Additional Appendices:

The Effect of Macroeconomic Announcements on U.S. Treasury Markets: An *Autometric* General-to-Specific Analysis of the Greenspan Era

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Abstract: This research studies the impact of macroeconomic announcement surprises on daily U.S. Treasury excess returns during the heart of Alan Greenspan's tenure as Federal Reserve Chair, addressing the possible limitations of standard static regression (SSR) models, which may suffer from omitted variable bias, parameter instability, and poor mis-specification diagnostics. To complement the SSR framework, an automated general-to-specific (Gets) modeling approach, enhanced with modern indicator saturation methods for robustness, is applied to improve empirical model discovery and mitigate potential biases. By progressively reducing an initially broad set of candidate variables, the Gets methodology steers the model toward congruence, dispenses unstable parameters, and seeks to limit information loss while seeking model congruence and precision. The findings, herein, suggest that U.S. Treasury market responses to macroeconomic news shocks exhibited stability for a core set of announcements that reliably influenced excess returns. In contrast to computationally costless standard static models, the automated Gets-based approach enhances parameter precision and provides a more adaptive structure for identifying relevant predictors. These results demonstrate the potential value of incorporating interpretable automated model selection techniques alongside traditional SSR and Markov switching approaches to improve empirical insights into macroeconomic announcement effects on financial markets.

Additional Appendices.

AA.1. —Correlation Matrix of Macro Announcement Surprises

This matrix illustrates the pairwise Pearson correlations among the standardized macroeconomic surprises. It is cited in Section 5.2 of the main paper to support the claim that Gets modeling mitigates collinearity risk, as traditional SSR frameworks may be vulnerable to inflated standard errors due to multicollinearity. The mild correlation structure shown here supports the feasibility of model selection from the full set of announcements.

Correlations
The sample is: 1/2/1990 to 9/10/2001

Correlation matrix:

	autos	businv	capacit	confidn	constrc	cpi	cpixfe	durgds	eci	gdp	gdppric	gdsserv	hrearn	hstarts	indprod	lei	napm	nonfarm	pce	persinc	ppi	ppixfe	retsls	rsxauto	unemp
ss_autos	1.00																								
ss_businv	-0.01	1.00																							
ss_capacit	0.02	0.08	1.00																						
ss_confidn	-0.01	0.00	0.00	1.00																					
ss_constrc	0.02	-0.01	0.00	0.00	1.00																				
ss_cpi	0.02	-0.02	-0.01	0.00	0.00	1.00																			
ss_cpixfe	-0.02	-0.06	0.06	0.01	0.00	0.55	1.00																		
ss_durgds	-0.01	0.00	0.00	0.02	0.00	0.00	0.00	1.00																	
ss_eci	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	1.00																
ss_gdp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.09	1.00															
ss_gdppric	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.10	-0.18	1.00														
ss_gdsserv	0.00	0.00	-0.01	0.00	0.00	-0.05	-0.03	0.00	0.00	0.00	0.00	1.00													
ss_hrearn	0.00	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00												
ss_hstarts	0.00	-0.01	-0.04	-0.01	0.00	-0.03	-0.04	0.00	0.00	-0.03	-0.02	0.00	0.00	1.00											
ss_indprod	0.01	-0.03	0.71	0.00	0.01	-0.03	0.05	0.00	0.00	0.00	0.00	-0.02	0.00	-0.03	1.00										
ss_lei	0.01	0.00	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.02	0.00	0.00	1.00									
ss_napm	0.00	0.00	0.00	0.00	-0.01	0.01	0.01	0.00	0.00	-0.02	0.03	0.00	0.03	0.00	0.00	0.03	1.00								
ss_nonfarm	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.09	0.00	0.00	0.00	0.02	1.00							
ss_pce	-0.05	0.00	0.00	0.00	-0.02	0.00	0.00	-0.04	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.01	-0.01	1.00						
ss_persinc	0.03	0.00	0.00	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.14	1.00					
ss_ppi	-0.01	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.04	-0.04	0.00	0.00	0.00	0.00	0.00	1.00				
ss_ppixfe	-0.01	0.02	-0.06	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	-0.05	0.00	0.00	0.00	0.00	0.00	0.49	1.00			
ss_retsls	0.01	0.00	0.00	0.01	0.00	0.04	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.12	0.01	1.00		
ss_rsxauto	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.04	0.67	1.00	
ss_unemp	0.02	0.00	0.00	0.00	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	-0.22	-0.01	-0.01	0.00	0.00	0.00	0.00	1.00

