

Central Bank Credibility: Insights from an Historical and Quantitative Exploration

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Introduction

- Central banks achieved remarkable credibility before the 2007-2008 crisis.
- An important element in the achievement of good credibility has been the advent and adoption of inflation targeting by many countries.
- This paper examines the empirical determinants and the historical evolution of central bank credibility using both historical narrative and empirics for a group of 16 countries, both advanced and emerging.

Introduction

- We show how the evolution of credibility has gone through a pendulum where credibility was high under the classical gold standard before 1914.
- Then credibility was lost after 1914 and not fully regained until the 1980s.
- This process was further enhanced in the past two decades with the advent of IT.
- The recent financial crisis and the call for central banks to focus more on financial stability and especially the tools of macro prudential regulation may pose significant challenges for central banking.
- We briefly conclude with some evidence on recent financial stability effects for central bank credibility.

Definitions

- We define central bank 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).
- We interpret credibility in terms of inflation performance.

Definitions

- Credibility is a flow variable that changes as observed inflation is seen to deviate from a time-varying 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).

Definitions

- Credibility builds trust in institutions and helps weather crises.
- It helps markets and the public discern the actual policies being followed.
- The key determinants of credibility are the monetary regime in effect and institutional factors such as the mandate of the central bank, its autonomy with respect to the government, the governance of the institution.

Empirical Determinants of Credibility

- We argue that a CB is deemed credible when it delivers, subject to a random error, the implied inflation rate objective conditional on the monetary regime in place.

$$(\pi_{it} - \bar{\pi}_{it})^2 = \boldsymbol{\theta} \mathbf{Z}_{it} + \varphi_i (\pi_{i,t-1} - \bar{\pi}_{i,t-1})^2 + \mathbf{u}_{it} \quad (1)$$

- Where the dependent variable is our indicator of credibility, $\boldsymbol{\theta} \mathbf{Z}_{it}$ is the product of a vector of coefficients. $\boldsymbol{\theta}$ and \mathbf{Z}_{it} represent economic and institutional variables that can explain departures from the inflation objective.

Definitions

- Thus equation (1) expresses credibility as the squared differential between the observed inflation rate and the central bank's goal.
- The inflation objective is derived using a Taylor Rule and it is adjusted for the type of policy instrument used: interest rate, monetary aggregates and exchange rates.

Panel Regressions

- In Bordo and Siklos (2015) we use annual data for 10 advanced countries from 1880 to present.
- We use three estimates of expected inflation to derive the inflation objective.
- We distinguish between interest rate, money supply growth and exchange rate instruments.
- As a measure of Z_{it} in equation (1) we use:
 - gold, a dummy for whether the country is on the gold standard;
 - \dot{M}_{it} , the growth of broad money;
 - loans, the ratio of bank credit to GDP;
 - debt, the ratio of sovereign debt to GDP;
 - OIL_{it} for oil price shocks;
 - CRISIS, a dummy to capture financial crises;
 - CBI, an index of central bank independence;
 - ERR, a dummy for the exchange rate regime.
- We estimate equation (1) using GLS in a panel setting.
- Our results are reported in Table 1.

Panel Regressions: Results

Table 1. Table Panel Regression Estimates of the Determinants of Credibility

<i>Ind. Variables</i>	1871-2008		1950-2008		1871-2008 +ve		1871-2008 -ve		1950-2008 +ve		1950-2008 -ve	
	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>	<i>Coeff.</i>	<i>s.e.</i>
Gold Standard	-57.57†	28.04	NA	NA	-3.67†	1.55	-2.40‡	1.49	NA	NA	NA	NA
Money growth	2.71	2.73	5.47	6.27	0.20*	0.06	0.18*	0.06	0.07	0.06	-0.04	0.05
Loans to GDP ratio	-1.16	1.74	-0.58	1.32	0.02	0.02	0.06*	0.02	0.06*	0.02	0.08*	0.02
Debt to GDP ratio	-0.52	0.71	0.56	0.79	-0.02	0.02	-0.02	0.01	-0.07*	0.01	-0.07*	0.02
Equity returns	0.60	0.56	0.79	0.69	-0.01	0.01	-0.01	0.01	-0.01	0.01	-0.00	0.01
Oil price shocks	35.27	71.30	-3.99	9.20	2.22†	0.94	0.96	1.29	4.68*	0.97	3.58†	1.61
Financial Crises	30.31†	16.69	52.13‡	32.05	0.55‡	0.31	0.29	0.32	0.44	0.46	0.10	0.34
Central Bank Independence	NA	NA	-18.75	14.03	NA	NA	NA	NA	-2.71	1.98	-1.29	1.93
Exchange rate regime	NA	NA	11.79†	5.50	NA	NA	NA	NA	-0.33	0.08*	-0.39*	0.12
<i>Summary Statistics</i>												
Adjusted R ²	0.10		0.11		0.43		0.44		0.49		0.46	
F-statistic	4.54		3.46		36.69		39.39		30.06		25.37	
p-value	0.00		0.00		0.00		0.00		0.00		0.00	

Empirical evidence on the Determinants of Credibility: Panel Regressions

- The principal results are that:
 - 1) adhering to the gold standard raises credibility;
 - 2) higher money growth reduces credibility when inflation is above the CBs implicit inflation objective;
 - 3) greater CBI raises credibility.

The historical pattern of credibility and reputation through the ages

- The history of CB credibility is tied up with the history of policy regimes.
- We compare credibility in 3 broadly defined regimes:
 - A. the gold standard which includes the pre 1914 classical gold standard and the 1920s gold exchange standard (GS)
 - B. the Bretton Woods era which includes the years when the US indirectly adhered to the gold nominal anchor and the period after when the golden anchor was raised leading to the Great Inflation (BW);
 - C. The recent fiat money regime with the primacy of low inflation (PS).

Credibility through the ages

- As a measure of the inflation objective we use expected inflation.
- Expected inflation is the mean of the forecasts from three different models in Bordo and Siklos (2015).
- The closer expectations are aligned with inflation the smaller the difference between the two series and, consequently, the more credible the central bank.
- See table 2.

Credibility through the ages

Table 2. The Pendulum of Monetary Regimes in Select Economies Since the Early 19th Century

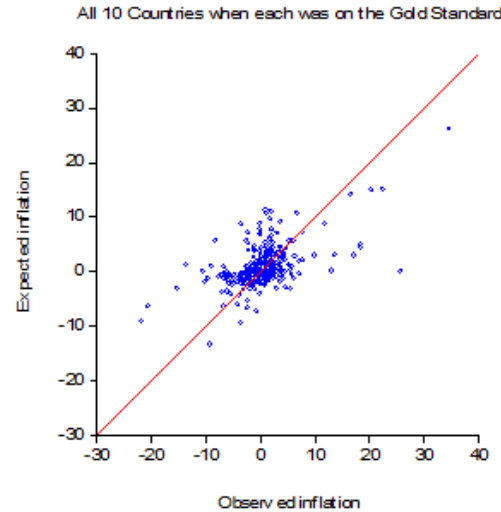
Economy	Gold Standard	Bretton Woods	Primacy of Price Stability - Flexible Monetary Regime (Type)
Sweden	1873-1914 & 1922-1931	1959-1974	1993- (IT)
United Kingdom	1821-1914 & 1925-1931	1959-1972	1992- (IT)
France	1878-1914 & 1926-1936	1959-1973	1993- (MaaT)
Norway	1875-1914 & 1928-1931	1959-1972	2001- (IT)
Germany	1871-1914 & 1924-1931	1959-1973	1993- (MT)
Japan	1897-1917 & 1930-1931	1959-1977	1997- (Ind)
Italy	1884-1917 & 1927-1934	1959-1972	1993- (MaaT)
Switzerland	1878-1914	1959-1972	1973- ¹
USA	1880-1917 & 1922-1933	1959-1972	1980- ²
Chile	1895-1898 & 1926-1931	1959-1970	1990- (IT)
Mexico	1905-1913 & 1921-1931	1959-1976	1999- (IT)
Canada	1854-1914 & 1926-1929	1960-1970	1991- (IT)
New Zealand	1821-1914 & 1925-1930	1959-1973	1990- (IT)
Argentina	1900-1914 & 1927-1929	1964-1970	1991-2002 (CBd)
Australia	1852-1915 & 1925-1930	1959-1974	1993- (IT)
Colombia	1923-1932	1959-1970	1999- (IT)

- Table 2 demarcates the dates of adherence to each regime for 16 countries

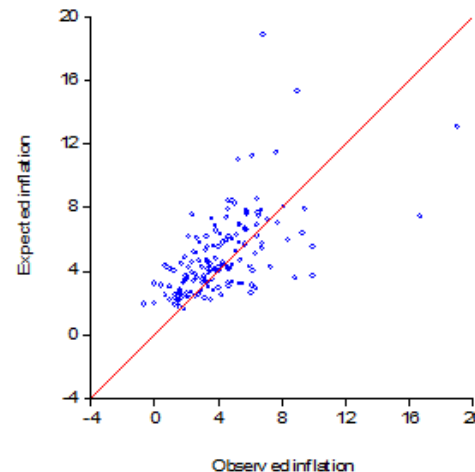
Credibility through the ages

- Figure 1 shows the patterns of expected and observed inflation for 10 countries for each regime
- Figure 1 reveals a pendulum pattern: credibility was high in the gold standard era, less so in the BW era and then back to the pattern of the gold standard under the current regime with primacy for low inflation

