

# **Central Bank Credibility and Reputation: An Historical and Quantitative Exploration\***

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# Introduction

- We define credibility as a commitment to follow well articulated and transparent rules and policy goals
- “ .. Extent to which the public believes that a shift in policy has taken place when , indeed , such a shift has actually occurred’ (Cukierman 1986, p.6)
  - Blinder (1999, p. 64-65) definition: “... that your pronouncements are believed – even though you are bound by no rule and may have an incentive to renege.” He goes on to add: “...it is ... built up by a history of matching deeds to words.”
  - Not the *time inconsistency*/game-theoretic definition
- We interpret credibility in terms of inflation performance

# Introduction

- Credibility is a flow variable that changes as observed inflation is seen to deviate from a time-varying inflation objective
- Credibility also affects a CB's reputation, which is a stock variable.
  - “It takes many good deeds to build a good reputation, and only one bad one to lose it”  
(Benjamin Franklin)

# Introduction

- Credibility builds trust in institutions and helps weather crises
- Credibility helps markets and the public discern the actual policies being followed
  - But this does NOT mean that rules must be slavishly followed
- What are the consequences when CBs fail to be credible from time to time?
- Is the loss permanent ? Probably not
- This is one reason why transparency and communication have become so important in monetary policy

# Introduction

- In this paper to measure credibility we focus on measures of inflation expectations
  - Also, the mean reversion properties of inflation , and movements in interest rates, money growth and exchange rate movements
- We also consider whether credibility is vulnerable during financial crises
- And whether it differs between inflation and deflation episodes
- And the role of institutional factors such as CB independence( and by implication, accountability and transparency)

# The Structure of the Paper

- We provide an historical narrative on the evolution of credibility through time in a select number of countries
  - Only touched upon in this talk
- We then provide some theoretical underpinnings for our empirical exercise evaluating how CB credibility and reputation have evolved over time
- The rest of the paper presents our findings and the lessons that derive from them

# Bottom Lines

- We find that credibility changes over time are frequent and can be sizeable
- Adherence to the gold standard improves credibility as does CB independence
- Financial Crises damage credibility
- Institutional factors can play an important role in mitigating reputational loss
- Credibility shocks are dependent on the type of monetary regime in place

# Credibility and Reputation

## Through the Ages: A Brief History

- The history of CB credibility is tied up with the history of policy regimes
- The classical gold standard embodied a rule based on the commitment to maintain the official peg
- It was a contingent rule where temporary suspension and the issue of fiat were permitted in well understood emergencies



# Credibility and Reputation

## Through the Ages : A Brief History

- Credible gold standard adherence allowed CBs leeway to conduct stabilization policies and LLR actions
- The history of the pre 1914 gold standard shows how the key countries: GB , France and Germany had credible regimes as well as others like Sweden and US
- Peripheral countries were less successful

# Credibility and Reputation

## Through the Ages : A Brief History

- WWI ended classical gold standard
- GE standard restored in interwar, but had less credibility
- GB returned to gold at prewar parity in 1925 but at an overvalued rate which continually threatened its adherence
- US never left gold but newly established Fed had lengthy learning experience
- France went through a period of high inflation and CB lost much credibility in a scandal
- Germany had hyperinflation

# Credibility and Reputation Through the Ages : A Brief History

- The GE standard was short lived
- Its success depended on the reputations of Benjamin Strong, Montagu Norman, Emile Moreau and Hjalmar Schacht
- Great Depression blamed on CBs who lost their independence and became appendages of the fiscal authorities

# Credibility and Reputation

## Through the Ages : A Brief History

- CBs regained independence beginning in the 1950s
- Fed gained independence after Accord in 1951
- Martin emphasized price stability until 1965
- Bundesbank , SNB followed stability culture
  - “...the Bundesbank is constantly winking at its devotion to M3 growth; but few doubt its devotion to low inflation.” (Blinder 1999, p. 66)
- 1960s CBs( with exception of DBB and SNB) followed Keynesian policies to maintain full employment at expense of higher inflation

# Credibility and Reputation Through the Ages : A Brief History

- The Great Inflation destroyed any vestiges of credibility as well as the reputations of central bankers (e.g., Arthur Burns)
- Volcker shock in 1979 broke the back of inflation and inflationary expectations and by mid 1980s restored Fed reputation
- Similar story in other advanced countries
- Great Moderation 1985 to 2006 heyday of CB credibility for low inflation and good reputation

# Credibility and Reputation

## Through the Ages : A Brief History

- Financial crisis of 2007-2009 led to massive discretionary intervention in financial markets by CBs
- Mixed monetary with fiscal policy and threatened independence
- QE policies may also be problematic for CB credibility and reputation if inflation ensues
  - The Fed risks “currency debasement and inflation” (WSJ 2010, Nov 15) OR “...the clear and present danger is Japanification...” (Krugman, NYT, 14 AUG. 2014)

The Metrics

# **CENTRAL BANK CREDIBILITY AND REPUTATION**

# The Basics

- A Taylor rule with some modifications
  - Allows for interest rate smoothing AND non constant inflation target/real or neutral real rate
  - Speed limit variable added
  - Two other instruments considered: monetary target/exchange rate target



# Credibility and Reputation

**STANDARD**

$$i_t = \bar{\rho} + \bar{\pi} + \alpha_2 \tilde{\pi}_t + \alpha_3 \tilde{y}_t + \varepsilon_{i,t}$$

$$i_t = \gamma_{5,t} \Delta i_{t-1} + (1 - \gamma_{6,t}) i_t^* + \gamma_{6,t} i_{t-1} + \eta_t$$

$$i_t^* = \bar{\rho}_t + \bar{\pi}_t + \alpha_2 (E_t(\pi_{t+1}) - \pi_t^*) + \alpha_3 (E_t y_{t+1} - y_t^*) + \alpha_4 \Delta y_t$$

**NON-STANDARD**

Changes depending on type of regime:

inflation targeting, monetary targeting, exchange rate targeting

$$\bar{\pi}_t = \frac{-\gamma_{1,t}}{(\gamma_{2,t} + \gamma_{6,t} - 1)}$$

$$\bar{\pi}_t = \frac{-\gamma_{1,t}}{(\gamma_{2,t} + \gamma_{6,t} - \gamma_{7,t} - 1)}$$

