The Benefits of Commitment to a Currency Peg: Lessons from the National Banking Era

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[1] The views expressed in this paper are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of Richmond or the Federal Reserve System.

Overview

- Can the prospect of an exchange rate devaluation be costly for an economy even if it doesn't ultimately occur?
  - Financial sector and real economy
- For example, would Greece be better off if only they could do something to take the possibility of them leaving the Euro off the table?
- We investigate evidence from the Gold Standard in the late XIXth century U.S.

Why the gold standard in the U.S.?

- Commitment for the Gold Standard was in question in late XIXth century.
- There was a clearly identified positive shock to this commitment in the 1896 "Cross of Gold" election.
  - Provides lens through which to identify fluctuations in commitment to gold standard through the period
- Contrast with inter-war period, where lack of credibility was ultimately followed by devaluation
- National Banking System:
  - Balance sheets of National Banks available by State in 5 call dates a year provided to the O.C.C.
  - Large number of individual banks, constrained to operations within individual states.
  - Similar laws and regulations across states.

Real effects of the silver scare

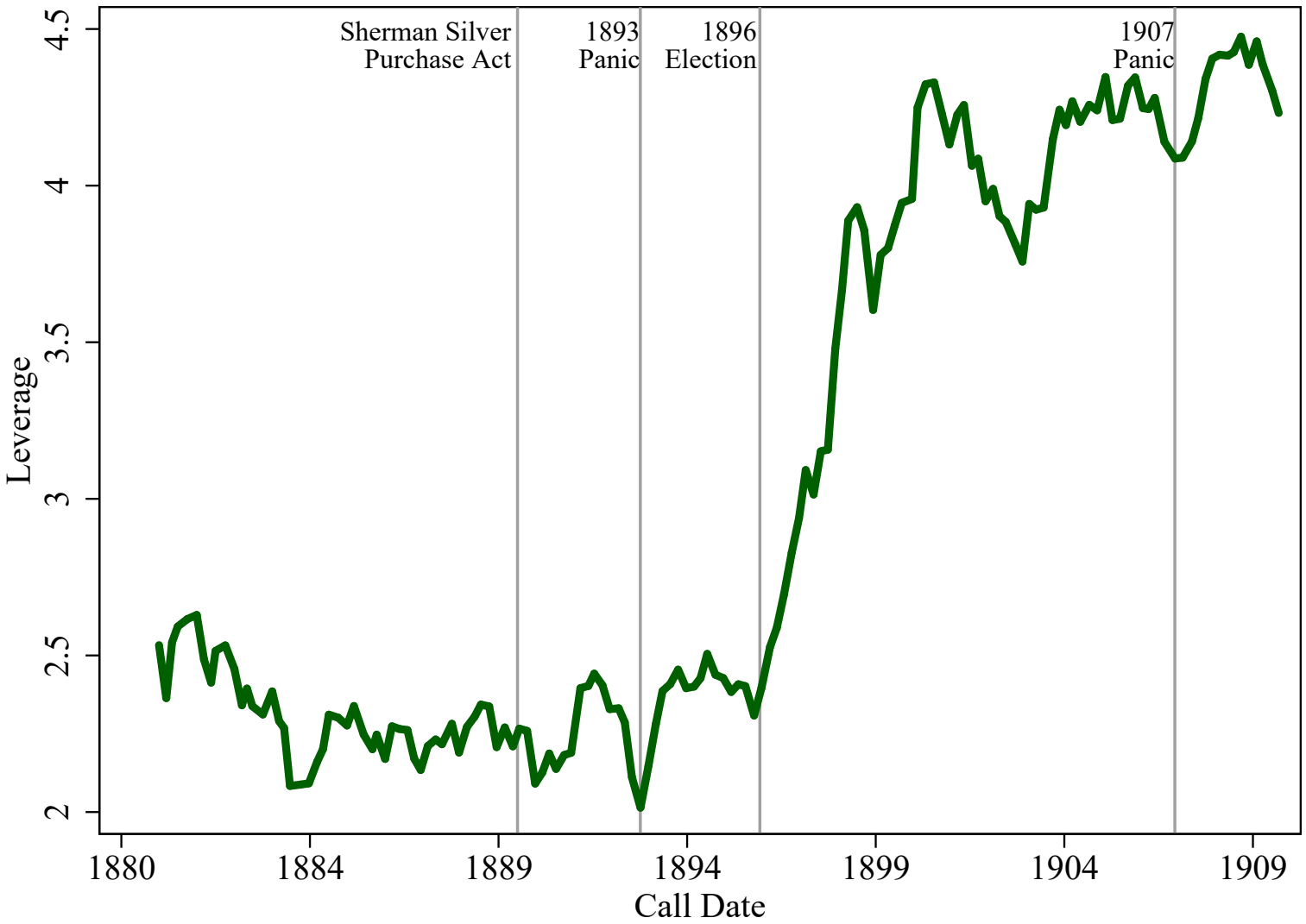
Source: Federal Reserve Archive (FRASER)

Real effects of the silver scare (text)

(in the sign) FREE SILVER SCARE
Prevents sale of New York City and Brooklyn City Bonds.
65 other municipalities had the same experience.
Banks and Business Houses Closing.
Railroads Have Abandoned Projected Improvements.
Factories and Manufactories all over the country close their doors.
Coke ovens silk mills and rolling mills close down.
Thousands thrown out of employment.

