For Online Publication

Internet Appendix of "Debt and Deficits: Fiscal Analysis with Stationary Ratios"

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Abstract

This appendix presents supplementary material and results not included in the main body of the paper.

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IA.1 Data sources and descriptions

IA.1.1 The US 1841-2022

Nominal GDP and GDP deflator data is from the website of Louis Johnston and Samuel H. Williamson.[1]

The **spending, tax and interest payment** data is taken from OMB. We use the most recent observations from OMB. We use total receipts as T_t, and the difference between total outlays and interest payments as X_t.[2]

For interest payment data after 1940 and tax and spending data after 1901, we download directly from FRED website (series named FYFR, FYOINT and FYONET).

We hand collect interest payment data before 1940 (or 1901 for tax and spending) from the most recent digitized archive, the *Annual Report of 1980* (pages 4–14). Data are available from 1791 (end of December). In 1842, Congress changed the beginning of the fiscal year from January 1 to July 1. In 1977, it was changed again from July 1 to October 1 where it remains today. We interpolate the spending and tax data before 1842 to match the change from January to July. We do not make any adjustment for the change in 1977, which means the one-period length between 1976-1977 is effectively 1.25 years. Later, we match the observations of debt market values with fiscal years by taking end of June observations until 1976 and end of September observations thereafter.

As we treat social security taxes as taxes and social security benefit payments as outlays, we are consolidating the Social Security trust fund with the federal government, and as a result we do *not* include the nonmarketable debt held by the Social Security trust fund in our measure of government debt. Conversely, as our measures of tax receipts and expenditures do include transfers between the Federal Reserve and Treasury, we are treating the Federal Reserve as being outside the federal government. We therefore include the marketable debt held by the Federal Reserve in our measure of the debt.

For the **market value of debt**, there are two main data sources. The Dallas Fed provides the market value of marketable debt, V_t, from the 1942. The suitable series according to our definition of debt is the *market value of gross federal debts* from the

[1] See https://www.measuringworth.com/ for details.

[2] Receipts include taxes and other collections from the public. See table 17.1 in https://www.whitehouse.gov/wp-content/uploads/2023/03/ap_17_receipts_fy2024.pdf for details. Outlays are payments that liquidate obligations. Details are given in the chapter on outlays in https://www.whitehouse.gov/wp-content/uploads/2023/03/ap_15_concepts_fy2024.pdf. The US federal government also collects income from the public through market-oriented activities. Collections from these activities are subtracted from gross outlays, rather than being added to taxes and other governmental receipts. See table 18.1 in https://www.whitehouse.gov/wp-content/uploads/2023/03/ap_18_offsetting_fy2024.pdf for details.

spreadsheet on the Dallas Fed's website. For long sample data, the calculation of 'privately held debt' from Robert Hall's website (as used in Hall and Sargent (2021)) is available.

The two sources are similar to each other (see the following figure). We use Dallas Fed's data from 1942 and connect it with Hall-Sargent's data before 1942.

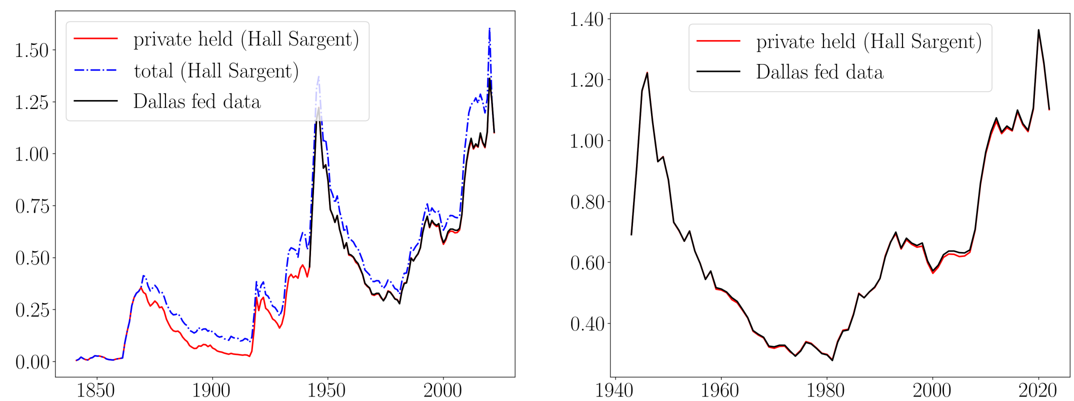


Figure IA.1: Hall-Sargent's data vs. Dallas Fed's 'market value of gross federal debts' (measured as debt-to-GDP ratio)

The US full sample range is 1790s to 2022. As there are three missing data points for the market value of debt from 1838 to 1840, we start from 1841. We match the observations of debt market values with fiscal years. To do so, we use end of June observations until 1976 and end of September observations thereafter.

We take 1 year and 10 year nominal bond yields from FRED after 1953, using variable names GS1 and GS10. Pre-1953 data is from Robert Shiller's website. The variable $yr_{1,t}$ is constructed by taking difference between the one-year yield and lagged inflation between $t-1$ and t. The variable $spr_{1\to 10,t}$ is the difference between the 10 and 1 year yield.

IA.1.2 The UK 1727-2022

The public sector in UK includes central government, local government, the Bank of England and other public corporations. Our measures are of **the central government**.

The **market value of debt** data has two parts: i) For 1727-2016, we use the time series of the 'market value of central government gross debt' from the Bank of England's macro dataset;[3] ii) For 2017-2022, we infer the market value of debt using the BIS's

[3] See https://www.bankofengland.co.uk/statistics/research-datasets.

government debt dataset, which reports (market value of) debt to GDP ratios from 2017 to 2022, and nominal GDP and deflator data from the website of Johnston and Williamson.

The spending (central government expenditure), tax (central government receipt), interest payment data is taken from website of the UK's Office for Budget Responsibility (*historical public finances database*).

IA.1.3 Canada, Japan, Switzerland, and the eurozone

We merge BIS government debt market value to GDP data and IMF public finance data to construct a panel dataset.[4] Debt to GDP ratio series are from BIS website; expenditure and revenue to GDP data, real GDP growth, and inflation data is from IMF; short and long term interest rates data are from FRED's website (source is OECD), monthly series.

Most countries' fiscal year ends in December, so we take December observations as our annual observations if higher frequency data are available. For Canada and Japan, we use March/June observations from year $N+1$ as the year N observation, because the fiscal years of those countries do not align with calendar years. We first compute real return minus GDP growth, then back out the real debt return by adding back the real GDP growth. Similar approaches are used to compute tax, spending, or debt growth rates.

The table below summarizes the starting years for which data are available for Canada, Switzerland, and the 11 eurozone countries.

Table IA.1: Panel data, starting year by country

Year	Countries
1989	CAN
1999	AUT, BEL, CHE, DEU, ESP, FIN
	FRA, GRC, IRL, ITA, NLD, PRT

For Japan 1980-2022. *Market value of debt* is from Koeda and Kimura (2025), which is measured in Yen.[5] We then take nominal GDP from FRED (measured in USD) and

[4]We exclude a number of smaller countries for which data are available (CHL, KOR, LUX, ISR, NOR, and TUR), and five EU countries that are not in the eurozone (CZE, DNK, HUN, POL, SWE) that are not in the eurozone.

[5]We thank the authors for sharing data with us.

convert to Japanese Yen using the exchange rate from BIS.

The other variables—real GDP growth, tax to GDP, spending to GDP and interest payment to GDP—are all from the IMF dataset.