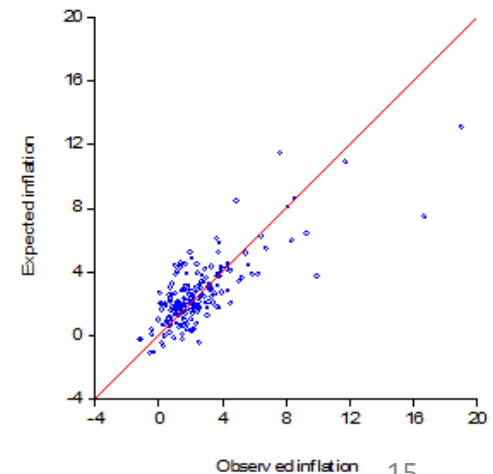
Figure 1. Expected and observed inflation for 10 countries



All 10 Countries when each was under the Bretton Woods system



All 10 countries under the Price Stability regime



Credibility through the ages

- 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 money were permitted in well understood emergencies.
- Credible gold standard adherence allowed CBs leeway to conduct stabilization policies and LLR actions.

Credibility through the ages

- The history of the pre 1914 gold standard countries shows how the key countries; GB, France, and Germany had credible regimes as well as others like Sweden and the US.
- Peripheral countries were less successful.
- WWI ended the 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.

Credibility through the ages

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

Credibility through the ages

- CBs regained independence beginning in the 1950s.
- Fed gained independence after Accord in 1951.
- Martin emphasized price stability until 1965.
- Bundesbank, SNB followed a stability culture.
- 1960s CBs (with exception of DBB and SNB) followed Keynesian policies to maintain full employment at expense of higher inflation.

Credibility through the ages

- 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 inflation expectations and by mid 1980s restored Fed reputation.
- Similar stories in other advanced countries.
- Great Moderation 1985 to 2006 heyday of CB credibility for low inflation and good reputation.

Credibility through the ages

- Financial Crisis of 2007-2008 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.

Historical narratives on the evolution of Credibility by 6 CBs

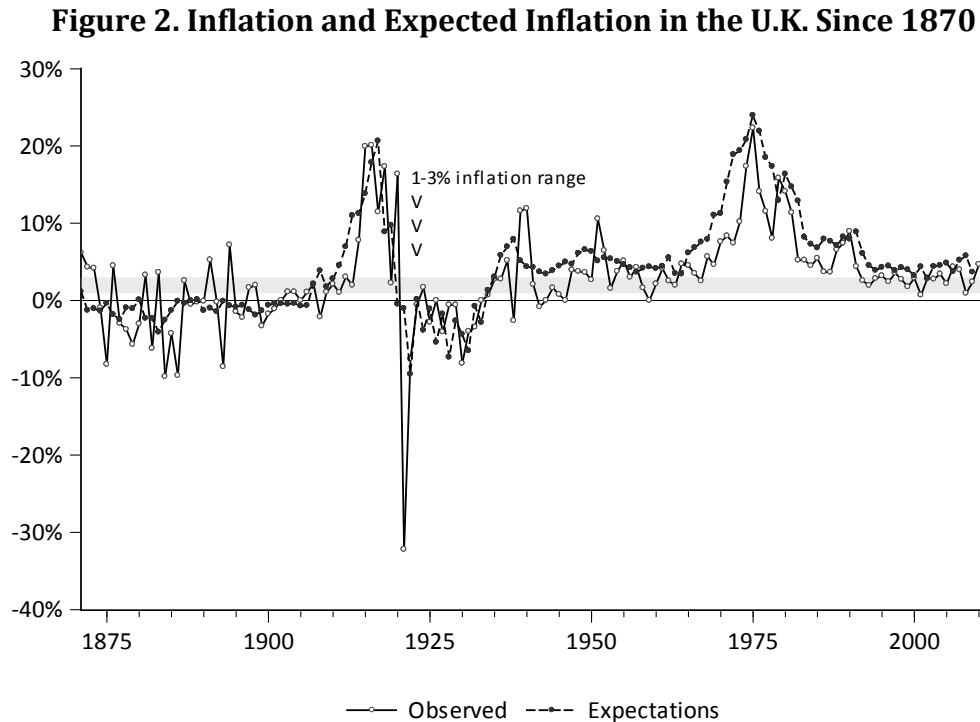
- We present narratives on 4 advanced country CBs (UK, US, Germany, Italy).
- And 2 emerging Latin American economies (Chile, Mexico).

Historical narratives - UK

- Bank of England founded 1694.
- Evolved from financing government to:
 - becoming a bankers' bank;
 - providing LLR;
 - managing gold standard;
 - war finance;
 - macro management;
 - price stability and IT.

Historical narratives - UK

- Figure 2 shows inflation and expected inflation since 1870



- Figure 2 shows pendulum of CB credibility

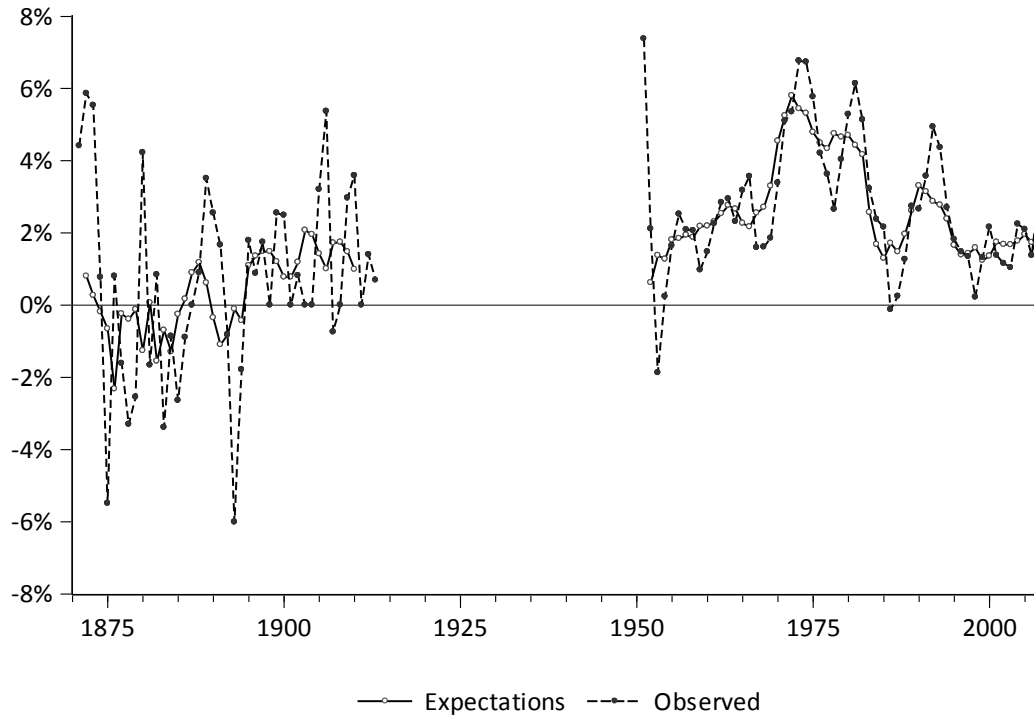
Historical narratives - Germany

- Reichsbank established to manage gold standard and act as LLR.
- Had good credibility pre WWI.
- Lost it in interwar.
- DBB established to maintain price stability. Had best performance of any CB.
- See figure 3.

Historical narratives - Germany

Figure 3. Inflation and Expected Inflation in Germany Since 1871

OBSERVED and EXPECTED INFLATION: Germany



- Strong evidence of pendulum.