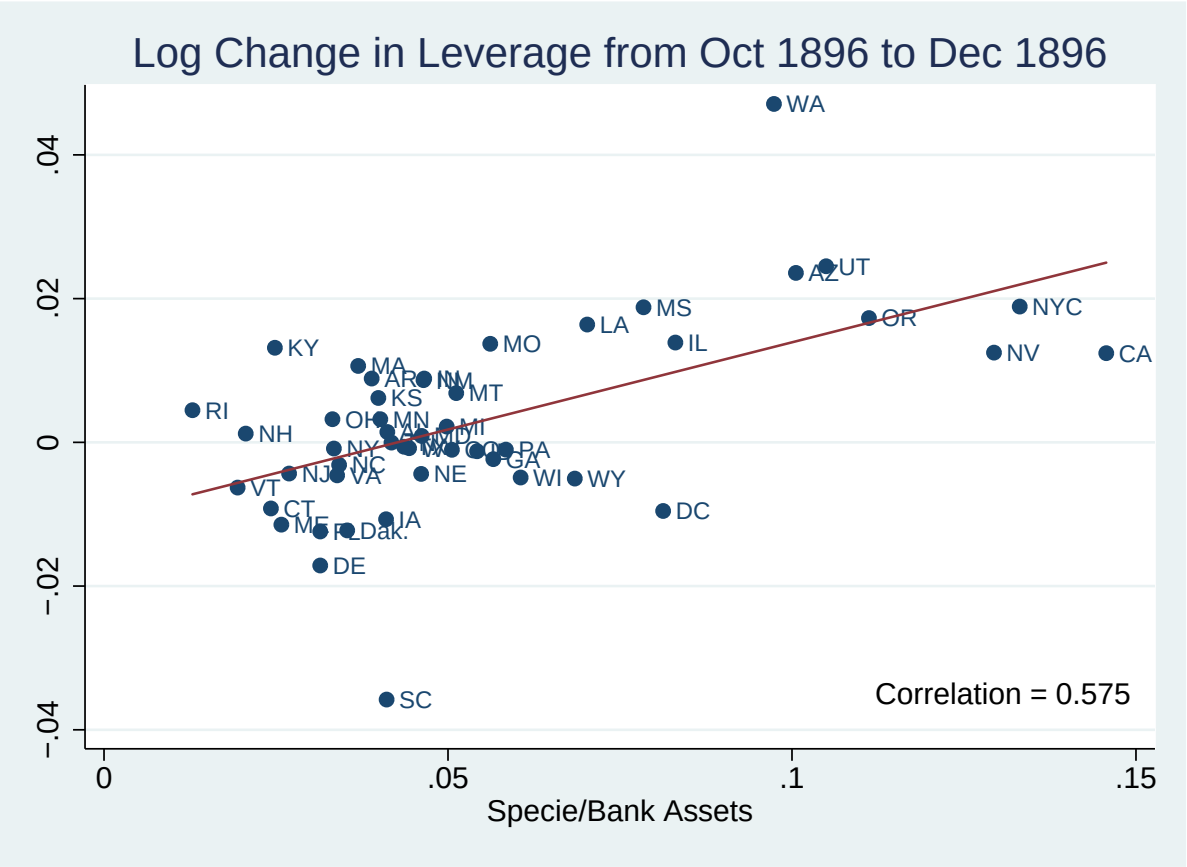
(below) FOREWARNED IS FOREARMED.
Workman - "If the cry of free silver will cause that, what would not free silver itself do?"

