Online Appendix

How does the U.S. government finance fiscal shocks?

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This appendix contains the VAR(2) results for Tables 1 through 9 and Table 12 in the article.

Table 1: Benchmark VAR(2) Estimates

This table reports the results of the benchmark VAR(2) estimation. The benchmark VAR(2) includes five variables, two lags and uses quarterly data. T-statistics for the GMM estimates are reported in parentheses. We use the Newey-West variance-covariance matrix with four lags as the weighting matrix. The last column reports the R-squared. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	r^b_{t-1}	π_{t-1}	$\xi^{ns,ndef}_{t-1}$	CP_{t-1}	$\xi^{g,def}_{t-1}$	r^b_{t-2}	π_{t-2}	$\xi^{ns,ndef}_{t-2}$	CP_{t-2}	$\xi^{g,def}_{t-2}$	R^2
r^b_t	-0.0831	-0.3014	-0.0007	0.7612	-0.0138	-0.0426	-0.1705	-0.0051	1.4020	0.0776	0.2109
	(-0.7720)	(-1.1917)	(-0.2487)	(0.4864)	(-0.5522)	(-0.5998)	(-0.9337)	(-2.2294)	(0.9305)	(4.7067)	
π_t	0.0098	0.4648	0.0007	-0.8217	0.0047	0.0612	0.2016	0.0031	0.5633	-0.0611	0.4654
	(0.3044)	(4.9856)	(0.4128)	(-2.1426)	(0.3250)	(2.3212)	(2.0424)	(1.5535)	(1.5948)	(-4.9749)	
$\xi^{ns,ndef}_t$	0.3000	6.8868	0.0861	-45.6428	-0.3948	-2.1472	-6.7317	0.0365	44.5359	0.3365	0.0594
	(0.1204)	(1.2222)	(0.5675)	(-1.8361)	(-0.7208)	(-1.0912)	(-1.0170)	(0.5641)	(2.0283)	(0.5987)	
CP_t	0.0081	0.0281	-0.0002	0.6473	0.0004	0.0028	0.0016	-0.0003	0.2757	0.0003	0.8874
	(1.4261)	(1.9391)	(-1.6573)	(5.7107)	(0.7044)	(0.5612)	(0.1352)	(-2.1986)	(2.5024)	(0.4399)	
$\xi^{g,def}_t$	-0.0335	0.5848	0.0062	-1.6026	0.0708	0.2126	0.4519	0.0141	-1.4445	0.0858	0.1892
	(-0.2256)	(1.0655)	(0.7394)	(-0.9830)	(0.4140)	(1.5693)	(0.8719)	(1.0895)	(-0.8328)	(0.5538)	

Table 2: Correlations Between Innovations for Benchmark VAR(2)

This table reports the standard deviations (diagonals) and the correlations (off-diagonals) of the news variables constructed from the benchmark VAR(2). We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	$h_{t+1}(r^b)$	$h_{t+1}(g^{def})$	$h_{t+1}(ns^{ndef})$
$h_{t+1}(r^b)$	0.04		
$h_{t+1}(g^{def})$	-0.73	0.09	
$h_{t+1}(ns^{ndef})$	-0.53	0.56	0.60

Table 3: Fiscal Adjustment Results for Benchmark VAR(2)

This table reports the results from regressing $h_{t+1}(r^b)$, its components $h^c_{t+1}(r^b)$ and $h^f_{t+1}(r^b)$, and $h_{t+1}(ns^{ndef})$ on $h_{t+1}(g^{def})$, as described in Equations (11) and (12) in the article. The first two columns show the intercept and the fiscal adjustment beta, with their t-statistics in parentheses. The third column reports the R-squared, and the final column shows the fraction of fiscal shocks financed by each channel. Innovations are computed from the benchmark VAR(2). We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	β_0	β_1	R^2	Fraction
$h^c(r^b)$	0.0003	-0.0608	0.0728	0.0159
	(0.2384)	(-2.6884)		
$h^f(r^b)$	0.0022	-0.2851	0.5442	0.0748
	(1.0788)	(-5.4792)		
$h(r^b)$	0.0024	-0.3459	0.5293	0.0907
	(1.0564)	(-5.5081)		
$h(ns^{ndef})$	-0.0003	3.5835	0.3089	0.9399
	(-0.0104)	(6.3184)		