AA.2 —ADF Tests of SS Variables

This appendix includes augmented Dickey–Fuller (ADF) and Fisher-type panel unit root tests for the standardized macroeconomic surprises and Treasury excess return series. These results are referenced in Section 4.2 of the main paper and confirm that all variables are stationary at the 1% significance level. This ensures the validity of linear Gets modeling and avoids spurious regression bias.

Null Hypothesis: Unit root (individual unit root process)
Series: BOND_30_OTR_ERT, BOND_30_FTR_1_ERT,
NOTE_10_OTR_ERT, NOTE_10_FTR_1_ERT
Date: 05/10/25 Time: 22:05
Sample: 1/02/1990 4/08/2002
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Total (balanced) observations: 12104
Cross-sections included: 4

Method	Statistic	Prob.**
ADF - Fisher Chi-square	73.6827	0.0000
ADF - Choi Z-stat	-7.43803	0.0000

** Probabilities for Fisher tests are computed using an asymptotic Chi
-square distribution. All other tests assume asymptotic normality.

AA.3. —Fisher ADF Tests of Surprise Variables

Null Hypothesis: Unit root (individual unit root process)
Series: SS_AUTOS, SS_BUSINV, SS_CAPACIT, SS_CONFIDN, SS_CONSTRC, SS_CPI, SS_CPIXFE, SS_DURGDS, SS_ECI, SS_GDP, SS_GDPPRIC, SS_GDSSERV, SS_HREARN, SS_HSLS, SS_HSTARTS, SS_INDPROD, SS_LEI, SS_NAPM, SS_NONFARM, SS_PCE, SS_PERSINC, SS_PPI, SS_PPIXFE, SS_RETSLS, SS_RSXAUTO, SS_UNEMP
Date: 05/10/25 Time: 22:01
Sample: 1990M01 2002M04
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0 to 3
Total number of observations: 3764
Cross-sections included: 26

Method	Statistic	Prob.**
ADF - Fisher Chi-square	2127.29	0.0000
ADF - Choi Z-stat	-44.0513	0.0000