National Bank Leverage



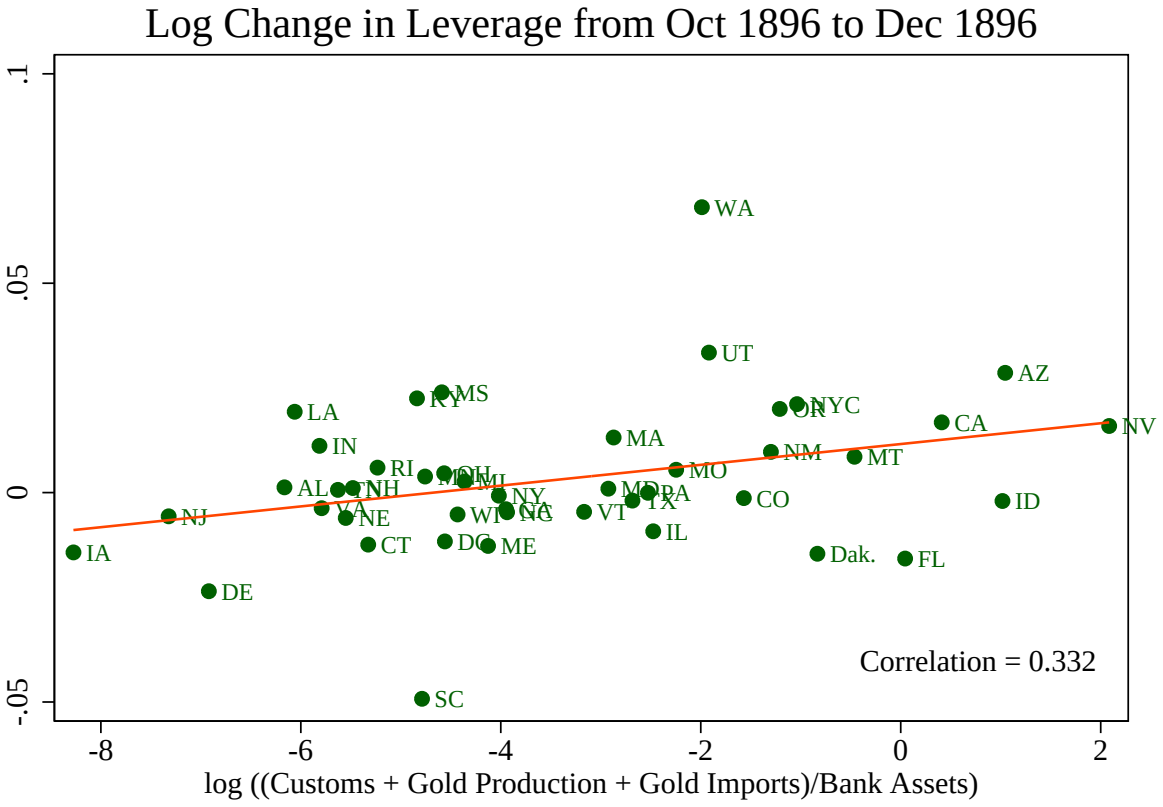
Source: Weber 2000 from the Annual Reports of the Comptroller of the Currency and author calculations.

The Impact of the 1896 Election across States



Specie/Assets is average from 1880 to 1890. National bank leverage are based on Weber 2000 and author calculations.

The Impact of the 1896 Election across States (cont.)



Customs equals amount of customs payments. Source: Annual Report of the Secretary of the Treasury for customs and Statistical Abstract of the United States for gold production and imports. National bank leverage are based on Weber 2000 and author calculations.

The 1896 election as a Lens to Fluctuations in Commitment to Gold Standard

- The 1896 election was
  1. The prominent economic event between Oct and Dec 1896
  2. Represented a strong shift in the probability of a devaluation of the Dollar relative to Gold
  3. Affected banks in different states in different ways.

- Identification assumption (informally):
  - Credibility $\uparrow$ in t if bank leverage changes across states resembles around 1896 election.
  - Robustness: Use dates of other macroeconomic shocks as "controls".

- We find that:
  - Credibility indicator is correlated with bank leverage.
  - Fluctuations in credibility can help explain fluctuations in the real economy until commitment to Gold Standard is enshrined in law in 1900, but not afterwards.

The 1896 Election as a Natural Experiment

- We need to argue that:
  1. Bimetallism as proposed by Bryan would probably lead to devaluation of dollar relative to gold.
  2. Election results had clear impact on expectations about exchange rates
  3. Other macroeconomic shocks around the election would be minor.
- Before that, a bit of the historical and institutional context.

Historical and Institutional Context

- From 1879 onward the U.S. was officially in a bimetallic, but de facto, gold standard (The "Crime of 1873")
- "Free Silver" movement to bring silver back into circulation.
  - 1890: The Sherman Silver Purchase Act
- In 1893 there is a widespread banking panic and flight of foreign capital.
  - Friedman and Schwartz (1963) point to "external drain" of gold as an important component.
  - Associated with protracted macroeconomic downturn.
- July 1896: Democratic party, led by W.J. Bryan, adopts bimetallism in its platform.
  - Bryan loses close election
  - The economy recovers from 1897 onward.
- In 1900 the U.S. adopts the Gold Standard formally.

Bimetallism as de Facto Devaluation

- Bryan proposed 16 to 1 parity between ounce of silver and ounce of gold.
  - Enforced with use "free and unlimited coinage" of silver.
- At the time, parity was close to 30-32 to 1.
  - Proposal would involve making silver twice as expensive relative to gold.
- Veldes and Weber (2000) argue such a parity would be workable if adopted worldwide.
- Meissner (2015) puts in question whether US could implement this unilaterally.
- Experience of Sherman Silver Purchase Act puts further reasons for doubt.

Election as Shock to Probability of Devaluation

- Election result was not easy to forecast:
  - decided by a few hundred votes in close states (Jones, 1964, p. 341)
  - No systematic polling
- Many took preparations for the contingency of a Bryan win:
  - Bankers and financial interests hoarded gold
  - Production orders were placed contingent on Bryan loss
  - Minor runs on regional offices of the Treasury before election to obtain gold in exchange for greenbacks.