IA.2 Data plots

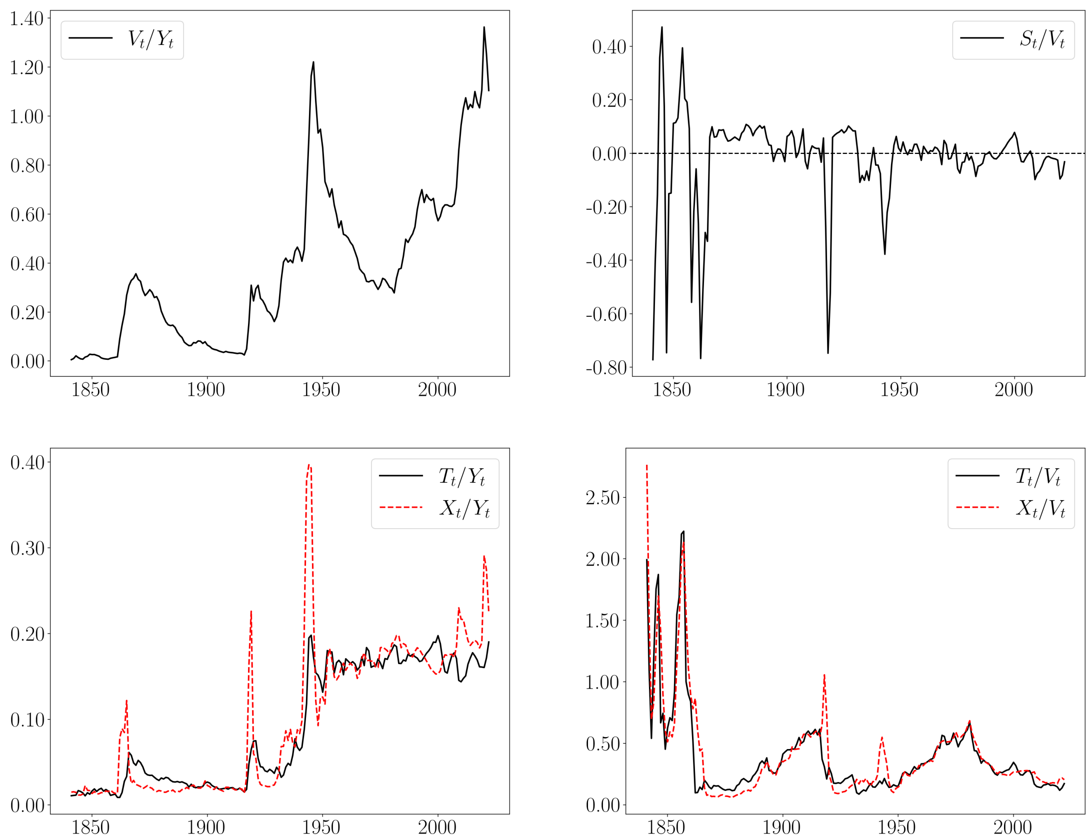


Figure IA.2: USA

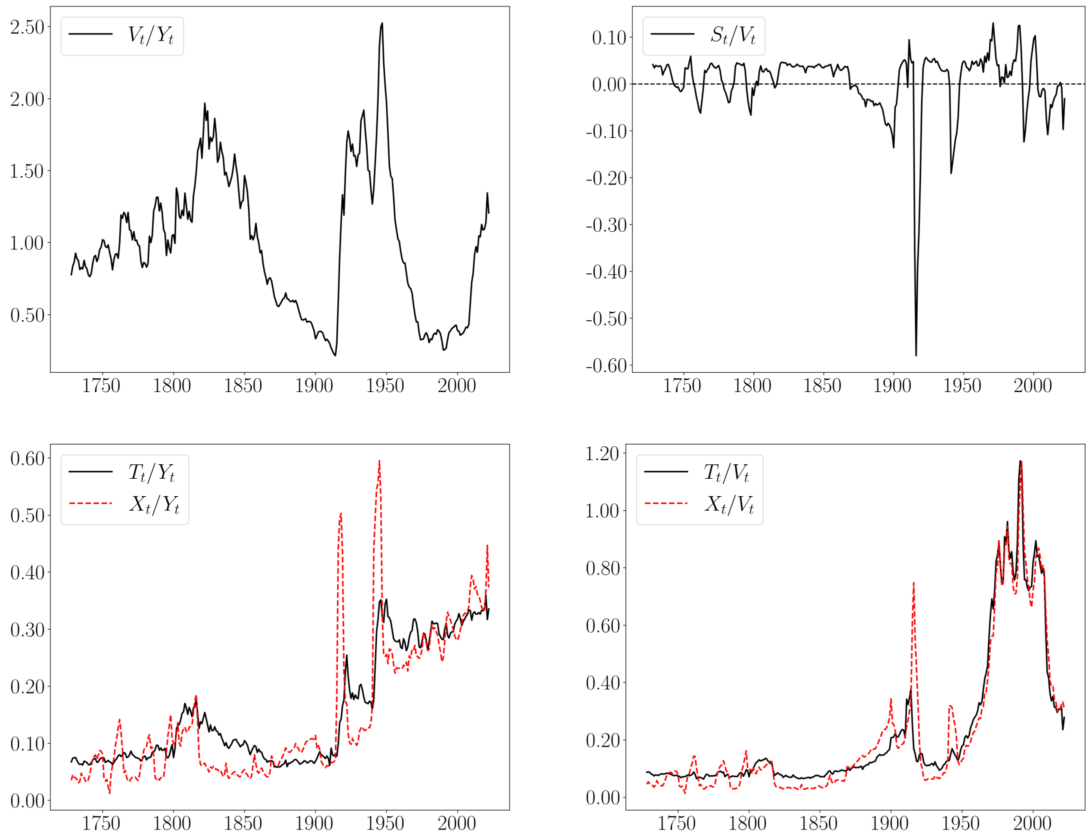


Figure IA.3: GBR

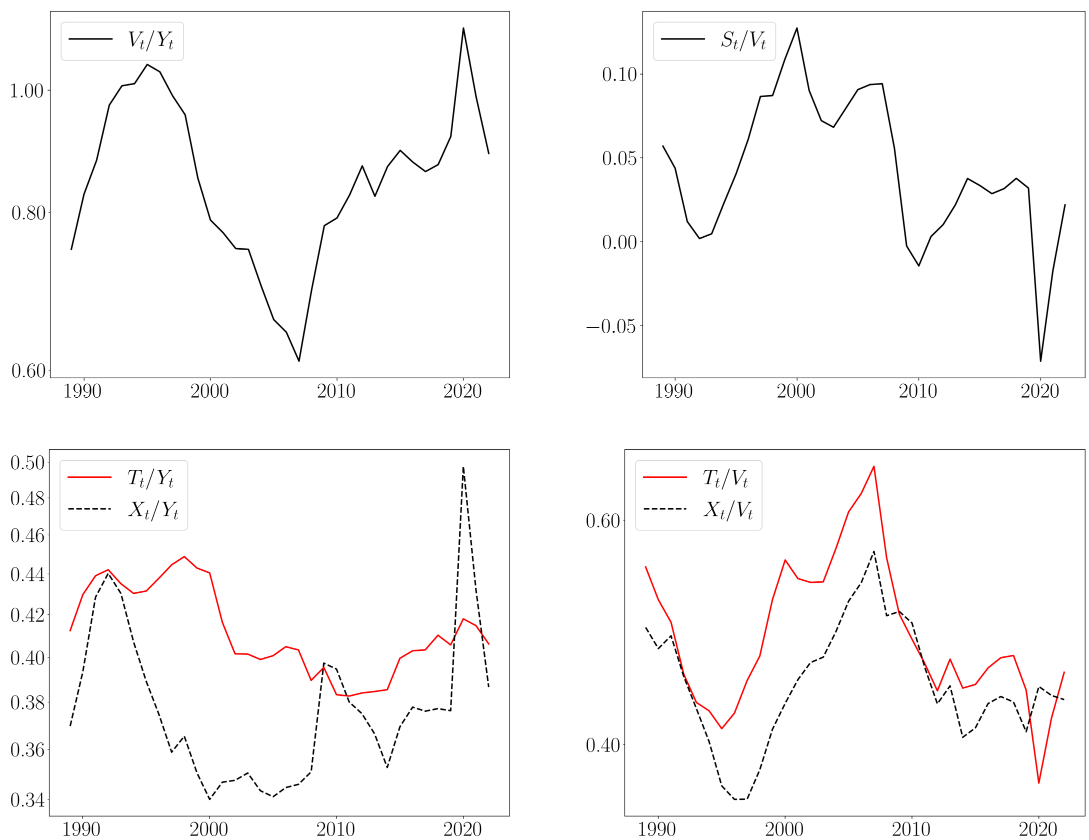


Figure IA.4: CAN

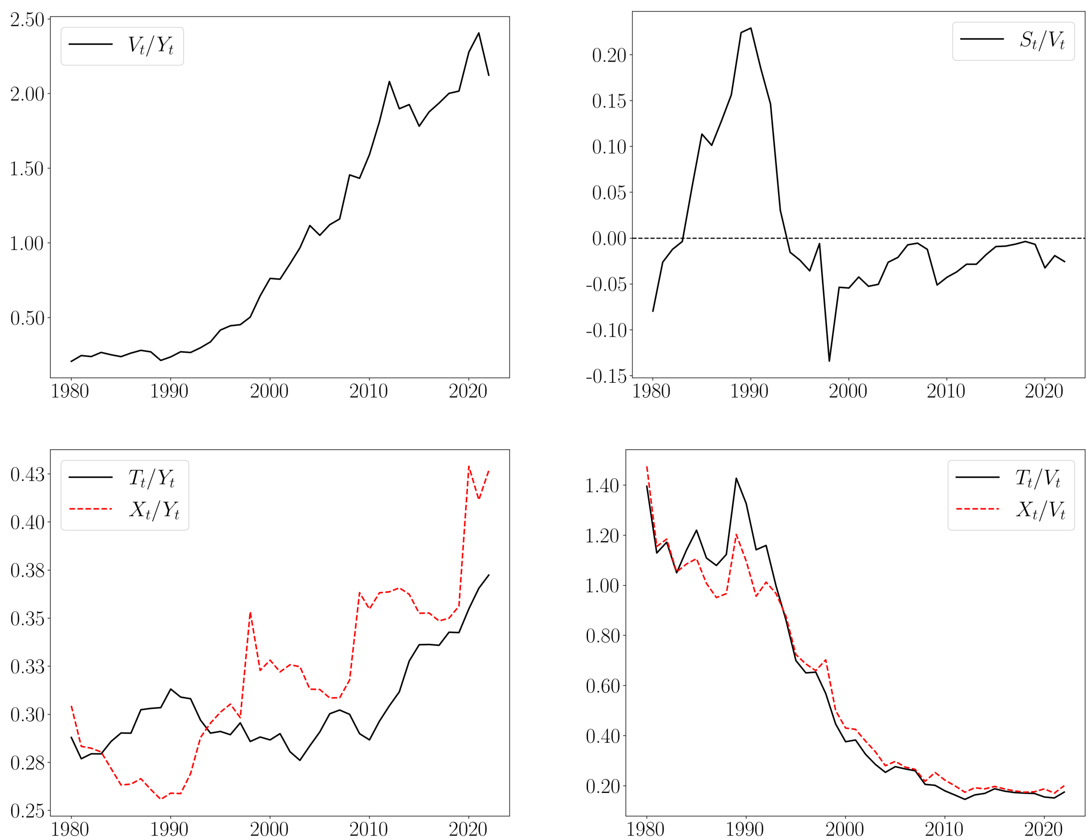


Figure IA.5: JPN

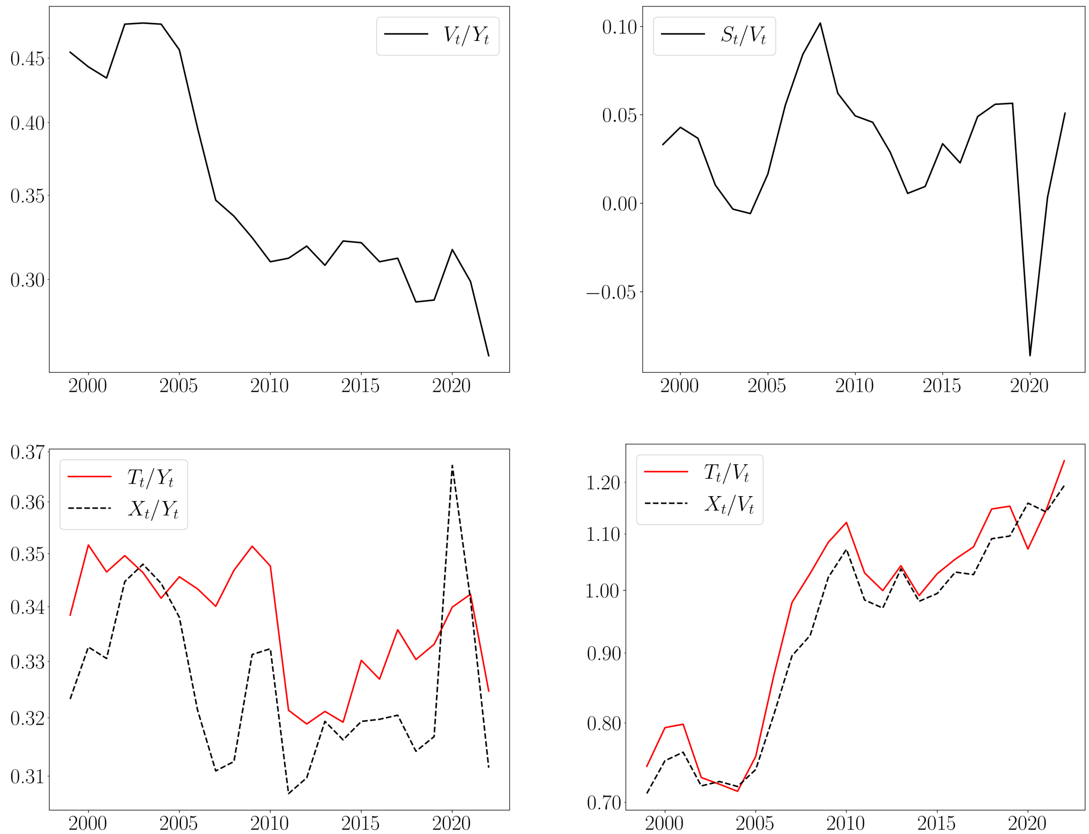


Figure IA.6: CHE

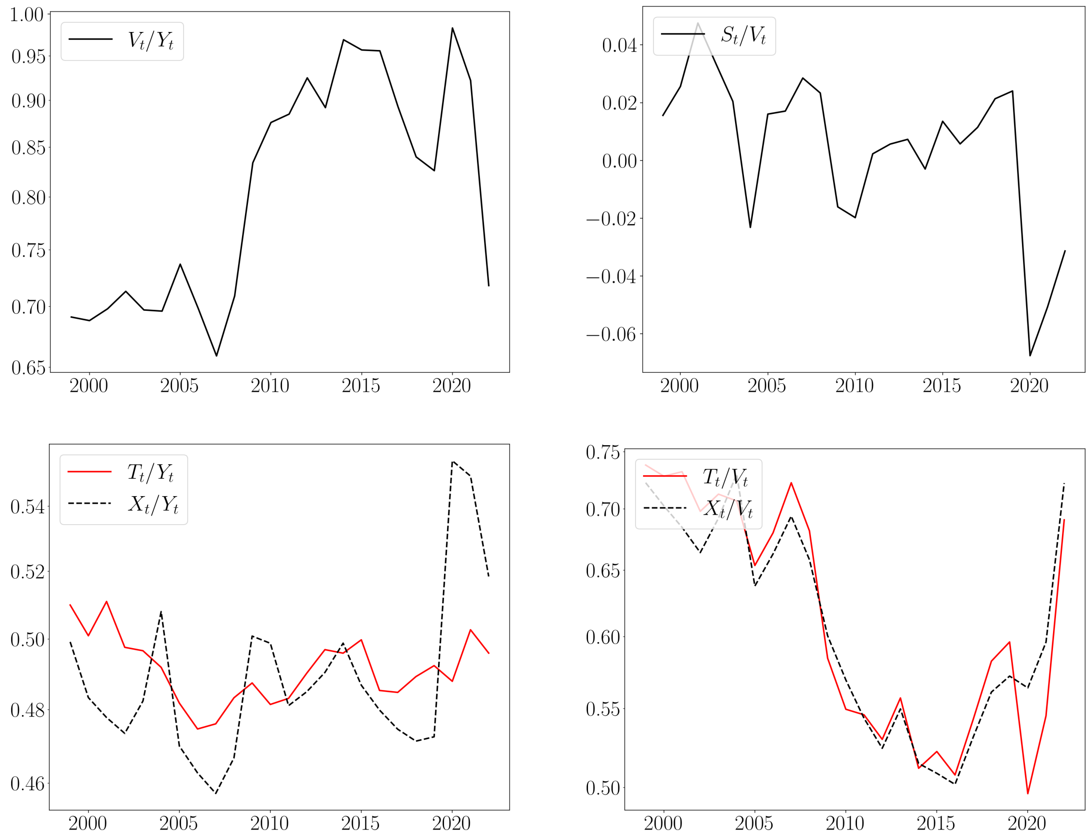


Figure IA.7: AUT

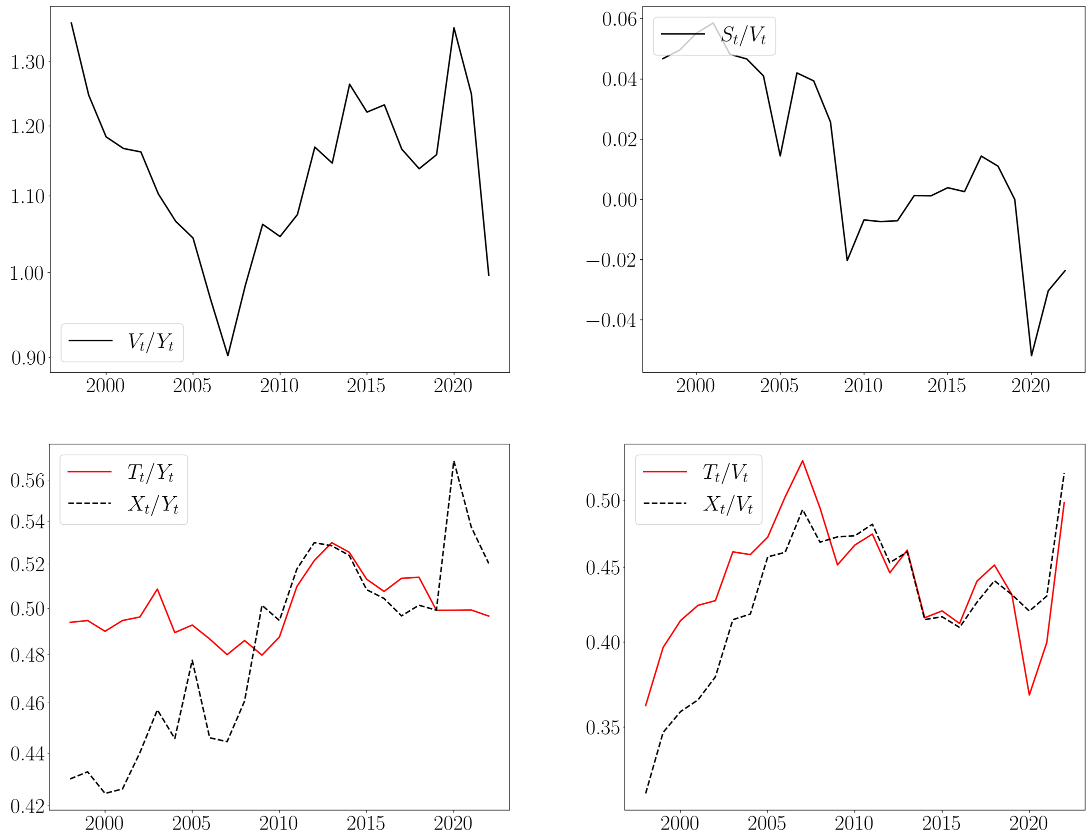


Figure IA.8: BEL

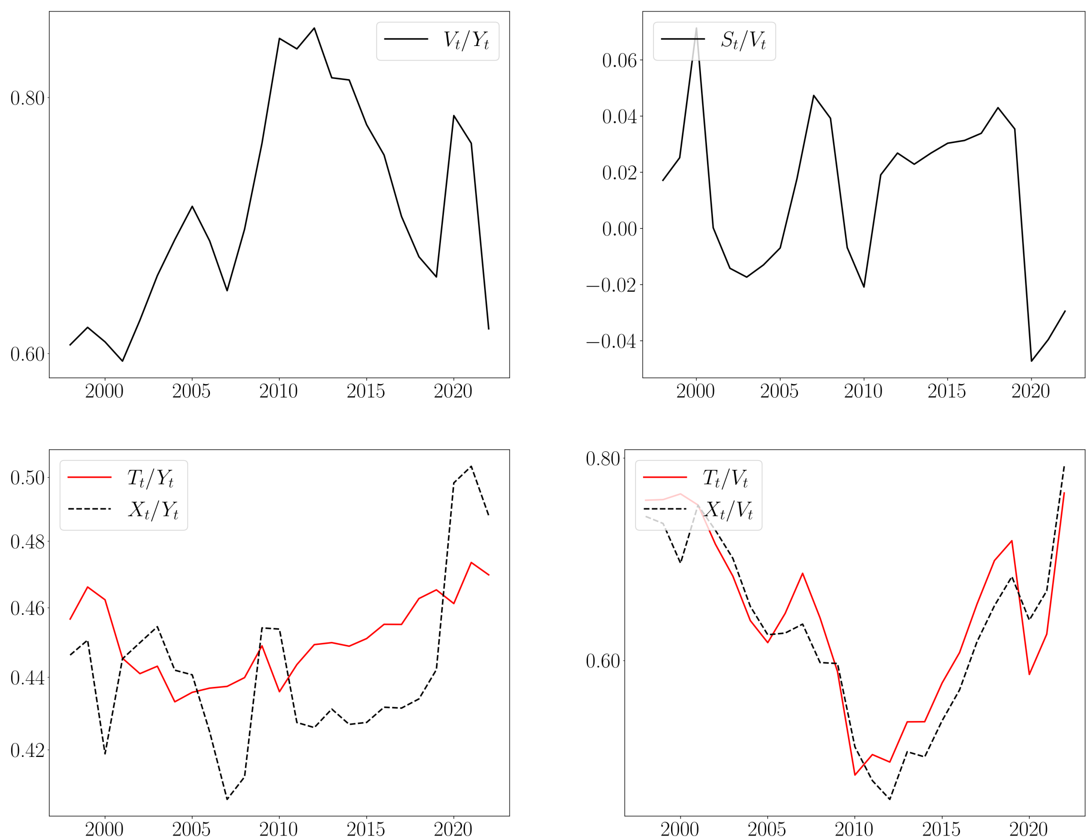


Figure IA.9: DEU

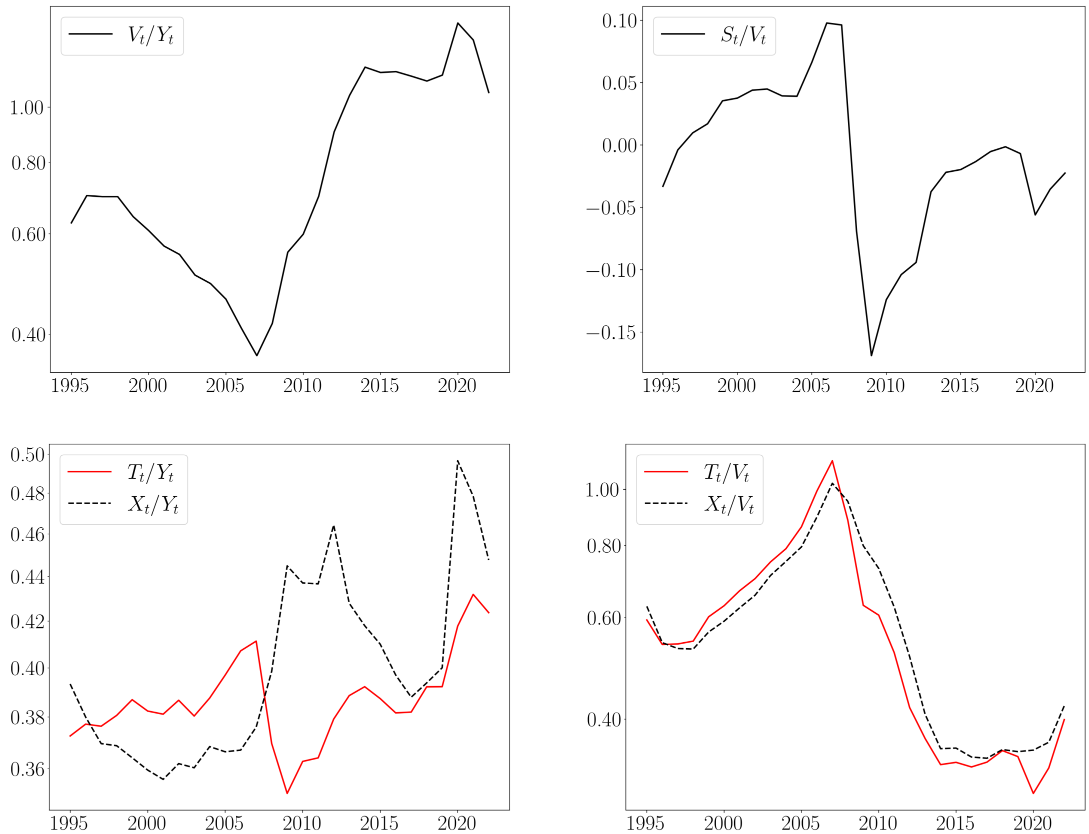


Figure IA.10: ESP

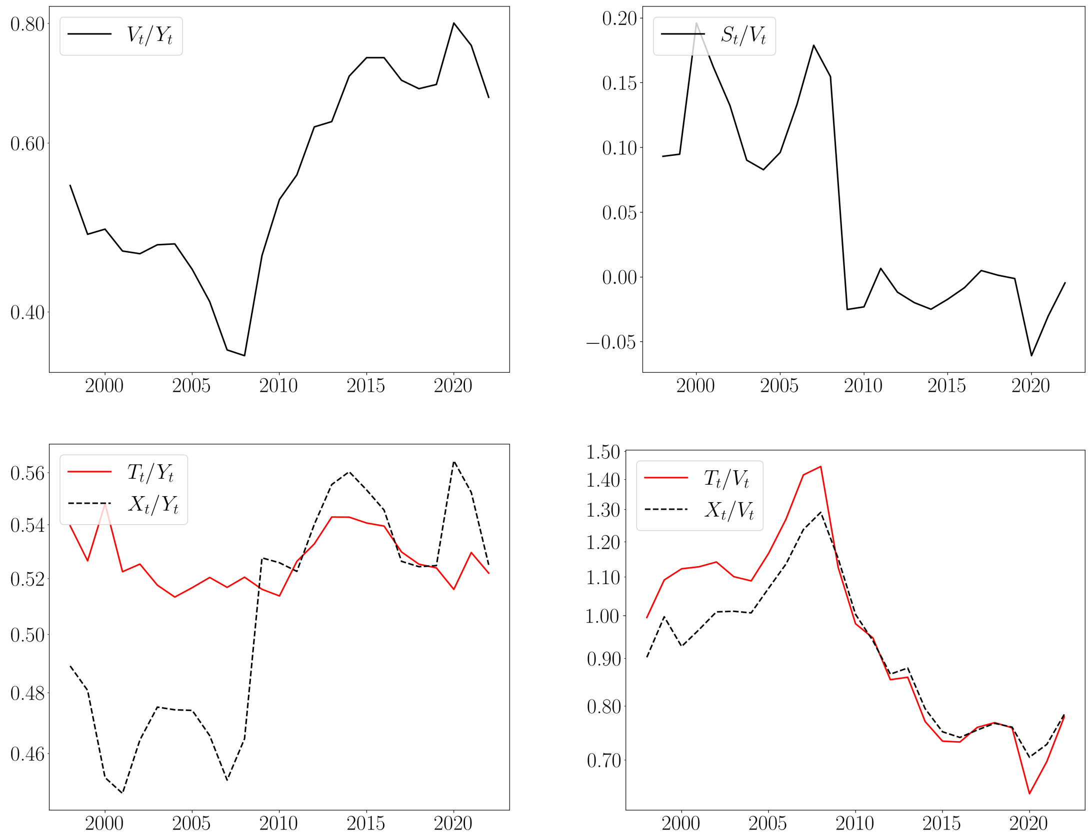


Figure IA.11: FIN

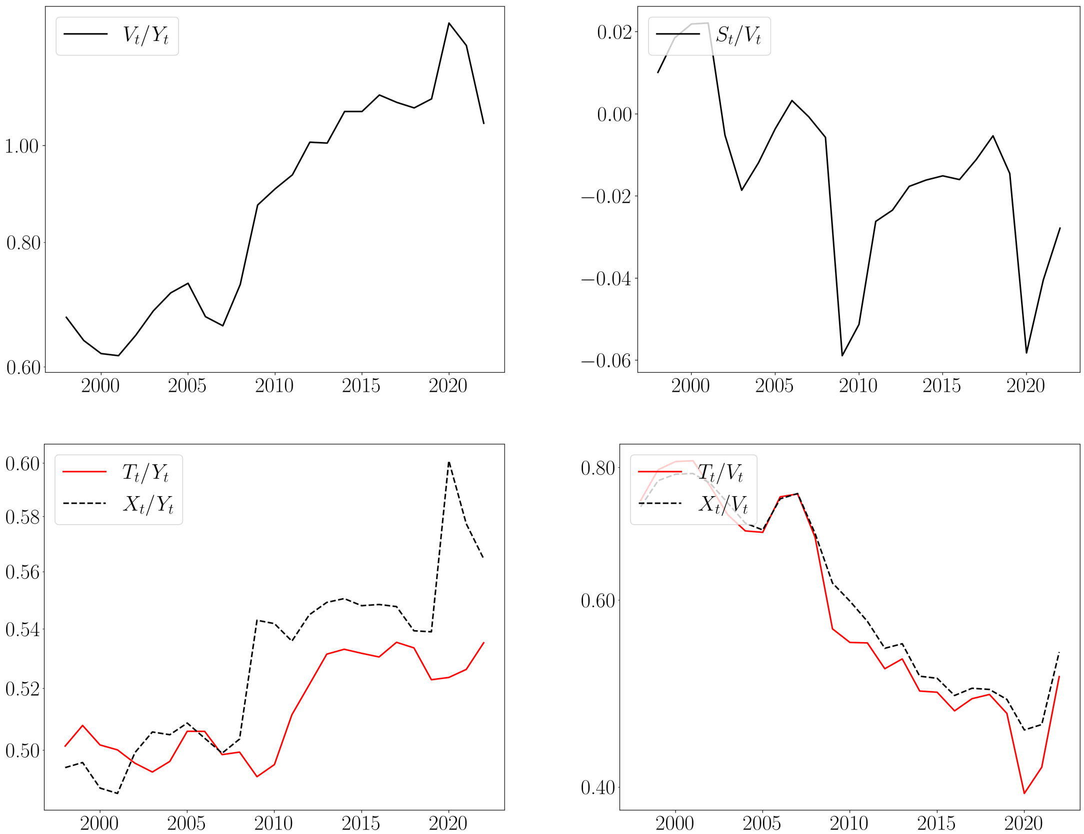


Figure IA.12: FRA

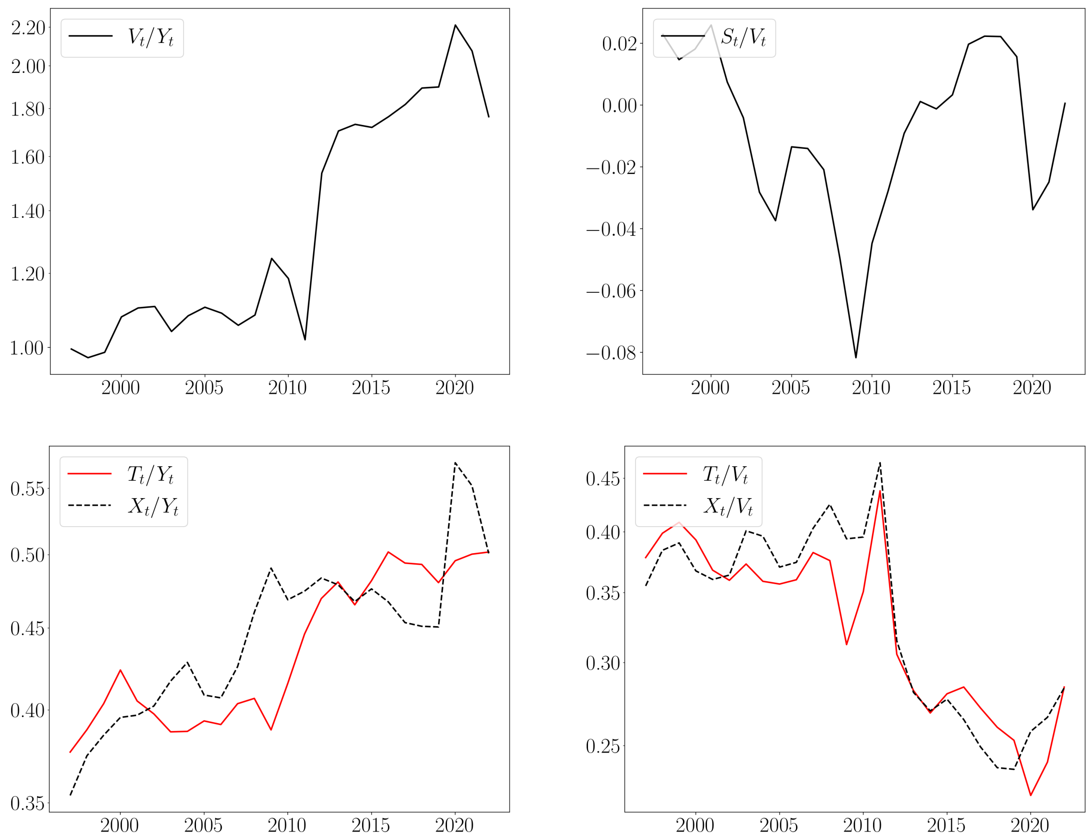


Figure IA.13: GRC

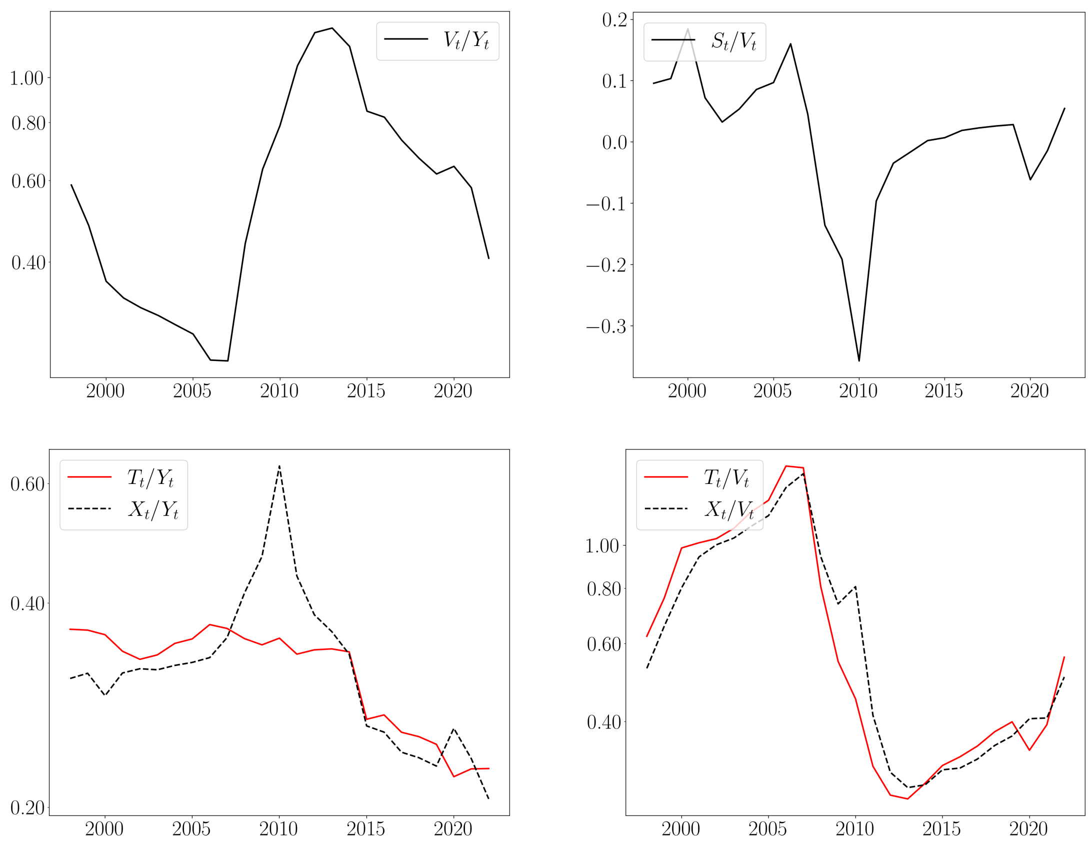


Figure IA.14: IRL

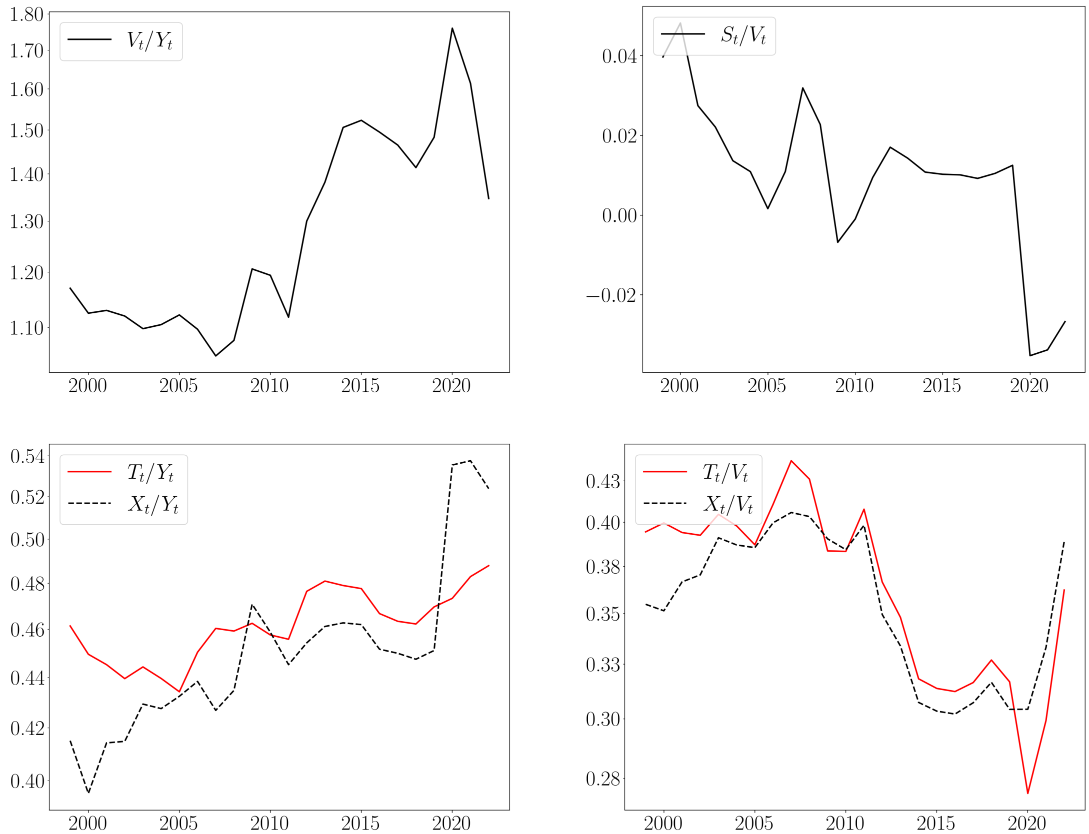


Figure IA.15: ITA

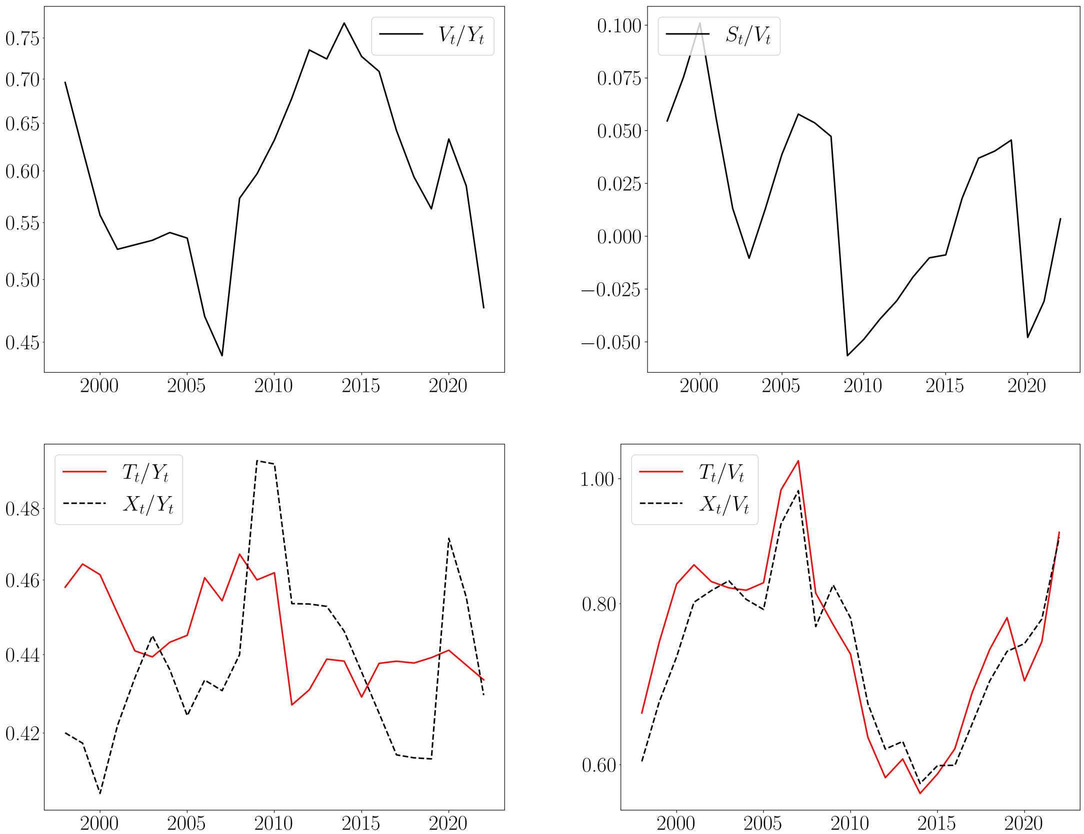


Figure IA.16: NLD

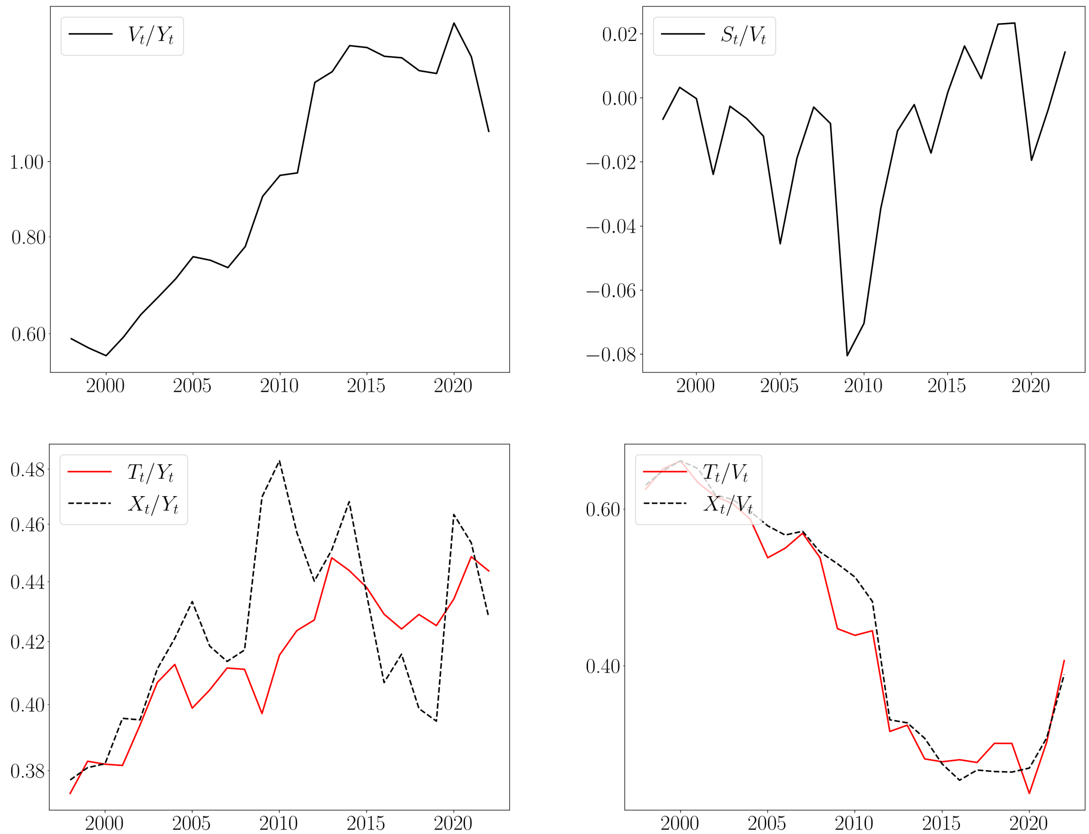


Figure IA.17: PRT

IA.3 Measurement of real debt returns post WWII

Table IA.2: US, UK, Canada, Japan, and Switzerland (1)

The imputed real debt return is regressed on the realized short-term real interest rate, the change in the long-term nominal bond yield, or both. Standard errors are computed using a Newey-West correction with a single lag. The multiple regression equation is the following:

$$r_t = \alpha + \beta\,\left(\text{short yield}_{t-1\to t} - \text{realised inflation}_t\right) + \gamma\,\Delta\text{long yield}_t + \varepsilon_t$$

country	α	NW_{se}	β	NW_{se}	γ	NW_{se}	R^2	obs.
	0.01	[0.00]	1.42	[0.15]	—	—	55.3%	76
USA	0.02	[0.00]	—	—	−4.09	[0.47]	60.2%	76
	0.01	[0.00]	1.01	[0.11]	−3.05	[0.36]	84.1%	76
	0.03	[0.01]	1.80	[0.36]	—	—	23.5%	76
GBR	0.03	[0.01]	—	—	−10.27	[1.12]	40.8%	76
	0.03	[0.01]	0.97	[0.34]	−8.49	[1.20]	46.4%	76
	0.05	[0.01]	1.06	[0.32]	—	—	35.1%	33
CAN	0.06	[0.01]	—	—	−4.43	[1.28]	34.4%	33
	0.05	[0.01]	0.78	[0.26]	−3.23	[0.82]	51.0%	33
	0.02	[0.00]	0.73	[0.44]	—	—	13.5%	25
JPN	0.02	[0.01]	—	—	−3.62	[1.94]	20.4%	25
	0.02	[0.00]	0.68	[0.37]	−3.47	[1.85]	32.3%	25
	0.03	[0.01]	1.50	[0.52]	—	—	20.5%	23
CHE	0.02	[0.01]	—	—	−5.85	[0.57]	65.8%	23
	0.02	[0.01]	0.02	[0.37]	−5.83	[0.74]	65.8%	23

Table IA.3: US, UK, Canada, Japan, and Switzerland (2)

The imputed real debt return is regressed on the nominal short rate, the realized inflation rate, the change in the long-term nominal bond yield, and the slope of the term structure (the yield spread between the long-term and short-term interest rate). Standard errors are computed using a Newey-West correction with a single lag.

country	α	nominal short yield	inflation	Δ long yield	slope	R^2	obs.
USA	0.012	1.051	−1.269	−2.759	0.587	86.6%	76
	[0.007]	[0.096]	[0.123]	[0.347]	[0.270]		
GBR	0.016	1.451	−1.277	−8.089	2.067	47.9%	76
	[0.013]	[0.412]	[0.450]	[1.097]	[1.164]		
CAN	0.096	0.394	−1.977	−4.115	−0.904	64.5%	33
	[0.015]	[0.180]	[0.422]	[0.771]	[0.497]		
JPN	0.008	0.930	−0.440	−2.868	1.176	38.3%	25
	[0.004]	[1.163]	[0.360]	[1.825]	[1.070]		
CHE	0.030	0.151	1.128	−7.314	−1.653	71.7%	23
	[0.008]	[0.322]	[0.586]	[0.842]	[0.627]		

Table IA.4: Eurozone countries (1)

The imputed real debt return is regressed on the realized short-term real interest rate, the change in the long-term nominal bond yield, or both. Standard errors are computed using a Newey-West correction with a single lag. The multiple regression equation is the following:

$$r_t = \alpha + \beta\ \left(\text{short yield}_{t-1\to t} - \text{realised inflation}_t\right) + \gamma\,\Delta\text{long yield}_t + \varepsilon_t$$

