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The Fed Policy Conduct during the Interwar Period

New Evidence from an Augmented Taylor Type Rule and Nonlinear Analysis

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Issues about the Fed behavior in the literature

- Why did Fed officials fail to respond appropriately to the crisis?
- Did they perceive domestic monetary conditions easy or tight?
- What was the consistency of the Fed's strategy?
- Was there a shift in monetary policy driven by a change in policy tools after the crisis was triggered?
- Irving Fisher (1932), Chandler (1958), Friedman and Schwartz (1963), Wicker (1966), Brunner and Meltzer (1968), Temin (1976), Bernanke (1983), Eichengreen (1992), Wheelock (1989, 1990, 1992), Meltzer (2003)

Conventional wisdom on Fed policy during and after 1929 crisis

- A monetarist dominant view: Inept policy, monumental mistake, erroneous understanding of monetary conditions
- Friedman and Schwartz's (1963) hypothesis that the Great Depression of 1929 occurred because the Central Bank failed to undertake expansionary monetary policy.
- Counterfactual analysis driven by Bordo *et al.* (2002, EEH) : had expansionary monetary policy been conducted in the 1930s, the Great Depression would have been avoided.
- Hsieh and Romer (2006): A big failure

New issues addressed in this paper

- Did the Fed monitor signals of liquidity tensions in the market and subsequently adapt its behaviour?
- Does historical and narrative evidence corroborate the conjecture that liquidity shortage episodes induced a shift in the Fed's policy?
- Should we necessarily conclude that Fed policy was systematically flawed?

Innovation of the paper: new econometric tools to test conventional wisdom on Fed policy during the 1929 crisis

- Applying a non-linear framework (STR methodology) to monetary history over the interwar period
- Assessing the consistency of the Fed monetary policy response to the 1929 crisis in light of an augmented Taylor-type rule
- Ultimately: Questioning conventional wisdom about the Fed policy conduct

What did Fed officials supposedly target for monetary policy conduct during the interwar period?

- Nominal interest rates, operations in government securities, volume of discount loans (Chandler, 1958; Wicker, 1966)
- "The Fed did not specify specific targets for these tools but used them as indicators of credit conditions" (Wheelock, 1989)
- Wheelock pioneering work (1989, Explorations): first econometric regression of a Fed policy reaction function based on the total *volume* of Federal Reserve Credit (FRC) outstanding = federal government security holdings + bankers' acceptance holdings + discount loans to member banks.

A Regime Switching Model by Wheelock (1990, JMCB)

- Wheelock (1990) tested a nonlinear relationship between borrowing and the spread based on the estimation, in difference, of the theoretical Golfeld-Kane model (1966):
- ΔBorrowed Reserves = function(*Spread*, *Non-borrowed*, *Stock Adjustment)*

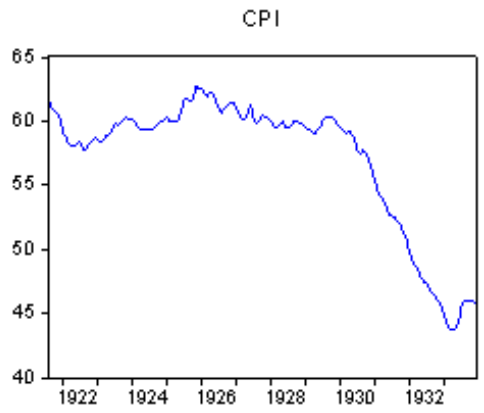
- In this methodology, structural breaks imply durable and abrupt changes without possible reversion.
- Toma's (1989) general reservations: misleading indicator + lack of data before 1929, annual data, which lessens the relevancy of performing econometric tests on quantities. Not a completely relevant guideline for monetary policy.

Purpose of our paper

- Extending the work of Wheelock (1990) by estimating a nonlinear relationship between the discount rate and its drivers using STR (Smooth Threshold Regression) modeling, which allows for smooth transition.
- Using credit spreads between open market rates and the Fed's instrument rates as a proxy for liquidity risk (like in Gorton and Metrick, 2012)
- *Testing whether credit spread actually played the role of transitional variable in the Fed policy reaction function*
- *Identifying whether the Fed was well aware of such risks as early as 1930, reacted to the financial stress and altered its monetary policy in consequence*.

