The Liquidity Effect

Theoretical Literature:

- Kydland and Prescott (1982), *Econometrica*
- Long and Plosser (1982), *JPE*
- Cooley and Hansen (1989), *AER*
- Fuerst (1992), *JME*
- Christiano and Eichenbaum (1992), *AER*
- Cook (1999), *JME*
- Edge (2000), *BOG Federal Reserve*

Real Economy

Monetary Economy-No Liquidity Effect

Monetary Models that Generate Liquidity Effects

Empirical Literature:

- Cagan and Gandolfi (1969), *AER* — Finds Liquidity Effects
- Melvin (1983), *Economic Inquiry*
- Reichenstein (1987), *Economic Inquiry*
- Leeper and Gordon (1992), *JME* — Liquidity Effects Vanish in Late 1970s
- Gali (1992), *QJE*
- Lastrapes and Selgin (1995), *JMacro* — Find Liquidity Effects in a Structural VAR
- Strongin (1995), *JME*
- Christiano and Eichenbaum (1997), *REStat* — Find Liquidity Effect using Non-Borrowed Reserves as Policy Instrument
- Pagan and Robertson (1998), *REStat* — Finds that Structural VAR Evidence is Weak

Long-Run Neutrality and Superneutrality:

- Lucas (1980), *AER*
- Geweke (1986), *Econometrica*
- Mishkin (1992), *JME*
- Crowder and Hoffman (1996), *JMCB*
- Crowder (1998), Economic Inquiry

Find Evidence in Favor of the LRN and/or LRSN Hypothesis

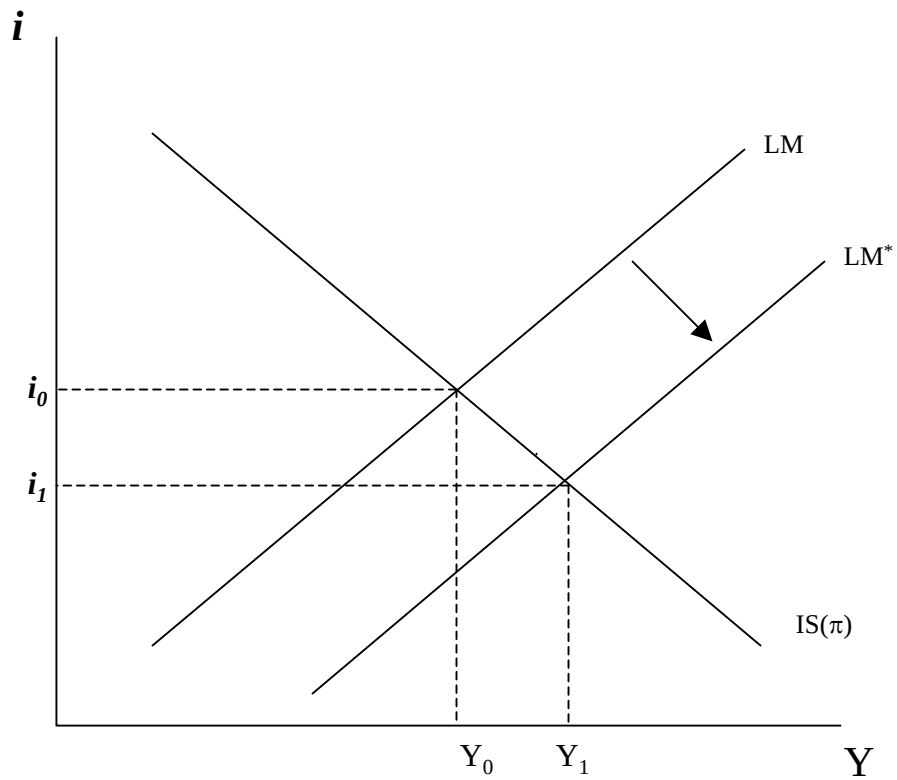
- King and Watson (1997), *FRB Richmond Econ Quarterly*
- Koustas and Serletis (1999), *JME*

Find Evidence Against LRN and/or LRSN

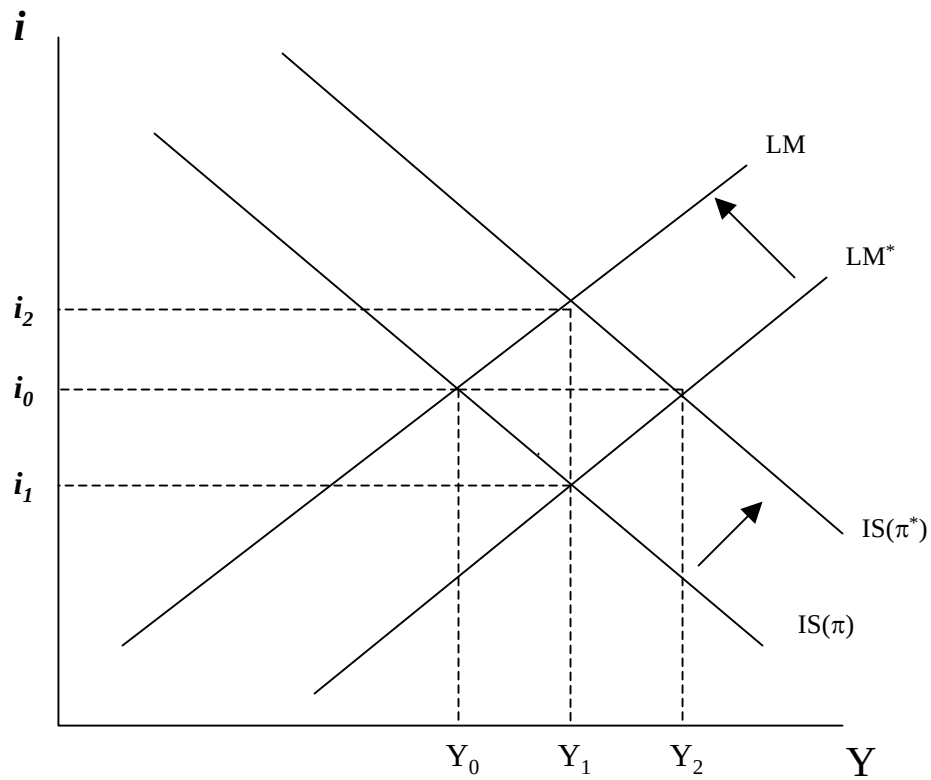
- Fisher and Seater (1993), *AER*

Derive Necessary and Sufficient Conditions for LRN and LRSN

Liquidity Effect in IS-LM Model



Fisher Effect in IS-LM Model



Importance of the Orders of Integration of Germane Variables:

• Fisher and Seater (1993) show that LRN and LRSN can only be tested when variables are integrated.

•Crowder (1998) finds evidence that monetary base growth and inflation are I(1) and CI(1,1) consistent with LRN.

•Crowder and Hoffman (1996) find evidence that inflation and nominal interest rates are I(1) and CI(1,1) consistent with LRSN.