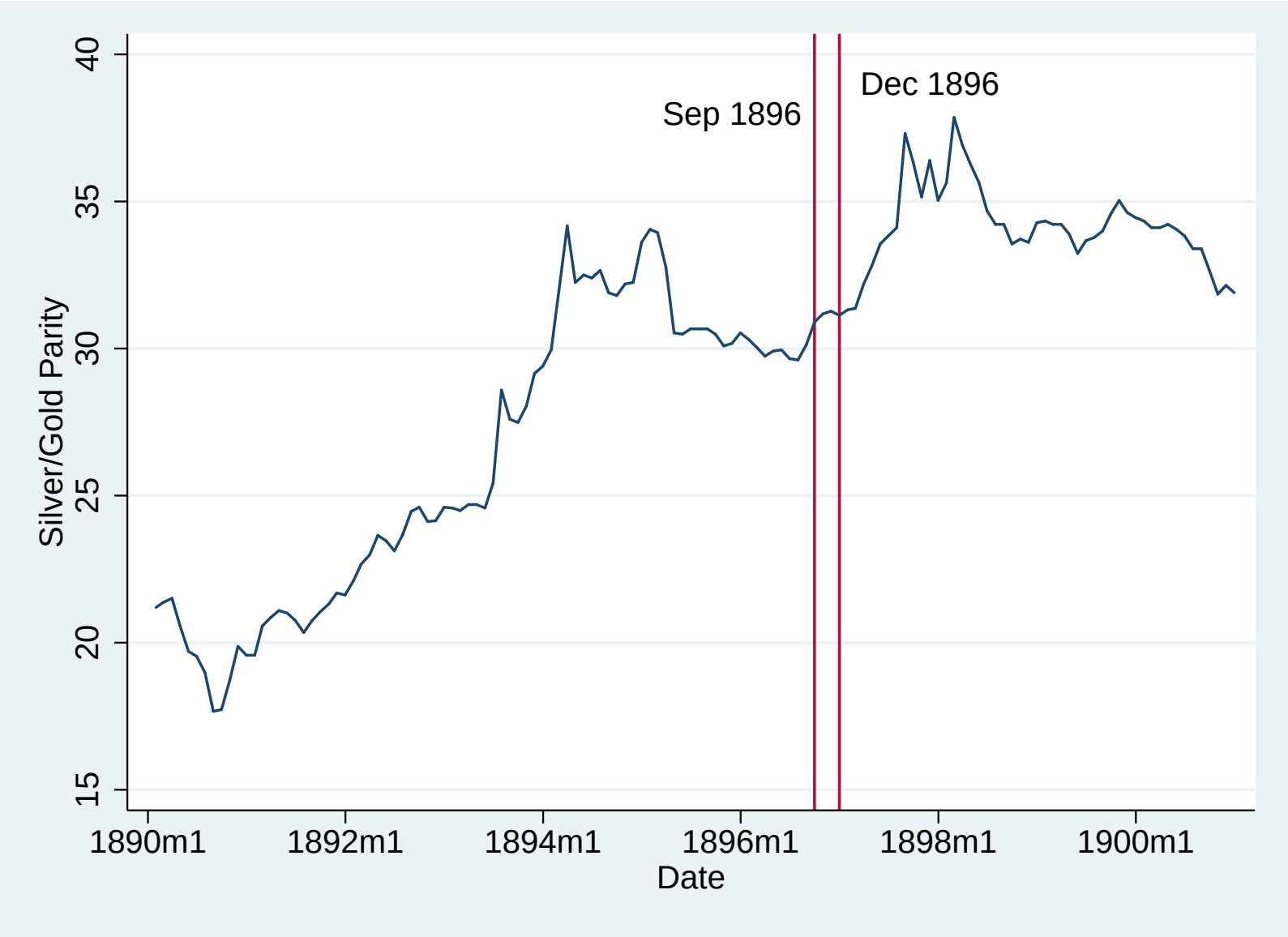
What else could have happened between Oct 6 and Dec 17 1896?

- Banking Panic
  - There was one in late 1896.
  - Probably caused by change in devaluation expectations.
  - Later: Control for data around 1907.
- Major gold find in Klondike (Alaska) in Oct 1896, but it was only important in retrospect.
  - It was known that there was gold to be found in Alaska since the 1880's
  - Other gold finds in 1895 that didn't lead to major gold rushes looked more promising.
  - Press coverage only becomes consistent in 1897. First shipments arrive in that summer.

What else could have happened between Oct 6 and Dec 17 1896? (cont.)

- Gold was possibly not the only issue at stake in the 1896 election.
  - There were important and long-running differences between Dems and Reps on tariffs.
  - Control for data around other elections.
- Commodity shock
  - Large increase in price of wheat within the period.
  - Noyes (1907) credits it for Bryan's loss.
  - Control for other commodity shock.

Relative Price of Silver vs. Gold



Note: Relative Price of Silver vs. Gold

An Indicator of Credibility of the Gold Standard

- The 1896 election was associated with distinctive pattern of cross-state changes in bank leverage.
  - Not a trend or seasonality.
- We use this to build an indicator of the credibility of the gold standard.
- We show that the indicator
  1. conforms well with narrative evidence on the credibility of the gold standard.
  2. correlates well with other variables plausibly connected to the probability of devaluation.
  3. correlates with bank leverage.
- We then assess how fluctuations in credibility have
  1. driven economic fluctuations in general and
  2. the 1893 depression in particular.