Table 4: Augmented VAR(2) Estimates: Excess Returns on Defense Stocks

This table reports the results of the augmented VAR(2) estimation. The augmented VAR(2) includes the five variables from the benchmark VAR(2) plus the excess returns on the Fama and French "Guns" portfolio, $r^{def,excess}$. It has two lags and uses quarterly data. T-statistics for the GMM estimates are reported in parentheses. We use the Newey-West variance-covariance matrix with four lags as the weighting matrix. The last column reports the R-squared. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	r^b_{t-1}	π_{t-1}	$\xi^{ns,ndef}_{t-1}$	CP_{t-1}	$\xi^{g,def}_{t-1}$	$r^{def,excess}_{t-1}$	r^b_{t-2}	π_{t-2}	$\xi^{ns,ndef}_{t-2}$	CP_{t-2}	$\xi^{g,def}_{t-2}$	$r^{def,excess}_{t-2}$	R^2
r^b_t	-0.0904	-0.3076	-0.0007	0.8022	-0.0129	0.0106	-0.0444	-0.1687	-0.0051	1.3613	0.0765	0.0057	0.2130
	(-0.8040)	(-1.1557)	(-0.2491)	(0.4868)	(-0.4790)	(0.6097)	(-0.5851)	(-0.8609)	(-2.1106)	(0.8542)	(4.2548)	(0.3904)	
π_t	0.0065	0.4655	0.0006	-0.8237	0.0051	0.0002	0.0567	0.1963	0.0031	0.5737	-0.0607	0.0092	0.4707
	(0.1927)	(4.6305)	(0.3540)	(-2.0442)	(0.3428)	(0.0298)	(2.0638)	(1.8586)	(1.4798)	(1.5165)	(-4.7309)	(1.8038)	
$\xi^{ns,ndef}_t$	0.1578	6.7170	0.0861	-44.5589	-0.3747	0.2685	-2.1278	-6.6097	0.0361	43.3384	0.3010	0.0137	0.0616
	(0.0620)	(1.1377)	(0.5432)	(-1.6775)	(-0.6484)	(0.7371)	(-1.0405)	(-0.9481)	(0.5368)	(1.7945)	(0.5253)	(0.0280)	
CP_t	0.0081	0.0281	-0.0002	0.6471	0.0004	-0.0000	0.0027	0.0015	-0.0003	0.2760	0.0003	0.0001	0.8874
	(1.3427)	(1.8064)	(-1.5560)	(5.2736)	(0.6375)	(-0.0312)	(0.4997)	(0.1181)	(-2.0776)	(2.2923)	(0.4071)	(0.1043)	
$\xi^{g,def}_t$	-0.0565	0.5582	0.0062	-1.4322	0.0740	0.0424	0.2148	0.4702	0.0140	-1.6312	0.0803	0.0040	0.1943
	(-0.3491)	(0.9714)	(0.6898)	(-0.8054)	(0.4105)	(1.5844)	(1.4620)	(0.8908)	(1.0256)	(-0.8357)	(0.4852)	(0.0938)	
$r^{def,excess}_t$	-0.3764	-0.9938	-0.0029	5.5168	0.1372	0.0636	-0.2413	0.4683	0.0052	-3.1689	-0.0674	0.1187	0.0546
	(-0.9900)	(-1.3265)	(-0.1970)	(1.3536)	(2.4468)	(0.8596)	(-0.6429	(0.6158)	(0.3848)	(-0.8260)	(-1.3613)	(1.2506)	

Table 5: Fiscal Adjustment Results for Augmented VAR(2): Excess Returns on Defense Stocks

This table reports the results from regressing $h_{t+1}(r^b)$, its components $h^c_{t+1}(r^b)$ and $h^f_{t+1}(r^b)$, and $h_{t+1}(ns^{ndef})$ on $h_{t+1}(g^{def})$, as described in Equations (11) and (12) in the article. The first two columns show the intercept and the fiscal adjustment beta, with their t-statistics in parentheses. The third column reports the R-squared, and the final column shows the fraction of fiscal shocks financed by each channel. Innovations are computed from the augmented VAR(2) in the previous table. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	β_0	β_1	R^2	Fraction
$h^c(r^b)$	0.0003	-0.0623	0.0766	0.0164
	(0.2534)	(-2.7682)		
$h^f(r^b)$	0.0021	-0.2838	0.5357	0.0744
	(1.0718)	(-5.5539)		
$h(r^b)$	0.0024	-0.3461	0.5309	0.0908
	(1.0645)	(-5.6200)		
$h(ns^{ndef})$	-0.0004	3.6004	0.3104	0.9444
	(-0.0126)	(6.3742)		