•Granger and Newbold (1977) and Phillips (1986) discuss spurious regression.

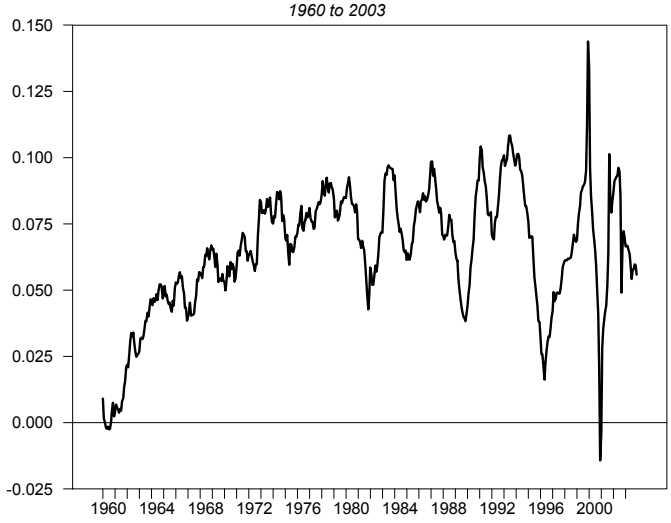
•Phillips (1987) shows that inference in non-standard in regressions with integrated variables.

Overview of my Results:

- Base growth, inflation and nominal interest rates I(1)
- Base growth, inflation and nominal interest rates CI(1,1)
- Two long-run equilibria $\Rightarrow$ one common I(1) component
- Two innovations have temporary effects, One innovation has permanent effect
- Cointegration $\Rightarrow$ restrictions on the reduced form VAR
- Using one extra ID restriction (money growth responds with a one-period lag to inflation innovation) generates IRFs consistent with Liquidity Effect
- My empirical model can explain the results using NBR

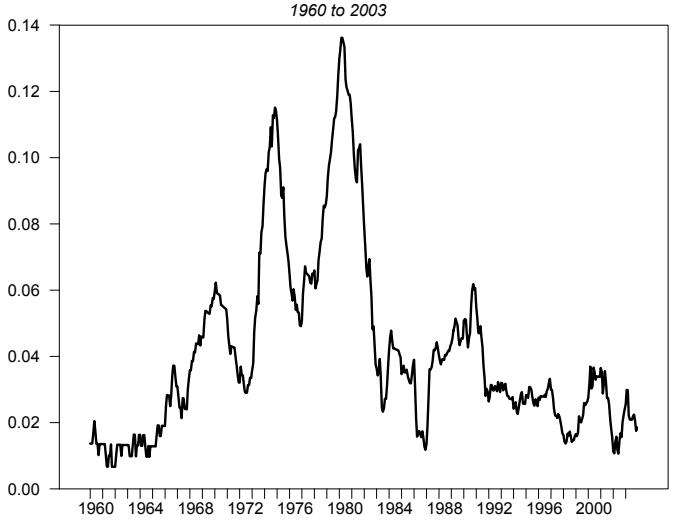
Monetary Base Growth Rate

1960 to 2003



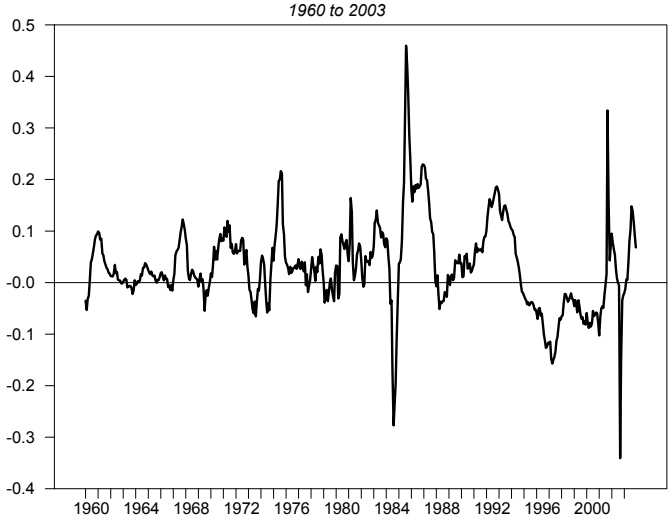
CPI Inflation Rate

1960 to 2003



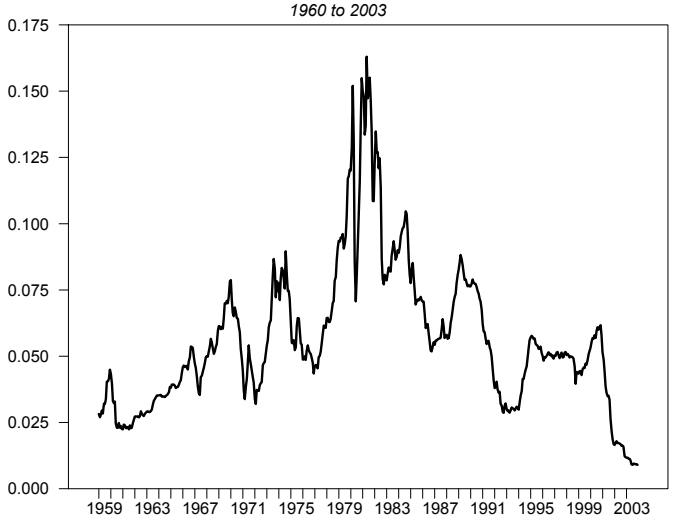
Non-Borrowed Reserves Growth Rate

1960 to 2003



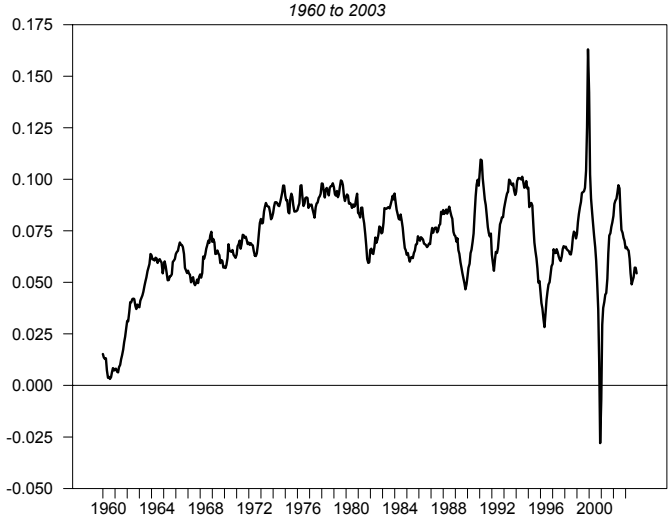
3-Month Treasury Bill Rate

1960 to 2003



Currency Growth Rate

1960 to 2003



5-year Treasury Note Rate

1960 to 2003

Table 1: Unit Root Test Results

Variable	ADF	DF_{GLS}	DF_{GLSu}	MZ_{α}	MZ_{τ}	CADF	Perron	AR(1)	MA(1)	ARCH(1)	GARCH(1)
Base Growth	-3.61*	-0.79	-3.25*	-1.64	-0.84		-4.07	0.96 (0.07)	0.54 (0.16)	0.28 (0.29)	0.88 (0.14)
NBR Growth	-3.24*	-2.36*	-3.19*	-9.77*	-2.16*		-4.83	0.71 (0.04)	0.16 (0.09)	0.02 (0.01)	0.99 (0.01)
Inflation	-2.36	-1.64	-2.29	-5.89	-1.72		-5.39	0.99 (0.01)	NA	0.12 (0.04)	0.83 (0.05)
T-bill Rate	-2.65	-2.31*	-2.55	-15.64*	-2.74*		-5.79*	1.00 (0.01)	0.40 (0.05)	0.25 (0.05)	0.76 (0.04)
5% CV	-2.86	-1.98	-2.73	-8.10	-1.98		-5.55				

