# Online appendix

## **Table A1**: Operationalization and sources

|  |  |  |
| --- | --- | --- |
| *Variable* | *Operationalization* | *Sources* |
| ΔDebt ratio; Debt ratio | General government debt in percentage of GDP; annual changes (differences) | Armingeon *et al*. (2015b), based on OECD Economic Outlook 96, Eurostat, and extrapolated time-series based on change rates from Abbas *et al*. (2010) and Reinhart and Rogoff (2009) |
| Real GDP growth | Annual percentage change of real GDP | Armingeon *et al*. (2015b), based on OECD Economic Outlook 96 and AMECO |
| Unemployment; ΔUnemployment | Unemployment rate in percentage of civilian employment; annual changes (differences). | Armingeon *et al*. (2015b), based on AMECO |
| Fiscal pressure | Lagged debt ratio \* (interest rate [10-y government bonds] – inflation rate [growth of CPI] – real GDP growth) | Interest rate: Armingeon *et al*. (2015b), based on OECD Economic Outlook 96 and AMECO. Inflation: Armingeon *et al*. (2015b), based on OECD Main Economic Indicators and AMECO |
| Coalition government | 1 = multi-party government, 0 = single-party government | Armingeon *et al*. (2015a) |
| Prospective cooperation | Interval-scale indicator with values between 0 (minimum) and 1 (maximum) | Own calculations based on Armingeon *et al*. (2015a) |
| Election year | 1 = legislative elections in given year, 0 = no elections | Armingeon *et al*. (2015a) |
| Government duration | Weighted average of days in office of past governments: $GovernmentDuration\_{i,t}$$=\frac{1}{\sum\_{τ=1}^{τ=t-t\_{0}}δ^{τ-1}}\*\sum\_{τ=1}^{τ=t-t\_{0}}β\_{i,t-τ}\*δ^{τ-1}$, where $δ$ is the depreciation rate and $β$ the number of days governments were in office in given years | Own calculations based on Armingeon *et al*. (2015a) |
| Minority government | 1 = government support in lower chamber <=50%, 0 = >50% | Armingeon *et al*. (2015a) |
| Left cabinet share | Left-wing parties‘ cabinet posts in percentage of total cabinet posts, weighted by days | Armingeon *et al*. (2015a) |
| Presidentialism | 0 = parliamentarism, 1 = semi-presidential dominated by parliament, 2 = hybrid system, 3 = semi-presidential dominated by president, 4 = presidentialism | Armingeon *et al*. (2015b) |
| Federalism | 0 = no, 1 = weak, 2 = strong federalism | Armingeon *et al*. (2015b) |
| Bicameralism | 0 = unicameralism, 1 = weak bicameralism (asymmetrical/congruent), 2 = medium-strength bicameralism (asymmetrical/incongruent or symmetrical/congruent), 3 = strong bicameralism (symmetrical/incongruent) | Armingeon *et al*. (2015b) |
| Delegation index | Index for centralization of budget process, values between 0 (min.) and 1 (max.) | Hallerberg *et al*. (2009: 74) |

## **Table A2**: Summary statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable* | *N* | *Mean* | *Standard deviation* | *Maximum* | *Minimum* |
| ΔDebt ratio | 1,210 | 1.23 | 5.41 | 54.90 | -17.47 |
| Debt ratio | 1,210 | 55.08 | 31.22 | 216.48 | 4.64 |
| Real GDP growth | 1,210 | 2.74 | 2.93 | 11.95 | -14.81 |
| Unemployment | 1,210 | 6.52 | 4.20 | 27.50 | 0.00 |
| ΔUnemployment | 1,210 | 0.14 | 1.17 | 9.80 | -4.50 |
| Fiscal pressure | 1,210 | 31.04 | 265.90 | 3,068.36 | -1,036.45 |
| Coalition government | 1,210 | 0.61 | 0.49 | 1 | 0 |
| Prospective cooperation | 1,210 | 0.84 | 0.20 | 1.00 | 0.10 |
| Election year | 1,210 | 0.29 | 0.45 | 1 | 0 |
| Government duration | 1,210 | 963.86 | 349.70 | 1,772.62 | 10.97 |
| Minority government | 1,210 | 0.25 | 0.43 | 1 | 0 |
| Left cabinet share | 1,210 | 33.82 | 38.48 | 100.00 | 0.00 |
| Presidentialism | 1,210 | 0.65 | 1.09 | 4 | 0 |
| Federalism | 1,210 | 0.50 | 0.82 | 2 | 0 |
| Bicameralism | 1,210 | 2.28 | 1.12 | 4 | 1 |
| Delegation index | 681 | 0.53 | 0.19 | 0.23 | 0.90 |