# Empirical Formulations

## CREDIBILITY

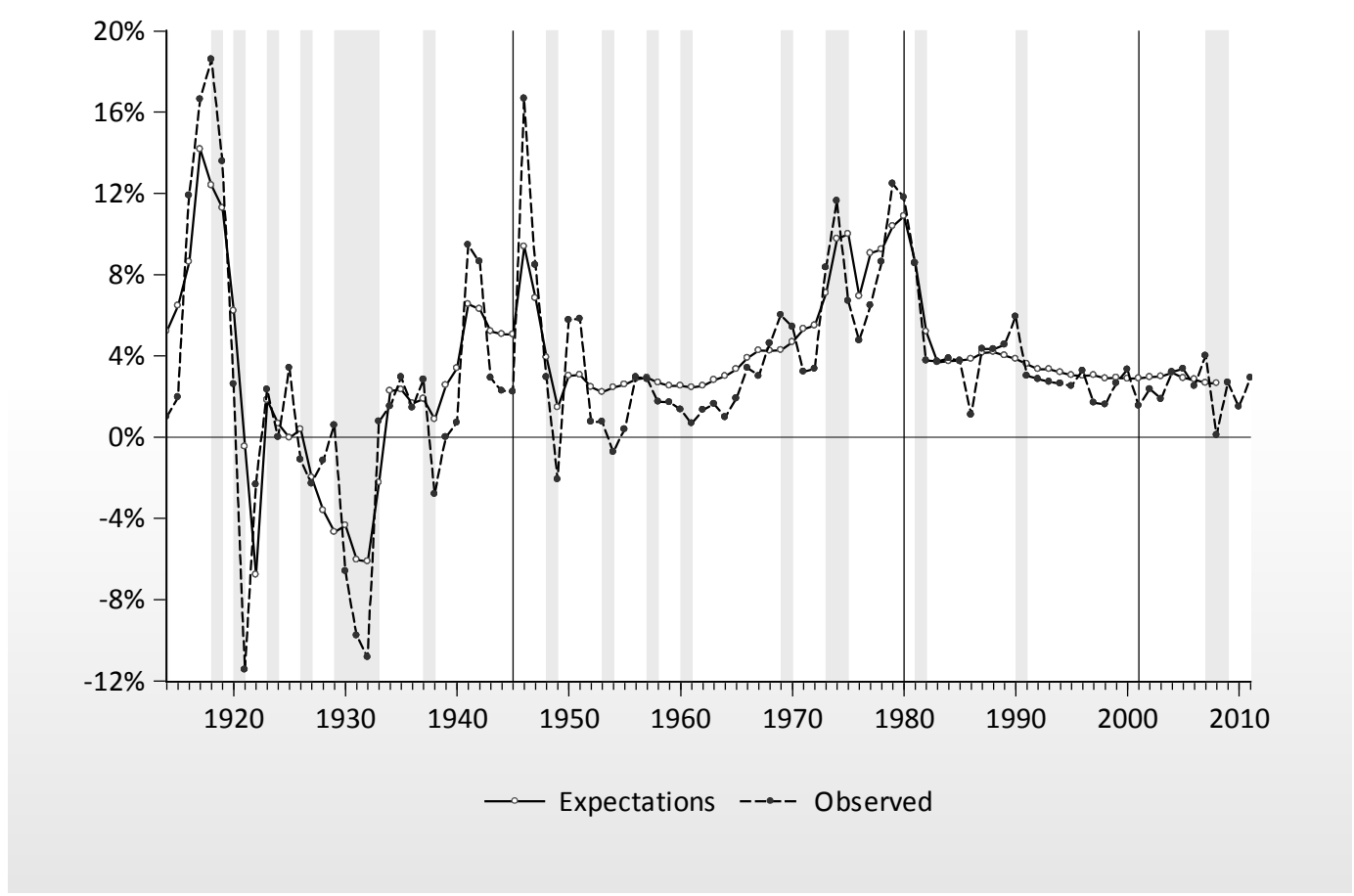
$$(\pi_t - \bar{\pi}_t)^2 = \boldsymbol{\theta} \mathbf{Z}_{t-1} + \varphi (\pi_{t-1} - \bar{\pi}_{t-1})^2 + \mathbf{u}_t$$



Influenced by EXPECTATIONS;  
THEREFORE, not really about target achievement  
(Svensson)

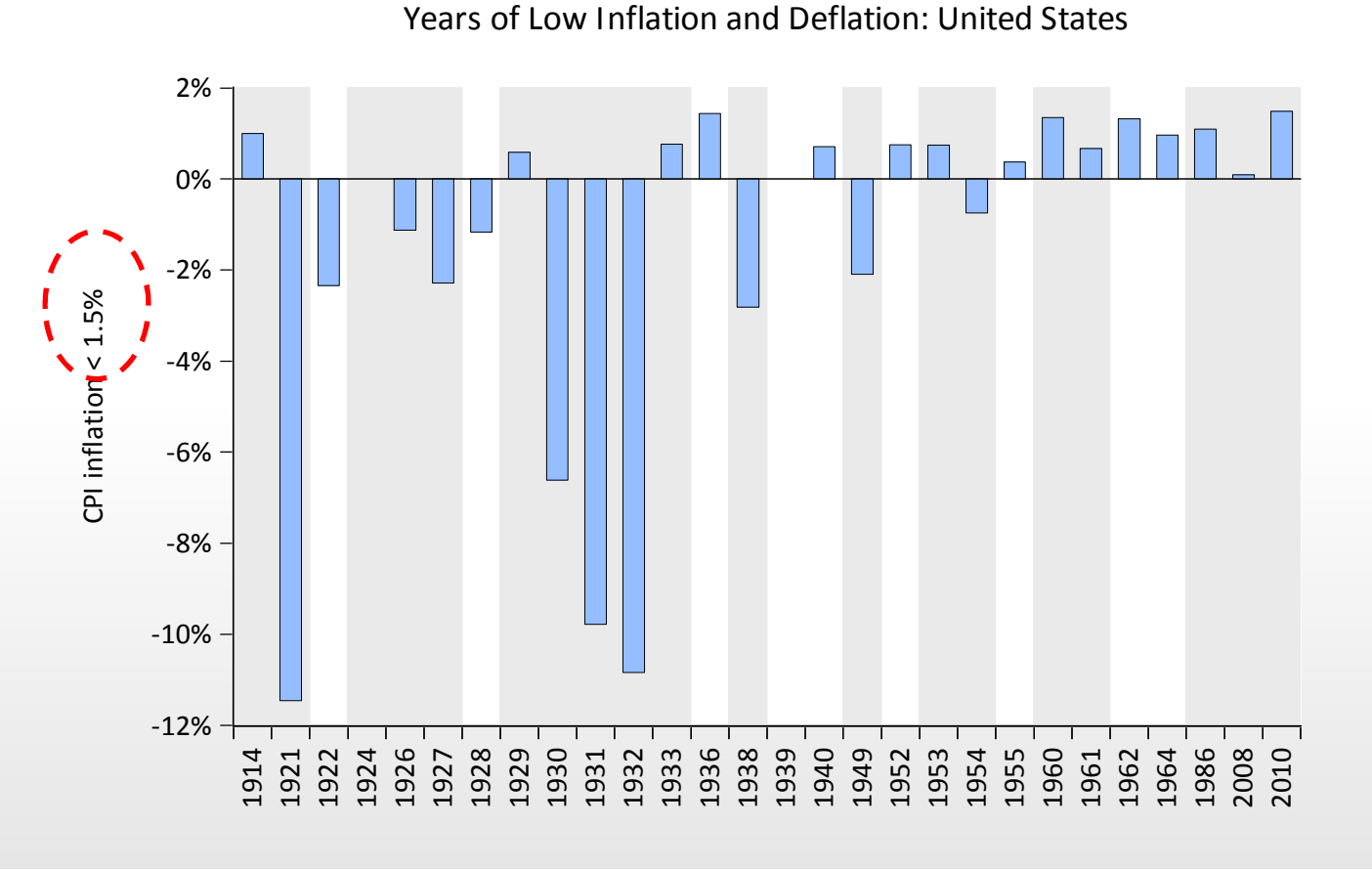
# Inflation and Expected Inflation in the U.S. Since the Fed's Creation