country	α	NW_{se}	β	NW_{se}	γ	NW_{se}	R^2	obs.
	0.04	[0.01]	2.18	[0.29]	—	—	74.4%	23
AUT	0.01	[0.01]	—	—	−7.76	[1.06]	69.2%	23
	0.03	[0.01]	1.42	[0.19]	−4.49	[0.54]	88.5%	23
	0.03	[0.01]	1.70	[0.34]	—	—	60.9%	24
BEL	0.01	[0.01]	—	—	−6.11	[1.39]	72.3%	24
	0.02	[0.00]	0.99	[0.15]	−4.34	[0.60]	86.8%	24
	0.03	[0.01]	1.63	[0.40]	—	—	54.5%	24
DEU	0.02	[0.01]	—	—	−6.29	[2.11]	50.7%	24
	0.03	[0.01]	1.10	[0.34]	−3.91	[1.31]	68.4%	24
	0.03	[0.01]	1.48	[0.38]	—	—	42.9%	27
ESP	0.02	[0.01]	—	—	−4.68	[0.81]	68.2%	27
	0.02	[0.01]	0.42	[0.30]	−3.97	[0.72]	70.2%	27
	0.08	[0.01]	2.18	[0.24]	—	—	47.7%	24
FIN	0.06	[0.02]	—	—	−5.98	[1.11]	32.6%	24
	0.07	[0.01]	1.71	[0.35]	−3.15	[1.19]	54.4%	24

Table IA.5: Eurozone countries (2)

The imputed real debt return is regressed on the realized short-term real interest rate, the change in the long-term nominal bond yield, or both. Standard errors are computed using a Newey-West correction with a single lag. The multiple regression equation is the following:

$$r_t = \alpha + \beta \left(\text{short yield}_{t-1\to t} - \text{realised inflation}_t\right) + \gamma\,\Delta\text{long yield}_t + \varepsilon_t$$

country	α	NW_{se}	β	NW_{se}	γ	NW_{se}	R^2	obs.
	0.02	[0.01]	1.80	[0.45]	—	—	57.0%	24
FRA	0.01	[0.01]	—	—	−5.98	[1.12]	71.6%	24
	0.02	[0.00]	1.08	[0.21]	−4.44	[0.52]	87.4%	24
	0.01	[0.02]	1.04	[0.44]	—	—	14.2%	25
GRC	0.01	[0.01]	—	—	−3.35	[0.40]	79.6%	25
	0.01	[0.01]	0.01	[0.35]	−3.35	[0.46]	79.6%	25
	0.04	[0.02]	2.16	[0.74]	—	—	23.4%	24
IRL	0.03	[0.02]	—	—	−3.69	[1.56]	17.4%	24
	0.04	[0.02]	1.90	[0.80]	−3.05	[1.66]	35.0%	24
	0.03	[0.01]	1.53	[0.14]	—	—	58.6%	23
ITA	0.02	[0.01]	—	—	−4.67	[0.58]	85.2%	23
	0.02	[0.00]	0.62	[0.16]	−3.69	[0.53]	91.1%	23
	0.03	[0.01]	1.58	[0.43]	—	—	31.8%	24
NLD	0.01	[0.01]	—	—	−5.95	[1.27]	33.2%	24
	0.02	[0.01]	1.00	[0.47]	−3.98	[0.90]	42.5%	24
	0.03	[0.01]	1.39	[0.33]	—	—	33.8%	24
PRT	0.02	[0.01]	—	—	−2.30	[0.56]	60.3%	24
	0.03	[0.01]	0.87	[0.31]	−1.94	[0.55]	71.9%	24

Table IA.6: Eurozone countries (3)

The imputed real debt return is regressed on the nominal short rate, the realized inflation rate, the change in the long-term nominal bond yield, and the slope of the term structure (the yield spread between the long-term and short-term interest rate). Standard errors are computed using a Newey-West correction with a single lag.

country	α	nominal short yield	inflation	Δ long yield	slope	R^2	obs.
AUT	0.023	1.483	−1.324	−4.608	0.100	88.5%	23
	[0.012]	[0.234]	[0.323]	[0.783]	[0.817]		
BEL	0.021	1.007	−0.972	−4.344	0.065	86.8%	24
	[0.009]	[0.235]	[0.305]	[1.000]	[0.869]		
DEU	0.029	0.849	−1.545	−2.828	1.220	71.5%	24
	[0.018]	[0.493]	[0.436]	[1.463]	[1.450]		
ESP	−0.008	0.867	−0.580	−3.234	1.333	76.1%	27
	[0.016]	[0.268]	[0.297]	[0.747]	[0.659]		
FIN	−0.020	3.090	0.177	−4.392	3.206	82.9%	24
	[0.020]	[0.316]	[0.416]	[0.897]	[1.009]		
FRA	0.017	1.076	−0.961	−4.655	−0.232	87.5%	24
	[0.009]	[0.199]	[0.326]	[0.659]	[0.351]		
GRC	−0.008	0.163	0.431	−3.418	0.160	80.4%	25
	[0.020]	[0.427]	[0.437]	[0.409]	[0.224]		
IRL	−0.001	3.614	−0.954	−3.476	−0.114	46.6%	24
	[0.032]	[1.310]	[0.635]	[1.386]	[1.346]		
ITA	−0.009	1.151	−0.804	−2.864	1.303	95.8%	23
	[0.006]	[0.147]	[0.144]	[0.359]	[0.195]		
NLD	0.008	1.768	−0.120	−6.161	−2.421	55.1%	24
	[0.023]	[0.682]	[0.545]	[1.993]	[2.273]		
PRT	−0.007	1.506	−0.812	−1.470	1.007	84.5%	24
	[0.012]	[0.269]	[0.297]	[0.228]	[0.263]		

IA.4 Theoretical values

Table IA.7: Parameters choices

The last three columns report the corresponding sample means.