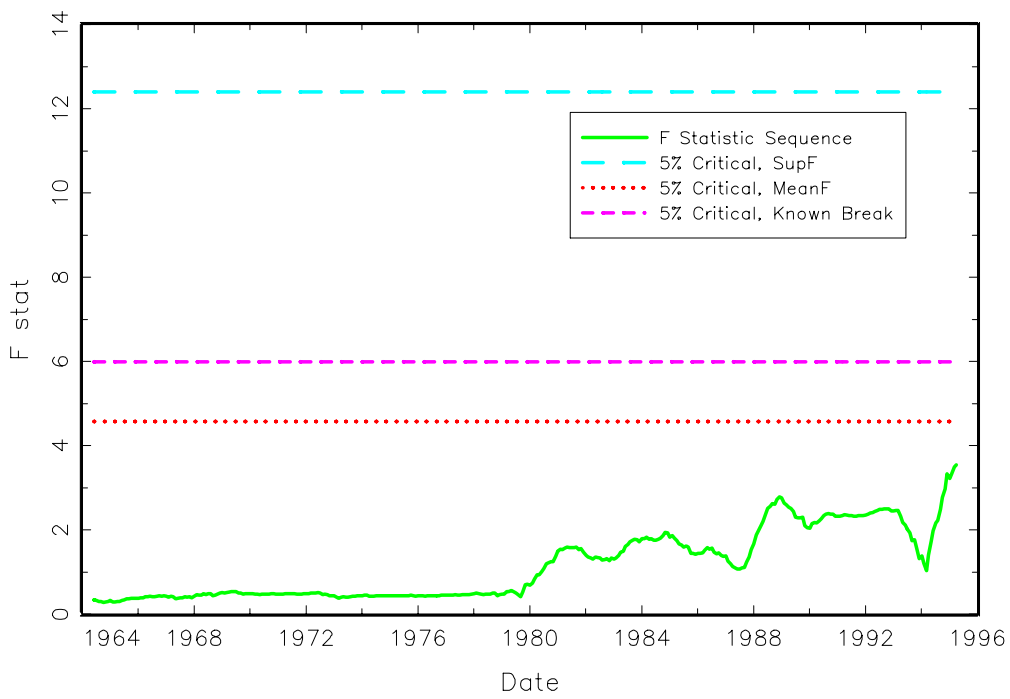
Table 2: Bivariate Cointegration Results - Phillips

Dependent Variable	Base Growth	NBR Growth	Inflation	T-bill Rate
Base Growth			1.38 (0.30)	1.11 (0.15)
NBR Growth			0.56 (0.33)	0.58 (0.27)
Inflation	0.76 (0.18)	1.43 (0.28)		0.83 (0.09)
T-bill Rate	0.92 (0.16)	1.58 (0.34)	1.29 (0.16)	
5% CV	-2.86	-1.98	-2.73	-8.10

Cointegration Results - Johansen

$$X_t\beta = \begin{bmatrix} \Delta m & \Delta\pi & \Delta i \end{bmatrix} \begin{bmatrix} 1.00 & 0.00 \\ 0.00 & 1.00 \\ \text{-}1.13 & \text{-}0.76 \\ (0.10) & (0.09) \end{bmatrix}$$

$$X_t\beta = \begin{bmatrix} \Delta nbr & \Delta & \pi\Delta i \end{bmatrix} \begin{bmatrix} 1.00 & 0.00 \\ 0.00 & 1.00 \\ \text{-}0.69 & \text{-}0.77 \\ (0.24) & (0.09) \end{bmatrix}$$