OBSERVED and EXPECTED INFLATION: United States



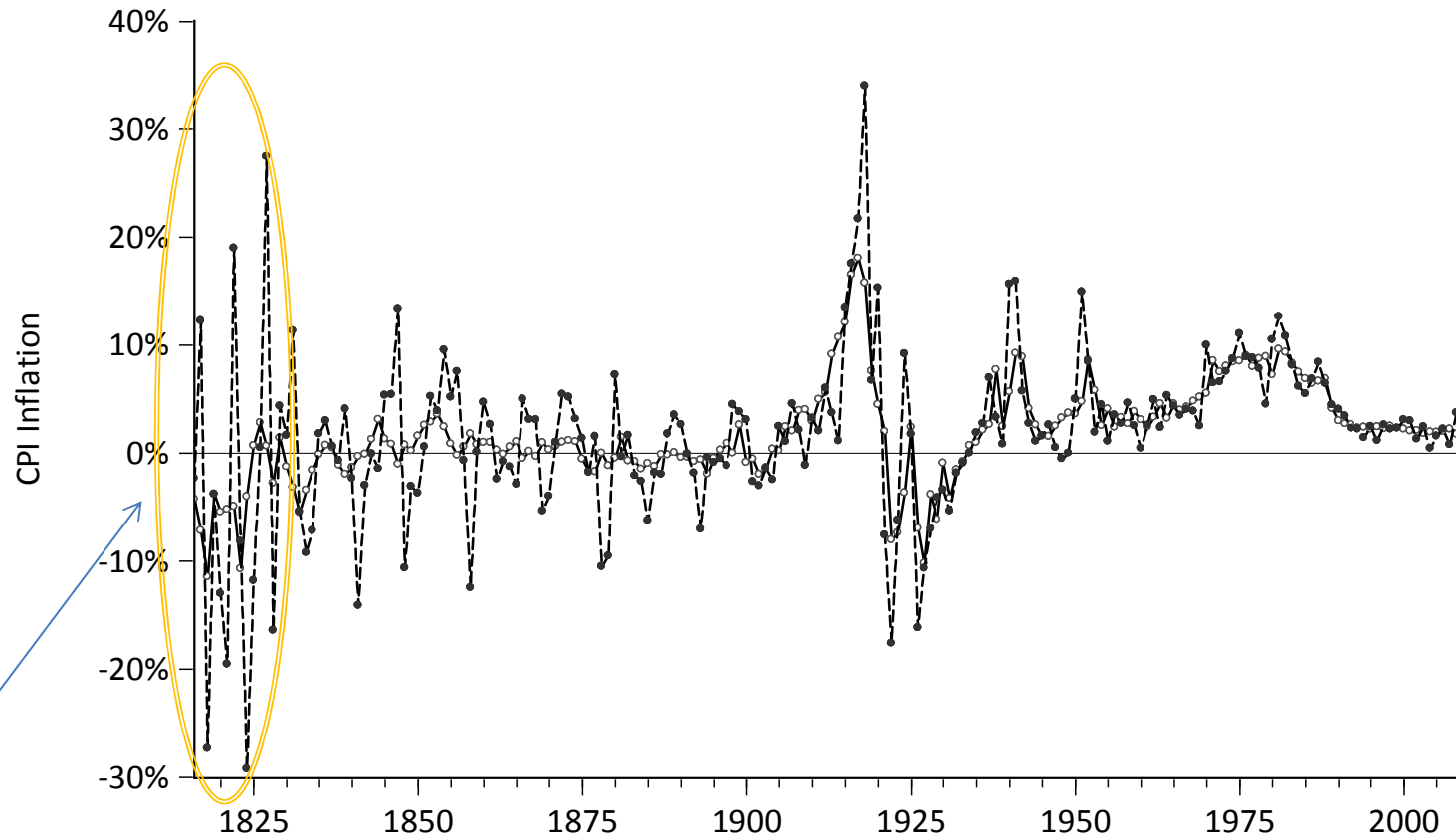
ANNUAL DATA

# Low and Deflationary Periods in the U.S. Since the Fed's Creation



# Norway's Inflationary Experience

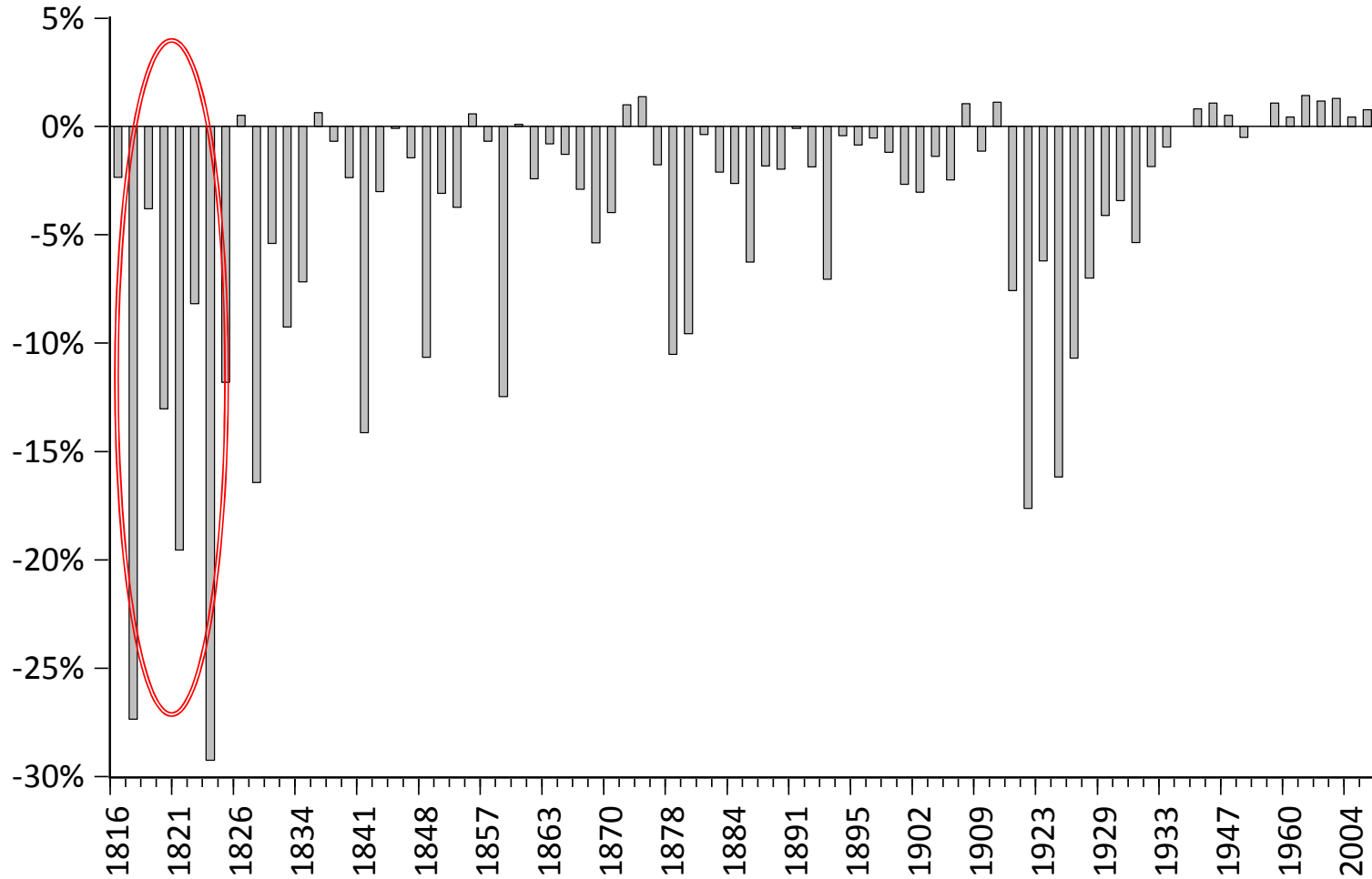
OBSERVED and EXPECTED INFLATION: Norway



Have been revised/  
No impact on our  
Results/regressions

—○— Expectations    - - - ● - - - Observed

# Low and Deflationary Periods Since the NB's Creation



# Summary Statistics for Norway

Episodes	Inflation (s.e.)	Nominal interest rate (s.e.)	Output gap (s.e.)	AR estimate	MA estimate
1816-1835	-3.33 (14.42)	-3.77 (14.42)	3.29 (0.62)	-0.16	-1.85**
1836-1861	0.72 (6.34)	0.72 (6.34)	-0.32 (1.75)	0.21	-1.00*
1862-1880	-0.14 (4.31)	-0.14 (4.91)	3.63 (0.81)	0.20	-0.90*
1881-1899	-0.49 (3.06)	-0.49 (3.06)	0.51 (0.75)	0.33	-0.33♦
1900-1919	5.60 (9.37)	5.23 (0.50)	-1.61 (0.69)	0.63*	-0.93*
1920-1940	-1.12 (3.67)	4.82 (1.15)	-1.90 (2.27)	0.40♦	-0.94*