Country	period	r	g	ρ	β	$\mathbb{E}\,r_t$	$\mathbb{E}\,\Delta y_t$	$\mathbb{E}\,\Delta v$
USA	1841-2022	0.029	0.035	1.006	1.014	0.029	0.035	0.064
		0.055	0.035	0.980	0.952	0.029	0.035	0.064
	1947-2022	0.020	0.030	1.010	1.036	0.021	0.030	0.029
		0.050	0.030	0.980	0.931	0.021	0.030	0.029
GBR	1727-2022	0.021	0.017	0.997	0.975	0.021	0.018	0.019
	1947-2022	0.032	0.024	0.991	0.980	0.032	0.024	0.014
CAN	1989-2022	0.067	0.021	0.955	0.944	0.067	0.021	0.026
CHE	1999-2022	0.025	0.019	0.994	0.993	0.025	0.019	-0.005
JPN	1980-2022	0.085	0.017	0.933	0.912	0.086	0.017	0.079
AUT	1999-2022	0.020	0.016	0.996	0.993	0.020	0.016	0.017
BEL	1999-2022	0.016	0.017	1.001	1.002	0.016	0.017	0.004
DEU	1999-2022	0.024	0.012	0.988	0.984	0.024	0.012	0.013
ESP	1999-2022	0.020	0.017	0.997	0.994	0.020	0.017	0.034
FIN	1999-2022	0.067	0.016	0.950	0.951	0.067	0.016	0.025
FRA	1999-2022	0.017	0.014	0.997	0.993	0.017	0.014	0.032
GRC	1999-2022	0.019	0.005	0.986	0.965	0.019	0.005	0.030
IRL	1999-2022	0.037	0.055	1.019	1.026	0.037	0.055	0.040
ITA	1999-2022	0.018	0.004	0.986	0.977	0.018	0.004	0.010
NLD	1999-2022	0.013	0.017	1.004	1.005	0.013	0.017	0.002
PRT	1999-2022	0.024	0.010	0.986	0.973	0.024	0.010	0.036

IA.5 Summary statistics for US and UK

Table IA.8: Summary statistics of US data, 1841 to 2022

horizon	mean	std	skew	kurt	median	max	min	auto-corr
r_t	0.029	0.102	-0.009	11.502	0.029	0.612	-0.543	0.048
Δx_t	0.049	0.293	1.644	17.469	0.024	1.886	-1.339	0.216
$\Delta \tau_t$	0.048	0.168	1.809	8.414	0.036	1.044	-0.367	0.325
Δv_t	0.064	0.232	3.633	20.421	0.017	1.783	-0.422	0.422
Δy_t	0.035	0.046	-0.473	2.452	0.034	0.169	-0.142	0.284
τv_t	-1.215	0.677	0.715	0.394	-1.286	0.799	-2.448	0.934
xv_t	-1.223	0.790	0.150	-0.104	-1.284	1.017	-2.817	0.958
$\log(1 + S_t/V_t)$	-0.043	0.255	-3.923	17.987	0.007	0.387	-1.479	0.475
S_t/V_t	-0.019	0.169	-2.209	8.142	0.007	0.472	-0.772	0.590
T_t/V_t	0.387	0.366	3.055	10.756	0.276	2.224	0.086	0.865
X_t/V_t	0.405	0.389	2.905	11.097	0.277	2.765	0.060	0.899
fp_t ($\rho = 1.006$)	0.015	0.184	-1.273	4.152	0.020	0.360	-0.870	0.784
fp_t ($\rho = 0.980$)	-0.039	0.182	-1.489	4.643	-0.028	0.284	-0.936	0.773
τy_t	-2.811	0.997	-0.189	-1.542	-2.881	-1.619	-4.728	0.988
xy_t	-2.820	1.108	-0.077	-1.747	-2.515	-0.924	-4.463	0.967
vy_t	-1.596	1.362	-0.859	-0.267	-1.173	0.310	-5.215	0.985
T_t/Y_t	0.091	0.070	0.203	-1.816	0.056	0.198	0.009	0.989
X_t/Y_t	0.100	0.086	0.723	0.173	0.081	0.397	0.012	0.936
S_t/Y_t	-0.009	0.041	-3.183	13.193	0.001	0.059	-0.261	0.736
V_t/Y_t	0.374	0.325	0.937	0.198	0.309	1.364	0.005	0.985

Table IA.9: Summary statistics of US data, 1947 to 2022

horizon	mean	std	skew	kurt	median	max	min	auto-corr
r_t	0.020	0.055	-0.339	0.597	0.019	0.144	-0.140	0.304
Δx_t	0.030	0.119	-1.476	14.762	0.028	0.412	-0.630	0.195
$\Delta \tau_t$	0.031	0.068	-0.133	1.543	0.038	0.227	-0.188	0.227
Δv_t	0.029	0.069	0.230	0.226	0.021	0.186	-0.153	0.443
Δy_t	0.030	0.024	-0.194	0.077	0.030	0.086	-0.027	0.068
τv_t	-1.242	0.450	-0.105	-0.917	-1.261	-0.398	-2.140	0.968
xv_t	-1.213	0.433	-0.035	-0.431	-1.293	-0.381	-2.308	0.975
$\log(1 + S_t/V_t)$	-0.008	0.038	-0.374	0.167	-0.005	0.075	-0.104	0.671
S_t/V_t	-0.008	0.037	-0.262	0.086	-0.005	0.078	-0.098	0.674
T_t/V_t	0.318	0.139	0.612	-0.507	0.283	0.672	0.118	0.963
X_t/V_t	0.326	0.141	0.746	-0.469	0.274	0.683	0.100	0.979
fp_t ($\rho = 1.010$)	0.017	0.045	-0.363	2.727	0.019	0.166	-0.131	0.746
fp_t ($\rho = 0.980$)	-0.058	0.048	-1.072	2.749	-0.050	0.07	-0.228	0.761
τy_t	-1.785	0.074	-0.532	0.723	-1.778	-1.622	-2.028	0.661
xy_t	-1.756	0.163	-0.330	3.992	-1.746	-1.234	-2.379	0.812
vy_t	-0.544	0.425	0.032	-0.958	-0.492	0.310	-1.280	0.983
T_t/Y_t	0.168	0.012	-0.277	0.363	0.169	0.198	0.132	0.663
X_t/Y_t	0.175	0.029	1.021	4.938	0.174	0.291	0.093	0.799
S_t/Y_t	-0.007	0.030	-1.522	4.525	-0.003	0.059	-0.131	0.744
V_t/Y_t	0.634	0.270	0.707	-0.341	0.612	1.364	0.278	0.975

Table IA.10: Summary statistics of UK data, 1727 to 2022

horizon	mean	std	skew	kurt	median	max	min	auto-corr
r_t	0.021	0.074	-0.080	2.220	0.024	0.346	-0.306	0.252
Δx_t	0.026	0.204	1.117	12.107	0.027	1.337	-0.754	0.307
$\Delta \tau_t$	0.023	0.070	1.349	7.672	0.022	0.437	-0.225	0.120
Δv_t	0.019	0.091	2.151	11.892	0.011	0.689	-0.216	0.402
Δy_t	0.018	0.031	-0.555	1.378	0.021	0.101	-0.109	-0.002
τv_t	-1.900	0.826	1.078	-0.124	-2.207	0.160	-2.763	0.994
xv_t	-2.082	1.063	0.374	-0.904	-2.243	0.157	-4.327	0.982
$\log(1 + S_t/V_t)$	0.002	0.084	-5.470	45.001	0.028	0.123	-0.867	0.806
S_t/V_t	0.005	0.070	-3.727	22.722	0.029	0.130	-0.580	0.837
T_t/V_t	0.227	0.254	1.907	2.459	0.110	1.173	0.063	0.989
X_t/V_t	0.222	0.257	1.683	1.772	0.106	1.170	0.013	0.985
fp_t	0.010	0.055	-0.324	0.720	0.008	0.195	-0.197	0.899
τy_t	-2.052	0.612	0.410	-1.442	-2.305	-1.023	-2.845	0.992
xy_t	-2.234	0.796	0.253	-1.002	-2.360	-0.519	-4.398	0.968
vy_t	-0.152	0.559	-0.484	-0.713	-0.039	0.926	-1.538	0.986
T_t/Y_t	0.156	0.099	0.744	-1.106	0.100	0.360	0.058	0.993
X_t/Y_t	0.147	0.122	1.278	0.972	0.094	0.595	0.012	0.962
S_t/Y_t	0.009	0.066	-3.032	12.445	0.020	0.101	-0.361	0.877
V_t/Y_t	0.988	0.487	0.461	-0.284	0.962	2.525	0.215	0.982

Table IA.11: Summary statistics of UK data, 1947 to 2022

horizon	mean	std	skew	kurt	median	max	min	auto-corr
r_t	0.032	0.067	-0.178	-0.217	0.036	0.169	-0.121	0.058
Δx_t	0.019	0.085	-2.973	19.385	0.020	0.275	-0.502	0.213
$\Delta \tau_t$	0.023	0.039	-0.304	1.118	0.024	0.133	-0.102	0.222
Δv_t	0.014	0.094	0.349	0.560	0.012	0.248	-0.216	0.389
Δy_t	0.024	0.026	-2.025	8.793	0.026	0.083	-0.109	0.053
τv_t	-0.706	0.586	-0.480	-1.029	-0.437	0.160	-2.060	0.984
xv_t	-0.758	0.630	-0.623	-0.770	-0.576	0.157	-2.175	0.989
$\log(1 + S_t/V_t)$	0.018	0.054	-0.619	0.470	0.031	0.123	-0.132	0.815
S_t/V_t	0.020	0.054	-0.457	0.279	0.031	0.130	-0.123	0.820
T_t/V_t	0.574	0.285	0.076	-1.294	0.646	1.173	0.127	0.971
X_t/V_t	0.554	0.283	0.043	-1.275	0.562	1.170	0.114	0.975
fp_t	0.008	0.050	-0.590	0.755	0.012	0.110	-0.162	0.825
τy_t	-1.192	0.075	-0.108	-0.832	-1.173	-1.023	-1.338	0.847
xy_t	-1.244	0.160	0.451	-0.544	-1.256	-0.805	-1.501	0.922
vy_t	-0.486	0.605	0.512	-0.918	-0.746	0.926	-1.370	0.988
T_t/Y_t	0.305	0.023	0.025	-0.766	0.310	0.360	0.262	0.842
X_t/Y_t	0.292	0.048	0.771	0.164	0.285	0.447	0.223	0.913
S_t/Y_t	0.013	0.038	-0.742	1.840	0.015	0.097	-0.130	0.806
V_t/Y_t	0.746	0.508	1.495	2.075	0.475	2.525	0.254	0.990

IA.6 Unit root tests and autocorrelation coefficients

sample	variable	r_t	Δx_t	$\Delta \tau_t$	Δv_t	Δy_t
1841-2022	t-stat	-3.70	-9.06	-5.73	-8.76	-7.77
	p-value	0.004	0.000	0.000	0.000	0.000
	auto-corr	0.05	0.22	0.32	0.42	0.28
1947-2022	t-stat	-6.12	-10.95	-5.88	-5.51	-8.18
	p-value	0.000	0.000	0.000	0.000	0.000
	auto-corr	0.30	0.19	0.23	0.44	0.07

Table IA.12: ADF tests for US samples (1)

sample	variable	τv_t	$x v_t$	τy_t	$x y_t$	$v y_t$
1841-2022	t-stat	-3.04	-3.10	-1.59	-1.35	-2.12
	p-value	0.032	0.027	0.488	0.604	0.238
	auto-corr	0.93	0.96	0.99	0.97	0.99
1947-2022	t-stat	-1.64	-2.67	-4.68	-2.22	-0.87
	p-value	0.462	0.079	0.000	0.199	0.797
	auto-corr	0.97	0.98	0.66	0.81	0.98

Table IA.13: ADF tests for US samples (2)

sample	variable	S_t/V_t	$\log(1+S_t/V_t)$	fp_t $(r = \mathbb{E}\, r_t)$	fp_t $(\rho = 0.980)$
1841-2022	t-stat	-4.19	-2.95	-5.02	-5.13
	p-value	0.001	0.040	0.000	0.000
	auto-corr	0.59	0.47	0.78	0.77
1947-2022	t-stat	-3.82	-3.84	-4.46	-3.87
	p-value	0.003	0.002	0.000	0.002
	auto-corr	0.67	0.67	0.75	0.76

Table IA.14: ADF tests for US samples (3)

sample	variable	T_t/V_t	X_t/V_t	T_t/Y_t	X_t/Y_t	S_t/Y_t	V_t/Y_t
1841-2022	t-stat	−5.62	−4.47	−0.61	−1.79	−6.46	−1.13
	p-value	0.000	0.000	0.869	0.384	0.000	0.704
	auto-corr	0.87	0.90	0.99	0.94	0.74	0.99
1947-2022	t-stat	−1.53	−1.68	−4.63	−1.80	−4.02	−0.90
	p-value	0.519	0.439	0.000	0.380	0.001	0.787
	auto-corr	0.96	0.98	0.66	0.80	0.74	0.98

Table IA.15: ADF tests for US samples (4)

sample	variable	r_t	Δx_t	$\Delta \tau_t$	Δv_t	Δy_t
1728-2022	t-stat	−4.63	−8.17	−15.11	−11.15	−17.10
	p-value	0.000	0.000	0.000	0.000	0.000
	auto-corr	0.25	0.31	0.12	0.40	−0.00
1947-2022	t-stat	−7.85	−10.28	−4.61	−5.62	−8.19
	p-value	0.000	0.000	0.000	0.000	0.000
	auto-corr	0.06	0.21	0.22	0.39	0.05

Table IA.16: ADF tests for UK samples (1)

sample	variable	τv_t	xv_t	τy_t	xy_t	vy_t
1728-2022	t-stat	−1.09	−1.54	−1.04	−1.27	−2.26
	p-value	0.719	0.512	0.739	0.642	0.184
	auto-corr	0.99	0.98	0.99	0.97	0.99
1947-2022	t-stat	−2.07	−2.47	−2.33	−1.03	−1.91
	p-value	0.257	0.123	0.163	0.741	0.326
	auto-corr	0.98	0.99	0.85	0.92	0.99

Table IA.17: ADF tests for UK samples (2)

sample	variable	S_t/V_t	$\log(1+S_t/V_t)$	fp_t
1728-2022	t-stat	-5.71	-5.96	-6.00
	p-value	0.000	0.000	0.000
	auto-corr	0.84	0.81	0.90
1947-2022	t-stat	-3.60	-3.60	-2.50
	p-value	0.006	0.006	0.116
	auto-corr	0.82	0.82	0.82

Table IA.18: ADF tests for UK samples (3)

sample	variable	T_t/V_t	X_t/V_t	T_t/Y_t	X_t/Y_t	S_t/Y_t	V_t/Y_t
1728-2022	t-stat	-2.85	-2.25	-0.50	-2.03	-7.08	-2.56
	p-value	0.052	0.189	0.893	0.274	0.000	0.101
	auto-corr	0.99	0.99	0.99	0.96	0.88	0.98
1947-2022	t-stat	-1.81	-1.83	-2.36	-1.49	-2.65	-0.79
	p-value	0.375	0.364	0.153	0.540	0.084	0.821
	auto-corr	0.97	0.98	0.84	0.91	0.81	0.99

Table IA.19: ADF tests for UK samples (4)

Table IA.20: t-tests for difference between mean growth rates, various samples

The table reports tests of differences in means of time series. The difference between two series is regressed against a constant. The test statistics are reported under the null of the intercept being zero. Standard error is Newey-West with 1 lag.

start year		$\Delta\tau_t - \Delta y_t$	$\Delta x_t - \Delta y_t$	$\Delta\tau_t - \Delta v_t$	$\Delta x_t - \Delta v_t$	$\Delta v_t - \Delta y_t$	$\Delta\tau_t - \Delta x_t$
USA 1841	t-stat	1.205	0.650	−0.704	−0.718	1.437	0.038
	p-value	0.228	0.515	0.481	0.473	0.151	0.969
1947	t-stat	0.384	0.769	0.154	0.630	0.051	−0.412
	p-value	0.701	0.442	0.878	0.529	0.959	0.680
GBR 1727	t-stat	1.171	0.610	0.679	0.490	0.228	−0.202
	p-value	0.242	0.542	0.497	0.624	0.820	0.840
1947	t-stat	0.117	0.251	0.753	0.899	−0.744	−0.166
	p-value	0.907	0.802	0.451	0.369	0.457	0.868

null	alternative	test-stat	90%	95%	99%
$r = 0$	$r \geq 1$	40.15	13.43	15.49	19.93
$r = 1$	$r \geq 2$	8.72	2.71	3.84	6.63
$r = 0$	$r \geq 1$	31.42	12.30	14.26	18.52
$r = 1$	$r \geq 2$	8.72	2.71	3.84	6.63

Table IA.21: Johansen test for $(\tau v_t, x v_t)$, US 1841-2022
Top panel is trace test and bottom panel is eigenvalue test

null	alternative	test-stat	90%	95%	99%
$r = 0$	$r \geq 1$	30.03	13.43	15.49	19.93
$r = 1$	$r \geq 2$	3.57	2.71	3.84	6.63
$r = 0$	$r \geq 1$	26.46	12.30	14.26	18.52
$r = 1$	$r \geq 2$	3.57	2.71	3.84	6.63

Table IA.22: Johansen test for $(\tau v_t, x v_t)$, US 1947-2022
Top panel is trace test and bottom panel is eigenvalue test

null	alternative	test-stat	90%	95%	99%
$r = 0$	$r \geq 1$	32.11	13.43	15.49	19.93
$r = 1$	$r \geq 2$	1.24	2.71	3.84	6.63
$r = 0$	$r \geq 1$	30.87	12.3	14.26	18.52
$r = 1$	$r \geq 2$	1.24	2.71	3.84	6.63

Table IA.23: Johansen test for $(\tau v_t, x v_t)$, UK 1728-2022
Top panel is trace test and bottom panel is eigenvalue test

null	alternative	test-stat	90%	95%	99%
$r = 0$	$r \geq 1$	27.24	13.43	15.49	19.93
$r = 1$	$r \geq 2$	3.62	2.71	3.84	6.63
$r = 0$	$r \geq 1$	23.62	12.3	14.26	18.52
$r = 1$	$r \geq 2$	3.62	2.71	3.84	6.63

Table IA.24: Johansen test for $(\tau v_t, x v_t)$, UK 1947-2022
Top panel is trace test and bottom panel is eigenvalue test

Table IA.25: Other 14 countries: unit-root tests for returns and growth rates

country		r_t	$\Delta\tau_t$	Δx_t	Δv_t	Δy_t
AUT	t-stat	−0.954	−6.306	−4.009	−2.804	−4.772
	p-value	0.770	0.000	0.001	0.058	0.000
BEL	t-stat	−1.406	−4.154	−3.017	−2.744	−4.723
	p-value	0.580	0.001	0.033	0.067	0.000
CAN	t-stat	−2.878	−3.553	−4.720	−2.832	−3.956
	p-value	0.048	0.007	0.000	0.054	0.002
CHE	t-stat	−2.302	−2.715	−4.779	−2.605	−4.389
	p-value	0.171	0.071	0.000	0.092	0.000
DEU	t-stat	−1.309	−4.202	−3.719	−2.726	−4.875
	p-value	0.625	0.001	0.004	0.070	0.000
ESP	t-stat	−1.853	−3.384	−2.469	−1.982	−3.125
	p-value	0.355	0.012	0.123	0.295	0.025
FIN	t-stat	−0.516	−4.657	−2.667	−2.420	−3.919
	p-value	0.889	0.000	0.080	0.136	0.002
FRA	t-stat	−1.774	−4.267	−3.674	−2.893	−4.479
	p-value	0.393	0.001	0.004	0.046	0.000
GRC	t-stat	−3.952	−3.326	−2.817	−5.092	−1.837
	p-value	0.002	0.014	0.056	0.000	0.362
IRL	t-stat	−3.531	−2.897	−3.012	−2.228	−2.427
	p-value	0.007	0.046	0.034	0.196	0.134
ITA	t-stat	−1.858	−4.191	−2.434	−3.205	−4.212
	p-value	0.352	0.001	0.132	0.020	0.001
JPN	t-stat	−3.620	−3.610	−4.190	−5.570	−2.930
	p-value	0.005	0.006	0.001	0.000	0.042
NLD	t-stat	−3.281	−2.691	−3.077	−3.077	−3.946
	p-value	0.016	0.076	0.028	0.028	0.002
PRT	t-stat	−2.257	−5.469	−4.445	−1.723	−3.730
	p-value	0.186	0.000	0.000	0.419	0.004

Table IA.26: Other 14 countries: autocorrelations of returns and growth rates

country	r_t	$\Delta\tau_t$	Δx_t	Δv_t	Δy_t
AUT	0.399	−0.293	−0.104	0.159	−0.034
BEL	0.153	−0.044	−0.240	0.103	−0.239
CAN	0.154	0.271	−0.079	0.263	0.109
CHE	−0.061	−0.187	−0.073	0.194	−0.110
DEU	0.214	−0.024	−0.076	0.131	−0.108
ESP	0.375	0.199	0.266	0.579	0.100
FIN	0.504	−0.170	0.380	0.324	0.145
FRA	0.264	−0.009	−0.027	0.240	−0.225
GRC	−0.007	0.185	0.511	−0.175	0.458
IRL	0.089	0.190	−0.021	0.577	0.326
ITA	0.260	−0.182	0.212	0.081	−0.103
JPN	0.210	0.390	−0.370	0.050	0.420
NLD	−0.110	0.002	0.274	0.085	0.061
PRT	−0.003	−0.224	0.197	0.093	0.031

Table IA.27: Other 14 countries: unit-root tests for ratios

country		vy_t	τy_t	xy_t	τv_t	xv_t	fp_t
AUT	t-stat	−1.840	−1.936	−2.948	−1.790	−1.276	−2.634
	p-value	0.361	0.315	0.040	0.386	0.640	0.086
BEL	t-stat	−2.214	−1.908	−1.549	−2.777	−1.775	−1.600
	p-value	0.201	0.328	0.509	0.062	0.393	0.484
CAN	t-stat	−1.92	−1.546	−2.405	−2.195	−1.766	−2.294
	p-value	0.323	0.511	0.14	0.208	0.397	0.174
CHE	t-stat	−0.669	−1.899	−3.338	−0.786	−0.574	−3.012
	p-value	0.855	0.333	0.013	0.823	0.877	0.034
DEU	t-stat	−2.063	−0.913	−2.037	−1.965	−0.695	−3.508
	p-value	0.259	0.784	0.271	0.302	0.848	0.008
ESP	t-stat	−1.461	−2.423	−1.650	−1.461	−2.123	−2.138
	p-value	0.553	0.135	0.457	0.553	0.235	0.230
FIN	t-stat	−1.365	−2.062	−1.855	−1.316	−1.331	−2.101
	p-value	0.599	0.260	0.354	0.622	0.615	0.244
FRA	t-stat	−1.521	−1.143	−1.313	−1.688	−1.588	−2.810
	p-value	0.523	0.697	0.623	0.437	0.490	0.057
GRC	t-stat	−0.903	−0.37	−1.811	−1.580	−1.091	−3.072
	p-value	0.787	0.915	0.375	0.494	0.719	0.029
IRL	t-stat	−1.893	0.189	−0.833	−1.870	−1.269	−2.447
	p-value	0.335	0.972	0.809	0.346	0.643	0.129
ITA	t-stat	−1.545	−1.121	−1.176	−1.781	−1.541	−2.267
	p-value	0.511	0.707	0.684	0.390	0.513	0.183
JPN	t-stat	−0.420	0.120	0.150	−0.660	−0.830	−0.990
	p-value	0.906	0.967	0.969	0.856	0.811	0.757
NLD	t-stat	−1.491	−2.244	−3.145	−1.639	−1.317	−3.342
	p-value	0.538	0.191	0.023	0.463	0.621	0.013
PRT	t-stat	−1.765	−1.667	−2.891	−1.634	−1.529	−2.828
	p-value	0.398	0.448	0.046	0.465	0.519	0.054