T-bill Rate on Base Growth (constant included)
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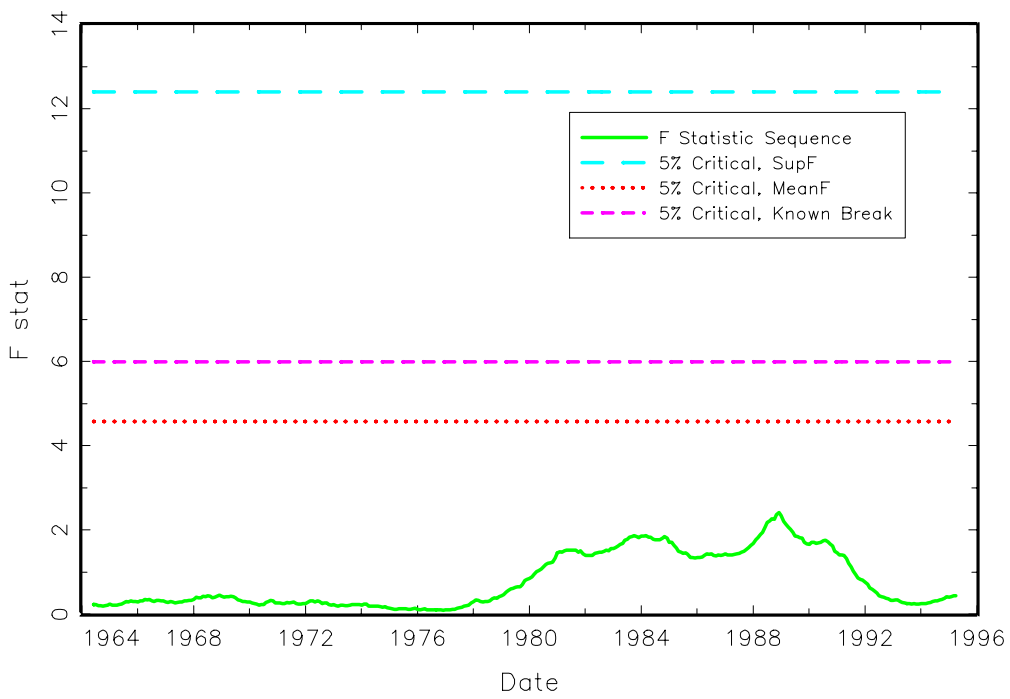
T-bill Rate on Base Growth (no constant)
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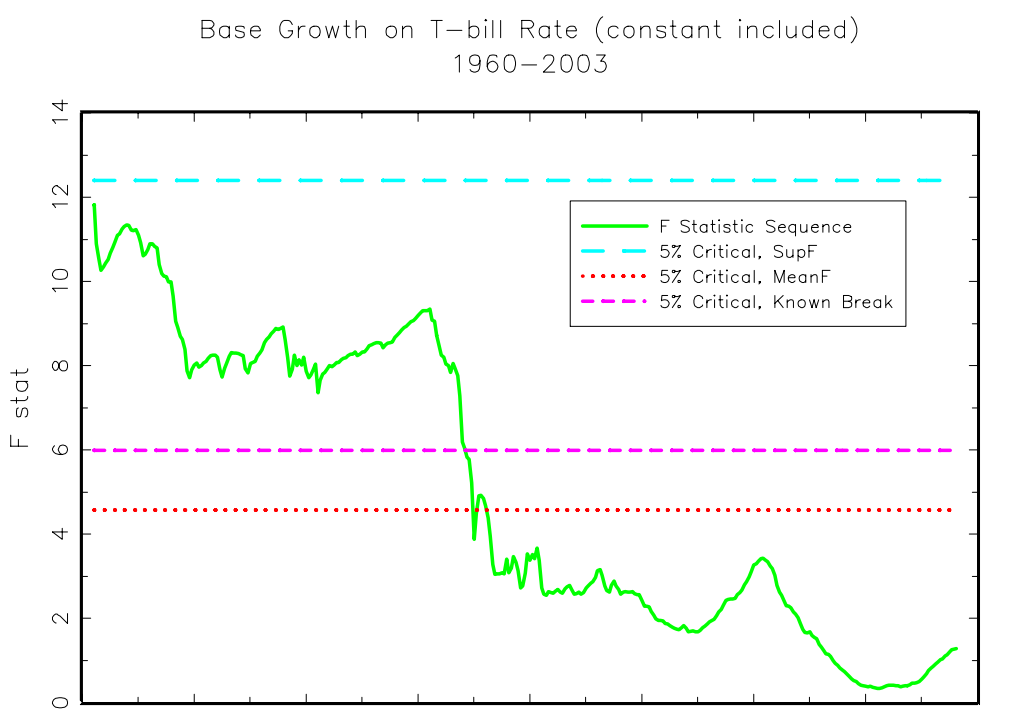
Base Growth on T-bill Rate (constant included)
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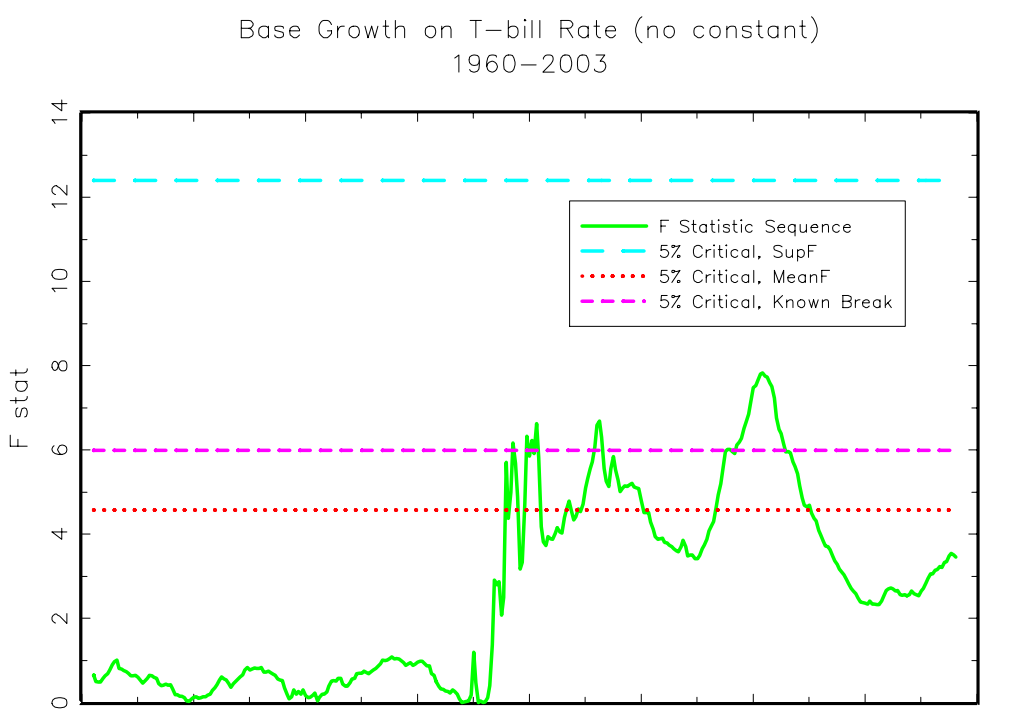
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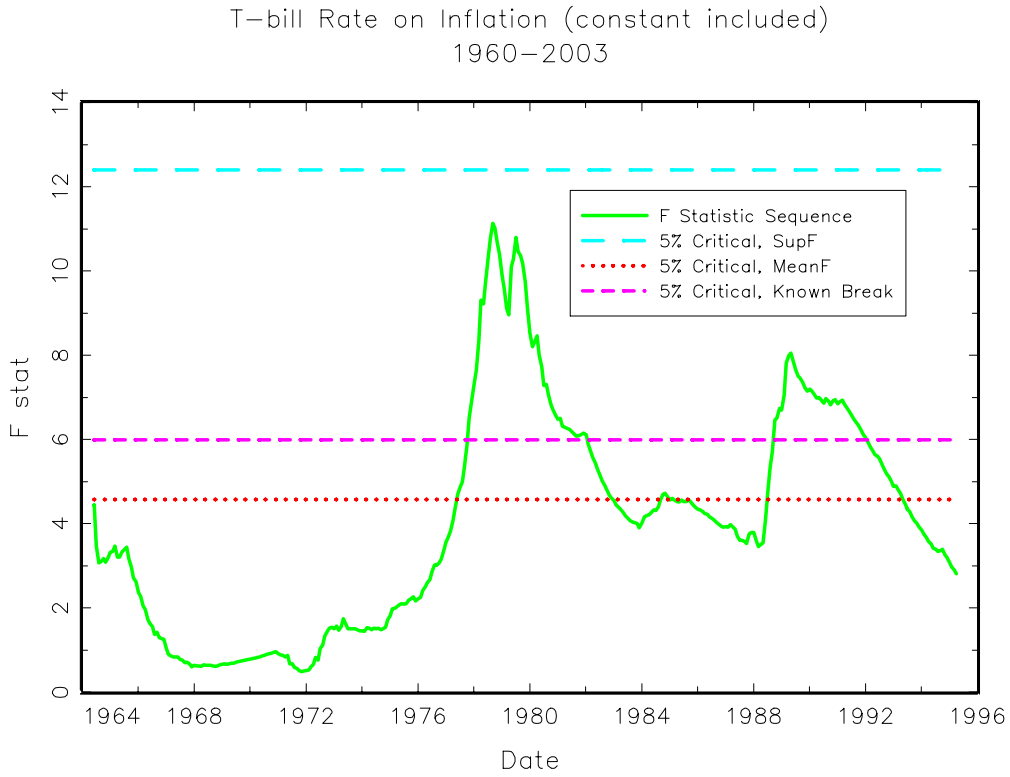
T−bill Rate on Inflation (constant included)
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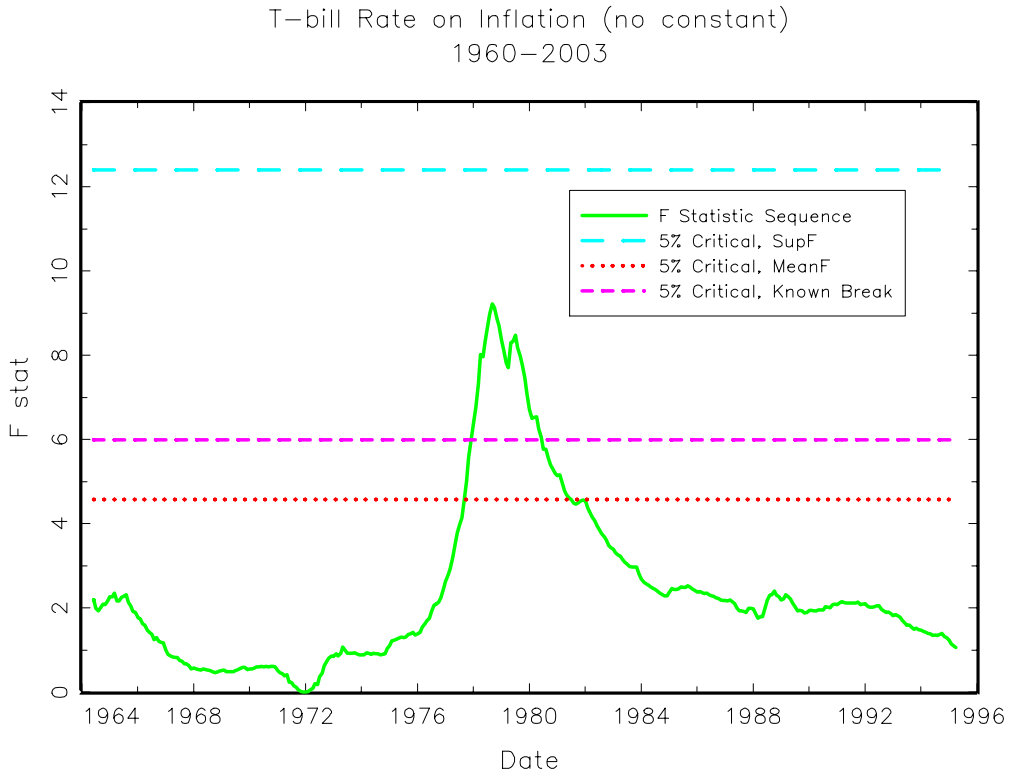
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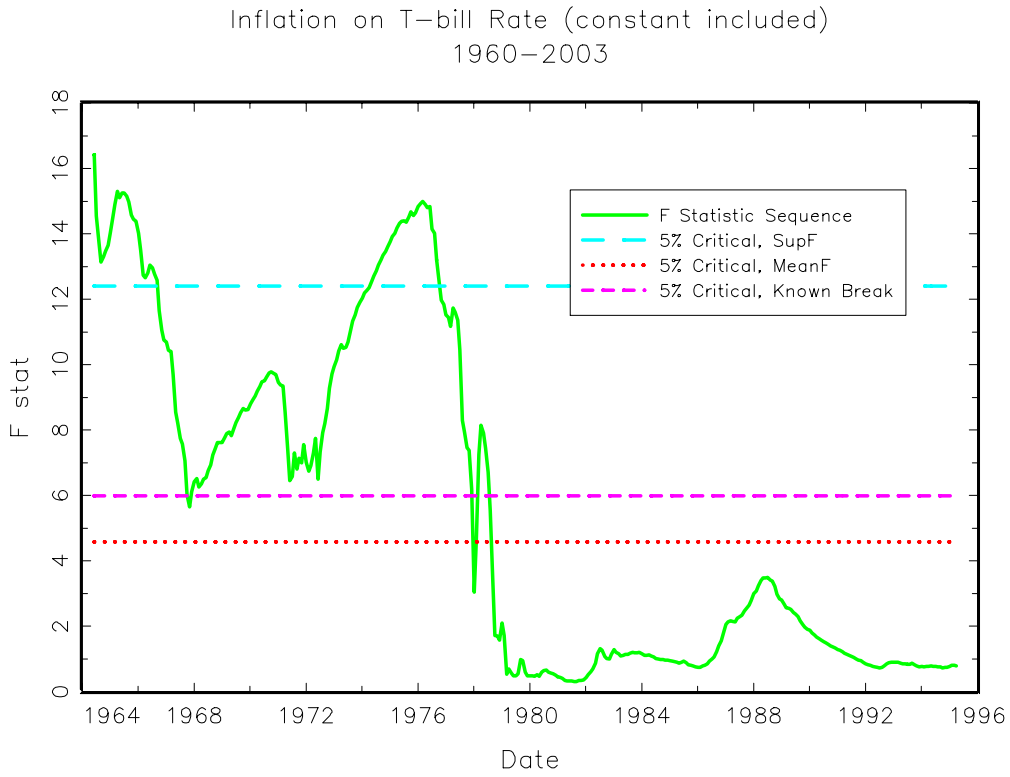
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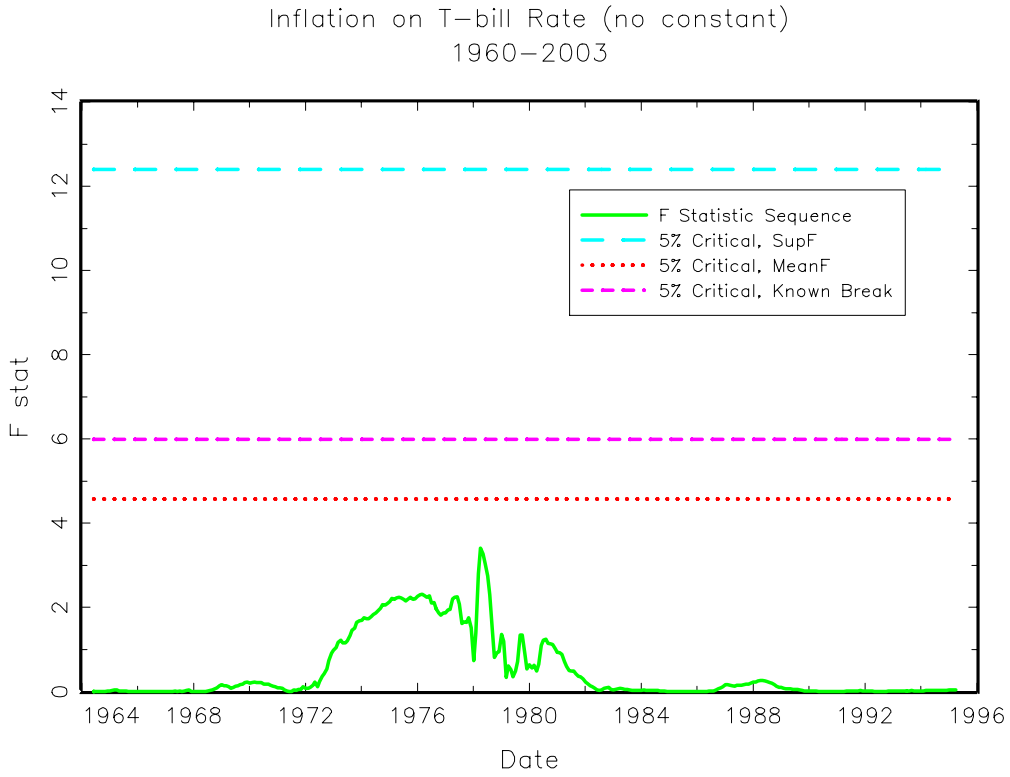
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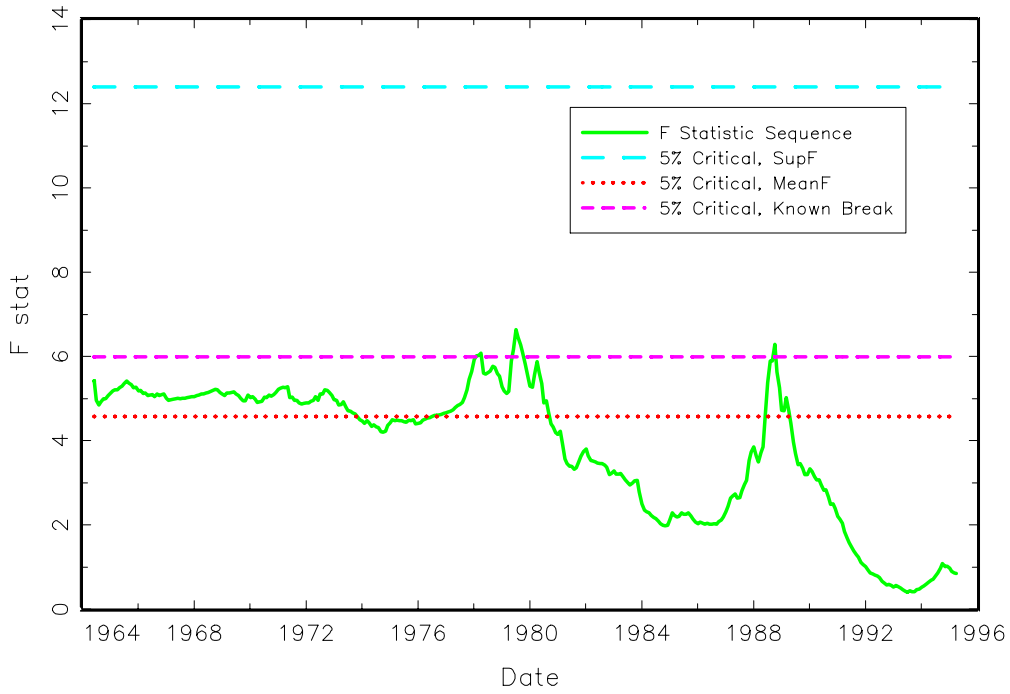
Base Growth on Inflation (constant included)
1960–2003