1941-1970	4.09 (3.84)	3.45 (1.00)	-0.63 (2.23)	0.48*	-0.01
1971-1989	7.91 (2.22)	10.87 (3.13)	2.24 (0.61)	0.42♦	0.24
1990-2008	2.24 (0.97)	5.98 (2.75)	-0.49 (1.11)	0.19	-0.88*

Low persistence

High persistence



Narrative may well yield different timing

# Summary Statistics for the U.S.

Episodes	Inflation (s.e.)	Nominal interest rate (s.e.)	Output gap (s.e.)	AR estimate	MA estimate
1914-1923	5.48 (9.44)	4.85 (1.65)	-1.10 (2.66)	0.64*	0.44*
1924-1932	-3.09 (4.88)	4.00 (1.01)	-6.52 (3.66)	0.87*	-0.86*
1933-1972	2.94 (3.44)	2.38 (1.95)	1.02 (1.73)	0.29**	-0.79*
1973-1981	8.82 (2.07)	9.12 (3.44)	-0.92 (0.42)	0.28	0.84*
1982-2007	3.09 (1.10)	5.70 (2.62)	0.27 (0.48)	0.16	-0.92*
1914-2007	3.24 (4.90)	4.36 (3.04)	-0.32 (2.80)	0.65*	0.08

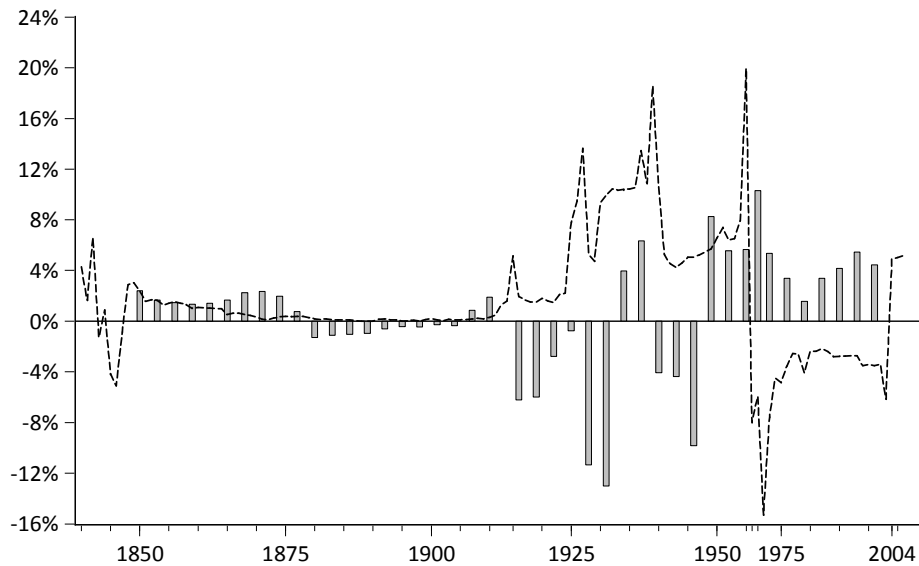
***The greater is THETA, the greater the proportion of the inflation variance accounted for by the temporary component. This implies inflation fluctuating around its mean.***