Table IA.28: Other 14 countries: autocorrelations of ratios

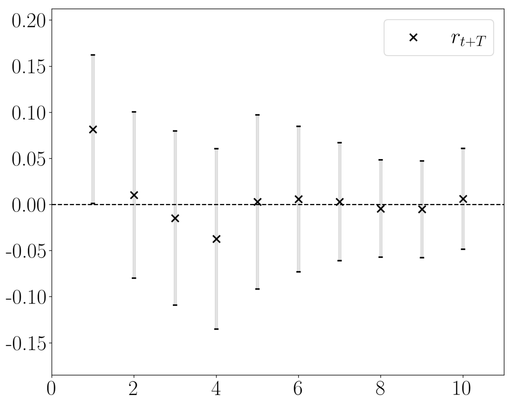
country	vy_t	τy_t	xy_t	τv_t	xv_t	fp_t
AUT	0.807	0.675	0.534	0.806	0.851	0.469
BEL	0.670	0.778	0.847	0.573	0.804	0.814
CAN	0.879	0.916	0.687	0.860	0.882	0.748
CHE	0.946	0.678	0.407	0.938	0.959	0.435
DEU	0.774	0.819	0.662	0.772	0.861	0.498
ESP	0.956	0.743	0.812	0.950	0.961	0.792
FIN	0.935	0.578	0.874	0.929	0.936	0.833
FRA	0.954	0.913	0.846	0.939	0.962	0.635
GRC	0.914	0.944	0.804	0.803	0.877	0.619
IRL	0.920	0.943	0.858	0.937	0.932	0.697
ITA	0.878	0.855	0.822	0.838	0.869	0.697
JPN	0.990	0.960	0.930	0.990	0.990	0.940
NLD	0.788	0.639	0.583	0.819	0.798	0.649
PRT	0.963	0.889	0.662	0.948	0.968	0.454

IA.7 Results for US and UK

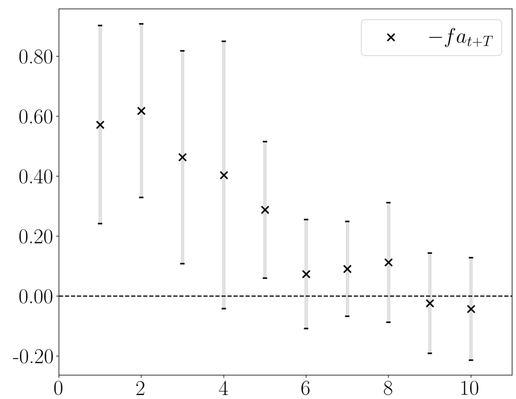
IA.7.1 Local projections

Figure IA.18: What does the US fiscal position predict?

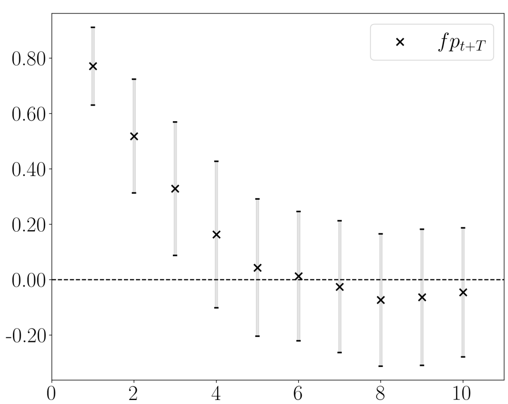
This figure plots estimated slope coefficients (with ± 2 Newey–West standard error bands) from regressions $\theta_{t+T} = \alpha + \beta_{\theta,T}\, fp_t + \varepsilon_{\theta,t+T}$, for $T = 1, \ldots, 10$, where the variables θ_{t+T} are indicated in the legend of each subfigure. US data 1841-2022, $\rho = 0.980$, $\beta = 0.952$.



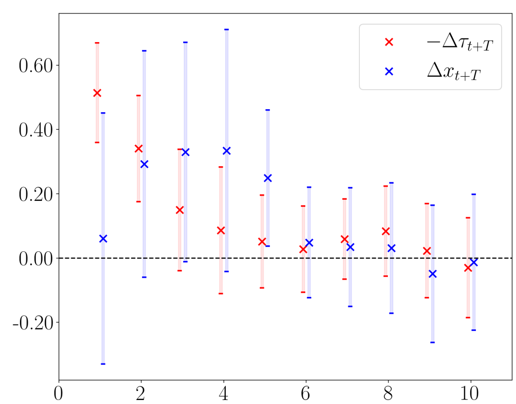
(a) Return



(b) Fiscal Adjustment

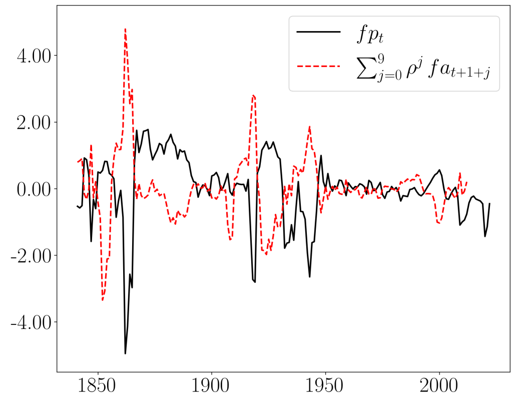


(c) Future fp

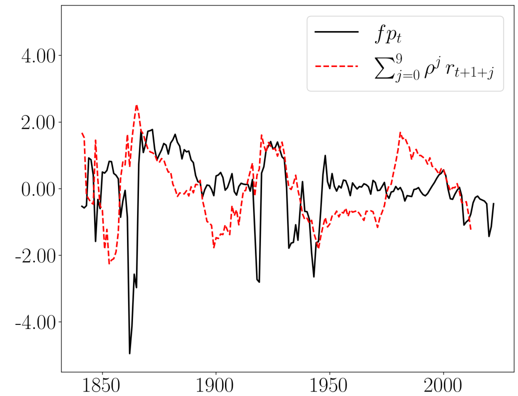


(d) Tax and spending growth

Figure IA.19: The fiscal position and subsequent fiscal adjustment and returns. US data 1841-2022, $\rho = 0.980$, $\beta = 0.952$.



(a) Fiscal Adjustment



(b) Return

Newey–West standard errors reported in the main text set lags equal to 2, 5, and 15, respectively, for $T = 1, 3$ and 10. The standard error for the spending ratio is computed via the delta method using the Newey–West standard errors of $\beta_{\tau,T}$ and $\beta_{x,T}$:

$$\text{s.e. of spending ratio} = \left| \frac{\beta_{\tau,T} \times \text{s.e. of spending}}{(\beta_{x,T} + \beta_{\tau,T})^2} \right| + \left| \frac{\beta_{x,T} \times \text{s.e. of tax}}{(\beta_{x,T} + \beta_{\tau,T})^2} \right|$$

horizon	return	fiscal adjustment	future fp	spending ratio
1	0.2	23.6	75.7	11.0
	[0.1]	[10.1]	[6.5]	[27.5]
3	0.2	63.7	33.3	37.9
	[0.2]	[20.4]	[11.0]	[16.8]
10	0.2	100.4	-3.3	47.2
	[0.5]	[31.3]	[13.5]	[15.8]

Table IA.29: Local projection for US data, 1841 to 2022, $\rho = 0.980$, $\beta = 0.952$

horizon	return	fiscal adjustment	future fp	spending ratio
1	-0.2	26.5	73.9	69.4
	[0.2]	[11.9]	[7.2]	[20.9]
3	-0.1	57.3	43.2	74.3
	[0.4]	[24.3]	[10.3]	[22.2]
10	1.0	78.9	20.7	80.5
	[1.6]	[45.5]	[24.7]	[29.8]

Table IA.30: Local projection for US data, 1947 to 2022, $\rho = 1.010$, $\beta = 1.036$

horizon	return	fiscal adjustment	future fp	spending ratio
1	0.6	24.6	74.3	63.8
	[0.4]	[10.7]	[7.5]	[20.7]
3	0.1	56.1	41.7	72.2
	[0.9]	[24.4]	[10.1]	[23.1]
10	-1.7	75.2	20.9	80.1
	[3.0]	[41.9]	[22.4]	[29.9]

Table IA.31: Local projection for US data, 1947 to 2022, $\rho = 0.980$, $\beta = 0.931$

horizon	return	fiscal adjustment	future fp	spending ratio
1	-0.1	17.4	82.6	85.0
	[0.2]	[8.4]	[6.4]	[22.1]
3	-0.8	39.6	61.0	77.3
	[0.3]	[16.7]	[10.2]	[22.5]
10	-2.0	51.6	49.3	90.1
	[0.8]	[37.9]	[10.8]	[41.4]

Table IA.32: Local projection for UK data, 1947 to 2022, $\rho = 0.991$, $\beta = 0.980$

Table IA.33: More details of covariance between fp_t and returns, US data

This table reports the components of the product

$$\frac{\text{cov}(\sum_{j=0}^{T-1}\rho^j r_{t+1+j}, fp_t)}{\text{var}\, fp_t} = \underbrace{\frac{std(r_t)}{std(fp_t)}}_{(1)} \times \underbrace{\frac{std(\sum_{j=0}^{T-1}\rho^j r_{t+1+j})}{std(r_t)}}_{(2)} \times \underbrace{\text{corr}\left(\sum_{j=0}^{T-1}\rho^j r_{t+1+j}, fp_t\right)}_{(3)}.$$

Period	ρ	β	T	(1)	(2)	(3)
1841-2022	1.006	1.014	1	0.561	0.997	0.171
	1.006	1.014	3	0.561	1.705	0.105
	1.006	1.014	10	0.561	3.079	0.049
	0.980	0.952	1	0.567	0.997	0.163
	0.980	0.952	3	0.567	1.664	0.088
	0.980	0.952	10	0.567	2.758	0.033
1947-2022	1.010	1.036	1	1.223	0.954	0.215
	1.010	1.036	3	1.223	1.857	0.029
	1.010	1.036	10	1.223	4.806	-0.157
	0.980	0.931	1	1.139	0.954	0.251
	0.980	0.931	3	1.139	1.797	0.090
	0.980	0.931	10	1.139	4.202	-0.053

Table IA.34: More details of covariance between fp_t and returns, UK data

This table reports the components of the product

$$\frac{\text{cov}(\sum_{j=0}^{T-1}\rho^j r_{t+1+j}, fp_t)}{\text{var}\, fp_t} = \underbrace{\frac{std(r_t)}{std(fp_t)}}_{(1)} \times \underbrace{\frac{std(\sum_{j=0}^{T-1}\rho^j r_{t+1+j})}{std(r_t)}}_{(2)} \times \underbrace{\text{corr}\left(\sum_{j=0}^{T-1}\rho^j r_{t+1+j}, fp_t\right)}_{(3)}.$$

Period	ρ	β	T	(1)	(2)	(3)
1727-2022	0.997	0.975	1	1.355	0.998	0.314
	0.997	0.975	3	1.355	2.064	0.368
	0.997	0.975	10	1.355	4.910	0.253
1947-2022	0.991	0.980	1	1.321	0.998	-0.095
	0.991	0.980	3	1.321	1.755	-0.346
	0.991	0.980	10	1.321	3.095	-0.485

IA.7.2 VAR estimates

Table IA.35: VAR(1) coefficients for US data, 1841 to 2022, $\rho = 0.980$, $\beta = 0.952$

OLS standard errors are reported in square brackets. The last two columns show imputed coefficients for spending growth and for $fa_{t+1} = \Delta\tau_{t+1} - \beta\Delta x_{t+1}$

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.095	0.201	0.037	0.080	0.013	0.189
	[0.075]	[0.090]	[0.033]	[0.085]	[0.213]	[0.200]
$\Delta\tau_t$	−0.042	0.103	−0.020	−0.034	0.190	−0.078
	[0.061]	[0.074]	[0.027]	[0.069]	[0.174]	[0.163]
Δy_t	0.119	1.171	0.305	0.175	0.793	0.415
	[0.180]	[0.217]	[0.078]	[0.203]	[0.510]	[0.480]
fp_t	0.227	−0.577	−0.028	0.944	−0.431	−0.166
	[0.067]	[0.080]	[0.029]	[0.075]	[0.189]	[0.178]
fp_{t-1}	−0.153	0.155	0.031	−0.211	0.675	−0.488
	[0.079]	[0.095]	[0.034]	[0.089]	[0.223]	[0.210]
R^2	11.02%	46.59%	10.52%	64.81%	8.41%	15.1%

Table IA.36: VAR(1) coefficients for US data, 1947 to 2022, $\rho = 1.010$, $\beta = 1.036$

OLS standard errors are reported in square brackets. The last two columns show imputed coefficients for spending growth and for $fa_{t+1} = \Delta\tau_{t+1} - \beta\Delta x_{t+1}$

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.313	−0.103	0.091	−0.040	0.060	−0.165
	[0.123]	[0.118]	[0.054]	[0.063]	[0.202]	[0.246]
$\Delta\tau_t$	−0.105	0.177	0.019	0.005	0.151	0.021
	[0.115]	[0.110]	[0.050]	[0.058]	[0.187]	[0.229]
Δy_t	0.056	1.918	0.267	0.591	−0.316	2.246
	[0.279]	[0.268]	[0.122]	[0.141]	[0.456]	[0.557]
fp_t	0.499	−0.937	−0.282	0.582	0.617	−1.576
	[0.252]	[0.242]	[0.110]	[0.128]	[0.411]	[0.503]
fp_{t-1}	−0.272	0.587	0.295	0.111	0.155	0.426
	[0.242]	[0.232]	[0.106]	[0.123]	[0.395]	[0.483]
R^2	16.08%	52.15%	16.84%	73.65%	21.53%	37.13%

Table IA.37: VAR(1) coefficients for US data, 1947 to 2022, $\rho = 0.980$, $\beta = 0.931$

OLS standard errors are reported in square brackets. The last two columns show imputed coefficients for spending growth and for $fa_{t+1} = \Delta\tau_{t+1} - \beta\Delta x_{t+1}$

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.311	−0.043	0.074	−0.001	−0.068	0.020
	[0.121]	[0.122]	[0.053]	[0.074]	[0.222]	[0.261]
$\Delta\tau_t$	−0.105	0.173	0.033	0.004	0.179	0.006
	[0.118]	[0.120]	[0.052]	[0.072]	[0.217]	[0.256]
Δy_t	0.053	1.869	0.272	0.600	−0.187	2.042
	[0.275]	[0.279]	[0.122]	[0.169]	[0.506]	[0.596]
fp_t	0.476	−0.713	−0.312	0.762	0.114	−0.819
	[0.239]	[0.242]	[0.106]	[0.147]	[0.439]	[0.517]
fp_{t-1}	−0.227	0.602	0.309	0.190	−0.041	0.640
	[0.250]	[0.254]	[0.111]	[0.154]	[0.460]	[0.542]
R^2	34.65%	47.64%	16.49%	90.56%	2.77%	17.57%

Table IA.38: VAR(1) coefficients for UK data, 1947 to 2022, $\rho = 0.991$, $\beta = 0.980$

OLS standard errors are reported in square brackets. The last two columns show imputed coefficients for spending growth and for $fa_{t+1} = \Delta\tau_{t+1} - \beta\Delta x_{t+1}$

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.097	−0.134	0.132	−0.092	0.082	−0.214
	[0.110]	[0.066]	[0.048]	[0.035]	[0.071]	[0.086]
$\Delta\tau_t$	0.731	0.241	0.026	0.122	−0.060	0.300
	[0.216]	[0.130]	[0.095]	[0.069]	[0.140]	[0.168]
Δy_t	−1.147	0.371	−0.075	0.815	−1.550	1.890
	[0.266]	[0.161]	[0.117]	[0.085]	[0.173]	[0.208]
fp_t	−0.127	−0.097	0.045	0.780	0.451	−0.539
	[0.286]	[0.173]	[0.126]	[0.092]	[0.186]	[0.223]
fp_{t-1}	−0.070	−0.123	0.094	−0.056	0.009	−0.132
	[0.290]	[0.175]	[0.128]	[0.093]	[0.189]	[0.226]
R^2	32.27%	15.90%	12.26%	87.67%	59.08%	60.13%

IA.7.3 Variance decomposition of fp_t

Table IA.39: Variance decomposition for US data, 1841 to 2022, $\rho = 0.980$, $\beta = 0.952$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future fp	spending ratio
1	0.3	22.0	78.3	5.9
	[0.1, 0.4]	[15.6, 29.6]	[70.7, 84.8]	[-43.5, 30.9]
3	0.4	63.6	36.6	33.4
	[0.1, 0.8]	[50.0, 80.0]	[20.3, 50.1]	[0.4, 57.3]
10	0.5	98.4	1.7	44.4
	[-0.1, 1.3]	[91.0, 100.9]	[-0.7, 8.6]	[14.0, 72.9]
∞	0.5	100.1	0.0	44.8
	[-0.1, 1.4]	[99.2, 100.6]	[0.0, 0.0]	[14.7, 72.8]

Table IA.40: Variance decomposition for US data, 1947 to 2022, $\rho = 1.010$, $\beta = 1.036$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future fp	spending ratio
1	-0.3	25.4	76.2	81.0
	[-0.5, 0.0]	[17.2, 36.5]	[65.1, 84.3]	[64.6, 103.6]
3	-0.6	56.3	45.6	85.5
	[-1.2, 0.1]	[32.6, 82.2]	[20.3, 69.0]	[53.6, 123.6]
10	-1.1	89.7	12.8	101.5
	[-2.6, 0.3]	[56.8, 102.1]	[0.9, 44.7]	[52.0, 174.2]
∞	-1.3	102.6	0.0	104.3
	[-4.8, 0.5]	[100.9, 106.1]	[0.0, 0.0]	[52.2, 208.5]

Table IA.41: Variance decomposition for US data, 1947 to 2022, $\rho = 0.980$, $\beta = 0.931$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future fp	spending ratio
1	0.6	3.4	97.4	124.5
	[0.3, 0.8]	[-1.0, 11.0]	[89.8, 101.8]	[-602.8, 701.8]
3	1.8	14.4	85.1	58.2
	[1.1, 2.7]	[6.8, 31.9]	[67.1, 92.7]	[-61.8, 128.9]
10	5.7	31.4	64.2	59.4
	[3.2, 9.0]	[16.3, 66.9]	[29.2, 77.0]	[-97.7, 155.7]
∞	17.6	83.7	0.0	60.3
	[6.3, 37.8]	[63.6, 95.0]	[0.0, 0.0]	[-128.6, 185.6]

Table IA.42: Variance decomposition for UK data, 1947 to 2022, $\rho = 0.991$, $\beta = 0.98$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future fp	spending ratio
1	-0.1	18.1	83.4	77.9
	[-0.3, 0.0]	[10.1, 25.4]	[76.0, 91.4]	[53.4, 122.6]
3	-0.8	46.9	55.2	64.4
	[-1.3, -0.2]	[22.8, 72.9]	[29.3, 79.2]	[37.7, 115.3]
10	-1.8	91.6	11.5	63.2
	[-2.9, -0.6]	[50.9, 106.4]	[-3.5, 53.4]	[28.0, 125.4]
∞	-2.1	103.4	0.0	63.0
	[-6.0, -0.6]	[102.0, 107.3]	[0.0, 0.0]	[27.1, 127.6]

IA.7.4 Unexpected tax and spending news

Table IA.43: Variance decomposition for short-run tax news, US data, 1841 to 2022, $\rho = 0.980$, $\beta = 0.952$

horizon	return	surplus	future fp	spending ratio
1	0.58	54.80	41.40	100.00
	[0.48, 0.67]	[49.52, 58.99]	[37.00, 47.05]	[100.00, 100.00]
3	0.71	70.67	25.40	116.00
	[0.08, 1.43]	[34.69, 103.28]	[-7.17, 61.39]	[88.26, 153.27]
10	0.74	94.89	1.14	102.10
	[-0.06, 1.72]	[86.33, 97.85]	[-1.27, 9.46]	[65.06, 142.32]
∞	0.74	96.03	0.00	101.69
	[-0.07, 1.74]	[95.10, 96.89]	[0.00, 0.00]	[62.77, 142.32]

Table IA.44: Variance decomposition for short-run spending news, US data, 1841 to 2022, $\rho = 0.980$, $\beta = 0.952$

horizon	return	surplus	future fp	spending ratio
1	-0.19	11.86	89.61	0.00
	[-0.23, -0.13]	[10.81, 12.91]	[88.51, 90.64]	[0.00, 0.00]
3	0.39	40.62	60.28	-40.92
	[0.05, 0.77]	[21.21, 55.22]	[45.61, 79.94]	[-187.06, 3.51]
10	0.56	97.63	3.1	16.45
	[-0.11, 1.41]	[85.13, 102.62]	[-1.92, 15.11]	[-24.49, 40.07]
∞	0.56	100.73	0.00	18.02
	[-0.12, 1.53]	[99.77, 101.4]	[0.00, 0.00]	[-19.78, 40.79]