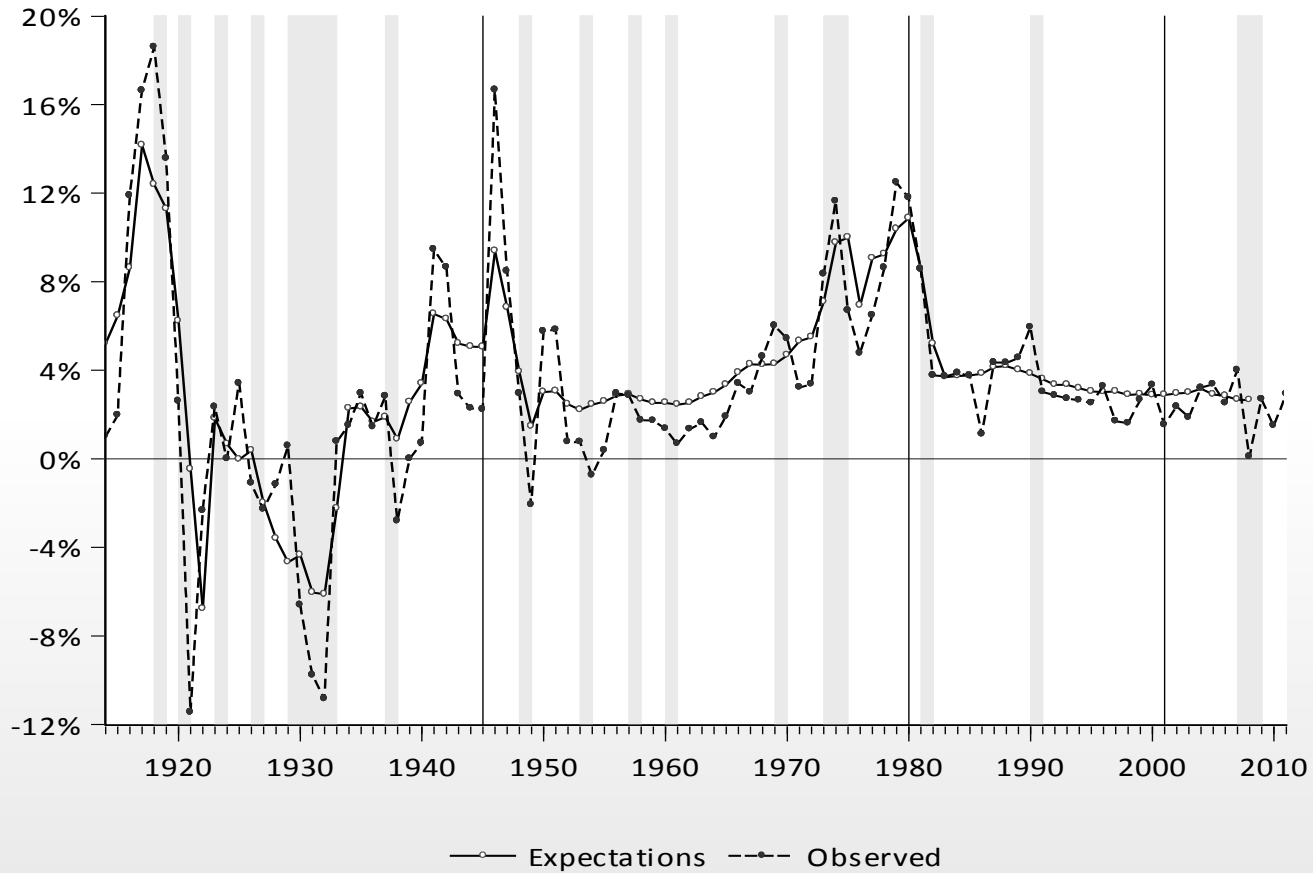
Historical narratives - USA

- US had no CB from 1836 to 1914.
- Fed established in 1914 to act as LLR, maintain gold standard.
- After WWI began macro management. Failed miserably in Great Depression. Lost independence.
- After 1951 regained independence. Maintained price stability until 1965.
- Lost Credibility with Great Inflation and regained it with Volcker and Greenspan.
- See figure 4.

Historical narratives - USA

Figure 4. Inflation and Expected Inflation in the U.S. Since the Fed's Creation

OBSERVED and EXPECTED INFLATION: United States



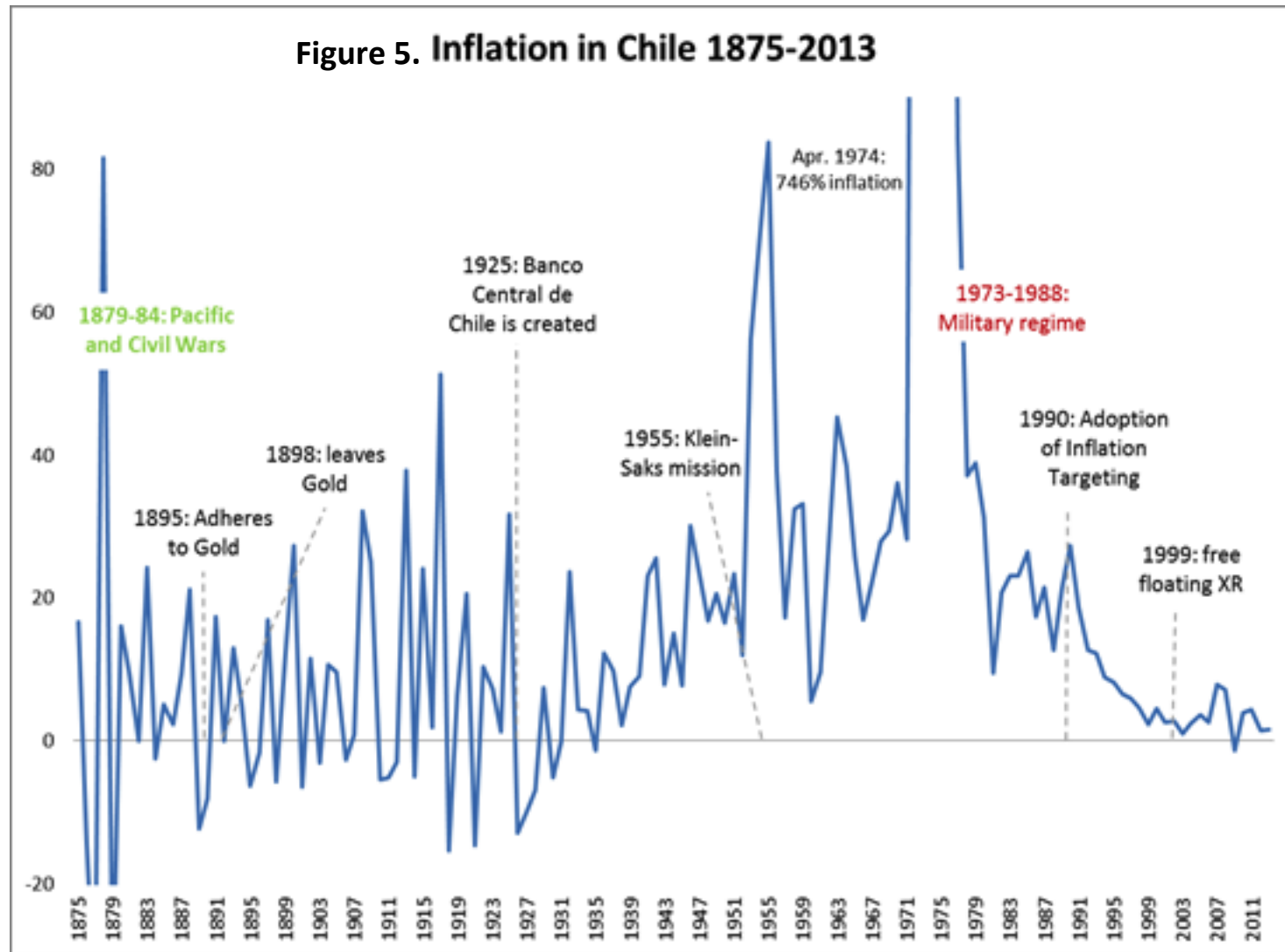
Historical narratives - Italy

- Italy unified in 1861.
- Had competing CBs for 3 decades (Fратиanni and Spinelli (1997)).
- Banca d'Italia founded in 1893.
- Italy had chequered specie adherence and inflation record before 1900 (Bordo and Schwartz (1996)).
- After 1900 Italy shadowed the gold standard.
- CB lost independence in 1923, high inflation in WWI and afterwards.
- Joined gold standard in 1928, left in 1935.
- Fiscal dominance and high inflation in 1930s/1940s.
- Joined Bretton Woods in 1946.
- Expansionary monetary and fiscal policy led to currency crisis in 1964 and rescue.
- 1970s: fiscally dominant regime, high and variable inflation.
- Problematic experience under EMS.
- Italy signed Maastricht Treaty in 1993 and inflation rate was reduced by 1999.
- Banca d'Italia became operationally independent in 1993 but did not adopt IT before joining ECB.
- Overall credibility performance not stellar.