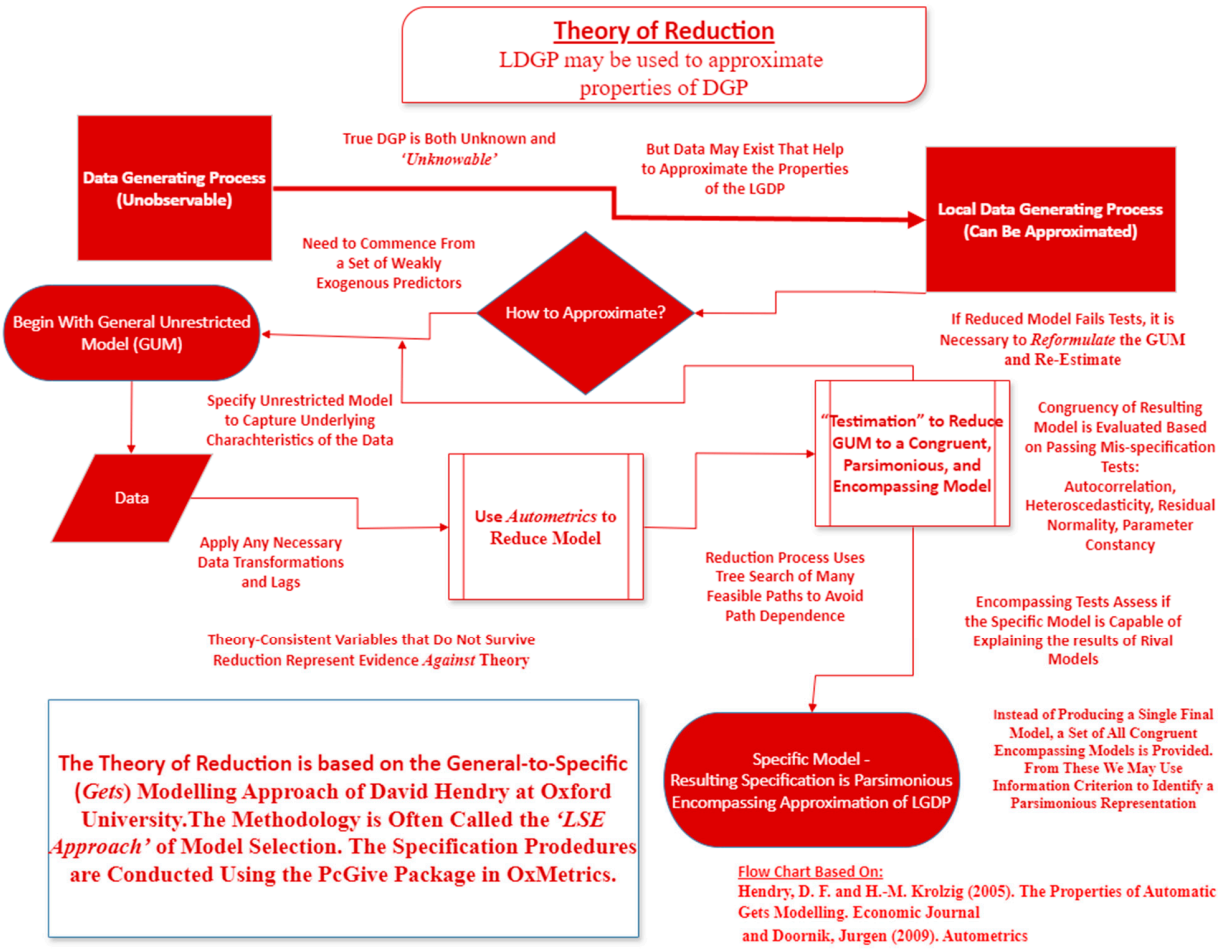
** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Intermediate ADF test results UNTITLED

Series	Prob.	Lag	Max Lag	Obs
SS_AUTOS	0.0000	0	13	145
SS_BUSINV	0.0000	3	13	142
SS_CAPACIT	0.0000	0	13	145
SS_CONFIDN	0.0000	0	13	145
SS_CONSTRC	0.0000	0	13	145
SS_CPI	0.0000	0	13	145
SS_CPIXFE	0.0000	0	13	145
SS_DURGDS	0.0000	1	13	144
SS_ECI	0.0000	0	13	145
SS_GDP	0.0000	0	13	145
SS_GDPPRIC	0.0000	0	13	145
SS_GDSSERV	0.0000	0	13	145
SS_HREARN	0.0000	2	13	143
SS_HSLS	0.0000	0	13	145
SS_HSTARTS	0.0000	0	13	145
SS_INDPROD	0.0000	0	13	145
SS_LEI	0.0000	0	13	145
SS_NAPM	0.0000	0	13	145
SS_NONFARM	0.0000	0	13	145
SS_PCE	0.0000	0	13	145
SS_PERSINC	0.0000	0	13	145
SS_PPI	0.0000	0	13	145
SS_PPIXFE	0.0000	0	13	145
SS_RETSLS	0.0000	0	13	145
SS_RSXAUTO	0.0000	0	13	145
SS_UNEMP	0.0000	0	13	145

AA.4.— Gets Flowchart from Forest (2018)

This visual summary of the Gets model reduction algorithm is reprinted from Forest (2018). It corresponds to Section 3.2 of the main paper, which describes the construction and reduction of the General Unrestricted Model (GUM). The figure clarifies the stepwise nature of Autometrics, including variable screening, congruence testing, and the iterative path elimination process. It is provided here for pedagogical transparency.