Base Growth on Inflation (no constant)
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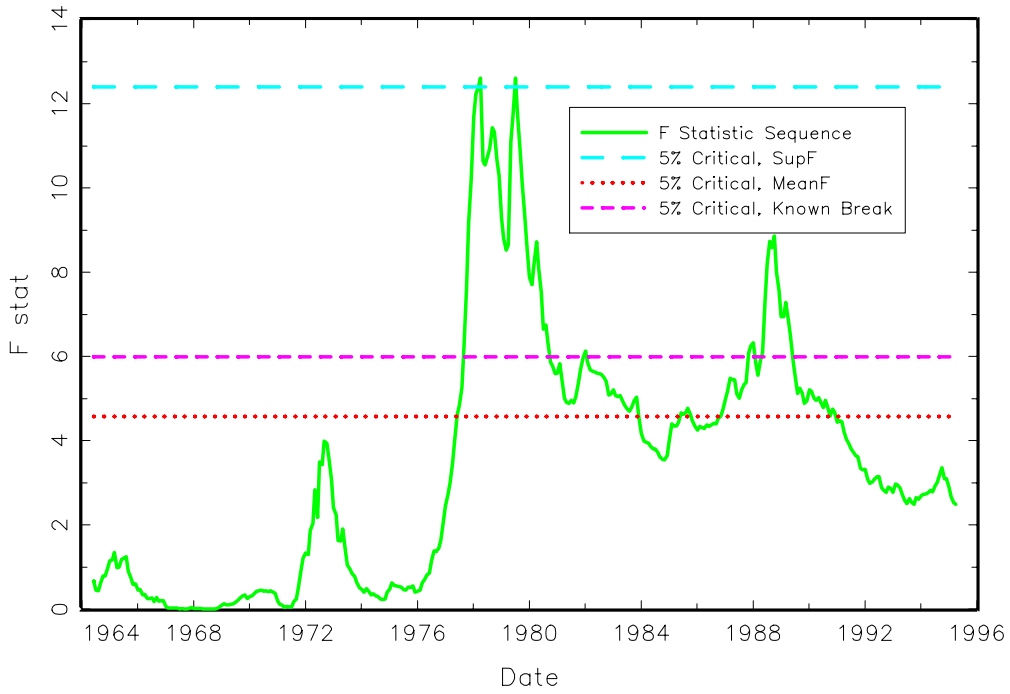