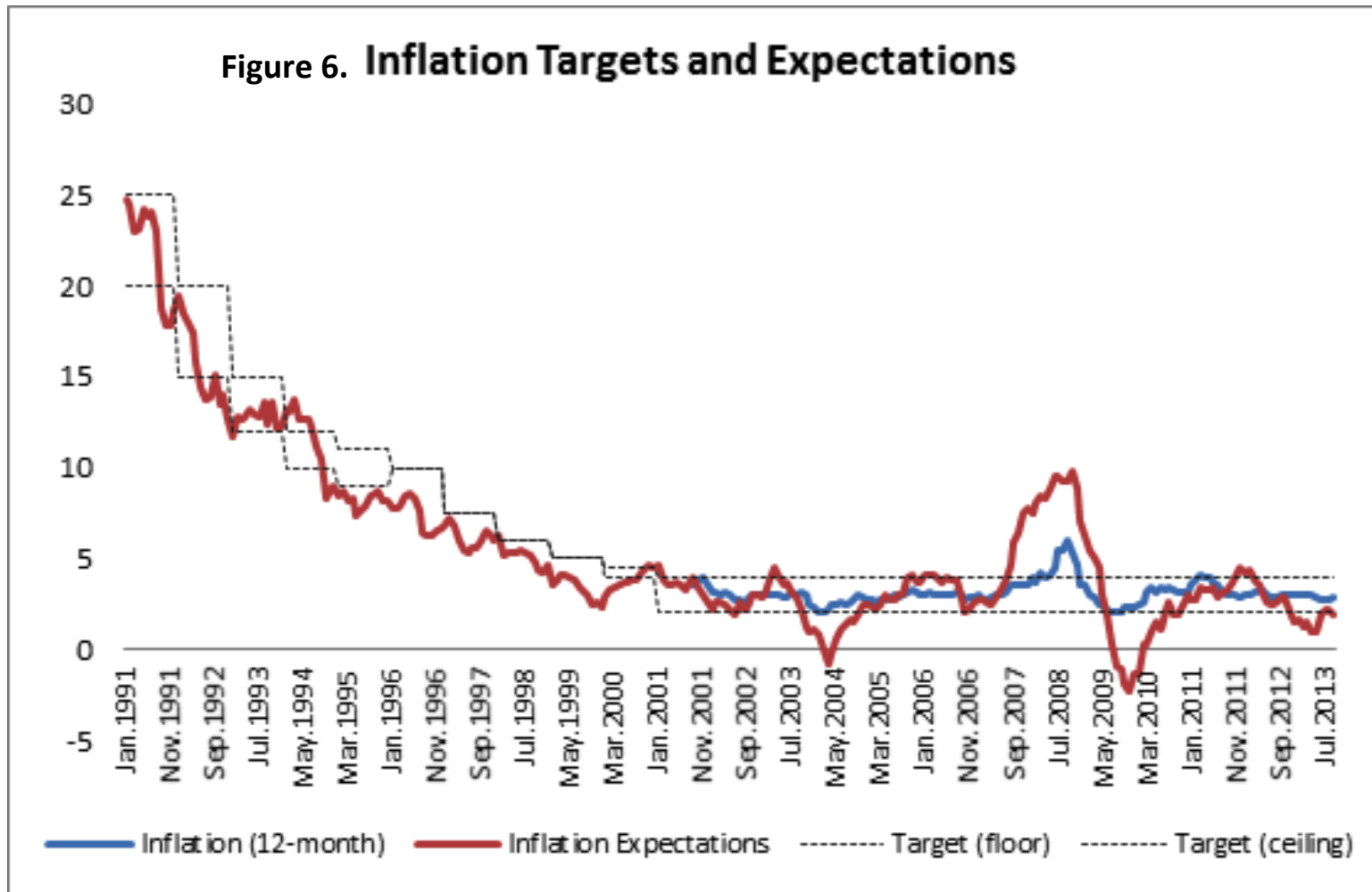
Historical narratives - Latin America

- Chile had considerable difficulty sticking to specie standard in nineteenth century.
- Problem of frequent wars and fiscal dominance
- Several attempts to set up CB.
- BCC set up in 1925 following Kemmerer mission
- Record of high inflation and fiscal dominance until 1980s.
- Movement towards price stability in 80s and 90s culminated in CB independence and IT.
- Credibility record greatly improved in last two decades.

Historical narratives - Latin America



Historical narratives - Latin America

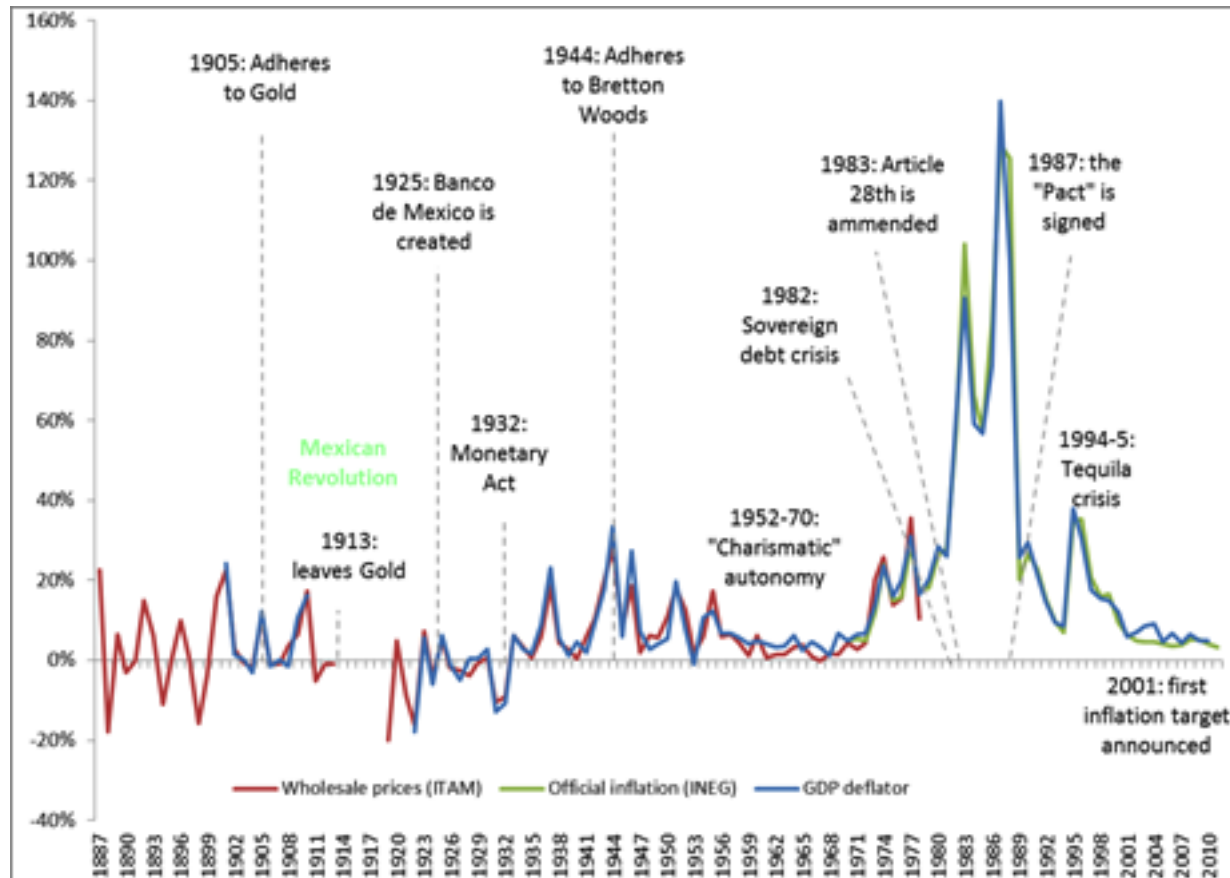


Historical narratives - Latin America

- Mexico had chaotic monetary history in the nineteenth century
- Central bank established in 1925
- Mexico faced many of same problems of fiscal and external imbalances in much of the twentieth century
- But during BW regime CB had considerable credibility
- 1970s, 1980s high inflation and debt crisis set back CB credibility as did Tequila crisis in 1994
- Movement towards IT, CB independence and floating exchange rates since 2000 has vastly improved CB credibility
- See figure 7.

Historical narratives - Latin America

Figure 7. Inflation in Mexico



Historical narratives - Latin America

- Latin America didn't go through the same pendulum pattern as the advanced countries (except Italy).
- These countries had little exchange rate credibility before they adopted CBs and this persisted until the 1980s.
- The record of the twentieth century was one of high inflation and frequent currency and banking crises and occasional debt crises.
- In the 1980s, the 3 LA countries developed mechanisms to achieve credibility for low inflation.
- In each case the movement towards CBI from the fiscal authorities and then the adoption of IT in the 1990s led to a significant reduction in inflation and the movement towards CB credibility.

Empirical evidence on the Pendulum: 10 countries

- We analyze the credibility performance of 10 advanced country CBs.
- Table 3 shows record of evolution of credibility across 3 policy regimes.
- The table determines the differences between observed inflation and what our model (Bordo and Siklos (2015)) suggests was the implied average inflation objective of the CB.