The Factor Model

- $x_{i,t}$ are N informational variables. Given $R < N$ we assume $x_{i,t}$ has the factor structure:

$$x_{i,t} = \sum_{r=1}^{R} \lambda_{i,r} F_{r,t} + \varepsilon_{i,t}, \; i \in \{1, .., N\}, \; t \in \{1, ..., T\}$$

- Under mild assumptions on $\varepsilon_{i,t}$, we can estimate *the space spanned* by $F_{r,t}$ using principal component analysis.
- $\lambda_{i,r}$ and $F_{r,t}$ are not separately identified.
- Identify an economic latent factor by imposing conditions to allow for identification.

Narrative Identification

- Let $F_{1,t}$ denote the latent factor of interest. The following two assumptions allow for identification:

  Assumption 1) There is some t_1 for which $F_{1,t_1} \neq 0$ and $F_{r,t^*} = 0$ for $r \neq 1$.

  Assumption 2) $cov_i\left(\lambda_{i,1}, \lambda_{i,r}\right) = 0$ for $r \neq 1$.

- Let $\bar{x}_{i,t} \equiv \sum_{r=1}^{R} \lambda_{i,r} F_{r,t}$ be the part of variable $x_{i,t}$ explained by the common factors

- Then $F_{1,t} = \frac{cov_i\left(\bar{x}_{i,t}, \bar{x}_{i,t^*}\right)}{var_i\left(x_{i,t^*}\right)} F_{1,t^*}$.

Narrative Identification (cont.)

- We can relax Assumptions 1 and 2 if we can identify other dates t_2, t_3 etc. in which other factors were likely to be important but our factor of interest was not.

- In that case, we can regress $\bar{x}_{i,t}$ on $\bar{x}_{i,t_1}$, and $\bar{x}_{i,t_2}$ etc. up to $K \leq R$ dates.

- The identified factor is proportional to the coefficient on $\bar{x}_{i,t_1}$ under a generalization of Assumptions 1 and 2

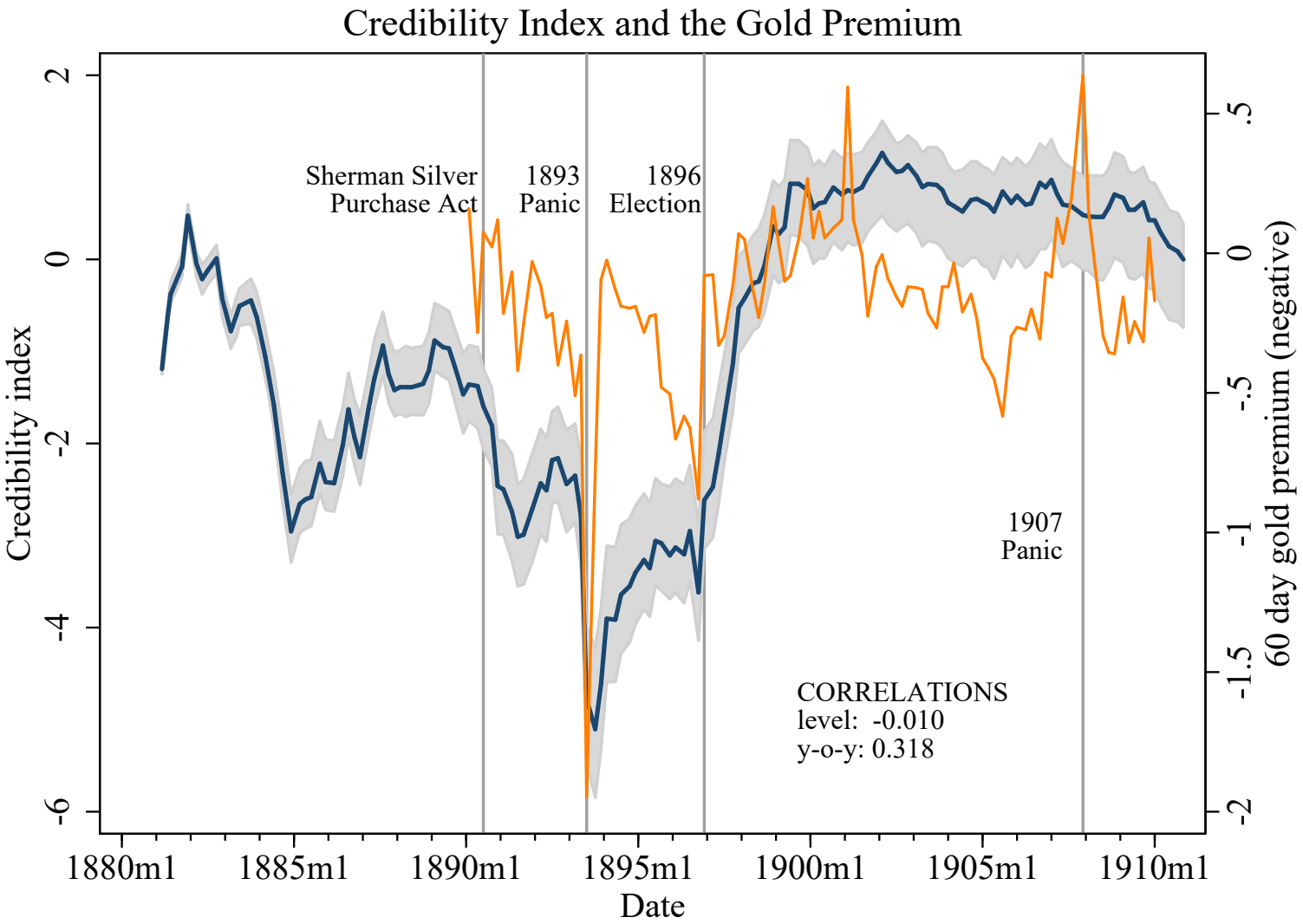
- Specifically:
  1. In the K dates selected at most K of the factors are different from 0.
  2. The loadings on those K factors is uncorrelated with the loadings on the remaining $R - K$ factors.
  3. $F_{1,t_k} = 0$ if $k \neq 1$