Data

- Our data are monthly and cover the 1922 :1 - 1933 :12 time periods for five variables
- the discount rate *r*
- deposits in suspended bank *s* which is used by Bernanke (1983) as a measure of the importance of bank failures.
- the M2 money supply *m*
- the industrial production index *y* (considered as a proxy of the real economic activity)
- the consumer price index *p*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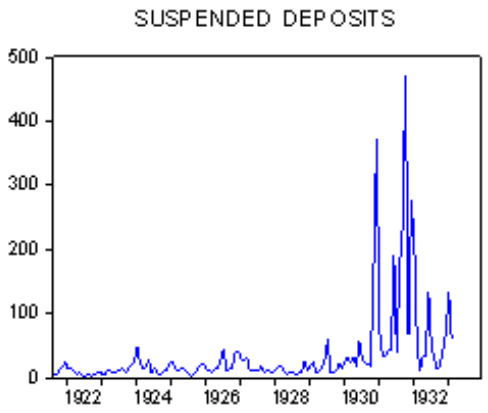
SUSPENDED DEPOSITS
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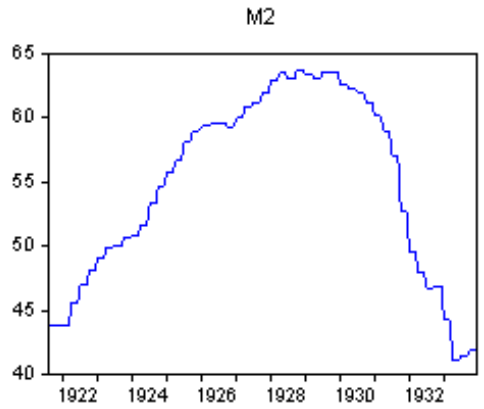
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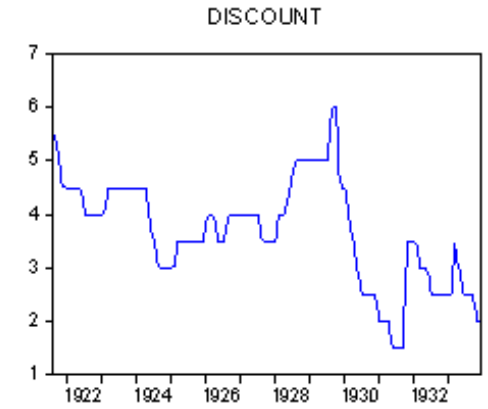
DISCOUNT
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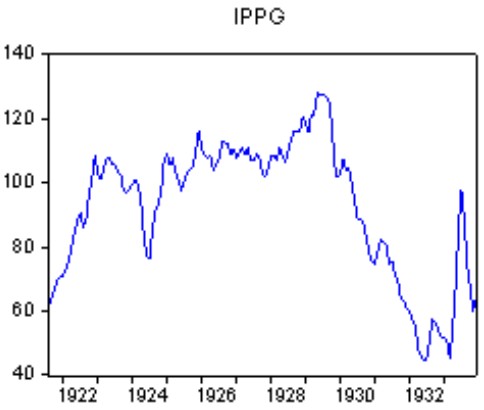
IPPG
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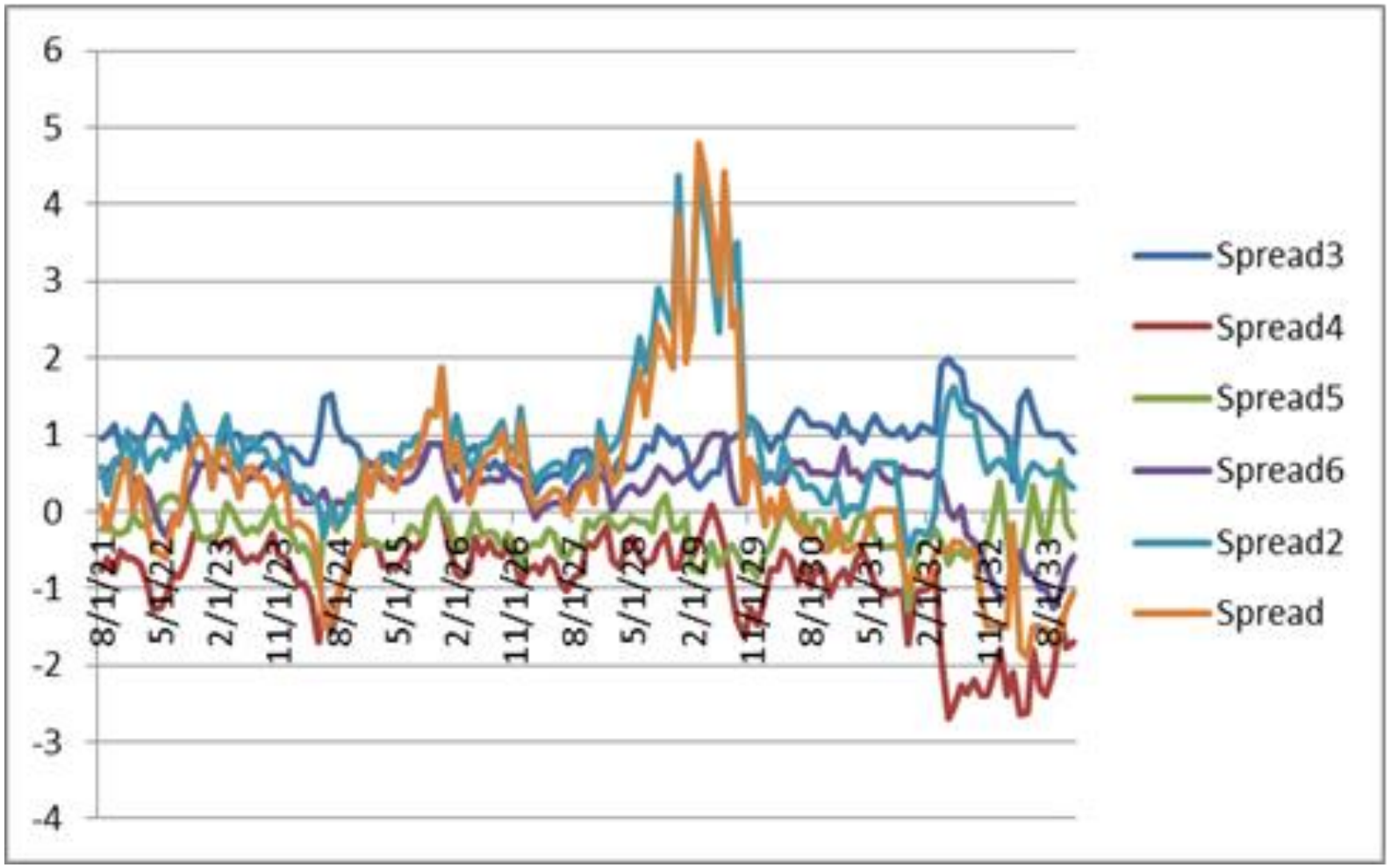
1932