Fewer regimes for the US



# The NB's Inflation Goal: Interest Rate vs Exchange Rate

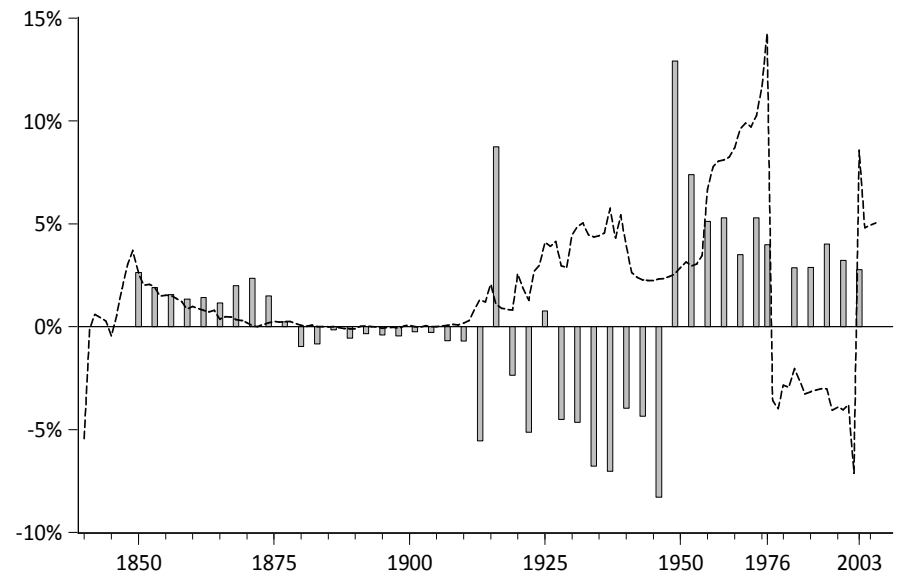
Norges Bank Inflation Goal: Interest Rate Instrument



Excludes 'outliers': 1956-1968, 1971, 1994-2003 (recursive), 1913, 2003 (rolling)

Rolling-based    Recursive-based

Norges Bank Inflation Goal: Exchange Rate Instrument



Excludes 'outliers': 1965-1973, 1975, 1979, 1994-2002 (recursive)

Rolling-based    Recursive

# The NB's Inflation Goal: Money Supply Growth

Norges Bank Inflation Goal: Money Growth Instrument

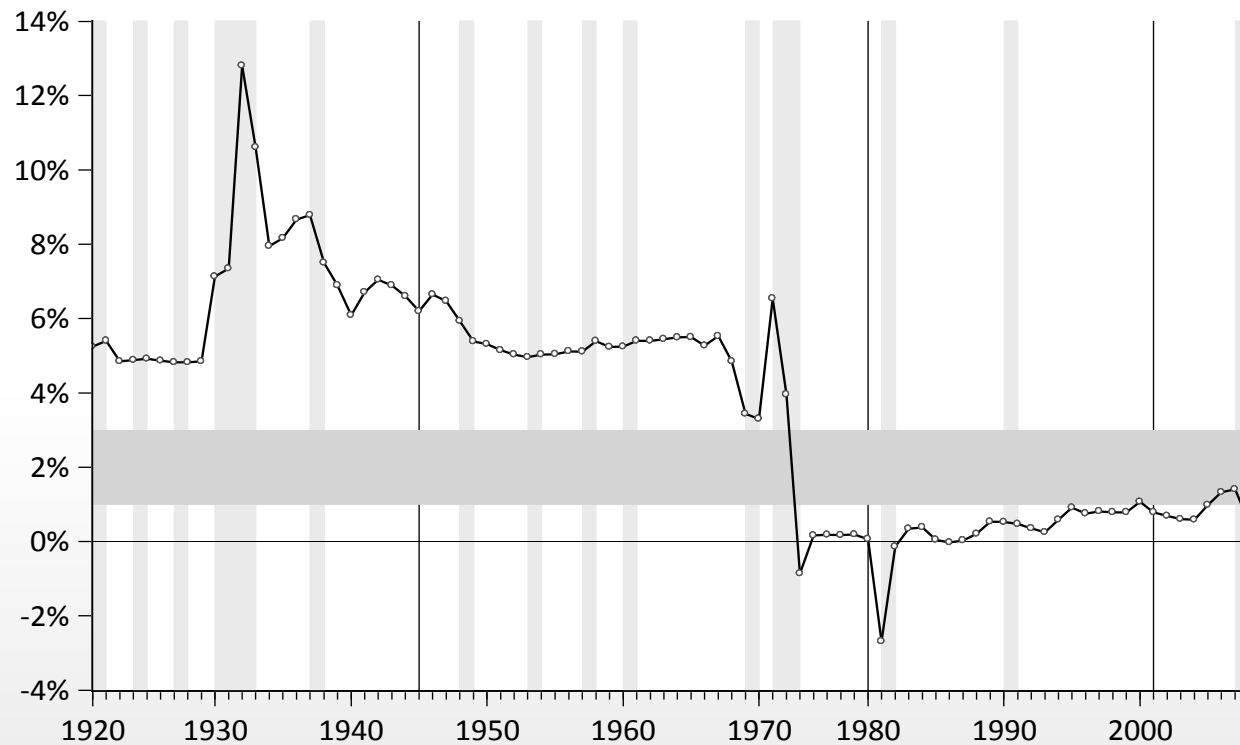


Excludes 'outliers': 1840-41, 1919 (recursive), 1912, 1915 (rolling)