Table 6: Augmented VAR(2) Estimates: Abnormal Returns on Defense Stocks

This table reports the results of the augmented VAR(2) estimation. The augmented VAR(2) includes the five variables from the benchmark VAR(2) plus the abnormal returns on the Fama and French "Guns" portfolio, $r^{def,abn}$. It has two lags and uses quarterly data. T-statistics for the GMM estimates are reported in parentheses. We use the Newey-West variance-covariance matrix with four lags as the weighting matrix. The last column reports the R-squared. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	r^b_{t-1}	π_{t-1}	$\xi^{ns,ndef}_{t-1}$	CP_{t-1}	$\xi^{g,def}_{t-1}$	$r^{def,abn}_{t-1}$	r^b_{t-2}	π_{t-2}	$\xi^{ns,ndef}_{t-2}$	CP_{t-2}	$\xi^{g,def}_{t-2}$	$r^{def,abn}_{t-2}$	R^2
r^b_t	-0.0827	-0.2859	-0.0004	0.7719	-0.0147	0.0160	-0.0371	-0.1697	-0.0050	1.3748	0.0755	0.0125	0.2128
	(-0.7231)	(-1.0436)	(-0.1537)	(0.4709)	(-0.5366)	(0.5081)	(-0.4985)	(-0.8625)	(-2.0424)	(0.8686)	(4.0594)	(0.4405)	
π_t	0.0089	0.4719	0.0008	-0.8170	0.0040	0.0065	0.0639	0.2038	0.0032	0.5525	-0.0622	0.0105	0.4686
	(0.2601)	(4.6220)	(0.4944)	(-2.0321)	(0.2747)	(0.4817)	(2.2870)	(1.9387)	(1.5216)	(1.4677)	(-4.7044)	(0.8725)	
$\xi^{ns,ndef}_t$	0.1536	6.6944	0.0853	-45.8075	-0.4196	-0.3137	-2.2010	-6.4793	0.0428	45.1177	0.3566	0.5121	0.0631
	(0.0573)	(1.1040)	(0.5137)	(-1.7610)	(-0.7220)	(-0.3350)	(-0.9936)	(-0.9279)	(0.6041)	(1.9394)	(0.6039)	(0.7403)	
CP_t	0.0083	0.0283	-0.0002	0.6475	0.0004	0.0004	0.0029	0.0012	-0.0003	0.2750	0.0003	-0.0007	0.8875
	(1.3612)	(1.8336)	(-1.5460)	(5.3980)	(0.7691)	(0.2287)	(0.5379)	(0.0981)	(-2.0783)	(2.3483)	(0.3798)	(-0.4078)	
$\xi^{g,def}_t$	-0.0275	0.7138	0.0082	-1.5127	0.0640	0.1358	0.2586	0.4531	0.0148	-1.6764	0.0683	0.0893	0.2139
	(-0.1776)	(1.2537)	(1.0161)	(-0.8686)	(0.3668)	(1.5590)	(1.7895)	(0.8259)	(1.1287)	(-0.8412)	(0.4234)	(1.0909)	
$r^{def,abn}_t$	-0.3437	-0.4495	0.0010	4.3587	0.1111	0.0199	-0.1361	0.2300	-0.0056	-3.2195	0.0151	0.0217	0.0794
	(-1.9474)	(-0.7138)	(0.1357)	(2.0189)	(3.6911)	(0.2566)	(-0.8574)	(0.4829)	(-0.8730)	(-1.7000)	(0.4358)	(0.2517)	

Table 7: Fiscal Adjustment Results for Augmented VAR(2): Abnormal Returns on Defense Stocks

This table reports the results from regressing $h_{t+1}(r^b)$, its components $h^c_{t+1}(r^b)$ and $h^f_{t+1}(r^b)$, and $h_{t+1}(ns^{ndef})$ on $h_{t+1}(g^{def})$, as described in Equations (11) and (12) in the article. The first two columns show the intercept and the fiscal adjustment beta, with their t-statistics in parentheses. The third column reports the R-squared, and the final column shows the fraction of fiscal shocks financed by each channel. Innovations are computed from the augmented VAR(2) in the previous table. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	β_0	β_1	R^2	Fraction
$h^c(r^b)$	0.0003	-0.0666	0.0897	0.0175
	(0.2556)	(-3.0874)		
$h^f(r^b)$	0.0021	-0.2753	0.5189	0.0722
	(1.0361)	(-5.5117)		
$h(r^b)$	0.0024	-0.3419	0.5316	0.0897
	(1.0431)	(-5.6657)		
$h(ns^{ndef})$	0.0000	3.5888	0.3146	0.9413
	(0.0005)	(6.5875)		

