are standard errors.

Instruments

* The first lag of interest rate (i_{t-1}).
* The first lag of inflation (π_{t-1}).
* The first lag of output gap (y_{t-1}).

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Estimation Results - Instruments

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Variable	Fed		ECB	
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SE	0.2250		0.1511	
J-statistic	0.0371		0.0103	

The numbers in italics are standard errors.

Instruments

* Lagged interest rate (i_{t-2}).
* Lagged inflation (π_{t-12}, π_{t-18}).
* Lagged output gap (y_{t-3}, y_{t-6}, y_{t-12}).

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Estimation Results - Instruments

$i_t = f_\pi \pi_t + f_y y_t + f_i i_{t-1} + \epsilon$

Variable	ECB	
Inflation (π_t)	0.1416***	*0.0486*
Output gap (x_t)	0.4339***	*0.1365*
Interest rate (i_{t-1})	0.8815***	*0.0400*
Adjusted R^2	0.9746	
SE	0.1550	
J-statistic	0.0406	

The numbers in italics are standard errors.

Instruments

* Lagged interest rate (i_{t-2}).
* Lagged output gap (y_{t-3}, y_{t-6}).