Rolling ----- Recursive

# The Fed's (Implicit) Inflation Goal: Interest Rate

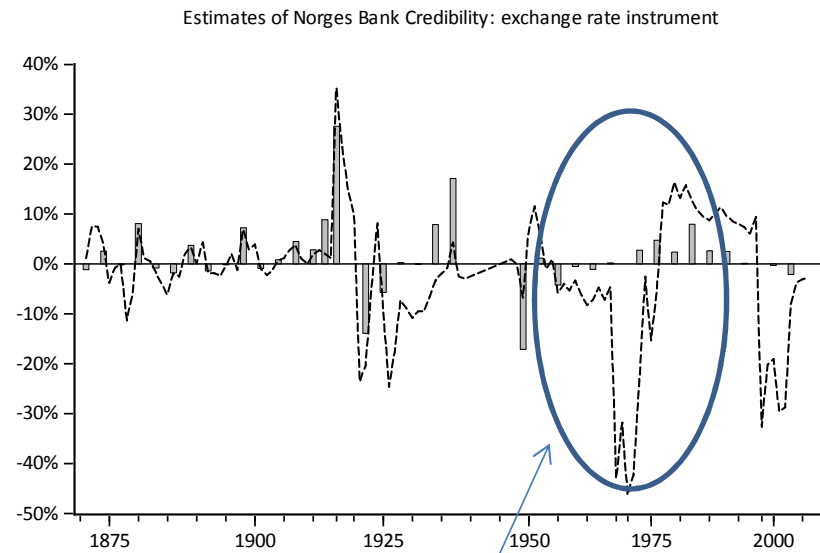
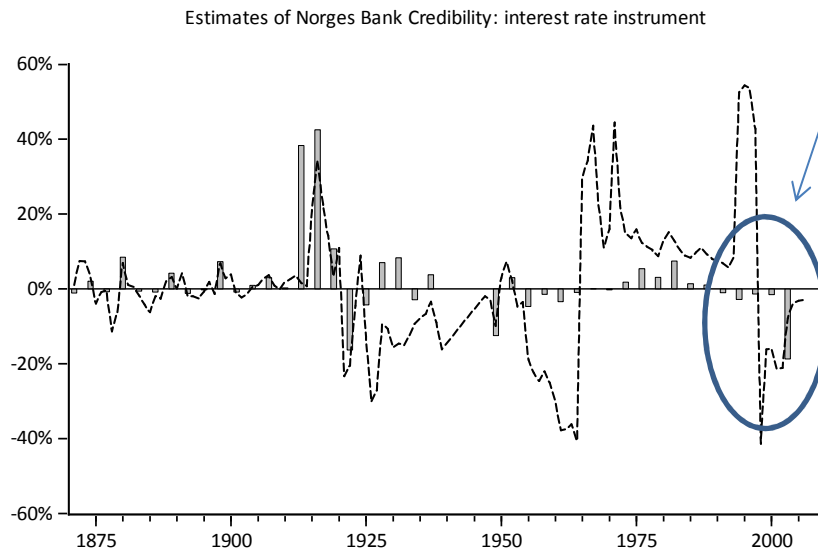
Federal Reserve Inflation Goal: Interest Rate Instrument



Excludes 'outliers': 1929, 1971-72  
Recursive estimates

# The NB's Credibility Over Time: Recursive and Rolling Estimates

IT generates credibility but its not immediate



Excludes 'outliers'

Rolling-based Recursive-based

Excludes 'outliers'