Credibility Index: Historical Behavior and Validation

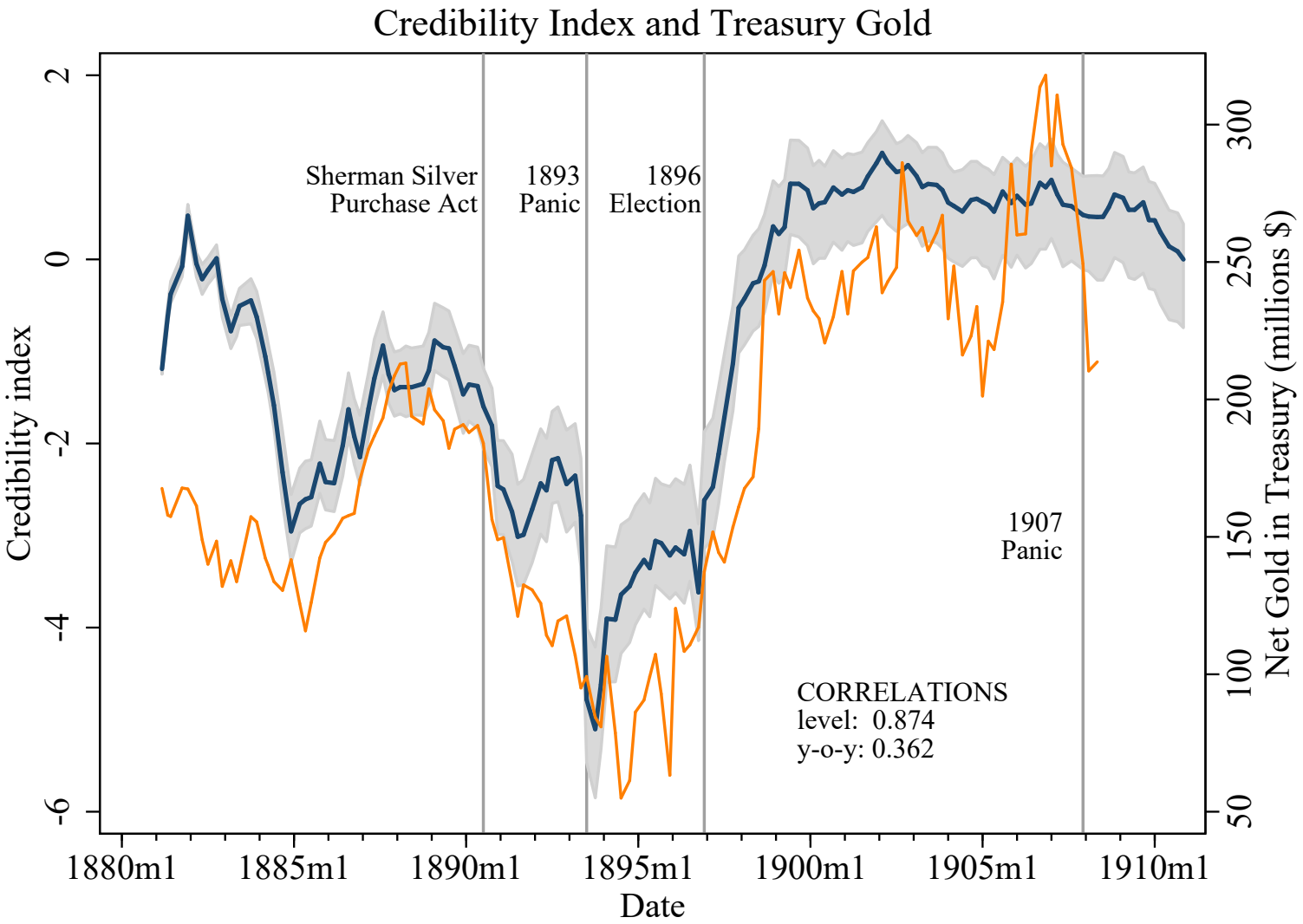
- We construct credibility index by identifying structural factor as delineated above.
- Use change in log bank debt/asset ratio in 48 states as informational variables.
- Following Bai and Ng's (2002) criteria, we estimate the model with 11 factors
  - This is a conservative stance, taking the max number of factors implied by different criteria.
  - We do robustness on this.
- We take 1896/12 as date of reference t_1 and assume Assumptions 1 and 2.
  - Wait for robustness