See: (James J. Forest, 2018)

AA.5.—Alternative Indicator Saturation Methods, 30-Year Bond from Forest (2018)

This figure illustrates the application of indicator saturation (IIS and SIS) for 30-year Treasury returns. It corresponds to Section 3.3 of the main paper. In the Gets framework, these saturation methods identify structural breaks and outliers through the inclusion of dummy variables. The results help justify the inclusion of robust error detection in the estimation pipeline. This visualization was originally featured in Forest (2018).

	On-the-Run Bonds				1st Off-the-Run Bonds		
Static No Saturation							
AR 1-2 test:	F(2,2898) =	4.9146 [0.0074]	**	AR 1-2 test:	F(2,2897) =	0.37984 [0.6840]	
ARCH 1-1 test:	F(1,2925) =	34.129 [0.0000]	**	ARCH 1-1 test:	F(1,2925) =	26.925 [0.0000]	**
Normality test:	Chi^2(2) =	450.27 [0.0000]	**	Normality test:	Chi^2(2) =	474.57 [0.0000]	**
Hetero test:	F(52,2874)=	1.8332 [0.0003]	**	Hetero test:	F(54,2872)=	2.026 [0.0000]	**
RESET23 test:	F(2,2898) =	2.3131 [0.0991]		RESET23 test:	F(2,2897) =	1.9772 [0.1386]	
Large Residual Saturation							
AR 1-2 test:	F(2,2884) =	0.40261 [0.6686]		AR 1-2 test:	F(2,2883) =	0.22184 [0.8011]	
ARCH 1-1 test:	F(1,2925) =	0.13277 [0.7156]		ARCH 1-1 test:	F(1,2925) =	1.0499 [0.3056]	
Normality test:	Chi^2(2) =	2.5398 [0.2809]		Normality test:	Chi^2(2) =	1.9546 [0.3763]	
Hetero test:	F(23,2875)=	1.9387 [0.0047]	**	Hetero test:	F(27,2872)=	1.8861 [0.0038]	**
RESET23 test:	F(2,2884) =	1.1726 [0.3097]		RESET23 test:	F(2,2883) =	3.1519 [0.0429]	*
Impulse Indication Saturation							
AR 1-2 test:	F(2,2808) =	0.56198 [0.5701]		AR 1-2 test:	F(2,2815) =	1.2327 [0.2917]	
ARCH 1-1 test:	F(1,2925) =	0.53201 [0.4658]		ARCH 1-1 test:	F(1,2925) =	1.1711 [0.2793]	
Normality test:	Chi^2(2) =	4.32590 [0.1150]		Normality test:	Chi^2(2) =	1.9221 [0.3825]	
Hetero test:	F(20,2800)=	1.83460 [0.0132]	*	Hetero test:	F(18,2808)=	1.8625 [0.0148]	*
RESET23 test:	F(2,2808) =	0.46745 [0.6266]		RESET23 test:	F(2,2815) =	0.40963 [0.6639]	
Step Indicator Saturation							
AR 1-2 test:	F(2,2760) =	3.4536 [0.0318]	*	AR 1-2 test:	F(2,2751) =	1.70890 [0.1813]	
ARCH 1-1 test:	F(1,2925) =	2.7299 [0.0986]		ARCH 1-1 test:	F(1,2925) =	1.25510 [0.2627]	
Normality test:	Chi^2(2) =	2.5819 [0.2750]		Normality test:	Chi^2(2) =	0.60785 [0.7379]	
Hetero test:	F(133,2752)=	1.0596 [0.3075]		Hetero test:	F(151,2739)=	1.18810 [0.0629]	
RESET23 test:	F(2,2760) =	2.9626 [0.0518]		RESET23 test:	F(2,2751) =	1.28880 [0.2758]	
IIS and SIS							
AR 1-2 test:	F(2,2764) =	1.6495 [0.1923]		AR 1-2 test:	F(2,2784) =	0.7803 [0.4584]	
ARCH 1-1 test:	F(1,2925) =	2.4525 [0.1174]		ARCH 1-1 test:	F(1,2925) =	0.41604 [0.5190]	
Normality test:	Chi^2(2) =	2.6591 [0.2646]		Normality test:	Chi^2(2) =	0.70898 [0.7015]	
Hetero test:	F(98,2756)=	1.1454 [0.1591]		Hetero test:	F(86,2777)=	1.1656 [0.1442]	
RESET23 test:	F(2,2764) =	1.4723 [0.2296]		RESET23 test:	F(2,2784) =	2.4078 [0.0902]	
Differenced IIS							
AR 1-2 test:	F(2,2817) =	3.0847 [0.0459]	*	AR 1-2 test:	F(2,2806) =	2.9772 [0.0511]	
ARCH 1-1 test:	F(1,2925) =	1.9619 [0.1614]		ARCH 1-1 test:	F(1,2925) =	2.6195 [0.1057]	
Normality test:	Chi^2(2) =	2.3248 [0.3127]		Normality test:	Chi^2(2) =	1.8608 [0.3944]	
Hetero test:	F(192,2734)=	0.6189 [1.0000]		Hetero test:	F(210,2716)=	0.59851 [1.0000]	
RESET23 test:	F(2,2817) =	6.3752 [0.0017]	**	RESET23 test:	F(2,2806) =	10.254 [0.0000]	**
IIS and DIIS							
AR 1-2 test:	F(2,2805) =	0.99931 [0.3683]		AR 1-2 test:	F(2,2823) =	0.82454 [0.4385]	
ARCH 1-1 test:	F(1,2925) =	3.3756 [0.0663]		ARCH 1-1 test:	F(1,2925) =	3.1551 [0.0758]	
Normality test:	Chi^2(2) =	0.87191 [0.6466]		Normality test:	Chi^2(2) =	2.196 [0.3335]	
Hetero test:	F(124,2749)=	0.65844 [0.9986]		Hetero test:	F(94,2779)=	0.70666 [0.9851]	
RESET23 test:	F(2,2805) =	1.3507 [0.2592]		RESET23 test:	F(2,2823) =	0.87421 [0.4173]	