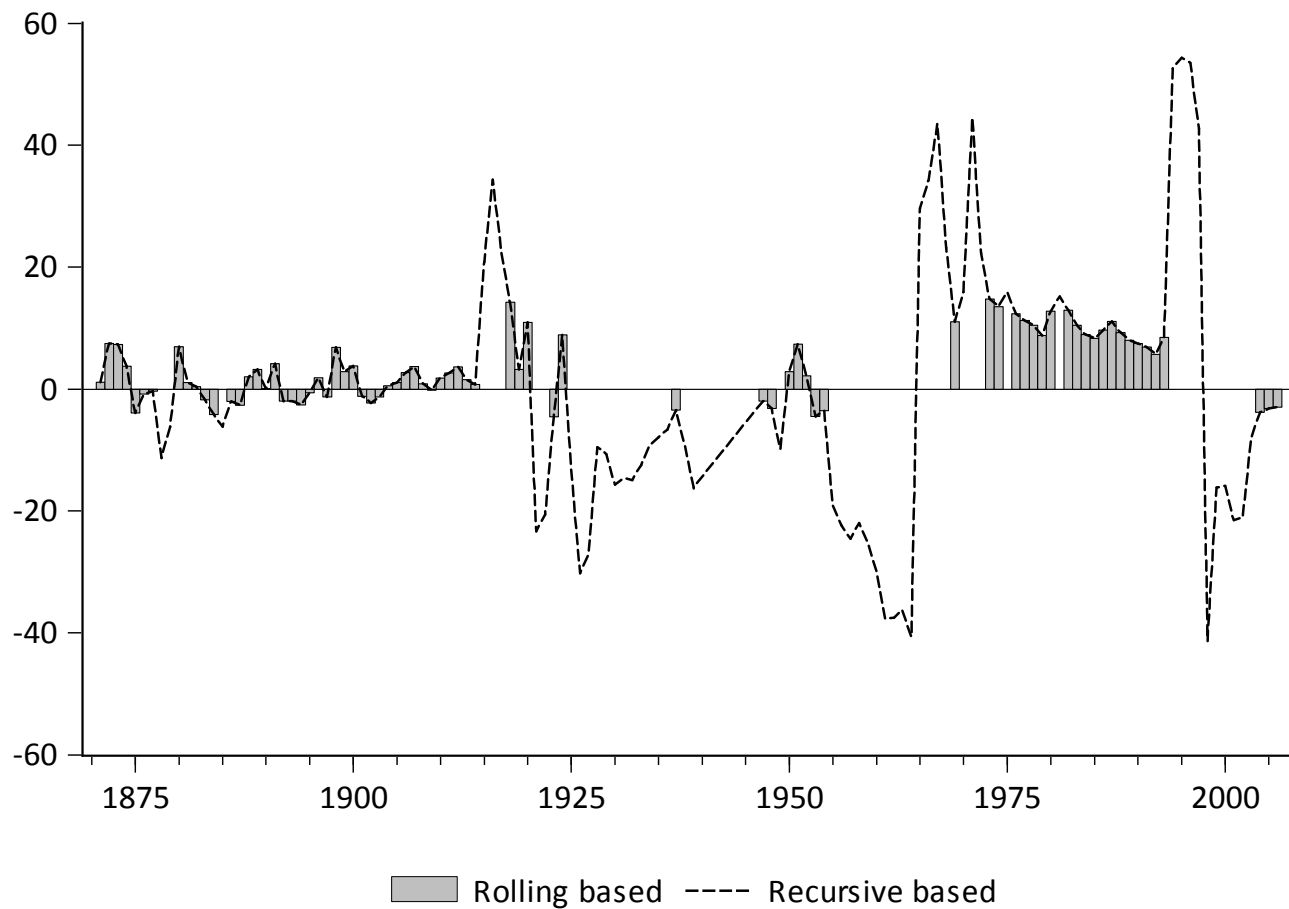
Rolling-based Recursive-based

$$(\pi - \pi^T)^2$$

A lot of volatility in 1970s & 1980s. True of many central banks

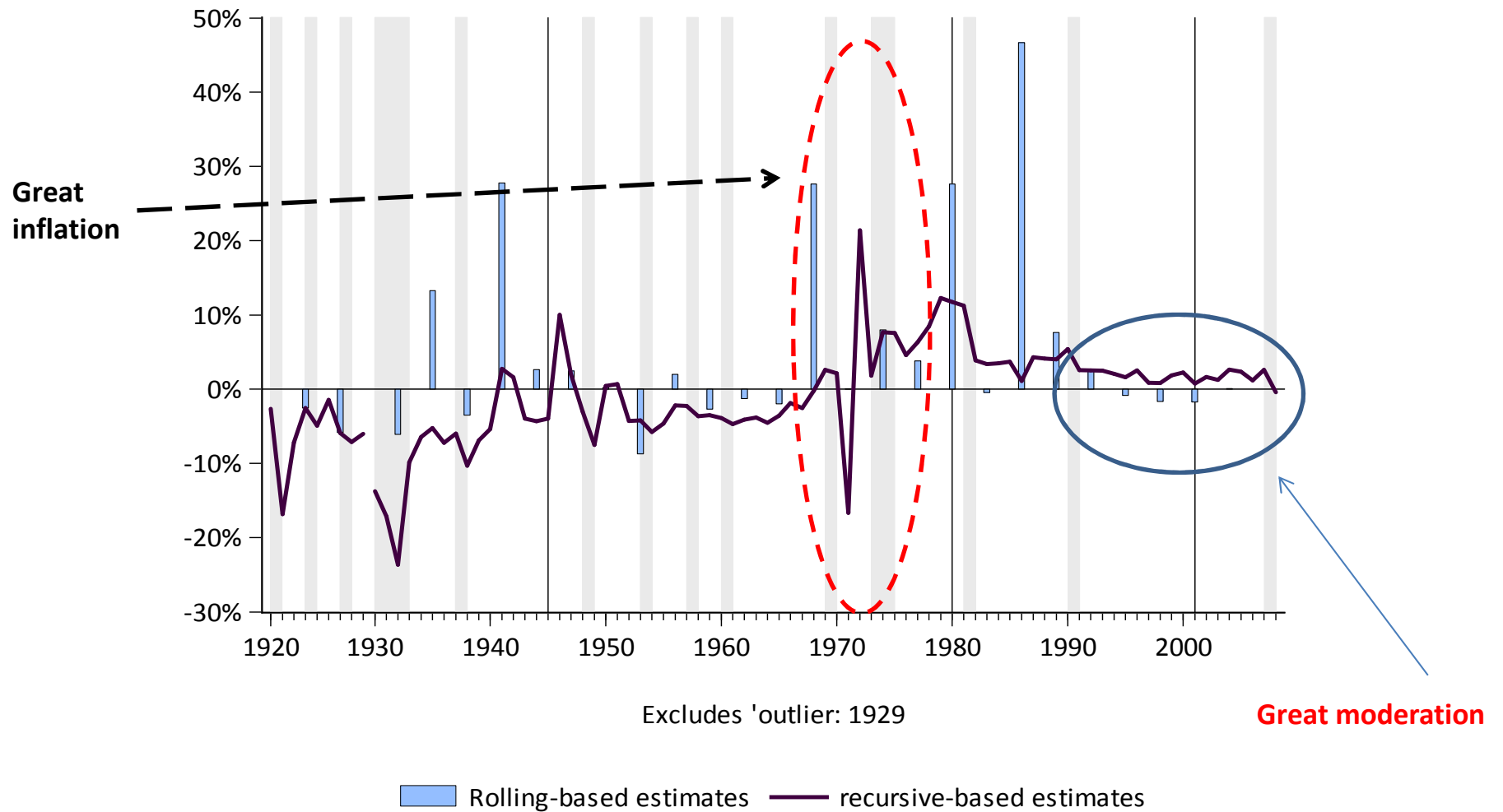
# The NB's Credibility Over Time: Recursive and Rolling Estimates

Estimates of Norges Bank Credibility: Money Growth Instrument



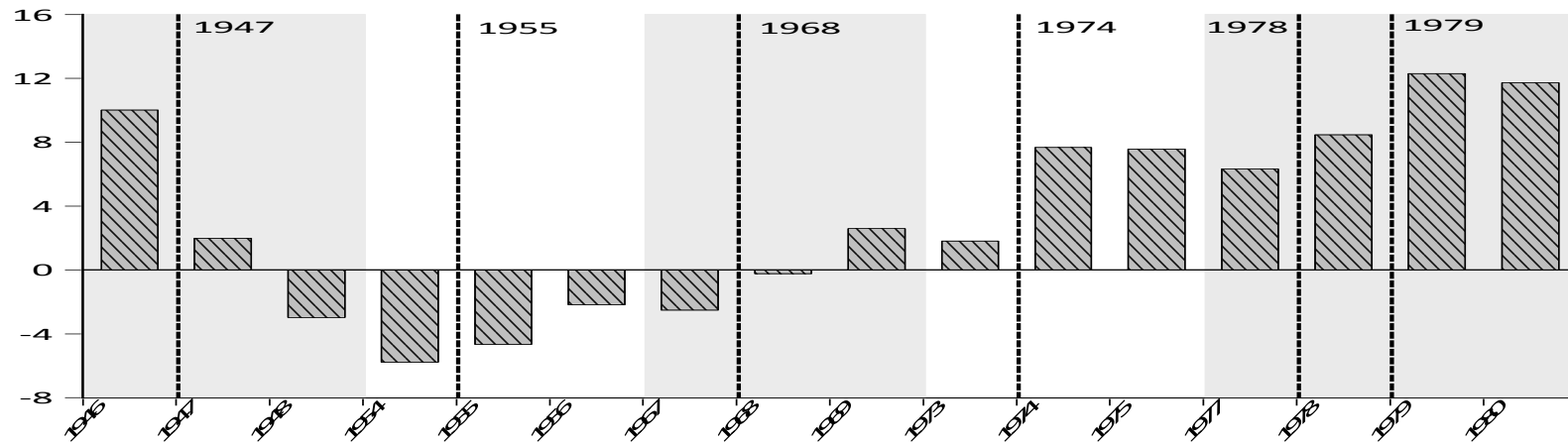
# The Fed's Credibility Over Time: Recursive and Rolling Estimates