Table IA.45: Variance decomposition for short-run tax news, US data, 1947 to 2022, $\rho = 1.010$, $\beta = 1.036$

horizon	return	surplus	future fp	spending ratio
1	1.30	-3.48	103.47	100.00
	[1.09, 1.51]	[-16.03, 7.16]	[93.28, 115.45]	[100.00, 100.00]
3	1.50	24.68	75.12	207.10
	[0.42, 2.87]	[-36.57, 71.22]	[28.74, 134.88]	[-1335.81, 1265.93]
10	0.85	81.81	18.64	139.17
	[-1.37, 3.64]	[33.4, 98.71]	[1.51, 65.52]	[87.51, 381.87]
∞	0.58	100.72	0.00	136.31
	[-3.89, 4.07]	[97.28, 105.01]	[0.00, 0.00]	[86.33, 300.78]

Table IA.46: Variance decomposition for short-run spending news, US data, 1947 to 2022, $\rho = 1.010$, $\beta = 1.036$

horizon	return	surplus	future fp	spending ratio
1	0.18	-1.12	102.43	0.00
	[0.05, 0.32]	[-4.91, 2.43]	[98.96, 106.13]	[0.00, 0.00]
3	-0.54	62.19	39.84	52.87
	[-1.25, 0.18]	[31.98, 87.24]	[15.04, 69.70]	[20.71, 79.73]
10	-1.10	89.9	12.68	79.33
	[-2.76, 0.17]	[60.08, 101.69]	[1.4, 42.47]	[42.39, 130.12]
∞	-1.28	102.77	0.00	84.90
	[-4.48, 0.43]	[101.04, 105.94]	[0.00, 0.00]	[45.09, 186.86]

Table IA.47: Variance decomposition for short-run tax news, US data, 1947 to 2022, $\rho = 0.980$, $\beta = 0.931$

horizon	return	surplus	future fp	spending ratio
1	-2.18	-22.03	127.38	100.00
	[-2.61, -1.76]	[-29.43, -10.28]	[114.64, 135.28]	[100.00, 100.00]
3	-1.82	-7.71	112.70	-97.49
	[-4.17, 0.14]	[-50.19, 39.15]	[64.41, 156.18]	[-1258.11, 958.55]
10	3.07	17.52	82.58	111.55
	[-1.06, 6.93]	[-16.18, 66.03]	[35.10, 116.87]	[-701.91, 629.16]
∞	18.38	84.79	0.00	71.30
	[2.10, 40.44]	[62.7, 100.65]	[0.00, 0.00]	[-132.18, 264.67]

Table IA.48: Variance decomposition for short-run spending news, US data, 1947 to 2022, $\rho = 0.980$, $\beta = 0.931$

horizon	return	surplus	future fp	spending ratio
1	-0.37	-9.02	110.57	0.00
	[-0.67, -0.1]	[-12.19, -4.55]	[105.93, 113.83]	[0.00, 0.00]
3	1.24	27.42	72.52	24.72
	[-0.29, 2.62]	[-5.06, 55.23]	[44.13, 105.63]	[-191.22, 165.53]
10	4.78	40.32	56.08	30.84
	[2.14, 7.86]	[15.99, 74.53]	[22.14, 79.51]	[-112.55, 102.49]
∞	15.18	86.00	0.00	46.76
	[4.44, 30.79]	[70.42, 96.6]	[0.00, 0.00]	[-82.8, 166.83]

Table IA.49: Variance decomposition for short-run tax news, UK data, 1947 to 2022, $\rho = 0.991$, $\beta = 0.980$

horizon	return	surplus	future fp	spending ratio
1	0.01	22.98	77.92	100.00
	[-0.17, 0.20]	[17.89, 28.55]	[72.15, 83.08]	[100.00, 100.00]
3	1.27	6.75	92.89	389.05
	[0.33, 2.32]	[-41.7, 48.84]	[51.39, 141.49]	[-1646.35, 1112.76]
10	-0.84	77.64	24.11	83.06
	[-2.55, 0.7]	[16.38, 107.1]	[-4.94, 85.0]	[34.74, 241.37]
∞	-1.39	102.3	0.00	77.77
	[-7.42, 0.58]	[100.37, 108.31]	[0.00, 0.00]	[35.3, 166.53]

Table IA.50: Variance decomposition for short-run spending news, UK data, 1947 to 2022, $\rho = 0.991$, $\beta = 0.980$

horizon	return	surplus	future fp	spending ratio
1	-0.14	23.06	78.32	0.00
	[-0.35, 0.06]	[17.26, 28.75]	[72.61, 84.13]	[0.00, 0.00]
3	-0.61	80.33	21.52	47.65
	[-1.17, 0.01]	[51.20, 109.63]	[-7.82, 50.19]	[27.12, 62.43]
10	-1.11	97.87	4.48	50.09
	[-1.95, -0.43]	[78.92, 106.04]	[-3.90, 23.81]	[27.59, 67.34]
∞	-1.22	102.46	0.00	50.57
	[-2.86, -0.46]	[101.69, 104.14]	[0.00, 0.00]	[26.9, 75.15]

IA.7.5 Sensitivity analysis of ρ and β

Table IA.51: Sensitivity analysis for variance decomposition of fp_t, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1841 to 2022.

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.025	1.025	6.69	0.652	-0.1	100.7	52.6
1.010	0.025	1.004	134.20	0.604	0.0	100.6	49.4
1.010	0.025	1.114	10.41	0.894	-1.0	101.6	67.5
1.005	0.030	1.013	6.45	0.623	0.0	100.6	51.3
1.005	0.030	1.002	132.01	0.602	0.0	100.6	49.7
1.005	0.030	1.058	10.07	0.790	-0.2	100.8	59.7
0.999	0.036	0.997	6.22	0.596	0.0	100.5	49.6
0.999	0.036	1.000	129.42	0.599	0.0	100.6	50.0
0.999	0.036	0.988	9.81	0.597	0.0	100.5	47.7
0.995	0.040	0.988	6.11	0.591	0.1	100.5	48.5
0.995	0.040	0.998	127.70	0.597	0.0	100.5	50.1
0.995	0.040	0.942	9.74	0.765	0.6	100.0	38.6
0.990	0.045	0.975	6.01	0.601	0.1	100.4	47.1
0.990	0.045	0.995	125.58	0.595	0.0	100.5	50.3
0.990	0.045	0.883	9.76	0.905	2.6	98.0	28.0
0.980	0.055	0.952	5.94	0.654	0.5	100.1	44.7
0.980	0.055	0.991	121.41	0.588	0.0	100.5	50.7
0.980	0.055	0.764	10.23	0.978	11.6	88.9	25.1
0.970	0.065	0.931	6.05	0.713	1.2	99.3	42.8
0.970	0.065	0.986	117.34	0.579	0.0	100.5	51.1
0.970	0.065	0.642	11.32	0.993	18.5	82.1	44.4
0.960	0.076	0.912	6.31	0.761	2.3	98.2	41.7
0.960	0.076	0.981	113.36	0.565	0.1	100.5	51.4
0.960	0.076	0.518	13.12	0.997	20.8	79.8	62.0

Table IA.52: Sensitivity analysis for variance decomposition of fp_t, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1947 to 2022.

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.020	1.038	0.07	0.825	-1.4	102.7	104.6
1.010	0.020	1.015	0.48	0.789	-0.6	102.0	99.2
1.010	0.020	1.084	0.14	0.929	-2.6	104.0	112.5
1.005	0.025	1.021	0.03	0.796	-0.7	102.1	101.0
1.005	0.025	1.007	0.47	0.796	-0.3	101.7	97.0
1.005	0.025	1.042	0.06	0.857	-1.0	102.3	105.9
0.999	0.031	0.995	0.01	0.827	0.3	101.1	92.7
0.999	0.031	0.999	0.48	0.816	0.1	101.3	94.1
0.999	0.031	0.991	0.03	0.844	0.5	100.8	91.0
0.995	0.035	0.976	0.02	0.9	2.2	99.1	83.7
0.995	0.035	0.993	0.49	0.833	0.4	100.9	91.9
0.995	0.035	0.957	0.04	0.958	6.6	94.7	67.5
0.990	0.040	0.956	0.07	0.951	7.1	94.2	71.4
0.990	0.040	0.985	0.51	0.858	1.1	100.2	89.0
0.990	0.040	0.914	0.10	0.995	29.6	71.7	14.6
0.980	0.050	0.931	0.22	0.98	17.5	83.8	60.5
0.980	0.050	0.97	0.59	0.907	3.8	97.5	82.7
0.980	0.050	0.827	0.36	1.004	40.2	61.2	53.9
0.970	0.061	0.917	0.45	0.987	23.3	78.0	62.4
0.970	0.061	0.954	0.71	0.943	8.8	92.5	76.7
0.970	0.061	0.737	0.82	1.003	32.6	68.8	84.2
0.960	0.071	0.907	0.72	0.991	26.3	75.0	66.8
0.960	0.071	0.938	0.88	0.967	15.4	86.0	72.6
0.960	0.071	0.646	1.52	1.002	28.8	72.6	92.3

Table IA.53: Sensitivity analysis for variance decomposition of fp_t, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1727 to 2022.

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.008	1.11	2.25	0.950	-5.9	106.2	96.4
1.010	0.008	1.008	85.44	0.823	-0.3	100.6	88.0
1.010	0.008	1.157	2.32	0.968	-10.9	111.2	100.3
1.005	0.013	1.051	1.59	0.906	-1.7	102.0	92.3
1.005	0.013	1.004	82.17	0.817	-0.1	100.5	88.0
1.005	0.013	1.079	1.67	0.936	-2.8	103.1	94.8
0.999	0.019	0.992	1.15	0.789	0.2	100.1	87.3
0.999	0.019	0.999	78.37	0.809	0.0	100.3	88.0
0.999	0.019	0.984	1.36	0.766	0.4	100.0	86.3
0.995	0.023	0.963	1.04	0.733	0.8	99.5	84.6
0.995	0.023	0.996	75.91	0.804	0.1	100.3	88.0
0.995	0.023	0.920	1.45	0.854	2.1	98.3	78.4
0.990	0.028	0.938	1.06	0.763	1.6	98.7	82.2
0.990	0.028	0.991	72.93	0.797	0.2	100.2	87.9
0.990	0.028	0.84	1.90	0.967	6.6	93.7	69.8
0.980	0.038	0.907	1.50	0.837	3.5	96.8	79.9
0.980	0.038	0.983	67.24	0.782	0.2	100.1	87.7
0.980	0.038	0.676	4.06	0.995	15.4	85.0	78.4
0.970	0.048	0.887	2.36	0.871	5.7	94.7	79.5
0.970	0.048	0.974	61.95	0.765	0.3	100.0	87.5
0.970	0.048	0.510	8.08	0.998	16.4	83.9	89.8
0.960	0.058	0.873	3.53	0.889	7.8	92.5	79.8
0.960	0.058	0.964	57.05	0.746	0.4	100.0	87.2
0.960	0.058	0.339	14.34	0.999	15.8	84.5	95.3

Table IA.54: Sensitivity analysis for variance decomposition of fp_t, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1947 to 2022.

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.014	1.032	0.10	0.925	-0.6	102.0	81.2
1.010	0.014	1.008	1.11	0.865	0.4	101.0	70.8
1.010	0.014	1.078	0.15	0.971	-12.0	113.4	97.8
1.005	0.019	1.015	0.08	0.893	0.6	100.8	76.2
1.005	0.019	1.004	1.04	0.857	0.3	101.1	70.8
1.005	0.019	1.039	0.13	0.946	-0.8	102.1	87.7
0.999	0.025	0.997	0.06	0.842	-0.2	101.6	69.6
0.999	0.025	0.999	0.97	0.848	-0.1	101.4	70.6
0.999	0.025	0.992	0.14	0.821	-0.7	102.1	66.1
0.995	0.029	0.987	0.06	0.816	-1.2	102.6	65.9
0.995	0.029	0.996	0.92	0.842	-0.4	101.7	70.4
0.995	0.029	0.961	0.18	0.907	-5.7	107.1	45.4
0.990	0.034	0.977	0.07	0.804	-2.3	103.7	62.1
0.990	0.034	0.991	0.86	0.834	-0.8	102.2	70.1
0.990	0.034	0.921	0.25	0.982	-6.9	108.3	35.7
0.980	0.044	0.962	0.09	0.821	-3.0	104.4	57.8
0.980	0.044	0.983	0.76	0.818	-1.9	103.2	69.0
0.980	0.044	0.840	0.51	0.997	10.8	90.5	73.1
0.970	0.054	0.950	0.13	0.849	-1.6	103.0	56.2
0.970	0.054	0.974	0.67	0.802	-2.8	104.2	67.7
0.970	0.054	0.757	0.92	0.998	17.4	84.0	88.9
0.960	0.065	0.940	0.17	0.870	1.2	100.1	56.2
0.960	0.065	0.964	0.60	0.790	-3.3	104.6	66.1
0.960	0.065	0.673	1.51	0.998	19.7	81.7	94.0

Table IA.55: Sensitivity analysis for variance decomposition of short term tax news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1841 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.025	1.025	6.69	0.652	-0.3	102.9	107.2
1.010	0.025	1.004	134.20	0.604	-0.1	101.3	105.4
1.010	0.025	1.114	10.41	0.894	-2.1	110.2	109.7
1.005	0.030	1.013	6.45	0.623	-0.1	101.7	106.5
1.005	0.030	1.002	132.01	0.602	0.0	100.9	105.6
1.005	0.030	1.058	10.07	0.790	-0.6	105.1	109.0
0.999	0.036	0.997	6.22	0.596	0.0	100.3	105.5
0.999	0.036	1.000	129.42	0.599	0.0	100.5	105.7
0.999	0.036	0.988	9.81	0.597	0.1	99.7	104.0
0.995	0.040	0.988	6.11	0.591	0.1	99.4	104.7
0.995	0.040	0.998	127.70	0.597	0.0	100.2	105.7
0.995	0.040	0.942	9.74	0.765	1.0	95.7	94.2
0.990	0.045	0.975	6.01	0.601	0.3	98.3	103.6
0.990	0.045	0.995	125.58	0.595	0.0	99.8	105.8
0.990	0.045	0.883	9.76	0.905	3.6	90.1	73.2
0.980	0.055	0.952	5.94	0.654	0.8	96.0	101.6
0.980	0.055	0.991	121.41	0.588	0.1	99.1	106.0
0.980	0.055	0.764	10.23	0.978	14.5	74.8	66.0
0.970	0.065	0.931	6.05	0.713	1.6	93.6	99.6
0.970	0.065	0.986	117.34	0.579	0.1	98.3	106.1
0.970	0.065	0.642	11.32	0.993	22.6	63.1	96.2
0.960	0.076	0.912	6.31	0.761	2.8	91.1	97.8
0.960	0.076	0.981	113.36	0.565	0.1	97.5	106.1
0.960	0.076	0.518	13.12	0.997	25.3	57.6	121.4

Table IA.56: Sensitivity analysis for variance decomposition of short term tax news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.020	1.038	0.074	0.825	0.6	100.7	136.3
1.010	0.020	1.015	0.488	0.789	0.1	101.9	132.8
1.010	0.020	1.084	0.141	0.929	1.8	97.4	133.6
1.005	0.025	1.021	0.034	0.796	0.4	100.9	134.8
1.005	0.025	1.007	0.478	0.796	0.1	101.6	130.5
1.005	0.025	1.042	0.068	0.857	1.4	99.4	134.9
0.999	0.031	0.995	0.018	0.827	0.0	101.4	125.4
0.999	0.031	0.999	0.481	0.816	0.0	101.3	127.3
0.999	0.031	0.991	0.035	0.844	0.1	101.4	122.7
0.995	0.035	0.976	0.029	0.900	1.4	100.3	109.9
0.995	0.035	0.993	0.491	0.833	0.1	101.0	124.6
0.995	0.035	0.957	0.048	0.958	6.0	96.5	81.8
0.990	0.040	0.956	0.071	0.951	6.4	95.9	88.6
0.990	0.040	0.985	0.513	0.858	0.4	100.5	120.3
0.990	0.040	0.914	0.104	0.995	33.8	70.4	7.2
0.980	0.050	0.931	0.228	0.980	18.2	84.9	71.6
0.980	0.050	0.970	0.590	0.907	2.7	98.1	109.7
0.980	0.050	0.827	0.361	1.004	44.2	62.6	58.2
0.970	0.061	0.917	0.455	0.987	24.6	78.9	73.5
0.970	0.061	0.954	0.713	0.943	7.9	93.2	99.1
0.970	0.061	0.737	0.825	1.003	30.5	78.2	95.7
0.960	0.071	0.907	0.728	0.991	27.6	75.9	79.0
0.960	0.071	0.938	0.885	0.967	15.0	86.5	91.6
0.960	0.071	0.646	1.521	1.002	21.6	88.5	104.7

Table IA.57: Sensitivity analysis for variance decomposition of short term tax news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1727 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.008	1.110	2.25	0.950	-6.8	115.5	105.4
1.010	0.008	1.008	85.44	0.823	-0.4	101.3	105.0
1.010	0.008	1.157	2.32	0.968	-10.9	123.7	106.5
1.005	0.013	1.051	1.59	0.906	-2.6	107.0	105.0
1.005	0.013	1.004	82.17	0.817	-0.2	100.9	104.9
1.005	0.013	1.079	1.67	0.936	-4.1	110.7	105.3
0.999	0.019	0.992	1.15	0.789	0.4	99.3	104.8
0.999	0.019	0.999	78.37	0.809	0.0	100.2	104.8
0.999	0.019	0.984	1.36	0.766	0.7	98.3	104.7
0.995	0.023	0.963	1.04	0.733	1.7	95.7	104.3
0.995	0.023	0.996	75.91	0.804	0.2	99.8	104.7
0.995	0.023	0.920	1.45	0.854	3.8	90.6	102.6
0.990	0.028	0.938	1.06	0.763	2.9	92.5	103.6
0.990	0.028	0.991	72.93	0.797	0.4	99.2	104.6
0.990	0.028	0.840	1.90	0.967	8.5	81.5	96.7
0.980	0.038	0.907	1.50	0.837	4.8	88.4	102.3
0.980	0.038	0.983	67.24	0.782	0.8	97.8	104.3
0.980	0.038	0.676	4.06	0.995	18.4	65.1	99.9
0.970	0.048	0.887	2.36	0.871	6.5	85.7	101.2
0.970	0.048	0.974	61.95	0.765	1.1	96.4	103.9
0.970	0.048	0.510	8.08	0.998	26.0	54.6	104.7
0.960	0.058	0.873	3.53	0.889	8.2	83.4	100.4
0.960	0.058	0.964	57.05	0.746	1.6	94.8	103.5
0.960	0.058	0.339	14.34	0.999	35.1	47.6	104.3

Table IA.58: Sensitivity analysis for variance decomposition of short term tax news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.014	1.032	0.10	0.925	-3.4	105.0	98.8
1.010	0.014	1.008	1.11	0.865	-0.1	102.0	87.2
1.010	0.014	1.078	0.15	0.971	-22.9	124.3	116.2
1.005	0.019	1.015	0.08	0.893	-0.4	101.9	93.7
1.005	0.019	1.004	1.04	0.857	0.0	101.6	87.5
1.005	0.019	1.039	0.13	0.946	-4.0	105.5	106.6
0.999	0.025	0.997	0.06	0.842	-0.1	101.4	86.3
0.999	0.025	0.999	0.97	0.848	0.0	101.3	87.5
0.999	0.025	0.992	0.14	0.821	-0.5	101.8	81.8
0.995	0.029	0.987	0.06	0.816	-0.8	101.9	81.6
0.995	0.029	0.996	0.92	0.842	-0.2	101.3	87.4
0.995	0.029	0.961	0.18	0.907	-4.9	106.2	53.1
0.990	0.034	0.977	0.07	0.804	-1.6	102.4	76.7
0.990	0.034	0.991	0.86	0.834	-0.5	101.3	87.0
0.990	0.034	0.921	0.25	0.982	-3.7	105.1	36.1
0.980	0.044	0.962	0.09	0.821	-1.4	101.7	71.0
0.980	0.044	0.983	0.76	0.818	-1.3	101.3	85.6
0.980	0.044	0.840	0.51	0.997	24.3	77.2	89.5
0.970	0.054	0.950	0.13	0.849	1.4	98.5	68.4
0.970	0.054	0.974	0.67	0.802	-1.7	101.0	83.8
0.970	0.054	0.757	0.92	0.998	37.6	63.9	119.0
0.960	0.065	0.940	0.17	0.870	6.1	93.4	68.1
0.960	0.065	0.964	0.60	0.790	-1.4	100.0	81.7
0.960	0.065	0.673	1.51	0.998	45.2	56.6	131.2