Notes on the tests above based on descriptions provided in the PCGIVE documentation.

Greater detail is available at https://www.doornik.com/pcgive/index.html

1) Autocorrelation test (AR 1-2 test) is the Lagrange-multiplier test for rth order residual autocorrelation.

The F- form of the test is used. Under the null hypothesis that there is no autocorrelation (that is, that the errors are white noise).

2) ARCH 1-1 test is the standard Autoregressive Conditional Heteroscedastity test H0: γ=0. The F-form is reported.

Both first-order and higher-order lag forms are easily calculated (see Engle, 1982, and Engle, Hendry, and Trumbull, 1985)

3) Normality Test is of the form of Doornik and Hansen (1994) with the null being that of normality.

4) Hetero test is a general test for heteroscedastic errors: H0 is that the errors are homoscedastic. Test is based on White (1980).

5) The RESET test (Regression Specification Test) due to Ramsey (1969) tests the null of correct specification of the original model against the alternative that powers of $\hat{y}t$ have been omitted.

Autometrics procedure also involves parameter stability testing based on the approach in Hansen (1992).

See: (James J. Forest, 2018)

AA.6.—Indicator Saturation Methods, 10-Year Note from Forest (2018)

This figure illustrates the application of indicator saturation (IIS and SIS) for 10-year Treasury returns. It corresponds to Section 3.3 of the main paper. In the Gets framework, these saturation methods identify structural breaks and outliers through the inclusion of dummy variables.