Data: Liquidity shortage variables

- *Spread1* = Call loans NY – discount rate
- *Spread2* = Call loans NY – Bankers' acceptance rate
- *Spread3* = Commercial paper – Bankers' acceptance rate
- *Spread4=* 3-6 months Treasury notes – discount rate
- *Spread5=* 3-6 months Treasury notes – Bankers' acceptance rate
- *Spread6=* commercial paper – discount rate

Dynamics of Spread1 to Spread6



Data Properties

- All variables (endogenous, explanatory and transition) need to be stationary in STR models
- We conduct usual unit root tests and all variables are differentiated of order one except the suspended deposits variable.
- Concerning the transition variables, it is clear that the spread variables are weakly stationary. At the least, they are stationary around a structural break in the end in 1929.
- We check this a priori performing the Lee and Strazicich LM unit root with structural break test (2004) which gives evidence in favor of the stationarity of the transition variables.

A nonlinear Model

$$r_t = \beta_1 z_t + \beta_2 z_t G(\gamma, c, s_t) + u_t,$$

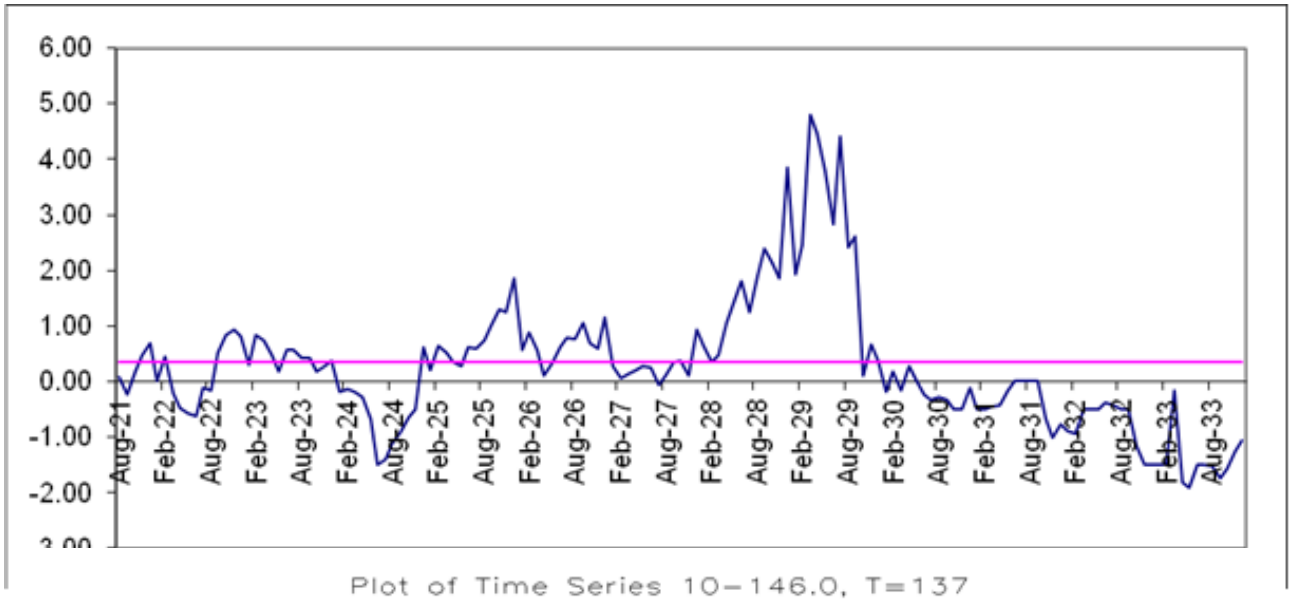
$$z_t = \left(w_t^{'}, x_t^{'}\right), w_t^{'} = \left(1, r_{t-1}, \ldots, r_{t-q}\right)^{'}$$

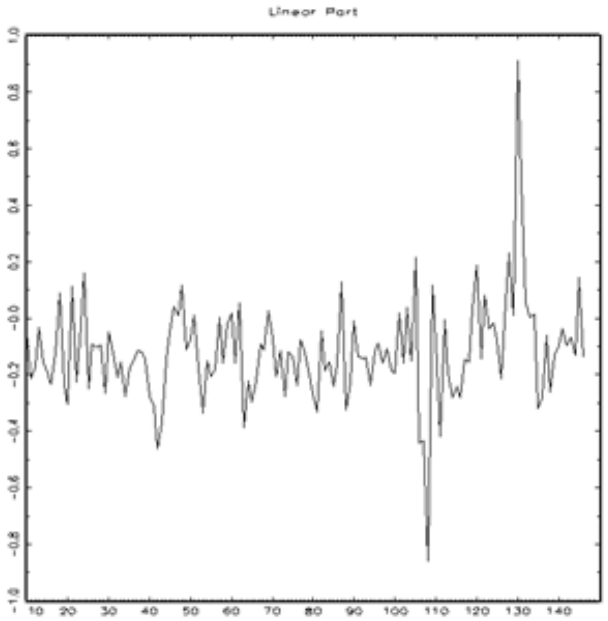
$$x_t^{'} = \left(y_t, \ldots y_{t-p}, p_t, \ldots, p_{t-p}, d_t, \ldots d_{t-p} m_t, \ldots, m_{t-p}\right)^{'}$$

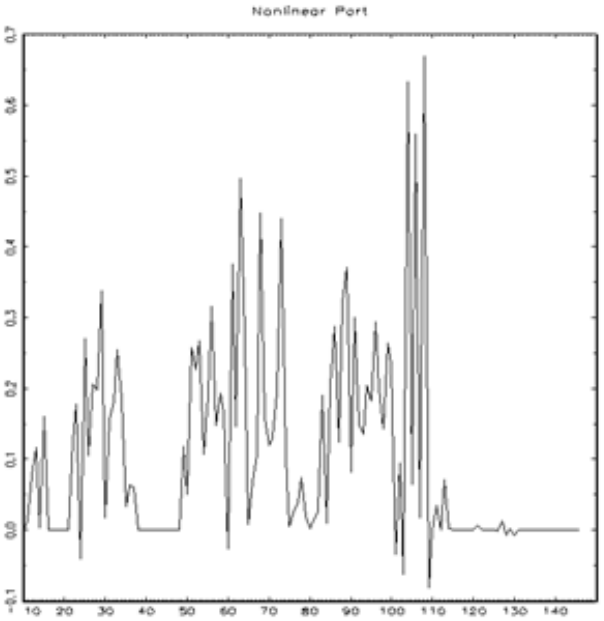
$$G(\gamma, c, s_t) = \left(1 + \exp\left\{-\gamma \prod_{k=1}^{K} (s_t - c_k)\right\}\right)^{-1}$$