Table IA.59: Sensitivity analysis for variance decomposition of short term spending news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1841 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.025	1.025	6.69	0.652	-0.2	100.4	24.9
1.010	0.025	1.004	134.20	0.604	0.0	101.2	21.9
1.010	0.025	1.114	10.41	0.894	-1.2	97.5	39.6
1.005	0.030	1.013	6.45	0.623	-0.1	100.4	23.7
1.005	0.030	1.002	132.01	0.602	0.0	100.9	22.2
1.005	0.030	1.058	10.07	0.790	-0.3	98.6	31.6
0.999	0.036	0.997	6.22	0.596	0.0	100.6	22.2
0.999	0.036	1.000	129.42	0.599	0.0	100.5	22.5
0.999	0.036	0.988	9.81	0.597	0.1	101.0	20.6
0.995	0.040	0.988	6.11	0.591	0.1	100.7	21.3
0.995	0.040	0.998	127.70	0.597	0.0	100.2	22.8
0.995	0.040	0.942	9.74	0.765	0.6	102.5	12.7
0.990	0.045	0.975	6.01	0.601	0.2	100.8	20.1
0.990	0.045	0.995	125.58	0.595	0.0	99.9	23.0
0.990	0.045	0.883	9.76	0.905	2.6	103.3	3.6
0.980	0.055	0.952	5.94	0.654	0.6	100.7	18.0
0.980	0.055	0.991	121.41	0.588	0.1	99.1	23.5
0.980	0.055	0.764	10.23	0.978	10.9	101.5	-2.5
0.970	0.065	0.931	6.05	0.713	1.2	100.4	16.3
0.970	0.065	0.986	117.34	0.579	0.1	98.4	24.0
0.970	0.065	0.642	11.32	0.993	17.6	102.8	5.0
0.960	0.076	0.912	6.31	0.761	2.2	99.6	15.3
0.960	0.076	0.981	113.36	0.565	0.1	97.6	24.4
0.960	0.076	0.518	13.12	0.997	20.1	108.1	7.3

Table IA.60: Sensitivity analysis for variance decomposition of short term spending news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.020	1.038	0.07	0.825	-1.3	102.8	85.2
1.010	0.020	1.015	0.48	0.789	-0.6	102.6	79.7
1.010	0.020	1.084	0.14	0.929	-2.3	103.1	95.8
1.005	0.025	1.021	0.03	0.796	-0.7	102.1	81.4
1.005	0.025	1.007	0.47	0.796	-0.3	102.0	77.6
1.005	0.025	1.042	0.06	0.857	-1.0	102.0	87.0
0.999	0.031	0.995	0.01	0.827	0.3	101.1	73.8
0.999	0.031	0.999	0.48	0.816	0.1	101.2	74.9
0.999	0.031	0.991	0.03	0.844	0.5	101.0	72.3
0.995	0.035	0.976	0.02	0.9	2.1	99.3	66.4
0.995	0.035	0.993	0.49	0.833	0.4	100.6	73.0
0.995	0.035	0.957	0.04	0.958	5.8	95.8	53.5
0.990	0.040	0.956	0.07	0.951	6.3	95.1	56.5
0.990	0.040	0.985	0.51	0.858	1.1	99.7	70.5
0.990	0.040	0.914	0.10	0.995	24.9	76.9	10.3
0.980	0.050	0.931	0.22	0.98	15.1	86.1	46.9
0.980	0.050	0.970	0.59	0.907	3.6	96.7	65.1
0.980	0.050	0.827	0.36	1.004	32.3	70.1	40.0
0.970	0.061	0.917	0.45	0.987	20.0	80.8	47.9
0.970	0.061	0.954	0.71	0.943	8.0	91.9	59.8
0.970	0.061	0.737	0.82	1.003	25.0	77.8	60.1
0.960	0.071	0.907	0.72	0.991	22.5	77.7	50.9
0.960	0.071	0.938	0.88	0.967	13.7	85.7	55.9
0.960	0.071	0.646	1.52	1.002	21.2	81.7	61.1

Table IA.61: Sensitivity analysis for variance decomposition of short term spending news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1727 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.008	1.110	2.25	0.950	-7.9	107.7	80.8
1.010	0.008	1.008	85.44	0.823	-0.4	101.4	66.8
1.010	0.008	1.157	2.32	0.968	-14.3	113.7	87.3
1.005	0.013	1.051	1.59	0.906	-2.4	102.4	73.7
1.005	0.013	1.004	82.17	0.817	-0.2	100.9	66.7
1.005	0.013	1.079	1.67	0.936	-3.9	103.7	77.7
0.999	0.019	0.992	1.15	0.789	0.3	100.1	65.5
0.999	0.019	0.999	78.37	0.809	0.0	100.2	66.6
0.999	0.019	0.984	1.36	0.766	0.6	99.9	64.1
0.995	0.023	0.963	1.04	0.733	1.3	99.2	61.5
0.995	0.023	0.996	75.91	0.804	0.1	99.8	66.5
0.995	0.023	0.920	1.45	0.854	3.2	97.9	53.4
0.990	0.028	0.938	1.06	0.763	2.5	98.0	58.1
0.990	0.028	0.991	72.93	0.797	0.3	99.3	66.4
0.990	0.028	0.840	1.90	0.967	9.2	92.6	41.5
0.980	0.038	0.907	1.50	0.837	5.0	95.3	54.5
0.980	0.038	0.983	67.24	0.782	0.4	98.3	66.1
0.980	0.038	0.676	4.06	0.995	21.7	81.3	39.8
0.970	0.048	0.887	2.36	0.871	7.6	92.2	53.1
0.970	0.048	0.974	61.95	0.765	0.6	97.2	65.8
0.970	0.048	0.510	8.08	0.998	28.3	73.5	30.2
0.960	0.058	0.873	3.53	0.889	10.1	89.2	52.6
0.960	0.058	0.964	57.05	0.746	0.7	96.1	65.4
0.960	0.058	0.339	14.34	0.999	34.3	49.1	-19.2

Table IA.62: Sensitivity analysis for variance decomposition of short term spending news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return. Two boundary values of β are considered by setting a to reflect the maximum and minimum of T_t/V_t in-sample and imputing the value of b given ρ using $b = 1 + a - \rho^{-1}$; then computing $\beta = b/a$.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment	spending ratio
1.010	0.014	1.032	0.10	0.925	-0.6	102.2	68.3
1.010	0.014	1.008	1.11	0.865	0.2	101.6	58.0
1.010	0.014	1.078	0.15	0.971	-8.9	110.8	84.6
1.005	0.019	1.015	0.08	0.893	0.4	101.1	62.1
1.005	0.019	1.004	1.04	0.857	0.2	101.4	57.1
1.005	0.019	1.039	0.13	0.946	-0.8	102.3	73.7
0.999	0.025	0.997	0.06	0.842	-0.1	101.5	55.2
0.999	0.025	0.999	0.97	0.848	0.0	101.4	56.0
0.999	0.025	0.992	0.14	0.821	-0.5	101.9	52.9
0.995	0.029	0.987	0.06	0.816	-0.7	102.0	52.4
0.995	0.029	0.996	0.92	0.842	-0.2	101.3	55.2
0.995	0.029	0.961	0.18	0.907	-2.9	104.2	46.0
0.990	0.034	0.977	0.07	0.804	-1.4	102.6	50.0
0.990	0.034	0.991	0.86	0.834	-0.5	101.3	54.4
0.990	0.034	0.921	0.25	0.982	-2.7	103.2	45.5
0.980	0.044	0.962	0.09	0.821	-1.6	102.7	47.6
0.980	0.044	0.983	0.76	0.818	-1.1	101.1	52.8
0.980	0.044	0.840	0.51	0.997	7.4	91.4	64.8
0.970	0.054	0.950	0.13	0.849	-0.4	101.4	47.3
0.970	0.054	0.974	0.67	0.802	-1.4	100.7	51.2
0.970	0.054	0.757	0.92	0.998	10.2	84.6	67.0
0.960	0.065	0.940	0.17	0.870	2.0	98.8	47.6
0.960	0.065	0.964	0.60	0.790	-1.3	99.9	49.7
0.960	0.065	0.673	1.51	0.998	9.6	75.1	60.8

IA.7.6 Variance decomposition of unexpected returns

Table IA.63: Variance decomposition of unexpected return news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1841 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment
1.010	0.025	1.025	6.69	0.652	-3.7	71.4
1.005	0.030	1.013	6.45	0.623	-3.5	71.1
0.999	0.036	0.997	6.22	0.596	-3.8	71.0
0.995	0.040	0.988	6.11	0.591	-4.3	70.8
0.990	0.045	0.975	6.01	0.601	-5.4	70.9
0.980	0.055	0.952	5.94	0.654	-9.0	71.6
0.970	0.065	0.931	6.05	0.713	-14.7	73.8
0.960	0.076	0.912	6.31	0.761	-22.4	78.1

Table IA.64: Variance decomposition of unexpected return news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, US data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment
1.010	0.020	1.038	0.07	0.825	-29.0	131.9
1.005	0.025	1.021	0.03	0.796	-30.2	133.9
0.999	0.031	0.995	0.01	0.827	-21.1	125.6
0.995	0.035	0.976	0.02	0.900	-0.6	104.9
0.990	0.040	0.956	0.07	0.951	37.8	65.7
0.980	0.050	0.931	0.22	0.98	81.7	18.5
0.970	0.061	0.917	0.45	0.987	76.8	18.4
0.960	0.071	0.907	0.72	0.991	54.4	34.4

Table IA.65: Variance decomposition of unexpected return news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1727 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment
1.010	0.008	1.110	2.25	0.950	-44.8	126.8
1.005	0.013	1.051	1.59	0.906	-37.4	120.4
0.999	0.019	0.992	1.15	0.789	-34.9	119.9
0.995	0.023	0.963	1.04	0.733	-34.7	120.7
0.990	0.028	0.938	1.06	0.763	-36.1	123.5
0.980	0.038	0.907	1.50	0.837	-42.3	132.2
0.970	0.048	0.887	2.36	0.871	-52.0	142.2
0.960	0.058	0.873	3.53	0.889	-64.3	152.5

Table IA.66: Variance decomposition of unexpected return news, using system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$, UK data 1947 to 2022

Infinite horizon results using different values of ρ. We report the sum of squared approximation errors, maximum eigenvalue of the VAR(1) coefficient matrix and implied theoretical mean of return.

ρ	r	β	approx. error	λ_{max}	return	fiscal adjustment
1.010	0.014	1.032	0.10	0.925	-4.4	104.3
1.005	0.019	1.015	0.08	0.893	18.1	82.3
0.999	0.025	0.997	0.06	0.842	33.3	67.0
0.995	0.029	0.987	0.06	0.816	37.5	62.9
0.990	0.034	0.977	0.07	0.804	38.1	62.5
0.980	0.044	0.962	0.09	0.821	29.0	70.8
0.970	0.054	0.950	0.13	0.849	9.7	88.0
0.960	0.065	0.940	0.17	0.870	-16.7	111.9

IA.8 Results for Canada, Japan, Switzerland and 11 Eurozone countries

IA.8.1 VAR estimates

Table IA.67: VAR coefficient estimates. AUT data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.433	−0.164	−0.175	0.008	−0.181	0.016
	[0.268]	[0.116]	[0.101]	[0.126]	[0.152]	[0.224]
$\Delta\tau_t$	0.833	−0.883	−0.788	−0.552	−0.030	−0.852
	[0.840]	[0.364]	[0.316]	[0.396]	[0.475]	[0.702]
Δy_t	0.049	0.649	0.437	0.916	−0.781	1.425
	[0.904]	[0.392]	[0.341]	[0.426]	[0.511]	[0.756]
fp_t	0.363	−0.281	−0.048	0.378	0.695	−0.971
	[0.712]	[0.309]	[0.268]	[0.336]	[0.403]	[0.595]
fp_{t-1}	1.681	−0.268	−0.470	−0.133	−0.073	−0.195
	[0.768]	[0.333]	[0.289]	[0.362]	[0.434]	[0.642]
R^2	53.62%	44.32%	43.21%	42.05%	30.21%	39.96%

Table IA.68: VAR coefficient estimates. BEL data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	−0.040	−0.214	−0.280	−0.157	0.183	−0.396
	[0.320]	[0.136]	[0.105]	[0.081]	[0.177]	[0.232]
$\Delta\tau_t$	0.238	0.241	0.119	0.270	−0.44	0.682
	[0.676]	[0.288]	[0.222]	[0.171]	[0.374]	[0.490]
Δy_t	−1.491	−0.410	−0.527	−0.289	0.316	−0.727
	[0.960]	[0.408]	[0.315]	[0.243]	[0.531]	[0.695]
fp_t	1.729	−0.316	−0.030	0.586	0.730	−1.047
	[1.238]	[0.527]	[0.407]	[0.314]	[0.684]	[0.897]
fp_{t-1}	−0.631	0.293	0.123	0.283	−0.421	0.715
	[1.117]	[0.475]	[0.367]	[0.283]	[0.618]	[0.809]
R^2	31.00%	16.25%	28.67%	78.12%	24.30%	32.70%

Table IA.69: VAR coefficient estimates. CAN data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.184	−0.120	−0.280	−0.474	0.504	−0.598
	[0.172]	[0.087]	[0.073]	[0.164]	[0.188]	[0.227]
$\Delta\tau_t$	−0.626	0.388	0.328	0.760	−0.576	0.934
	[0.461]	[0.232]	[0.194]	[0.438]	[0.502]	[0.606]
Δy_t	0.023	0.021	0.428	0.444	−0.560	0.552
	[0.681]	[0.343]	[0.287]	[0.649]	[0.743]	[0.896]
fp_t	0.711	−0.135	−0.366	0.330	0.745	−0.841
	[0.383]	[0.193]	[0.161]	[0.365]	[0.418]	[0.504]
fp_{t-1}	−0.423	0.085	0.378	0.452	−0.488	0.548
	[0.346]	[0.174]	[0.146]	[0.329]	[0.377]	[0.455]
R^2	34.75%	17.95%	38.80%	70.27%	37.22%	37.05%

Table IA.70: VAR coefficient estimates. CHE data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.145	−0.132	−0.204	−0.310	0.171	−0.297
	[0.199]	[0.119]	[0.060]	[0.132]	[0.161]	[0.147]
$\Delta\tau_t$	−0.661	−0.054	0.042	0.091	−0.128	0.070
	[0.381]	[0.227]	[0.114]	[0.252]	[0.308]	[0.281]
Δy_t	1.887	−0.213	−0.150	0.724	−1.007	0.763
	[0.903]	[0.539]	[0.271]	[0.597]	[0.729]	[0.666]
fp_t	−0.440	−0.148	−0.122	0.305	0.589	−0.720
	[0.442]	[0.264]	[0.132]	[0.292]	[0.356]	[0.326]
fp_{t-1}	1.030	0.017	−0.087	0.121	−0.137	0.150
	[0.456]	[0.272]	[0.137]	[0.302]	[0.368]	[0.337]
R^2	55.69%	24.11%	60.20%	48.64%	37.23%	51.77%

Table IA.71: VAR coefficient estimates. DEU data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.257	0.018	−0.063	−0.034	0.061	−0.042
	[0.263]	[0.113]	[0.104]	[0.132]	[0.122]	[0.199]
$\Delta\tau_t$	−1.506	0.151	−0.026	0.293	−0.213	0.361
	[0.964]	[0.414]	[0.380]	[0.485]	[0.448]	[0.729]
Δy_t	−0.228	0.115	−0.109	0.348	−0.349	0.458
	[0.832]	[0.357]	[0.327]	[0.418]	[0.386]	[0.629]
fp_t	1.419	−0.385	−0.121	0.363	0.454	−0.832
	[0.590]	[0.253]	[0.232]	[0.297]	[0.274]	[0.446]
fp_{t-1}	−0.449	0.053	−0.180	−0.046	0.123	−0.068
	[0.641]	[0.275]	[0.252]	[0.322]	[0.297]	[0.484]
R^2	36.61%	19.03%	15.64%	45.38%	42.51%	38.76%

Table IA.72: VAR coefficient estimates. ESP data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.396	0.035	0.005	0.047	−0.043	0.079
	[0.214]	[0.172]	[0.145]	[0.143]	[0.148]	[0.260]
$\Delta\tau_t$	−0.863	0.678	0.534	0.370	0.078	0.601
	[0.442]	[0.355]	[0.300]	[0.295]	[0.306]	[0.537]
Δy_t	−0.136	−0.699	−0.359	−0.588	0.267	−0.964
	[0.426]	[0.342]	[0.289]	[0.284]	[0.294]	[0.518]
fp_t	1.223	−0.030	−0.029	1.125	−0.239	0.207
	[0.516]	[0.413]	[0.350]	[0.343]	[0.356]	[0.626]
fp_{t-1}	−0.970	0.068	0.157	−0.236	0.465	−0.394
	[0.447]	[0.358]	[0.303]	[0.298]	[0.309]	[0.543]
R^2	31.73%	22.48%	20.46%	77.19%	34.40%	30.37%

Table IA.73: VAR coefficient estimates. FIN data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.028	−0.043	0.005	−0.134	0.084	−0.123
	[0.223]	[0.140]	[0.124]	[0.191]	[0.070]	[0.203]
$\Delta\tau_t$	−0.031	−0.297	−0.297	−0.145	−0.169	−0.137
	[1.033]	[0.650]	[0.573]	[0.886]	[0.326]	[0.943]
Δy_t	0.182	1.184	0.673	1.067	0.202	0.992
	[0.801]	[0.504]	[0.445]	[0.687]	[0.253]	[0.732]
fp_t	0.076	−0.589	−0.159	0.470	−0.063	−0.529
	[0.702]	[0.442]	[0.390]	[0.603]	[0.222]	[0.642]
fp_{t-1}	0.648	0.501	0.122	0.331	0.172	0.337
	[0.703]	[0.442]	[0.390]	[0.603]	[0.222]	[0.642]
R^2	60.75%	29.05%	11.07%	76.09%	54.81%	22.27%

Table IA.74: VAR coefficient estimates. FRA data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.506	−0.271	−0.326	−0.213	0.173	−0.443
	[0.326]	[0.161]	[0.140]	[0.095]	[0.074]	[0.223]
$\Delta\tau_t$	−0.822	1.616	1.532	0.784	−0.020	1.636
	[1.391]	[0.688]	[0.597]	[0.403]	[0.313]	[0.951]
Δy_t	−0.126	−1.211	−1.114	−0.593	0.032	−1.243
	[0.999]	[0.494]	[0.429]	[0.289]	[0.225]	[0.683]
fp_t	2.036	−1.619	−1.627	0.217	0.013	−1.631
	[1.986]	[0.982]	[0.853]	[0.575]	[0.448]	[1.357]
fp_{t-1}	−1.327	1.535	1.811	0.748	−0.024	1.558
	[2.157]	[1.066]	[0.926]	[0.625]	[0.486]	[1.474]
R^2	33.44%	37.95%	34.97%	80.30%	28.88%	31.85%

Table IA.75: VAR coefficient estimates. GRC data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	−0.047	0.014	0.077	0.003	0.009	0.005
	[0.201]	[0.081]	[0.076]	[0.052]	[0.111]	[0.143]
$\Delta\tau_t$	1.266	0.445	0.543	−0.040	0.521	−0.059
	[0.779]	[0.316]	[0.293]	[0.203]	[0.432]	[0.554]
Δy_t	−1.269	−0.025	0.061	−0.088	0.238	−0.255
	[0.686]	[0.278]	[0.258]	[0.179]	[0.380]	[0.488]
fp_t	−0.227	−0.780	−0.816	1.109	−1.056	0.241
	[0.910]	[0.369]	[0.343]	[0.237]	[0.504]	[0.648]
fp_{t-1}	1.003	0.710	0.998	−0.214	1.242	−0.490
	[1.029]	[0.417]	[0.387]	[0.268]	[0.570]	[0.732]
R^2	23.06%	24.85%	44.34%	83.68%	38.87%	11.63%

Table IA.76: VAR coefficient estimates. IRL data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.127	0.002	−0.225	−0.134	0.193	−0.196
	[0.312]	[0.158]	[0.128]	[0.185]	[0.284]	[0.301]
$\Delta\tau_t$	0.118	0.235	0.091	0.271	−0.155	0.394
	[0.498]	[0.252]	[0.204]	[0.295]	[0.453]	[0.479]
Δy_t	−0.138	0.162	−0.108	0.574	−0.646	0.826
	[0.630]	[0.320]	[0.258]	[0.374]	[0.573]	[0.606]
fp_t	−0.290	−0.012	0.177	0.682	0.405	−0.427
	[0.376]	[0.191]	[0.154]	[0.223]	[0.342]	[0.362]
fp_{t-1}	0.255	−0.007	−0.04	−0.219	0.306	−0.321
	[0.303]	[0.154]	[0.124]	[0.179]	[0.275]	[0.291]
R^2	5.43%	17.22%	27.60%	69.86%	42.87%	45.47%

Table IA.77: VAR coefficient estimates. IRL data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.026	−0.282	−0.171	−0.288	0.212	−0.489
	[0.238]	[0.158]	[0.159]	[0.139]	[0.171]	[0.266]
$\Delta\tau_t$	−0.630	−0.046	−0.080	0.106	−0.217	0.166
	[0.637]	[0.422]	[0.424]	[0.371]	[0.457]	[0.711]
Δy_t	−0.892	−0.010	0.260	−0.285	0.507	−0.505
	[0.610]	[0.404]	[0.406]	[0.356]	[0.438]	[0.681]
fp_t	2.063	−0.631	−0.729	0.962	−0.617	−0.028
	[0.544]	[0.361]	[0.362]	[0.317]	[0.391]	[0.607]
fp_{t-1}	−1.405	0.339	0.633	−0.074	0.507	−0.156
	[0.703]	[0.467]	[0.469]	[0.410]	[0.505]	[0.786]
R^2	65.00%	40.79%	32.26%	68.75%	24.76%	22.65%

Table IA.78: VAR coefficient estimates. JPN data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	−0.075	−0.066	−0.010	−0.145	0.144	−0.197
	[0.166]	[0.052]	[0.036]	[0.068]	[0.068]	[0.094]
$\Delta\tau_t$	0.555	0.476	0.249	0.594	−0.291	0.742
	[0.875]	[0.275]	[0.188]	[0.362]	[0.359]	[0.496]
Δy_t	1.256	0.573	0.257	0.538	−0.253	0.803
	[1.167]	[0.367]	[0.251]	[0.482]	[0.478]	[0.662]
fp_t	−1.072	−0.323	−0.146	0.479	0.489	−0.769
	[0.541]	[0.17]	[0.116]	[0.224]	[0.222]	[0.307]
fp_{t-1}	1.266	0.3	0.17	0.534	−0.514	0.769
	[0.555]	[0.175]	[0.119]	[0.229]	[0.228]	[0.315]
R^2	27.36%	28.91%	23.59%	96.82%	19.07%	22.33%

Table IA.79: VAR coefficient estimates. NLD data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	−0.150	−0.207	−0.155	−0.225	0.111	−0.318
	[0.230]	[0.082]	[0.051]	[0.067]	[0.078]	[0.107]
$\Delta\tau_t$	−0.769	0.12	0.385	0.036	0.064	0.055
	[0.825]	[0.294]	[0.184]	[0.240]	[0.280]	[0.384]
Δy_t	0.386	−0.210	0.009	0.025	−0.242	0.033
	[1.328]	[0.473]	[0.296]	[0.386]	[0.450]	[0.619]
fp_t	0.594	0.085	−0.340	0.842	0.304	−0.221
	[1.096]	[0.391]	[0.245]	[0.319]	[0.371]	[0.510]
fp_{t-1}	−0.022	−0.053	0.239	−0.187	0.211	−0.265
	[0.825]	[0.294]	[0.184]	[0.240]	[0.279]	[0.384]
R^2	10.85%	23.24%	40.34%	69.38%	50.21%	51.48%

Table IA.80: VAR coefficient estimates. PRT data.