	On-the-Run Notes				**1st Off-the-Run Notes**		
Static No Saturation							
AR 1-2 test:	F(2,2897) =	0.37984 [0.6840]		AR 1-2 test:	F(2,2898) =	4.347 [0.0130]	*
ARCH 1-1 test:	F(1,2925) =	26.925 [0.0000]	**	ARCH 1-1 test:	F(1,2925) =	24.823 [0.0000]	**
Normality test:	Chi^2(2) =	474.57 [0.0000]	**	Normality test:	Chi^2(2) =	479.71 [0.0000]	**
Hetero test:	F(54,2872)=	2.026 [0.0000]	**	Hetero test:	F(52,2874)=	1.599 [0.0043]	**
RESET23 test:	F(2,2897) =	1.9772 [0.1386]		RESET23 test:	F(2,2898) =	2.0078 [0.1345]	
Large Residual Saturation							
AR 1-2 test:	F(2,2871) =	0.63503 [0.5300]		AR 1-2 test:	F(2,2875) =	0.56044 [0.5710]	
ARCH 1-1 test:	F(1,2925) =	0.040235 [0.8410]		ARCH 1-1 test:	F(1,2925) =	0.093487 [0.7598]	
Normality test:	Chi^2(2) =	7.7743 [0.0205]	*	Normality test:	Chi^2(2) =	13.294 [0.0013]	**
Hetero test:	F(36,2855)=	1.622 [0.0111]	*	Hetero test:	F(37,2859)=	1.5888 [0.0135]	*
RESET23 test:	F(2,2871) =	3.899 [0.0204]	*	RESET23 test:	F(2,2875) =	4.9986 [0.0068]	**
Impulse Indication Saturation							
AR 1-2 test:	F(2,2819) =	1.2836 [0.2772]		AR 1-2 test:	F(2,2796) =	2.6703 [0.0694]	
ARCH 1-1 test:	F(1,2925) =	0.91307 [0.3394]		ARCH 1-1 test:	F(1,2925) =	0.21052 [0.6464]	
Normality test:	Chi^2(2) =	2.2006 [0.3328]		Normality test:	Chi^2(2) =	2.9671 [0.2268]	
Hetero test:	F(20,2811)=	1.7026 [0.0264]	*	Hetero test:	F(20,2788)=	1.3793 [0.1208]	
RESET23 test:	F(2,2819) =	0.53229 [0.5873]		RESET23 test:	F(2,2796) =	0.12934 [0.8787]	
Step Indicator Saturation							
AR 1-2 test:	F(2,2757) =	1.9565 [0.1415]		AR 1-2 test:	F(2,2771) =	1.47890 [0.2281]	
ARCH 1-1 test:	F(1,2925) =	0.62871 [0.4279]		ARCH 1-1 test:	F(1,2925) =	0.37855 [0.5384]	
Normality test:	Chi^2(2) =	2.3116 [0.3148]		Normality test:	Chi^2(2) =	1.00720 [0.6044]	
Hetero test:	F(134,2747)=	0.95983 [0.6132]		Hetero test:	F(123,2761)=	0.93475 [0.6817]	
RESET23 test:	F(2,2757) =	2.1907 [0.1120]		RESET23 test:	F(2,2771) =	2.82890 [0.0592]	
IIS and SIS							
AR 1-2 test:	F(2,2727) =	0.92569 [0.3964]		AR 1-2 test:	F(2,2726) =	2.80810 [0.0605]	
ARCH 1-1 test:	F(1,2925) =	0.17571 [0.6751]		ARCH 1-1 test:	F(1,2925) =	0.05769 [0.8102]	
Normality test:	Chi^2(2) =	4.5265 [0.1040]		Normality test:	Chi^2(2) =	1.57020 [0.4561]	
Hetero test:	F(112,2719)=	1.3208 [0.0149]	*	Hetero test:	F(121,2716)=	1.01850 [0.4286]	
RESET23 test:	F(2,2727) =	2.58 [0.0760]		RESET23 test:	F(2,2726) =	1.90110 [0.1496]	
Differenced IIS							
AR 1-2 test:	F(2,2814) =	0.61483 [0.5408]		AR 1-2 test:	F(2,2796) =	0.5749 [0.5628]	
ARCH 1-1 test:	F(1,2925) =	3.8205 [0.0507]		ARCH 1-1 test:	F(1,2925) =	2.4689 [0.1162]	
Normality test:	Chi^2(2) =	2.0524 [0.3584]		Normality test:	Chi^2(2) =	0.69013 [0.7082]	
Hetero test:	F(194,2732)=	0.5 [1.0000]		Hetero test:	F(225,2701)=	0.59947 [1.0000]	
RESET23 test:	F(2,2814) =	14.498 [0.0000]	**	RESET23 test:	F(2,2796) =	10.724 [0.0000]	**
IIS and DIIS							
AR 1-2 test:	F(2,2798) =	0.15254 [0.8585]		AR 1-2 test:	F(2,2781) =	0.074857 [0.9279]	
ARCH 1-1 test:	F(1,2925) =	4.0607 [0.0440]	*	ARCH 1-1 test:	F(1,2925) =	0.43975 [0.5073]	
Normality test:	Chi^2(2) =	1.9943 [0.3689]		Normality test:	Chi^2(2) =	1.6227 [0.4443]	
Hetero test:	F(133,2739)=	0.56899 [1.0000]		Hetero test:	F(118,2730)=	0.54746 [1.0000]	
RESET23 test:	F(2,2798) =	5.5684 [0.0039]	**	RESET23 test:	F(2,2781) =	5.9552 [0.0026]	**