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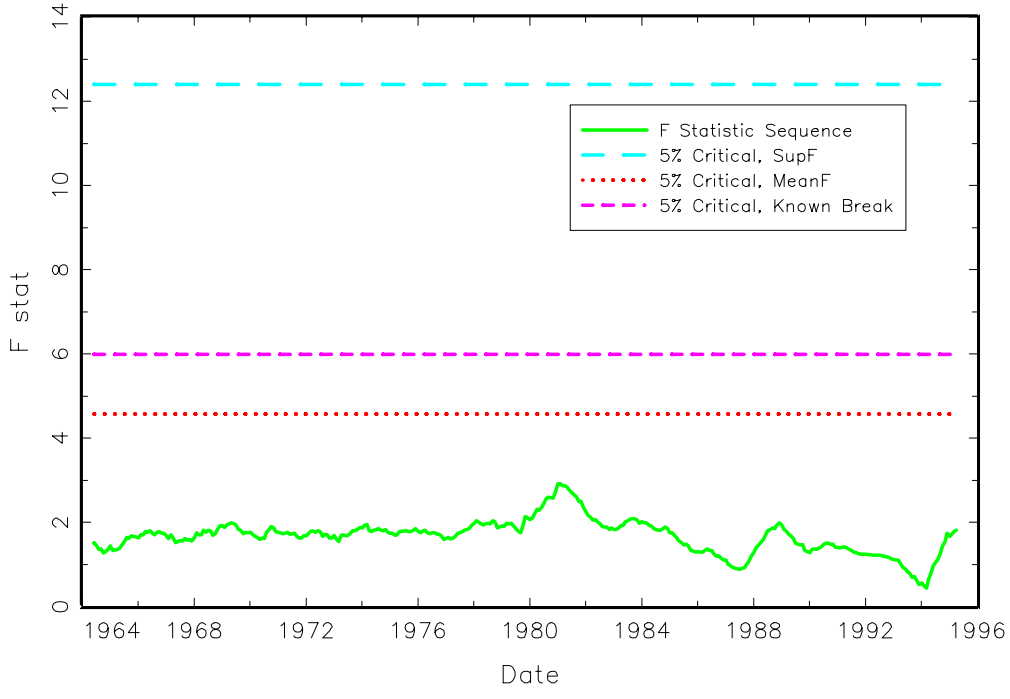