**Table 3. Summary Record of Main Monetary Policy Regimes:
Means and Standard Deviations**

Country	Regime ¹	Years	Observed inflation ⁴	Implicit Inflation Objective (rolling) ⁵
U.S.	GS	1922-1933	-2.25 (4.54) T=12 ⁵	2.45 (4.81) T=4
	BW	1959-1971	2.55 (1.72) T=12	3.52 (0.80) T=4
	PS	1981-2008	3.08 (7.82) T=22	3.08 (1.68) T=4
U.K.	GS	1844-1914, 1922-1931	-0.21 (5.11) T=11	7.94 (3.70) T=25
	BW	1959-1972	4.15 (2.46) T=13	1.67 (2.36) T=4
	GM	1985-2007	3.10 (2.19) T=23	-1.72 (3.01) T=7
Norway	PS	1992-2008	2.65 (0.96) T=17	0.40 (1.33) T=5
	GS	1875-1914, 1928-1931	-0.36 (2.05) T=44	-0.36 (2.05) T=14
	BW	1959-1972	4.24 (2.36) T=14	4.77 (3.88) T=4
Sweden	GM	1985-2007	3.07 (2.04) T=23	INS ²
	PS	2001-2008	1.93 (1.12) T=8	INS
	GS	1873-1914, 1922-1931	-0.68 (4.82) T=52	-0.68 (4.82) T=11
Germany	BW	1959-1974	4.59 (2.30) T=16	3.48 (1.38) T=5
	GM	1985-2007	3.30 (2.67) T=23	4.79 (2.04) T=8
	PS	1994-2008	4.59 (2.30) T=16	-0.75 (0.62) T=5
Switzerland	GS	1871-1914, 1924-1931	0.44 (2.48) T=33	1.60 (1.89) T=8
	BW	1959-1973	3.01 (1.63) T=15	1.56 (1.91) T=4
	GM	1985-2007	1.96 (1.25) T=23	8.32 (8.81) T=8
Canada	PS	1993-2008	1.80 (0.97) T=16	-0.87 (4.19) T=5
	GS	1878-1914	1.94 (1.92) T=8	INS
	BW	1959-1972	3.31 (1.87) T=14	3.13 (3.24) T=5
Italy	GM	1985-2007	1.78 (1.56) T=23	1.25 (14.37) T=8
	PS	1973-2008	2.69 (2.94) T=36	4.02 (5.02) T=10
	GS	1854-1914, 1926-1929	NA	NA ³
France	BW	1960-1970	2.49 (1.40) T=11	3.04 (0.40) T=4
	GM	1985-2007	2.61 (1.39) T=23	-1.01 (0.51) T=5
	PS	1991-2008	1.90 (1.01) T=17	0.59 (3.21) T=4
Japan	GS	1902-1917, 1927-1934	-1.58 (4.33) T=19	-3.63 (6.25) T=6
	BW	1959-1972	3.61 (1.96) T=14	3.85 (0.70) T=4
	GM	1985-2007	3.87 (1.90) T=23	9.79 (6.34) T=7
France	PS	1993-2008	2.82 (1.02) T=16	4.64 (1.43) T=4
	GS	1878-1914, 1926-1936	0.40 (6.54) T=48	NA
	BW	1960-1973	4.43 (1.40) T=14	0.11 (7.29) T=5
Japan	GM	1985-2007	2.15 (0.93) T=23	-4.90 (11.36) T=7
	PS	1993-2008	1.63 (0.57) T=15	NA
	GS	1897-1917, 1930-1931	3.20 (9.67) T=23	3.94 (1.67) T=8
France	BW	1959-1977	6.96 (4.32) T=19	NA
	GM	1985-2007	0.63 (1.22) T=23	5.38 (5.08) T=6
	PS	1998-2008	-0.15 (0.64) T=11	-0.20 (0.02) T=2

Empirical evidence on the Pendulum

- The results suggest that CB inflation objectives and actual inflation can be far apart.
- It could be because CBs practiced discretion or because of large shocks.
- A comparison of mean observed inflation across regimes suggests that:
 - 1) GS has lowest observed inflation rate;
 - 2) PS second lowest;
 - 3) BW the highest.
- The two regimes that had credible nominal anchors had best inflation outcome.

Empirical evidence on the Pendulum

- A comparison of standard deviations of observed inflation shows that GS has highest volatility; PS the lowest.
- This may reflect the Great Moderation and that the GS focused on price levels and not inflation.
- A comparison of the CB implicit inflation objective reveals that GS and PS have the lowest.
- It appears that the GS and PS regimes tie the hands of policy makers.

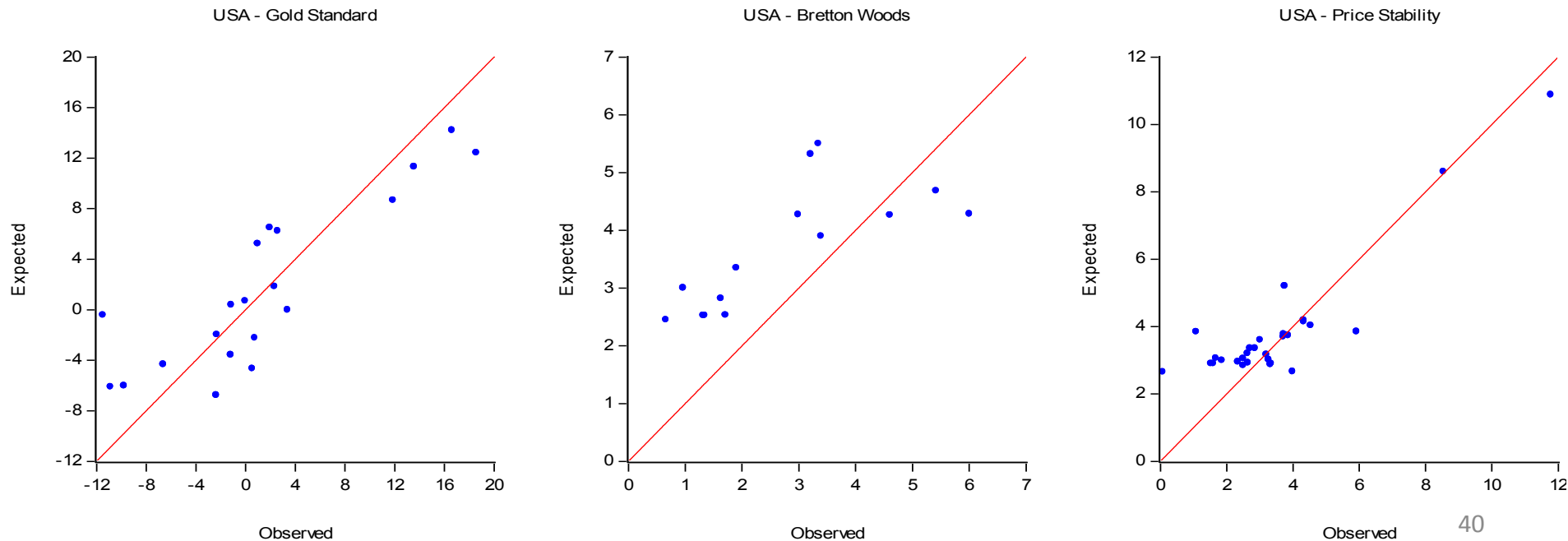
Empirical evidence on the Pendulum: Tobit Regressions

- We ask how the policy regimes impact the probability of being credible.
- We use a Tobit regression where the dependent variable is our measure of credibility (the difference between observed inflation and the inflation objective).
- Our results show that in the majority of countries GS increases credibility as does PS; BW reduces it.

Empirical evidence on the Pendulum: Actual VS expected inflation

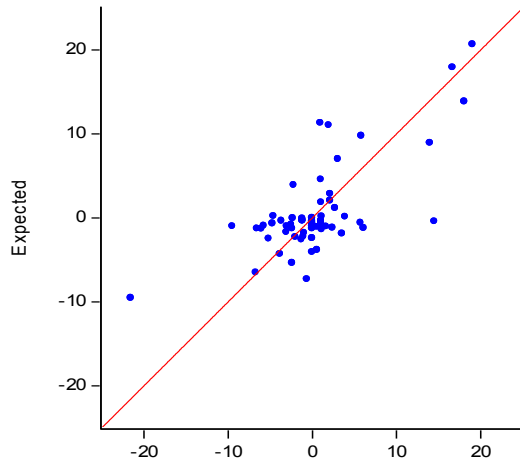
- A comparison of actual with expected inflation where expected inflation is the mean of the forecasts from three different models . We do this for 10 countries.