Table 8: Fiscal Adjustment Results for Augmented VAR(2): Receipts vs. Non-defense Spending

This table reports the results from regressing $h_{t+1}(r^b)$, its components $h^c_{t+1}(r^b)$ and $h^f_{t+1}(r^b)$, as well as $h_{t+1}(\tau)$ and $h_{t+1}(g^{ndef})$ on $h_{t+1}(g^{def})$. The left panel shows the results with innovations computed from the VAR(2) augmented with excess returns on defense stocks, and the right panel reports the results for the VAR(2) augmented with abnormal returns. In each panel, the first two columns show the intercept and the fiscal adjustment beta, with their t-statistics in parentheses. The third column reports the R-squared, and the final column shows the fraction of fiscal shocks financed by each channel. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

	Excess Returns				Abnormal Returns			
	β_0	β_1	R^2	Fraction	β_0	β_1	R^2	Fraction
$h^c(r^b)$	0.0003	-0.0520	0.0586	0.0136	0.0003	-0.0558	0.0697	0.0146
	(0.2326)	(-2.4492)			(0.2339)	(-2.7070)		
$h^f(r^b)$	0.0021	-0.2707	0.5330	0.0710	0.0020	-0.2614	0.5141	0.0686
	(1.0700)	(-6.1981)			(1.0314)	(-6.1289)		
$h(r^b)$	0.0024	-0.3227	0.5080	0.0847	0.0023	-0.3173	0.5059	0.0832
	(1.0463)	(-5.9292)			(1.0235)	(-5.9367)		
$h(\tau)$	0.0004	0.2417	0.3446	0.6894	0.0001	0.2426	0.3606	0.6920
	(0.0507)	(5.5781)			(0.1367)	(5.8130)		
$h(g^{ndef})$	0.0004	-0.2129	0.1934	0.3386	0.0003	-0.2077	0.1885	0.3303
	(0.1641)	(-5.4564)			(0.1367)	(-5.6189)		

Table 9: Fiscal Adjustment Betas for Augmented VAR(2) for a Variety of HP Smoothing Parameters

This table reports the results from regressing $h_{t+1}(r^b)$ and $h_{t+1}(ns^{ndef})$ on $h_{t+1}(g^{def})$, as described in Equations (11) and (12) in the article. The left panel shows the results with innovations computed from the VAR(2) augmented with excess returns on defense stocks, and the right panel reports the results for the VAR(2) augmented with abnormal returns. In each panel, the first column shows the fiscal adjustment betas, with their t-statistics in parentheses. The second column reports the R-squared, and the final column shows the fraction of fiscal shocks financed by each channel. We report results for several smoothing parameters for the HP filter. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

		Excess Returns			Abnormal Returns		
HP cycle		β_1	R^2	Fraction	β_1	R^2	Fraction
9.9-year*	β_1^r	-0.4510	0.4865	0.1183	-0.4444	0.4857	0.1166
		(-4.4818)			(-4.5278)		
	β_1^{ns}	3.0964	0.1702	0.8122	3.1388	0.1775	0.8233
		(4.9183)			(5.1225)		
15-year	β_1^r	-0.3461	0.5309	0.0908	-0.3419	0.5316	0.0897
		(-5.6200)			(-5.6657)		
	β_1^{ns}	3.6004	0.3104	0.9444	3.5888	0.3146	0.9413
		(6.3742)			(6.5875)		
20-year	β_1^r	-0.2815	0.5878	0.0738	-0.2807	0.5928	0.0736
		(-7.0612)			(-7.1087)		
	β_1^{ns}	3.9515	0.4608	1.0365	3.9335	0.4617	1.0317
		(9.3629)			(9.4642)		
30-year	β_1^r	-0.2196	0.6255	0.0576	-0.2202	0.6327	0.0577
		(-8.4696)			(-8.5351)		
	β_1^{ns}	4.2698	0.6217	1.1200	4.2606	0.6214	1.1175
		(15.1486)			(15.0326)		
50-year	β_1^r	-0.1938	0.6412	0.0508	-0.1943	0.6477	0.0510
		(-9.1502)			(-9.2249)		
	β_1^{ns}	4.4177	0.6868	1.1587	4.4139	0.6868	1.1577
		(19.6465)			(19.3918)		

*This cycle is actually 9.93 years, corresponding to a HP filter smoothing factor of 1600, the smoothing factor used in business cycle analysis.