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	−0.124	−0.034	−0.135	−0.137	0.243	−0.270
	[0.255]	[0.152]	[0.137]	[0.128]	[0.207]	[0.278]
$\Delta\tau_t$	−0.696	0.239	0.208	−0.093	0.451	−0.200
	[0.601]	[0.359]	[0.323]	[0.301]	[0.488]	[0.656]
Δy_t	−0.224	−0.318	−0.102	−0.092	−0.138	−0.183
	[0.674]	[0.403]	[0.362]	[0.338]	[0.547]	[0.736]
fp_t	1.149	−0.554	−0.329	0.896	−0.373	−0.192
	[0.529]	[0.316]	[0.284]	[0.265]	[0.429]	[0.578]
fp_{t-1}	−1.164	0.483	0.381	−0.048	0.621	−0.121
	[0.552]	[0.330]	[0.296]	[0.277]	[0.448]	[0.603]
R^2	19.38%	19.42%	11.27%	75.02%	17.35%	13.62%

IA.8.2 Variance decomposition of fp_t

Variance decomposition of fp_t based on the system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1})$ of different countries are reported below.

Throughout this section, quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

Table IA.81: Variance decomposition. AUT.

horizon	return	surplus	future fp	spending ratio
1	0.8	57.1	46.6	31.3
	[0.4, 1.1]	[22.4, 96.1]	[7.7, 81.4]	[−27.0, 55.8]
3	2.3	134.0	−31.8	28.6
	[1.0, 4.2]	[54.5, 187.8]	[−85.3, 47.2]	[−56.5, 57.2]
10	1.8	105.9	−3.2	25.9
	[0.6, 8.6]	[60.6, 157.7]	[−54.9, 40.2]	[−165.6, 56.5]
∞	1.8	102.8	0.0	25.0
	[0.7, 15.0]	[89.5, 103.9]	[0.0, 0.0]	[−217.1, 58.3]

Table IA.82: Variance decomposition. BEL.

horizon	return	surplus	future fp	spending ratio
1	−0.1	31.5	73.1	64.5
	[−0.1, 0.0]	[11.4, 53.7]	[50.9, 93.2]	[22.6, 114.2]
3	−0.2	66.3	38.4	67.7
	[−0.4, 0.0]	[23.1, 113.9]	[−9.1, 81.5]	[20.8, 145.7]
10	−0.3	101.1	3.8	68.5
	[−0.7, 0.0]	[45.0, 116.9]	[−11.9, 59.8]	[14.5, 190.0]
∞	−0.3	104.9	0.0	68.5
	[−1.2, 0.0]	[104.5, 105.7]	[0.0, 0.0]	[12.8, 213.1]

Table IA.83: Variance decomposition. CAN.

horizon	return	fiscal adjustment	future fp	spending ratio
1	1.5	27.1	74.6	87.7
	[0.6, 2.4]	[9.0, 45.8]	[55.5, 93.0]	[65.7, 136.1]
3	2.7	69.4	31.0	81.0
	[0.4, 5.1]	[26.7, 111.1]	[−12.1, 74.3]	[57.8, 138.4]
10	3.7	97.8	1.6	78.1
	[0.2, 8.4]	[50.9, 104.0]	[−4.3, 47.0]	[51.1, 163.8]
∞	3.8	99.4	0.0	77.9
	[0.0, 11.5]	[91.6, 103.1]	[0.0, 0.0]	[50.3, 170.2]

Table IA.84: Variance decomposition. CHE.

horizon	return	fiscal adjustment	future fp	spending ratio
1	1.0	57.6	45.9	60.3
	[−0.4, 2.4]	[25.8, 88.4]	[15.6, 77.3]	[3.6, 115.8]
3	3.5	127.1	−26.1	77.5
	[0.1, 7.5]	[81.8, 168.8]	[−68.7, 19.8]	[31.0, 130.6]
10	2.6	104.6	−2.7	78.5
	[−0.1, 6.4]	[84.9, 131.5]	[−29.7, 16.5]	[34.4, 140.1]
∞	2.6	102.0	0.0	78.5
	[−0.1, 6.4]	[98.1, 104.7]	[0.0, 0.0]	[34.5, 142.7]

Table IA.85: Variance decomposition. DEU.

horizon	return	surplus	future fp	spending ratio
1	0.8	56.9	46.9	60.5
	[−0.1, 1.6]	[25.8, 89.7]	[14.2, 78.0]	[40.3, 101.7]
3	1.5	141.3	−38.2	74.6
	[−0.8, 4.5]	[69.1, 187.0]	[−84.6, 33.7]	[53.5, 136.2]
10	0.8	109.5	−5.7	75.8
	[−1.4, 4.5]	[68.0, 152.5]	[−49.1, 34.7]	[52.9, 172.0]
∞	0.8	103.8	0.0	75.0
	[−1.2, 4.8]	[99.5, 106.0]	[0.0, 0.0]	[53.2, 181.4]

Table IA.86: Variance decomposition. ESP.

horizon	return	surplus	future fp	spending ratio
1	−0.0	18.3	86.2	90.2
	[−0.1, 0.1]	[−0.6, 40.9]	[63.6, 105.2]	[−74.6, 302.7]
3	0.0	61.9	42.6	83.2
	[−0.4, 0.4]	[13.2, 123.3]	[−18.6, 91.3]	[38.8, 257.7]
10	−0.1	105.8	−1.2	81.6
	[−1.7, 1.3]	[42.0, 160.5]	[−55.0, 62.3]	[17.6, 294.1]
∞	−0.1	104.7	0.0	81.8
	[−4.0, 3.4]	[101.2, 108.6]	[0.0, 0.0]	[−16.2, 429.5]

Table IA.87: Variance decomposition. FIN.

horizon	return	surplus	future fp	spending ratio
1	3.3	20.5	80.8	73.0
	[2.3, 4.2]	[2.4, 38.9]	[62.4, 99.0]	[40.5, 312.2]
3	9.3	54.0	41.2	91.7
	[6.5, 12.4]	[7.1, 102.9]	[−8.0, 87.8]	[51.9, 409.9]
10	15.3	86.1	3.2	98.0
	[6.5, 29.8]	[9.0, 106.2]	[−13.4, 66.6]	[44.1, 563.3]
∞	15.8	88.8	0.0	98.3
	[7.2, 91.8]	[12.8, 97.4]	[0.0, 0.0]	[44.4, 621.3]

Table IA.88: Variance decomposition. FRA.

horizon	return	surplus	future fp	spending ratio
1	0.2	29.1	75.2	5.6
	[0.0, 0.5]	[6.3, 55.0]	[49.2, 98.3]	[−55.5, 26.5]
3	0.8	75.9	27.8	18.7
	[0.0, 1.8]	[15.9, 142.3]	[−38.8, 88.2]	[−32.1, 45.4]
10	1.2	103.2	0.2	26.4
	[−0.1, 3.6]	[31.4, 132.7]	[−30.1, 71.7]	[−30.6, 94.8]
∞	1.2	103.4	0.0	26.3
	[−0.1, 9.5]	[95.2, 104.6]	[0.0, 0.0]	[−31.0, 126.8]

Table IA.89: Variance decomposition. GRC.

horizon	return	surplus	future fp	spending ratio
1	0.4	9.8	94.3	46.7
	$[-0.9, 1.7]$	$[-11.5, 33.8]$	$[69.9, 115.8]$	$[-263.8, 500.8]$
3	1.6	34.1	68.9	83.1
	$[-0.8, 4.2]$	$[-8.5, 79.3]$	$[22.9, 111.6]$	$[-132.7, 367.7]$
10	2.8	90.9	10.9	108.7
	$[-2.7, 9.3]$	$[7.7, 154.1]$	$[-51.4, 92.1]$	$[-101.6, 393.3]$
∞	2.7	101.8	0.0	112.7
	$[-4.3, 28.4]$	$[75.1, 108.9]$	$[0.0, 0.0]$	$[-81.0, 450.9]$

Table IA.90: Variance decomposition. IRL.

horizon	return	surplus	future fp	spending ratio
1	0.2	30.5	73.9	117.2
	$[-0.6, 1.0]$	$[6.0, 55.2]$	$[49.2, 98.5]$	$[64.0, 257.3]$
3	-0.1	92.4	12.2	108.6
	$[-2.3, 2.2]$	$[29.5, 147.7]$	$[-42.0, 73.6]$	$[68.5, 241.4]$
10	-0.3	104.8	0.1	106.8
	$[-3.8, 4.5]$	$[55.0, 124.3]$	$[-16.9, 45.6]$	$[59.2, 302.7]$
∞	-0.3	104.9	0.0	106.8
	$[-3.9, 6.6]$	$[97.9, 108.5]$	$[0.0, 0.0]$	$[60.0, 315.9]$

Table IA.91: Variance decomposition. ITA.

horizon	return	surplus	future fp	spending ratio
1	1.3	36.3	67.0	−3.0
	[0.6, 2.0]	[9.0, 65.7]	[37.5, 94.8]	[−161.8, 33.8]
3	2.2	96.1	6.2	32.4
	[0.1, 4.7]	[30.2, 163.1]	[−61.0, 72.3]	[−82.5, 73.2]
10	1.6	102.1	0.9	42.4
	[−1.7, 6.8]	[40.5, 136.3]	[−32.8, 63.1]	[−92.4, 109.5]
∞	1.5	103.0	0.0	43.8
	[−2.9, 12.9]	[91.4, 107.5]	[0.0, 0.0]	[−126.4, 122.4]

Table IA.92: Variance decomposition. JPN.

horizon	return	fiscal adjustment	future fp	spending ratio
1	1.9	1.9	98.6	276.4
	[0.5, 3.4]	[−5.7, 9.6]	[90.7, 105.7]	[−853.3, 1369.0]
3	4.8	10.6	87.1	126.1
	[1.4, 8.7]	[−5.5, 26.3]	[68.9, 102.0]	[−19.6, 612.9]
10	11.5	42.6	48.3	79.2
	[0.2, 20.6]	[20.9, 73.8]	[16.7, 68.3]	[13.3, 153.4]
∞	19.6	82.8	0.0	70.6
	[−1.3, 35.2]	[67.2, 103.7]	[0.0, 0.0]	[10.3, 114.7]

Table IA.93: Variance decomposition. NLD.

horizon	return	surplus	future fp	spending ratio
1	−0.1	46.7	57.9	86.8
	[−0.4, 0.2]	[24.2, 70.1]	[34.5, 80.4]	[52.6, 153.6]
3	−0.3	113.5	−8.7	83.4
	[−1.0, 0.4]	[65.8, 156.4]	[−51.2, 38.6]	[50.1, 149.4]
10	−0.3	104.2	0.6	80.0
	[−0.8, 0.6]	[79.4, 115.4]	[−10.2, 24.7]	[44.9, 172.6]
∞	−0.3	104.8	0.0	79.9
	[−0.8, 0.7]	[103.9, 105.4]	[0.0, 0.0]	[45.1, 177.3]

Table IA.94: Variance decomposition. PRT.

horizon	return	surplus	future fp	spending ratio
1	0.2	21.1	83.2	3.4
	[−0.6, 1.0]	[−5.0, 52.6]	[51.1, 109.5]	[−448.7, 461.9]
3	0.1	46.7	57.8	53.0
	[−1.4, 1.7]	[4.8, 92.6]	[11.5, 99.9]	[−61.9, 123.6]
10	−0.6	86.9	18.3	70.3
	[−4.8, 2.7]	[22.0, 110.4]	[−5.4, 84.1]	[−37.8, 179.3]
∞	−0.9	105.5	0.0	73.5
	[−22.9, 4.9]	[99.5, 127.4]	[0.0, 0.0]	[−38.4, 253.8]

IA.9 Other state variables

Table IA.95: VAR coefficient estimates for a system that includes the log tax-GDP ratio, τy_t. US data, 1947–2022.

OLS standard errors are reported in square brackets. The last two columns show imputed coefficients for spending growth and for $fa_{t+1} = \Delta\tau_{t+1} - \beta\Delta x_{t+1}$.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	τy_{t+1}	Δx_{t+1}	fa_{t+1}
r_t	0.221	−0.205	0.033	−0.164	−0.239	0.288	−0.492
	[0.123]	[0.101]	[0.050]	[0.074]	[0.088]	[0.185]	[0.232]
$\Delta\tau_t$	−0.147	0.164	−0.002	−0.161	0.166	0.650	−0.483
	[0.119]	[0.097]	[0.049]	[0.072]	[0.085]	[0.178]	[0.224]
Δy_t	0.221	1.313	0.105	0.619	1.208	−0.544	1.855
	[0.318]	[0.260]	[0.130]	[0.192]	[0.228]	[0.476]	[0.599]
fp_t	0.272	−0.424	−0.074	0.804	−0.350	0.165	−0.589
	[0.183]	[0.150]	[0.075]	[0.111]	[0.132]	[0.275]	[0.346]
τy_t	0.218	−0.268	−0.074	0.080	0.806	−0.501	0.241
	[0.103]	[0.084]	[0.042]	[0.062]	[0.074]	[0.154]	[0.193]
fp_{t-1}	−0.082	0.135	0.138	−0.166	−0.004	0.634	−0.498
	[0.186]	[0.152]	[0.076]	[0.112]	[0.134]	[0.279]	[0.351]
R^2	19.69%	57.10%	12.91%	70.35%	74.41%	31.37%	34.99%

Table IA.96: VAR coefficient estimates for a system that includes bond return forecasting variables based on the yield curve. US data, 1947–2022

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	$yr_{1,t+1}$	$spr_{1\to 10,t+1}$	Δx_{t+1}	fa_{t+1}
r_t	−0.019	−0.209	−0.040	−0.202	0.005	0.020	0.397	−0.605
	[0.140]	[0.129]	[0.061]	[0.090]	[0.041]	[0.020]	[0.234]	[0.284]
$\Delta\tau_t$	−0.033	0.048	−0.003	−0.125	0.010	−0.002	0.424	−0.375
	[0.108]	[0.099]	[0.047]	[0.070]	[0.032]	[0.016]	[0.180]	[0.219]
Δy_t	−0.505	1.742	0.149	0.428	−0.038	−0.132	0.463	1.280
	[0.309]	[0.284]	[0.135]	[0.199]	[0.091]	[0.045]	[0.516]	[0.627]
fp_t	0.473	−0.576	−0.108	0.863	0.166	0.017	−0.165	−0.412
	[0.169]	[0.156]	[0.074]	[0.109]	[0.050]	[0.025]	[0.283]	[0.343]
$yr_{1,t}$	1.195	−0.400	0.035	0.265	0.710	0.041	−1.203	0.799
	[0.299]	[0.276]	[0.131]	[0.193]	[0.089]	[0.044]	[0.500]	[0.608]
$spr_{1\to 10,t}$	1.592	−0.219	0.673	0.263	0.293	0.535	−1.018	0.796
	[0.780]	[0.718]	[0.340]	[0.504]	[0.231]	[0.114]	[1.303]	[1.584]
fp_{t-1}	−0.177	0.198	0.186	−0.195	−0.108	−0.006	0.786	−0.586
	[0.184]	[0.169]	[0.080]	[0.119]	[0.054]	[0.027]	[0.307]	[0.373]
R^2	30.85%	52.70%	13.99%	70.60%	60.43%	48.11%	26.67%	35.17%

Table IA.97: VAR coefficient estimates that includes bond return forecasting variables based on the yield curve and the log tax-GDP ratio. US data, 1947–2022

OLS standard errors are reported in square brackets.

	r_{t+1}	$\Delta\tau_{t+1}$	Δy_{t+1}	fp_{t+1}	τy_{t+1}	$yr_{1,t+1}$	$spr_{1\to 10,t+1}$	Δx_{t+1}	fa_{t+1}
r_t	−0.025	−0.186	−0.033	−0.206	−0.153	0.003	0.020	0.434	−0.618
	[0.140]	[0.123]	[0.060]	[0.090]	[0.106]	[0.041]	[0.020]	[0.226]	[0.286]
$\Delta\tau_t$	−0.060	0.154	0.028	−0.146	0.126	0.002	−0.001	0.594	−0.438
	[0.116]	[0.102]	[0.050]	[0.075]	[0.088]	[0.034]	[0.017]	[0.187]	[0.236]
Δy_t	−0.396	1.312	0.023	0.514	1.289	−0.006	−0.135	−0.227	1.539
	[0.354]	[0.310]	[0.152]	[0.228]	[0.268]	[0.105]	[0.052]	[0.572]	[0.722]
fp_t	0.433	−0.419	−0.062	0.831	−0.356	0.154	0.018	0.088	−0.506
	[0.180]	[0.158]	[0.077]	[0.116]	[0.137]	[0.053]	[0.026]	[0.291]	[0.368]
τy_t	0.070	−0.275	−0.081	0.055	0.806	0.021	−0.002	−0.442	0.165
	[0.111]	[0.098]	[0.048]	[0.072]	[0.084]	[0.033]	[0.016]	[0.180]	[0.228]
$yr_{1,t}$	1.094	−0.003	0.152	0.186	−0.155	0.680	0.043	−0.565	0.561
	[0.339]	[0.297]	[0.145]	[0.219]	[0.257]	[0.100]	[0.050]	[0.548]	[0.693]
$spr_{1\to 10,t}$	1.604	−0.262	0.660	0.272	−0.922	0.296	0.534	−1.087	0.822
	[0.778]	[0.683]	[0.334]	[0.502]	[0.590]	[0.230]	[0.114]	[1.258]	[1.590]
fp_{t-1}	−0.156	0.115	0.161	−0.179	−0.046	−0.101	−0.006	0.653	−0.536
	[0.186]	[0.163]	[0.080]	[0.120]	[0.141]	[0.055]	[0.027]	[0.301]	[0.380]
R^2	31.26%	57.19%	17.20%	70.88%	75.14%	60.62%	48.11%	32.72%	35.68%

Table IA.98: Variance decomposition of fiscal position fp_t, US 1947-2022, based on system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1}, yr_{1,t}, spr_{1\to 10,t})$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future sv	spending ratio
1	0.0	24.2	77.1	65.4
	$[0.0, 0.0]$	$[11.3, 36.8]$	$[64.5, 90.0]$	$[36.9, 87.5]$
3	0.1	71.6	29.7	68.3
	$[0.0, 0.1]$	$[35.8, 103.0]$	$[-1.8, 65.5]$	$[38.9, 98.7]$
10	0.1	100.1	1.1	81.6
	$[-0.1, 0.2]$	$[70.0, 106.6]$	$[-5.2, 31.1]$	$[40.5, 127.2]$
∞	0.1	101.3	0.0	82.4
	$[-0.2, 0.4]$	$[100.9, 101.5]$	$[-0.0, 0.0]$	$[31.9, 142.4]$

Table IA.99: Variance decomposition of fiscal position fp_t, US 1947-2022, based on system $(r_t, \Delta\tau_t, \Delta y_t, fp_t, fp_{t-1}, \tau y_t, yr_{1,t}, spr_{1\to 10,t})$

Quantities in square brackets indicate the 95% confidence intervals due to a bootstrap exercise. In this bootstrap procedure we i) draw a new VAR(1) coefficient matrix using the covariance matrix of the estimated coefficients around the point estimates; ii) given this VAR matrix and the data, generate the news series and do the variance decomposition; iii) repeat i) and ii) 2,000 times and report the 95% quantiles.

horizon	return	fiscal adjustment	future sv	spending ratio
1	0.0	24.3	77.0	66.4
	[0.0, 0.0]	[11.1, 36.6]	[64.7, 90.2]	[42.8, 87.9]
3	0.1	73.2	28.1	74.5
	[0.0, 0.1]	[39.7, 104.0]	[−2.8, 61.6]	[56.3, 97.2]
10	0.0	101.2	0.1	103.1
	[−0.1, 0.2]	[78.0, 111.0]	[−9.6, 23.5]	[91.1, 129.8]
∞	0.0	101.3	0.0	100.7
	[−0.1, 0.2]	[101.1, 101.5]	[−0.0, 0.0]	[88.6, 135.6]

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