Figure 8. Inflation versus Expected Inflation Across Regimes in 10 Countries Since the 19th Century

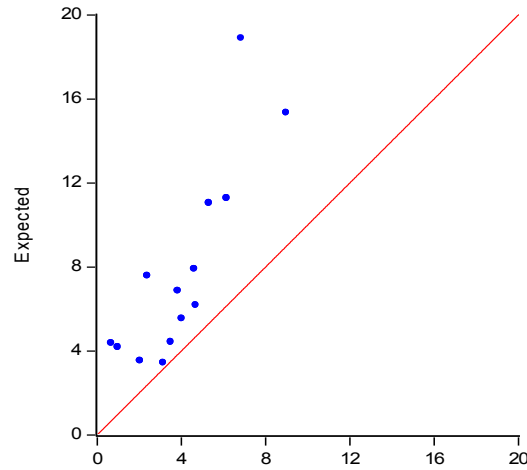


Empirical evidence on the Pendulum: Actual VS expected inflation

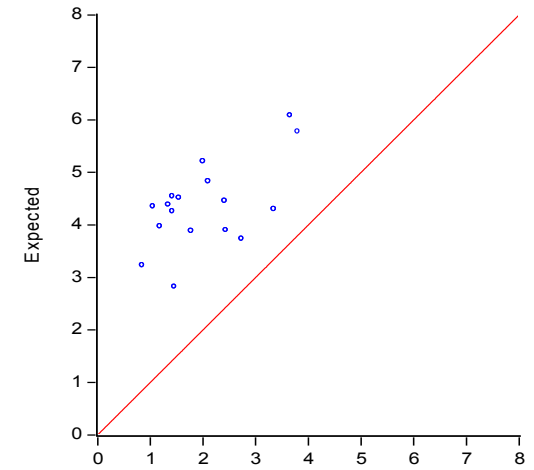
UK - Gold Standard



UK - Bretton Woods

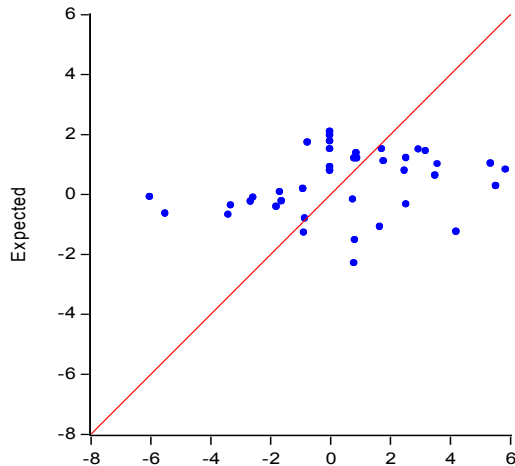


UK - Price Stability

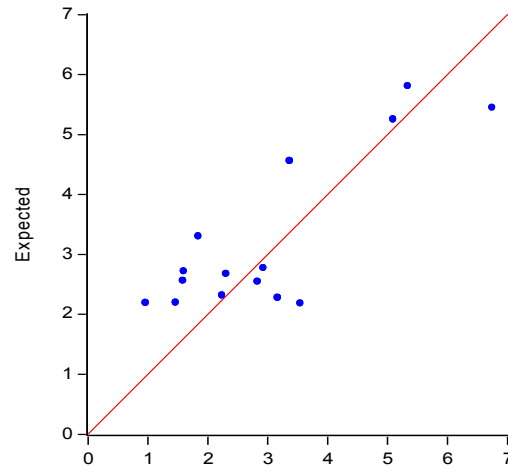


Observed

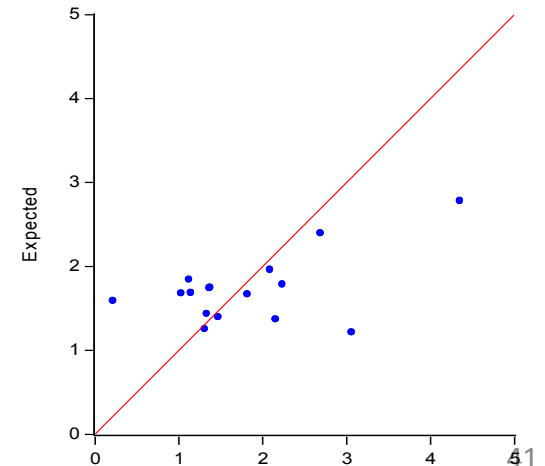
Germany - Gold Standard



Germany - Bretton Woods



Germany - Price Stability



Observed

Observed

Observed

Empirical evidence on the Pendulum: Actual VS expected inflation

- Our results show that:
 - 1) observed and expected inflation are most closely aligned in the gold standard period but it comes at the cost of greater price volatility;
 - 2) BW is the worst regime in delivering credibility with the exception of Germany and Switzerland.

Empirical evidence on the Pendulum

- IT countries (Canada, UK, Norway, Sweden) have been more successful at anchoring expectations in the recent PS period than in other countries where low inflation is the declared aim.
- Non IT countries have reduced inflation relative to under BW.

Empirical evidence on the Pendulum: Summary

- The different strands of evidence support the Pendulum hypothesis.
- Both GS and PS had considerable credibility while BW did not.
- Institutional factors like CBI enhanced credibility.
- Recently countries adhering to IT had greater credibility than those which do not.

Inflation Targeting as a Credibility Enhancer

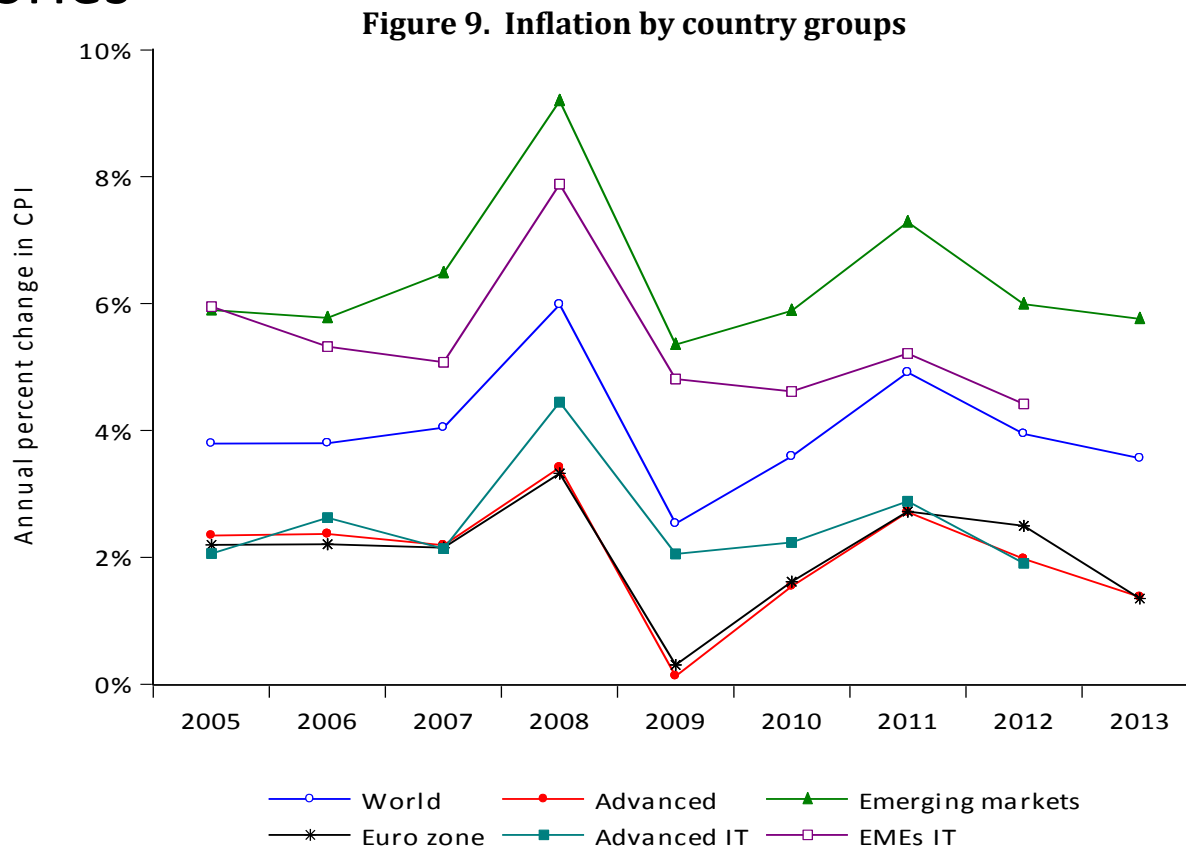
- There is considerable evidence that IT improves CB credibility over non IT monetary policy strategies that focus on maintaining low inflation (Walsh 2009).
- But the evidence is not overwhelming that advanced IT CBs have delivered better performance than non IT CBs (Ball and Sheridan 2005).
- In the case of emerging countries the superiority of IT is clear.

Inflation Targeting as a Credibility Enhancer

- The main advantage of IT for enhancing credibility is that it is a superior means to anchor inflation expectations.
- It does this by clearly stating the target and communicating its intentions on how to implement it.
- Also IT has greater transparency than other monetary policy strategies and is more accountable to the public.
- We provide some new evidence.

Inflation Targeting as a Credibility Enhancer: Inflation Performance

- Figure 9 shows IFS annual data on CPI inflation for the past 8 years for the world divided into different categories



Inflation Targeting as a Credibility Enhancer: Inflation Performance

- First we find little difference between all advanced countries and the Eurozone.
- Second there is less volatility in inflation in advanced countries with IT and they are close to the 2% target.
- Third, emerging countries with IT deliver better inflation performance than emerging countries in general.
- Fourth, we see that inflation in emerging countries with IT is slowly converging towards inflation in advanced countries.