Credibility Index Index

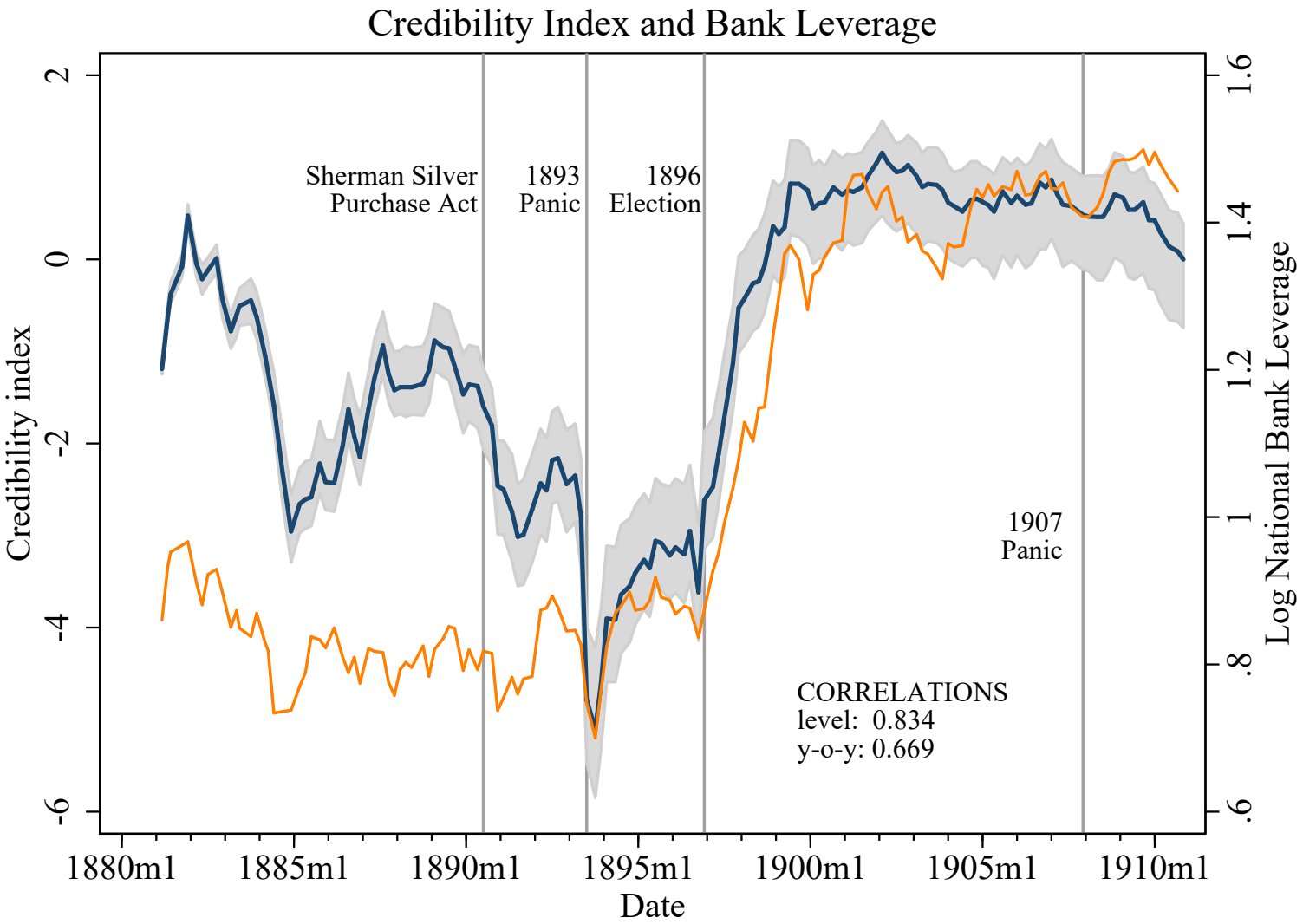
Credibility Index and Interest Spread



The credibility Index and Gold in Treasury



The credibility Index and Leverage



Controls

- We now experiment with different controls:
- Financial Panic (December 1907)
- Commodity Shock (October 1888)
- Election Years (December 1888 and December 1900).