Notes on the tests above based on descriptions provided in the PCGIVE documentation.

Greater detail is available at https://www.doornik.com/pcgive/index.html

1) Autocorrelation test (AR 1-2 test) is the Lagrange-multiplier test for rth order residual autocorrelation.

The F- form of the test is used. Under the null hypothesis that there is no autocorrelation (that is, that the errors are white noise).

2) ARCH 1-1 test is the standard Autoregressive Conditional Heteroscedastity test H0: γ=0. The F-form is reported.

Both first-order and higher-order lag forms are easily calculated (see Engle, 1982, and Engle, Hendry, and Trumbull, 1985)

3) Normality Test is of the form of Doornik and Hansen (1994) with the null being that of normality.

4) Hetero test is a general test for heteroscedastic errors: H0 is that the errors are homoscedastic. Test is based on White (1980).

5) The RESET test (Regression Specification Test) due to Ramsey (1969) tests the null of correct specification of the original model against the alternative that powers of ŷt ha

Autometrics procedure also involves parameter stability testing based on the approach in Hansen (1992).

See: (James J. Forest, 2018)

Appendix AA.7.—15 Notable No Announcement Days from Forest (2018)

This figure depicts a sample of "no announcement" days used in the scenario simulation analysis of Section 6. By selecting periods with minimal macro news flow, the baseline volatility and behavior of Treasury returns under calm conditions can be compared with reaction magnitudes to simulated macro surprises. This aligns with the shock profiles in Figure 6 and validates the claim that announcements, not regular variation, drive much of the high-frequency volatility in yields.