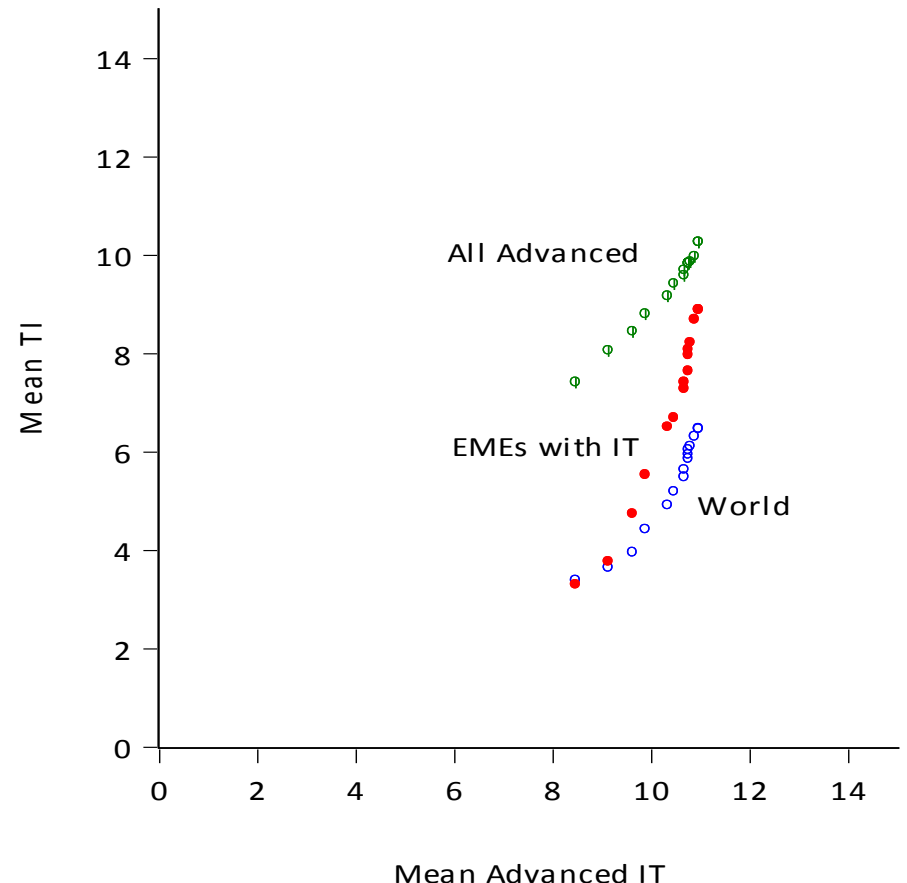
Inflation Targeting as a Credibility Enhancer: Transparency

- One of the main advantages of IT is that it embodies greater transparency than non IT regimes.
- Using the Dincer Eichengreen index of transparency updated by Siklos (2014) we compare the TI score between advanced IT countries with the mean transparency score for all 105 countries in the sample.
- See figure 10.

Inflation Targeting as a Credibility Enhancer: Transparency

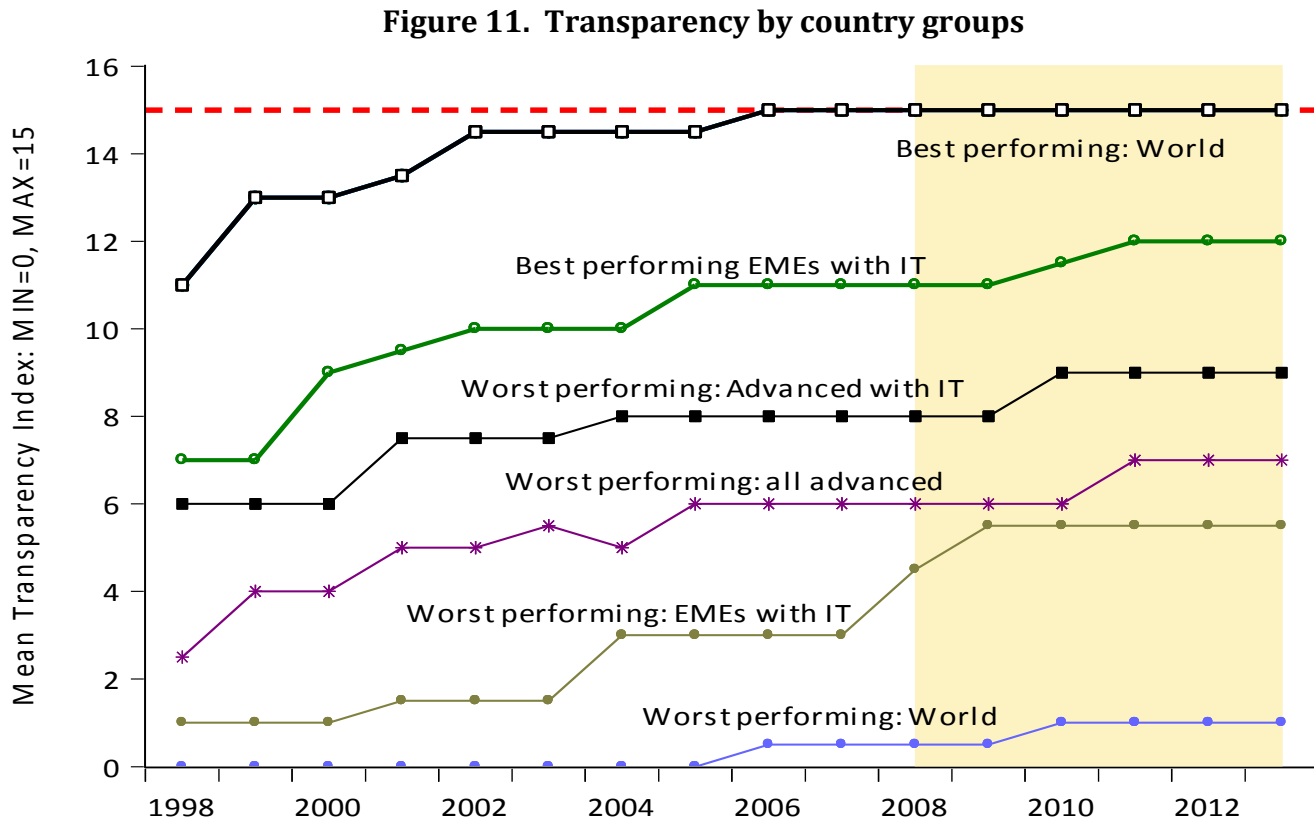
- The figure shows that emerging countries with IT start at the same point as the world in 1998 but begin to converge rapidly towards the advanced countries.
- Not only do emerging countries adopt It very quickly but they become more transparent.

Figure 10. Transparency: advanced IT vs whole IT sample



Inflation Targeting as a Credibility Enhancer: Transparency by Country Groups

- Figure 11 shows that the range of transparency across CBs in the world remains quite large.



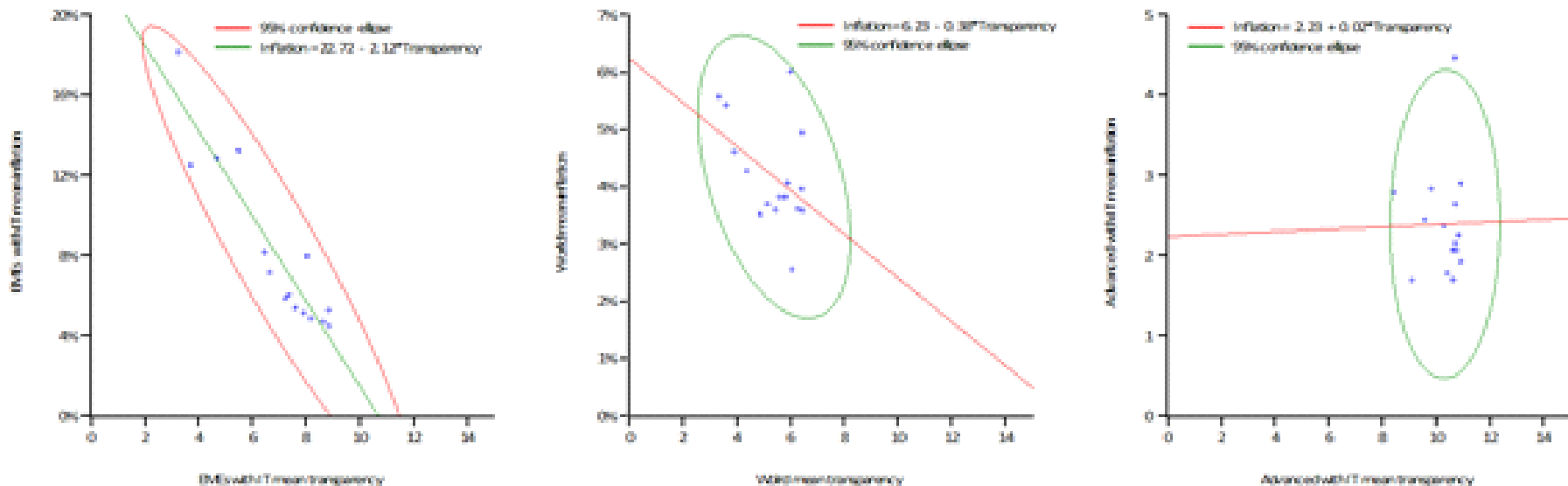
Inflation Targeting as a Credibility Enhancer: Transparency by Country Groups

- The worst performing emergers outperform the worst in the ROW.
- The best emergers with IT outperform the least transparent advanced countries.