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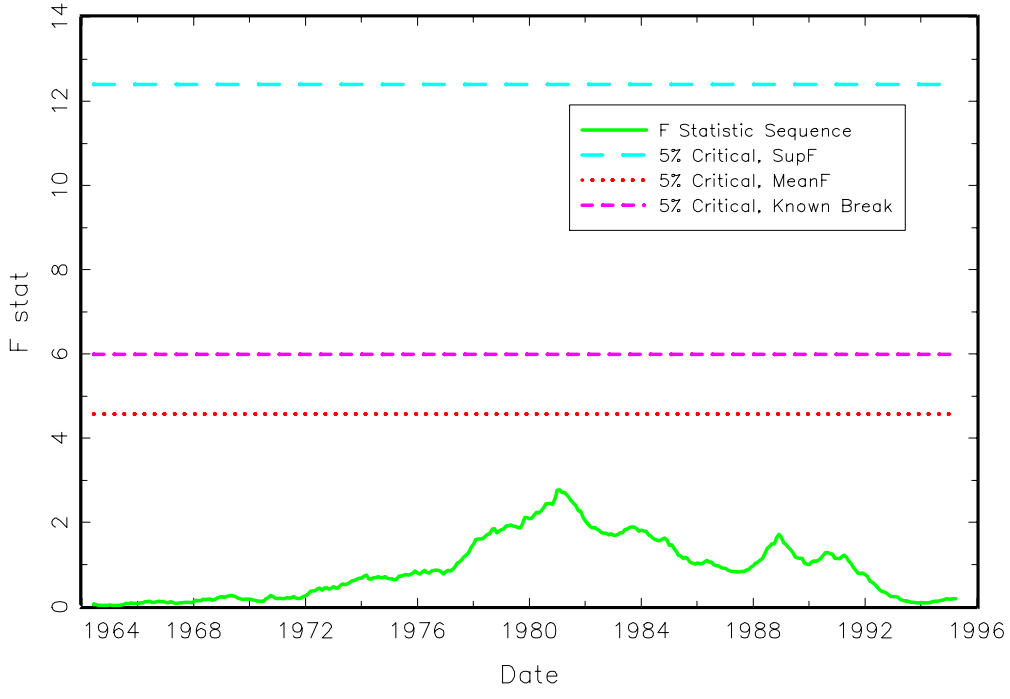