Robustness

	corr. with baseline	std(> 1900)/std(< 1900)	change 1890/5 - 1891/7	change 1896/10 - 1897/12	change 1893/5 - 1893/7
Baseline	1	0.246	-1.64	3.09	-2
	(1,1)	(0.242,0.281)	(-1.9,-1.37)	(2.73,3.29)	(-2.21,-1.68)
5 factors	0.971	0.28	-2.16	3.46	-2.54
	(0.904,0.993)	(0.268,0.374)	(-2.49,-1.72)	(2.72,3.96)	(-2.95,-2.01)
20 factors	0.994	0.242	-1.73	2.88	-1.84
	(0.988,0.996)	(0.232,0.263)	(-1.83,-1.57)	(2.71,2.97)	(-1.92,-1.7)
Dec-07	0.987	0.286	-1.39	2.79	-1.77
	(0.942,0.999)	(0.254,0.35)	(-1.79,-1.14)	(2.54,3.03)	(-1.96,-1.58)
Dec-88	0.988	0.231	-1.77	3.39	-2.11
	(0.975,0.995)	(0.226,0.267)	(-1.99,-1.35)	(2.91,3.56)	(-2.27,-1.78)
Dec-00	0.994	0.225	-1.87	3.32	-2.1
	(0.981,1)	(0.218,0.273)	(-2.13,-1.54)	(2.88,3.5)	(-2.28,-1.79)
Aug-05	0.912	0.255	-2.01	3.33	-1.86
	(0.861,0.957)	(0.239,0.314)	(-2.47,-1.51)	(2.95,3.66)	(-2.22,-1.66)
Dec-1907 (window)	0.973	0.273	-1.51	2.94	-1.83
	(0.807,0.98)	(0.257,0.378)	(-2.19,-1.1)	(2.28,3.2)	(-2.2,-1.54)
Aug-05 (window)	0.882	0.259	-2.09	3.22	-1.91
	(0.795,0.945)	(0.224,0.353)	(-3.2,-1.67)	(2.72,3.65)	(-2.4,-1.64)

Note: Correlations and standard deviations calculated based on changes between call-dates

The Real Impact of Credibility Fluctuations

- We estimate the impact of fluctuations in credibility of the exchange rate on indicators of real activity:
  - Business Failures (Dun and Bradstreet's)
  - Pig Iron Production (Macaulay 1938)
  - Factory Employment (Jerome 1926)
  - Industrial Production (Romer and Miron 1989)
- Estimate a 2 dimensional VAR with 5 lags including our index and one of the indicators above at a time.
- Do the two possible Cholesky identifications.
- Counterfactual: Back out shocks to credibility index necessary to keep it equal to zero.
  - Use post 1900 period as placebo for identification.
- Robustness to Lucas critique: Use VAR coefficients based on post 1900 subsample.

Results baseline

	speed of response of economic activity	Rel. vol. (<1900)	Rel. vol. (>1900)	total change Mar - Oct 1893	change full commitment
business failures	fast	0.807	1.01	1.01	0.307
		(0.791,0.863)	(0.959,1.11)		(0.21,0.406)
	slow	0.903	1.02	1.01	0.5
		(0.878,0.992)	(0.978,1.13)		(0.308,0.693)
pig iron	fast	0.856	0.966	-0.578	-0.329
		(0.834,0.92)	(0.948,1.03)		(-0.366,-0.286)
	slow	0.907	0.967	-0.578	-0.445
		(0.881,0.981)	(0.95,1.03)		(-0.479,-0.406)
factory employment	fast	0.833	0.98	-0.155	-0.0616
		(0.812,0.9)	(0.961,1.06)		(-0.0746,-0.0482)
	slow	0.86	0.994	-0.155	-0.0938
		(0.849,0.921)	(0.978,1.08)		(-0.108,-0.0767)
industrial production	fast	0.971	0.976	-0.196	-0.0581
		(0.912,1.09)	(0.959,1.05)		(-0.0851,-0.0336)
	slow	0.969	0.988	-0.196	-0.0893
		(0.911,1.09)	(0.969,1.07)		(-0.118,-0.0631)

Note: Rel. vols. compare volatility in changes in the counterfactual vs. the actual series

Results - Lucas Critique Robust

	speed of response of economic activity	Rel. vol. (<1900)	Rel. vol. (>1900)	total change Mar - Oct 1893	change full commitment
business failures	fast	0.84	1.24	1.01	0.27
		(0.806,0.998)	(1.07,1.51)		(0.115,0.44)
	slow	0.94	1.32	1.01	0.36
		(0.898,1.14)	(1.12,1.65)		(0.115,0.654)
pig iron	fast	0.84	0.96	-0.58	-0.31
		(0.827,0.977)	(0.944,1.1)		(-0.38,-0.211)
	slow	0.89	0.96	-0.58	-0.42
		(0.87,1.05)	(0.947,1.1)		(-0.491,-0.339)
factory employment	fast	0.82	1.06	-0.16	-0.05
		(0.795,0.971)	(1.01,1.3)		(-0.0663,-0.0349)
	slow	0.86	1.06	-0.16	-0.08
		(0.848,1.02)	(1.02,1.33)		(-0.0997,-0.0575)
industrial production	fast	0.87	1.03	-0.20	-0.04
		(0.861,1.07)	(0.985,1.35)		(-0.101,0.0109)
	slow	0.88	1.04	-0.20	-0.08
		(0.867,1.07)	(0.991,1.38)		(-0.137,-0.029)

Note: Rel. vols. compare volatility in changes in the counterfactual vs. the actual series

Conclusion

- The lack of credibility in the Gold Standard appears to have had significant effects on bank balance sheet data.
- We have some indication that these fluctuations accounted for an important part of business cycles in the last couple of decades of the XIXth century U.S.