15 Days of Bond Market Moves and No Macro Announcements

Sample: 1/1/1990-9/10/2001

	Returns				Spreads		Fed Funds		Indicator Saturation Captured				Standardized Returns				Standardized Spreads	
Date	OTR 30 Yr Bond	FTR 30 Yr Bond	OTR 10 Yr Note	FTR 10 Yr Note	Change Treas 10-1	Change Baa-Aaa	Bp Chg. Actual	Bp Chg. Expected	OTR 30 Yr Bond	FTR 30 Yr Bond	OTR 10 Yr Note	FTR 10 Yr Note	OTR 30 Yr Bond	FTR 30 Yr Bond	OTR 10 Yr Note	FTR 10 Yr Note	Change Treas 10-1	Change Baa-Aaa
2/20/1990	**-7.49**	**-7.50**	**-4.87**	**-4.56**	0.05	-0.02	0	0	**XS**	**XS**	**XS**	**XI**	**-3.21**	**-3.27**	**-3.18**	**-3.09**	1.26	-1.19
8/6/1990	**-9.93**	**-9.80**	**-6.17**	**-6.09**	0.21	-0.02	0	0	**XI**	**XS**	**XS**	**XI**	**-4.26**	**-4.27**	**-4.03**	**-4.14**	**5.29**	-1.19
8/20/1990	0.96	0.72	0.15	0.04	-0.03	0.07	0	0					0.41	0.31	0.10	0.02	-0.76	**4.17**
10/9/1990	**-6.89**	**-6.75**	**-3.91**	**-3.80**	0.05	-0.01	0	0	**XS**			**XI**	**-2.96**	**-2.94**	**-2.55**	**-2.58**	1.26	-0.60
11/5/1990	2.93	2.87	1.91	1.97	-0.05	0.09	0	0					1.25	1.25	1.25	1.34	-1.26	**5.36**
8/21/1991	0.87	0.75	0.19	0.08	-0.16	-0.01	0	0					0.37	0.33	0.12	0.05	**-4.03**	-0.60
4/9/1992	3.59	3.51	2.06	2.16	0.15	-0.02	-25	-24					1.54	1.53	1.34	1.47	**3.78**	-1.19
5/21/1992	-2.59	-2.51	**-3.40**	**-3.07**	-0.03	0.01	0	0				**XI**	-1.11	-1.10	**-2.22**	**-2.09**	-0.76	0.60
4/18/1994	**-4.94**	-4.56	**-4.21**	**-4.00**	-0.01	-0.02	25	10	**XI**	XS	**XS**	**XI**	**-2.12**	-1.99	**-2.75**	**-2.72**	-0.25	-1.19
12/8/1994	1.03	0.90	0.42	0.31	-0.18	-0.01	0	0					0.44	0.39	0.27	0.21	**-4.53**	-0.60
10/5/1998	0.15	**6.55**	0.40	0.15	-0.04	0.01	0	0					0.06	**2.86**	0.26	0.10	-1.01	0.60
10/8/1998	**-14.81**	**-6.81**	**-9.81**	**-9.84**	0.34	-0.01	0	0				**XI**	**-6.35**	**-2.97**	**-6.40**	**-6.68**	**8.56**	-0.60
10/9/1998	**-8.00**	**-7.79**	**-5.96**	**-5.38**	0.16	-0.01	0	0	**XS**	**XS**	**XS**	**XI**	**-3.43**	**-3.40**	**-3.89**	**-3.65**	**4.03**	-0.60
10/13/1998	0.22	2.11	0.17	0.14	-0.13	0.01	0	0					0.09	0.92	0.11	0.09	**-3.27**	0.60
4/19/2001	**-6.90**	**-6.53**	**-4.18**	**-3.82**	0.16	0.00	-50	-43	**XS**	**XS**	**XS**		**-2.96**	**-2.85**	**-2.73**	**-2.60**	**4.03**	0.00
Sigma r	2.33	2.29	1.53	1.47	0.04	0.02		**Saturation**	**IIS+SIS**	**SIS**	**SIS**	**IIS**						
								% Captured	40.0%	33.3%	33.3%	46.7%						

Shading indicates the LTCM Crisis

Bold indicates standardized returns greater than 2 standard deviations

	Headline/Market Comments	Source
2/20/1990	Foreign and domestic interest rate expectations	
8/6/1990	High inflation fear	Wall Street Journal/ New York Times
8/20/1990	Middle East issues	New York Times
10/9/1990	Rising oil prices, weakening dolar	New York Times
11/5/1990	Falling oil prices	New York Times
8/21/1991	Political coup in USSR	New York Times
4/9/1992	Decline in Federal funds rate	Wall Street Journal
5/21/1992	Credit markets were thrown into turmoil yesterday by an article in the WSJ suggesting that credit conditions would not be eased, and prices of Treasury securities fell sharply	New York Times
4/18/1994	Federal Reserve announced raise in short term interest rates to moderate the economy's growth and stave off inflation pressures	New York Times
12/8/1994	Continued concerns over impact of the bankruptcy of Orange County, California. Hints of fed raising short-term rates again because of signs of the economy improving.	New York Times
10/5/1998	Bond prices surge for biggest one day gain in over a year. Due to global stock market downfall us market affected reinforcing the demand for treasury securities.	New York Times
10/8/1998	Global market weakness boosts short maturities.	New York Times
10/9/1998	After shock of the Federal Reserve's $3.5 Billion bail-out. Worries about a global credit crunch and fears of American economy weakening. Collapsing hedge funds.	Wall Street Journal
10/13/1998	Cedent Corporation calls off a $3.1 Billion American Bankers deal causing all its own brand of stocks to drop. Merrill Lynch and Company eliminated 2,00 jobs in the US	Boston Herald
4/19/2001	Rate cut help auto and housing markets however borrowing costs for credit worthy companies still too high	New York Times

See: (James J. Forest, 2018)

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