- *u* is an *iid* innovation, *z* a vector of explanatory variables which can be decomposed into q lagged endogenous variables stacked in a vector *w* (here the lagged discount rate) and in exogenous variables (vector *x*).
- In vector *x*: *y* is the output measured by the IPPG proxy, *p* is the CPI, *m* is the monetary supply M2 and *d* denotes the suspended deposits; *l* denotes the number of lags in lagged exogenous variables.
- *G* stands for a continuous transition function bounded between 0 and 1: as a consequence, the model is able to explain not only the two extreme states but also a continuum of states between the extreme cases.
- ɣ is the smoothness or slope parameter, which is an indicator of the speed of transition between 0 and 1.
- *c* is a threshold parameter referring to the transition variable: it indicates where the transition (the smooth regime switching) takes place.
- *s* denotes the transition variable i.e. spreads 1 to 6

Call loans spread 1 dynamics and threshold value







Main Results 1: Evidence of 3 clear cut periods

- The estimations with call loans and bankers' acceptance spreads lead to very similar results.
- Considering the six models as a whole, we find that all the variables except the CPI one enter the linear and non linear part significantly.
- *Evidence of 3 clear-cut periods: a "regular regime" where linear patterns dominate, from 1922 to the end of 1927; a "Liquidity shortage state" from mid-1928 to January 1930, where non linear patterns dominate; then a return to a "regular regime" from January 1930 to March 1933*

Main Results 2: Under the « regular regime », the coefficients of sensitivity of the interest rate to IPPG and M2 conform to theoretical predictions

- The instrument rate reacts positively to industrial production (IPPG), the central bank raising its discount rate in response to economic recovery (*leaning against the wind*).
- The interest rate reacts negatively to a rise in M2: an increase in the money supply logically implies a decrease in the interest rate.
- Under this “regular” regime, the Fed raised its discount rate when bankruptcies (proxy Bernanke) increased. *This suggests a strategy of eliminating bad banks*.

Main Results 3: Under the « Liquidity shortage state », all signs are reversed

- CPI, still not significant (as in the regular regime)
- The discount rate reacts negatively to Industrial Production Index: changes in output lost their influence on the normal conduct of monetary policy
- The discount rate reacts negatively to increasing bankruptcies: illustration of regime switching
- M2 becomes not significant: *insensitivity of the interest rate to a move in M2.* The Fed lost control in monetary policy
- Smoothness coefficient reveals that the return to normal regime is not accomplished instantly but that usual transmission channels are at stake again as soon as the end of January 1930: *the Fed policy was far from passive and inactive*.

Historical interpretation of our outcomes

- We provide evidence that the Fed had drawn the lessons from the episode of 1928-1929 and wished to avoid the extension of liquidity risks
- Repelling liquidity risks appears to be the essence of this new belief and priority as soon as 1930.
- What Meltzer (*A History of the Fed*, 2003) qualifies as inaction, passivity, misinterpretation of current economic conditions proved to be a deep understanding of the damage caused by the liquidity shortage episodes of 1928-1929.

Historical Evidence

- January 1930: Institutional change at the Fed: The OMIC is replaced by a new OMPC (Open Market Policy Conference)
- The evolution of the speech: Progressively, the Minutes of the Fed cease to mention mere risks of speculation but speak of risks of paralysis of the system : liquidity risks lead to bank insolvency
- In 1931 and 1932, direct references to “idle reserves”, “currency hoarding” and “renewed banking failures”.

Conclusion

- STR analysis highlights that the Fed reinstated a policy conduct that prevailed before the crisis had been triggered.
- This behaviour reveals the consistent use of a single strategy over the entire interwar period (except during the turmoil of 1928-1929 characterised by the predominance of non-linear patterns)
- The importance and statistical significance of the variable 'Liquidity shortage', which acts as the transitional variable in our model, lead us to name this strategy: *'liquidity crisis avoidance'*.

Was the Fed policy necessarily flawed?

- Historical and narrative evidence corroborate econometric findings and confirm that Fed officials were well aware of the dangers of liquidity crisis and targeted indicators of tension in the open markets.
- Since banking failures ocured in the early thirties, at least the diagnosis of the crisis risks by the Fed did not prove to be erroneous
- Using augmented Taylor-type rules in a non-linear framework seems perfectly complementary with narrative history.
- It appears as a necessary and useful tool for cliometric purpose, in the sense that it streghthens historical evidence and helps selecting and testing appropriate readings of the past.