Estimates of Federal Reserve Credibility: Interest Rate Instrument

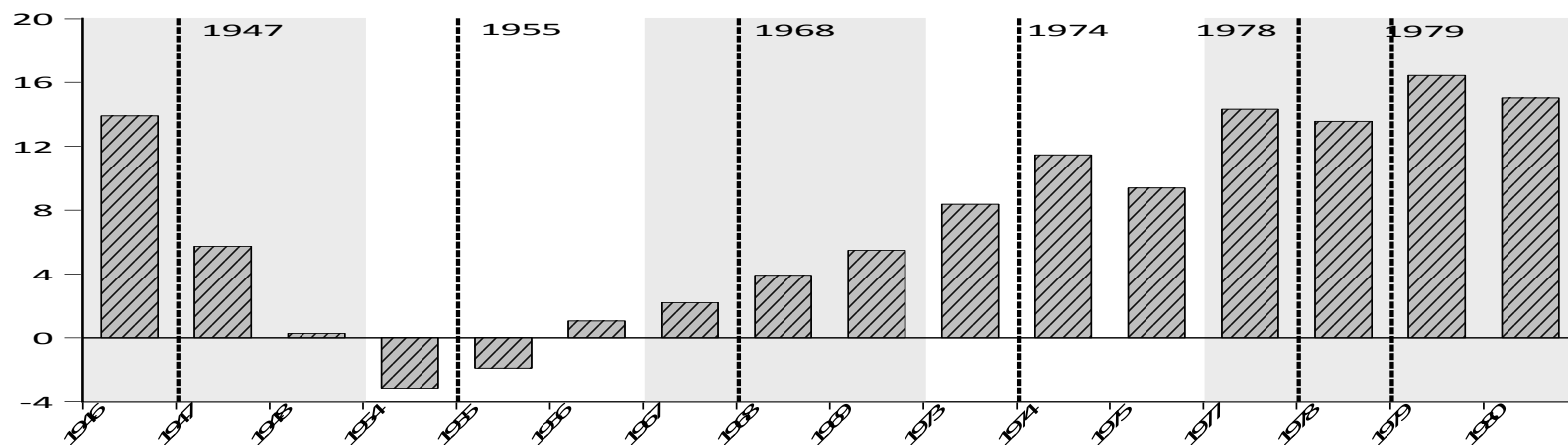


# Credibility and “Decisive” Episodes of Monetary Policy Tightening

Interest Rate Instrument



Money Growth Instrument



# Mean Fed Inflation Objective

Episodes	Interest Rate Instrument		Money Growth Instrument	
	Recursive (s.e.; T)	Rolling (s.e.; T)	Recursive (s.e.; T)	Rolling (s.e.; T)
1914-1923	-7.30 (6.73; 4)	NA	-7.96 (7.47; 4)	NA
1924-1932	-9.41 (6.83; 10)	-5.44 (0.94; 3)	-5.21 (5.60; 10)	6.33 (18.71; 3)
1933-1972	-2.82 (5.85; 40)	4.45 (1.44; 13)	1.20 (3.49; 40)	-22.04 (75.42; 13)
1973-1981	7.96 (3.47; 9)	13.13 (12.71; 3)	12.63 (12.80; 9]	16.15 (6.14; 3)
1982-2007	2.51 (1.23; 26)	6.53 (16.50; 3)	-0.95 (24.09; 26)	1.02 (7.59; 8)
1914-2007	-1.01 (6.77; 88)	4.66 (12.77; 28)	0.62 (14.19; 88)	-7.40 (52.76; 28)



# The Institutional Determinants of the NB's Credibility

Dependent Variable: CREDIBILITY, interest rate instrument  
 Method: Least Squares  
 Sample (adjusted): 1881 1912 1914 1955 1969 1969 1970 1970 1972  
 1993 2004 2006

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	73.47	85.46	0.86	0.39
<b>Loans to GDP ratio</b>	<b>1.53</b>	<b>0.89</b>	<b>1.72</b>	<b>0.09</b>
<b>CREDIBILITY (t-1)</b>	<b>0.30</b>	<b>0.06</b>	<b>4.75</b>	<b>0.00</b>
Debt to GDP ratio (t-1)	-1.28	2.15	-0.59	0.56
<b>Gold Standard</b>	<b>-112.58</b>	<b>37.20</b>	<b>-3.03</b>	<b>0.00</b>
R-squared	0.36			
Adjusted R-squared	0.34			

Less Robust

Robust

# The Institutional Determinants of the Fed's Credibility

Dependent Variable: CREDIBILITY, interest rate instrument

Method: Least Squares

Sample: 1921 1928 1930 2008

Signals a future loss of credibility  
Via higher inflation (relative to goal)?

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-46.91	49.42	-0.95	0.35
<i>Loans to GDP ratio</i>	2.45	1.38	1.77	0.08
<i>McChesney MARTIN</i>	-5.33	28.84	-0.18	0.85
<i>BURNS &amp; MILLER</i>	20.61	31.53	0.65	0.52
<i>GREENSPAN</i>	-48.97	25.58	-1.91	0.06
<i>CREDIBILITY (t-1)</i>	0.46	0.14	3.42	0.00
<i>Sovereign Debt</i>				
<i>Crisis*Debt to GDP</i>				
<i>ratio(t-1)</i>	-6.42	3.26	-1.97	0.05
<i>Stock market Crisis</i>	23.52	20.60	1.14	0.26
<hr/>				
R-squared	0.34			
Adjusted R-squared	0.28			

Gets the "credit"  
...benefits from Volcker?

Fed keeps inflation in check?  
Not robust

# Conclusions

- Credibility changes are frequent and can be large
  - Large changes seem to be associated with ‘policy errors’ & policy shifts
- No robust connection between the size of shocks and loss of credibility is found
- Crises, governance, and institutional factors more generally play a role
  - Spillovers do take place and are a function of the monetary regime in place...*work to be done*
  - *Other extensions? Definition of credibility, more non-linearities*