Table 10: Fiscal Adjustment Betas for Augmented VAR(2) for Each Maturity

The top panel of this table reports the results from regressing $h_{t+1}(r^k)$ on $h_{t+1}(g^{def})$, maturity by maturity (in years). The first two columns show the intercept and the beta, with their t-statistics in parentheses. The third and fourth columns report the R-squared and the fraction of fiscal shocks financed. The middle and bottom panels report similar results for innovations to future returns and to current returns. Innovations are computed from the VAR(2) augmented with excess returns on defense stocks (left panel) or abnormal returns on defense stocks (right panel), and with r_t^k, $k = 1, 5, 10, 15, 20$. We extend the sample period, 1946.I-2008.III, to include data from 1945.IV to keep the number of observations in the estimations constant.

		Excess Returns				Abnormal Returns		
Mat	β_0	$\beta_1^{r,k}$	R^2	Fraction	β_0	$\beta_1^{r,k}$	R^2	Fraction
		$h(r^b)$				$h(r^b)$		
1	0.0019	-0.2772	0.6018	0.0727	0.0018	-0.2730	0.6006	0.0716
	(1.1427)	(-6.9229)			(1.1207)	(-7.0151)		
5	0.0028	-0.3893	0.4106	0.1021	0.0028	-0.3903	0.4256	0.1024
	(0.9219)	(-4.9309)			(0.9126)	(-5.0391)		
10	0.0035	-0.4355	0.2821	0.1142	0.0034	-0.4358	0.2898	0.1143
	(0.8303)	(-4.4847)			(0.8157)	(-4.5073)		
15	0.0043	-0.5354	0.1825	0.1404	0.0041	-0.5214	0.1756	0.1368
	(0.6278)	(-3.1676)			(0.5992)	(-3.1113)		
20	0.0047	-0.6763	0.0950	0.1774	0.0044	-0.6390	0.0861	0.1676
	(0.3959)	(-2.2174)			(0.3649)	(-2.1299)		
		$h^f(r^b)$				$h^f(r^b)$		
1	0.0015	-0.2105	0.5643	0.0552	0.0014	-0.2052	0.5529	0.0538
	(1.0727)	(-6.1110)			(1.0428)	(-6.1704)		
5	0.0025	-0.3415	0.5351	0.0896	0.0024	-0.3306	0.5165	0.0867
	(1.0658)	(-5.9591)			(1.0280)	(-5.9547)		
10	0.0036	-0.4761	0.5087	0.1249	0.0035	-0.4588	0.4843	0.1203
	(1.0698)	(-5.8363)			(1.0232)	(-5.7723)		
15	0.0043	-0.5770	0.5208	0.1514	0.0041	-0.5528	0.4877	0.1450
	(1.0548)	(-6.0126)			(0.9940)	(-5.8294)		
20	0.0039	-0.5297	0.4860	0.1389	0.0037	-0.4988	0.4381	0.1308
	(0.9888)	(-5.4996)			(0.9102)	(-5.1512)		
		$h^c(r^b)$				$h^c(r^b)$		
1	0.0004	-0.0668	0.2599	0.0175	0.0004	0.0677	0.2759	0.0178
	(0.6046)	(-6.2172)			(0.6097)	(-6.5446)		
5	0.0003	-0.0478	0.0176	0.0125	0.0003	-0.0597	0.0282	0.0157
	(0.1555)	(-1.0972)			(0.1681)	(-1.4034)		
10	-0.0001	0.0406	0.0045	-0.0106	-0.0000	0.0230	0.0015	-0.0060
	(-0.0172)	(0.6058)			(-0.0040)	(0.3479)		
15	-0.0001	0.0417	0.0016	-0.0109	-0.0001	0.0314	0.0010	-0.0082
	(-0.0103)	(0.3408)			(-0.0123)	(0.2637)		
20	0.0008	-0.1466	0.0059	0.0385	0.0007	-0.1403	0.0056	0.0368
	(0.0775)	(-0.6009)			(0.0647)	(-0.5946)		