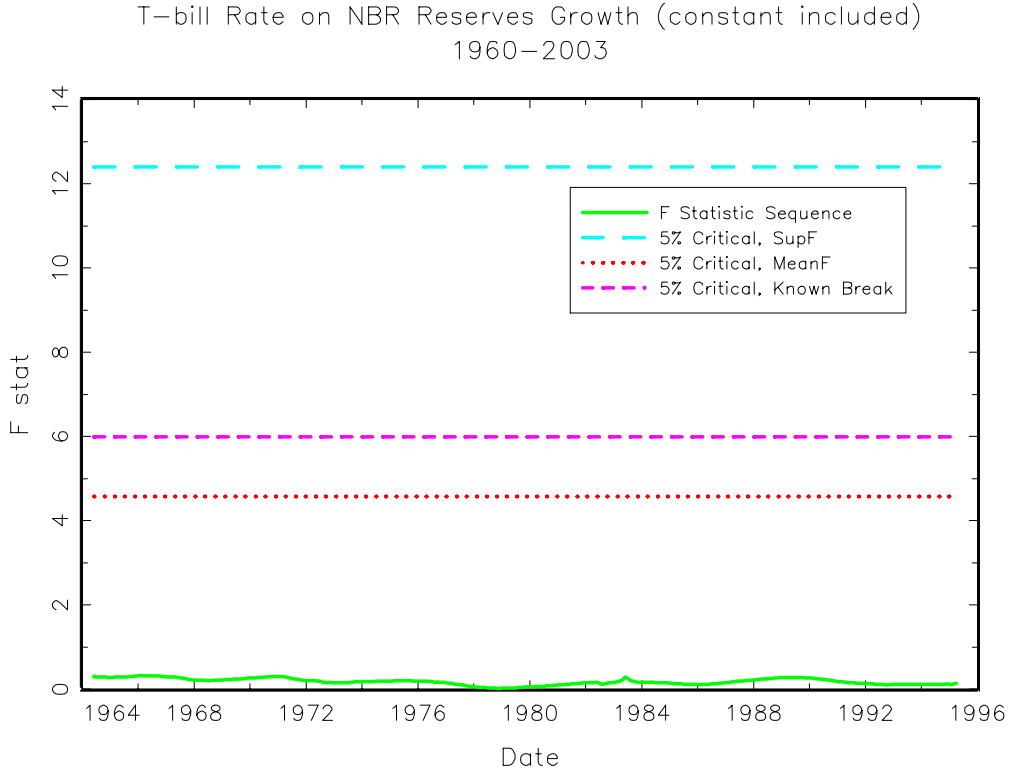
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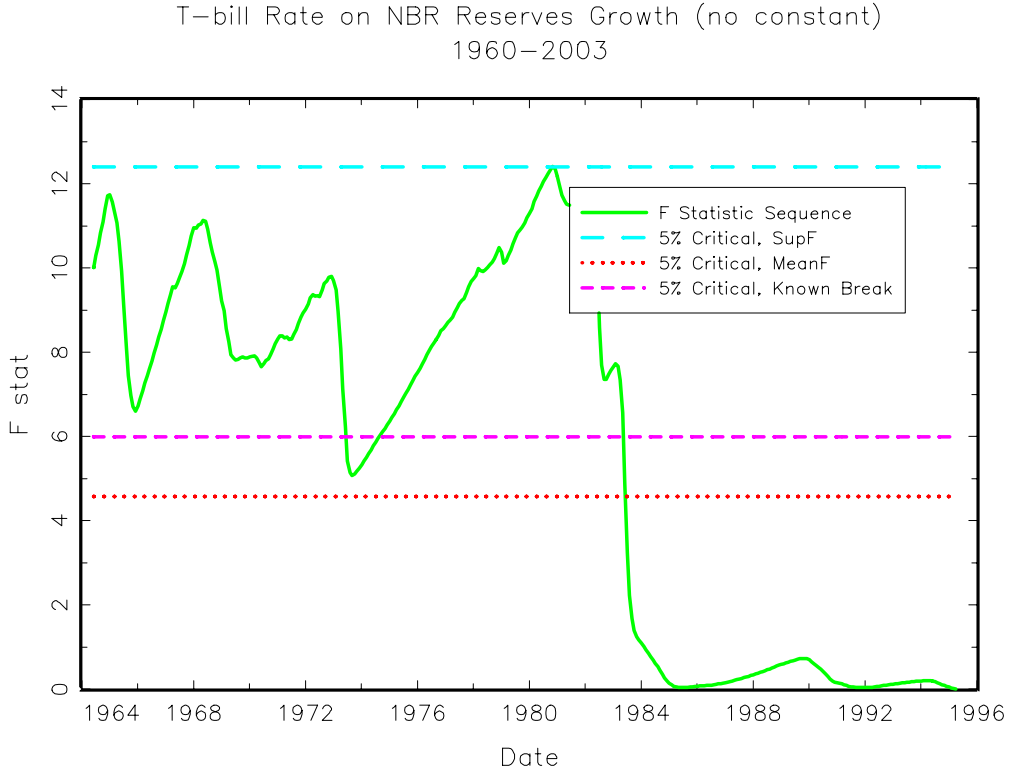
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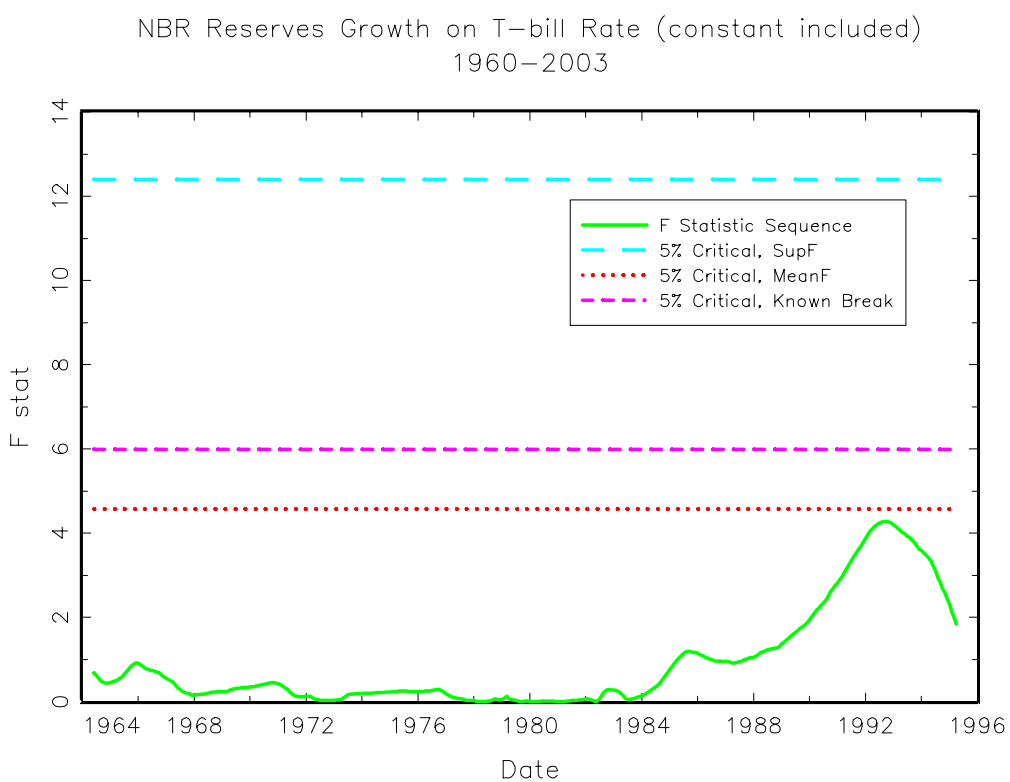
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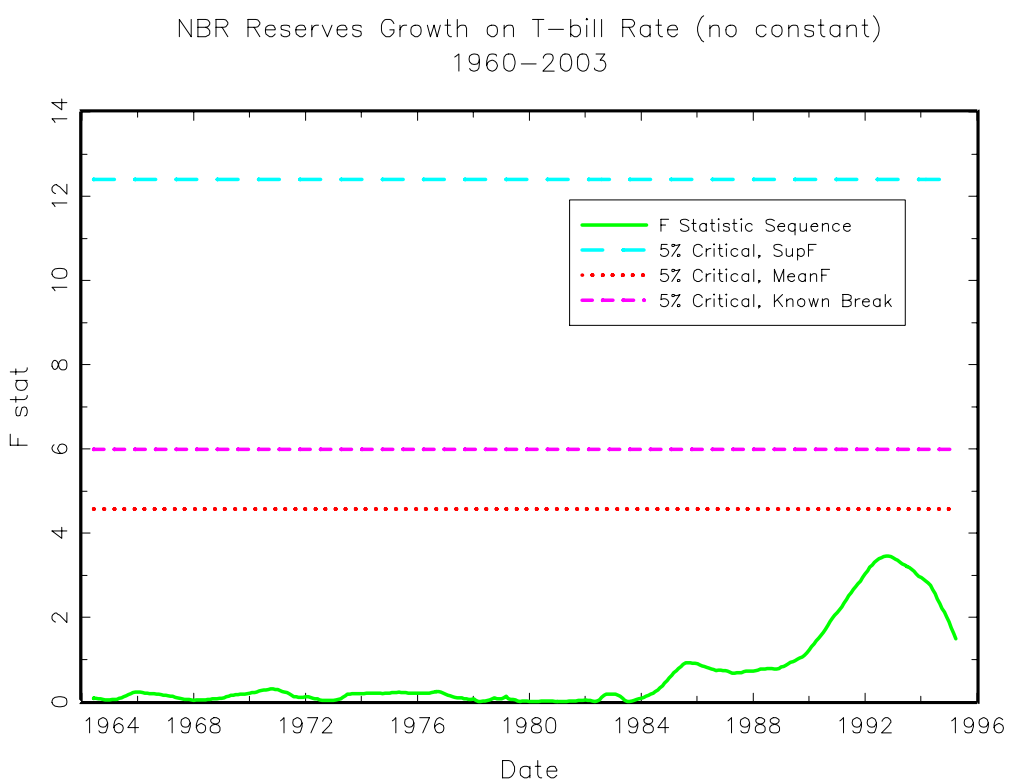
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