Inflation Targeting as a Credibility Enhancer: Inflation and Credibility

- Figure 12 shows that there is a strong statistically significant and negative relationship between inflation performance and transparency.

Figure 12. Inflation and transparency



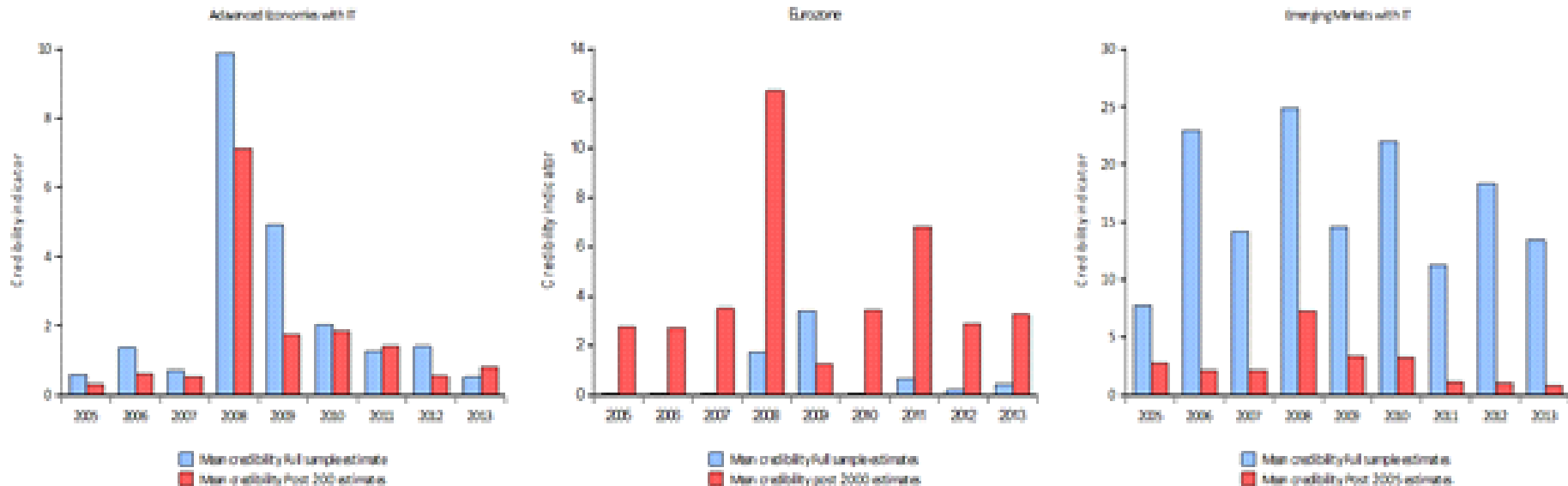
Inflation Targeting as a Credibility Enhancer: Inflation and Credibility

- But we don't find this for advanced countries because they have largely converged both in terms of transparency and the level of inflation.
- After a CB becomes transparent it still needs to demonstrate competence and an ability to set the appropriate stance of policy.

Inflation Targeting as a Credibility Enhancer: Credibility

- Figure 13 shows the evolution of credibility since 2005.

Figure 13. Credibility indicator



Inflation Targeting as a Credibility Enhancer: Credibility

- The data reveal that if inflation forecasts (used to measure target inflation) are generated with only the most recent data.
- These indicate that credibility has improved since the bars are generally lower than if we assume inflation forecasts are generated for a much longer sample.
- This suggests that CBs with IT have succeeded in anchoring inflation at lower levels.

Inflation Targeting as a Credibility Enhancer: Regressions

- We present panel regressions on the determinants of credibility.
- The dependent variable is credibility proxied by the square of the forecast error where the inflation forecast is generated by two time series models.
- Table 6 shows that for advanced countries transparency improves credibility but that credibility declines after the crisis of 2007.

Inflation Targeting as a Credibility Enhancer: Regressions

Table 4. Determinants of credibility, advanced countries with IT,

1998-2012

Dependent Variable:

Credibility proxy – Advanced economies with Inflation targeting

Cross-sections included: 12

Total pool (unbalanced) observations: 175

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	7.82	4.85	1.61	0.11
Lagged credibility	0.01	0.08	0.14	0.89
Transparency index	-0.85	0.49	-1.72	0.09
Net lending/borrowing as a % of GDP	-0.50	0.13	-3.69	0.00
Current account balance as a % of GDP	-0.55	0.14	-3.88	0.00
Interaction effect: Transparency index and Inflation Targeting	4.18	2.28	1.83	0.07
R-squared	0.32			
Adjusted R-squared	0.25			

Inflation Targeting as a Credibility Enhancer: Regressions

Table 5. Determinants of credibility, EME with IT, 1998-2013

Dependent Variable:

Credibility proxy – Emerging Market economies with Inflation Targeting

Included observations: 16

Cross-sections included: 18

Total pool (unbalanced) observations: 264

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	64.88	68.50	0.95	0.34
Lagged credibility	-0.03	0.03	-0.94	0.35
Transparency index	-5.64	2.19	-2.58	0.01
General Government Expenditure as a % of GDP	0.09	2.63	0.03	0.97
Net lending/borrowing as a % of GDP	-1.75	2.41	-0.73	0.47
Current account balance as a % of GDP	2.37	1.31	1.81	0.07
R-squared	0.16			
Adjusted R-squared	0.08			
F-statistic	2.08			
Prob(F-statistic)	0.00			

Inflation Targeting as a Credibility Enhancer: Regressions

Table 6. Determinants of credibility, world economy, 1998-2013

Dependent Variable:

Credibility proxy, World economy

Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	4.65	5.59	0.83	0.42
Lagged credibility	-0.26	0.22	-1.21	0.25
Transparency index	0.83	1.01	0.83	0.43
World Oil price inflation	-0.11	0.04	-2.67	0.02
R-squared	0.46			
Adjusted R-squared	0.32			

Inflation Targeting as a Credibility Enhancer: Regressions

- Table 5 shows that emerging countries with IT see a credibility bonus from greater transparency.
- Table 6 shows that that this does not hold up for the rest of the world.
- Our empirics suggest that in general countries adopting IT have greater credibility and transparency than those without it. These results are most striking for the emerging countries.

Since the Crisis

- Our historical/ empirical approach reveals a pendulum in CB credibility from the nineteenth century to the present.
- The recent PS regime has been characterized by the same level of credibility as under GS but it is based on a more efficient fiat M regime.
- The recent PS experience has been enhanced by IT, especially for the emergers.

Since the Crisis

- The recent financial crisis forced CBs to focus on LLR and financial stability. They have worked with the fiscal authorities which has compromised their independence. They have engaged in QE policies.
- Through the crisis the nominal anchor has held and inflation has been low and stable.
- The question arises – will CBs continue to have credibility for low inflation?

Since the Crisis

- The recent crisis led to the call for CBs to elevate the goal of financial stability to the same level as macro/price stability
- This is based on the belief that the credit cycle will create future imbalances and future asset booms and busts and financial crises.
- Hence CBs should head off these imbalances by preemptive monetary policy
- However such policies (assuming they don't backfire as in 1929) can be problematic if they impinge on CBs mandate for low and credible inflation

Since the Crisis

- Bordo and Siklos (2016) ask whether emphasis on financial stability since the crisis had enhanced or harmed CB credibility.
- We estimate an unbalanced panel consisting of 53 emerging market economies, 32 advanced countries, including countries that have announced a formal inflation target.
- We use monthly, quarterly and annual data and express all series to the quarterly frequency.
- We estimate the evolution and empirical properties of credibility, as defined in our earlier work.

Since the Crisis

- We then estimate an ordered probit model which asks what are the factors which statistically influence credibility.
- The institutional and economic factors are both domestic and global.
- To these, we add proxies for financial stability.
- We use a measure developed by Siklos (2014).
- The data used to construct this measure includes asset price gaps; the first principal component of selected financial indicators from a World Bank data set; the volatility in equity returns, in real exchange rates and conditional volatility of inflation forecast errors.

Since the Crisis

- Our results suggest that financial crises can lead to credibility loss, but not for all CBs.
- When CBs perform well in terms of credibility, they respond to economic, financial and institutional determinants differently from the median or less credible CBs.
- CBs do respond to asset prices and financial indicators.
- But asset price inflation can boost credibility as well as reduce it.
- The best performing CBs in credibility either do not respond to asset prices other than the term spread or they can suffer credibility losses when asset prices inflate.

Since the Crisis

- Institutional factors such as the adoption of inflation targeting or greater CB transparency are significant determinants of CB credibility.
- Real growth has a significant influence on CB credibility even in IT economies.
- The bottom line is that, with respect to the relationship between financial stability and CB credibility, the data suggest caution is in order for those who posit that CBs should take on broader responsibilities for financial performance.