## **Table A3**: ADL regressions of annual debt changes (sensitivity analyses)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model A1 |  | Model A2 |  | Model A3 |  | Model A4 |  |
| ΔDebt ratio t-1 (LDV) | 0.161\*\*\* | (0.047) | 0.210\*\*\* | (0.050) | 0.203\*\*\* | (0.045) | 0.200\*\*\* | (0.045) |
| Debt ratio t-1 | -0.051\*\*\* | (0.009) | -0.021\*\*\* | (0.006) | -0.022\*\*\* | (0.006) | -0.021\*\*\* | (0.006) |
| Real GDP growth t | -0.376\*\*\* | (0.082) | -0.309\*\*\* | (0.087) | -0.301\*\*\* | (0.081) | -0.299\*\*\* | (0.081) |
| Unemployment t | 0.253\*\*\* | (0.072) | 0.121\*\*\* | (0.043) | 0.119\*\*\* | (0.037) | 0.116\*\*\* | (0.037) |
| ΔUnemployment t | 0.603\*\*\* | (0.158) | 0.731\*\*\* | (0.171) | 0.786\*\*\* | (0.161) | 0.784\*\*\* | (0.162) |
| Fiscal pressure t | 0.004\*\*\* | (0.001) | 0.004\*\*\* | (0.001) | 0.004\*\*\* | (0.001) | 0.004\*\*\* | (0.001) |
| Coalition government t | 0.517 | (0.598) | 0.053 | (0.646) | -0.061 | (0.610) | 0.473 | (0.532) |
| Coalition government t-1 | -0.725 | (0.583) | -1.190\* | (0.619) | -1.276\*\* | (0.592) | -1.667\*\*\* | (0.544) |
|  *LRM Coalition government* | *-0.248* | *(0.481)* | *-1.438\*\*\** | *(0.390)* | *-1.678\*\*\** | *(0.373)* | *-1.492\*\*\** | *(0.374)* |
| Prospective cooperation t | -2.017 | (1.469) | -2.804\* | (1.586) |  |  |  |  |
| Prospective cooperation t-1 | -0.826 | (1.458) | -0.953 | (1.581) | -3.725\*\*\* | (0.878) | -3.240\*\*\* | (0.814) |
|  *LRM Prospective cooperation* | *-3.391\*\*\** | *(1.097)* | *-4.753\*\*\** | *(0.936)* | *-4.674\*\*\** | *(0.874)* | *-4.051\*\*\** | *(0.815)* |
| ∆Prospective cooperation t |  |  |  |  | -2.674\* | (1.473) |  |  |
| ∆Prospective cooperation t-1 |  |  |  |  | -0.323 | (1.350) |  |  |
|  *LRM ∆Prospective cooperation* |  |  |  |  | *-3.760\** | *(2.033)* |  |  |
| Election year t | 0.548\* | (0.281) | 0.526\* | (0.317) | 0.589\*\* | (0.286) | 0.612\*\* | (0.288) |
| Election year t-1 | 0.549\*\* | (0.276) | 0.579\* | (0.310) | 0.570\*\* | (0.279) | 0.624\*\* | (0.280) |
|  *LRM Election year* | *1.308\*\*\** | *(0.484)* | *1.398\*\*\** | *(0.525)* | *1.454\*\*\** | *(0.485)* | *1.546\*\*\** | *(0.486)* |
| Government duration t | -0.007\* | (0.004) | -0.006 | (0.005) | -0.006\* | (0.004) | -0.006\* | (0.004) |
| Government duration t-1 | 0.005 | (0.004) | 0.005 | (0.004) | 0.006 | (0.004) | 0.006\* | (0.004) |
|  *LRM Government duration* | *-0.002\*\** | *(0.001)* | *-0.001* | *(0.000)* | *-0.000* | *(0.000)* | *-0.000* | *(0.000)* |
| Minority government t | -0.624\* | (0.342) | -0.501 | (0.340) | -0.546\* | (0.285) | -0.544\* | (0.285) |
| Left cabinet share t | -0.004 | (0.004) | -0.008\*\* | (0.004) | -0.009\*\* | (0.003) | -0.009\*\* | (0.003) |
| Presidentialism t | -0.223 | (0.452) |  |  | 0.021 | (0.083) | 0.015 | (0.083) |
| Federalism t | -2.059\*\*\* | (0.431) | -0.502\*\*\* | (0.158) | -0.523\*\*\* | (0.140) | -0.540\*\*\* | (0.141) |
| Bicameralism t | 0.970 | (0.866) | 0.317\* | (0.164) | 0.306\*\* | (0.152) | 0.312\*\* | (0.153) |
| Time-trend | 0.313 | (0.196) | 0.307 | (0.216) | 0.310 | (0.194) | 0.317 | (0.193) |
| Time-trend2 | -0.014\* | (0.007) | -0.015\* | (0.008) | -0.014\* | (0.007) | -0.014\*\* | (0.007) |
| Time-trend3 | 0.000\*\* | (0.000) | 0.000\*\* | (0.000) | 0.000\*\* | (0.000) | 0.000\*\* | (0.000) |
| Constant | 1.194 | (4.371) | 4.783\*\* | (1.991) | 4.328\*\* | (1.856) | 3.698\*\* | (1.835) |
| *R*2 | 0.44 |  | 0.38 |  | 0.39 |  | 0.39 |  |
| *N* | 1,210 |  | 1,043 |  | 1,210 |  | 1,210 |  |

*Note*: \* *p*<0.1; \*\* *p*<0.05; \*\*\* *p*<0.01 (two-sided tests), panel-corrected standard errors in parentheses.

Model A1: Including country fixed effects (coefficients not shown).

Model A2: Excluding (semi)presidential/ hybrid systems (CYP, FRA, SWI, USA).

Model A3: Including changes of prospective cooperation.

Model A4: “Dead-start” model (assuming no short-run association between cooperation and debt growth).

## **Table A4**: ADL regressions of prospective cooperation levels (endogeneity test)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model A5 |  | Model A6 |  | Model A7 |  | Model A8 |  |
| Prospective cooperation t-1 (LDV) | 0.875\*\*\* | (0.022) | 0.859\*\*\* | (0.025) | 0.811\*\*\* | (0.027) | 0.801\*\*\* | (0.028) |
| ΔDebt ratio t | -0.001\* | (0.000) | -0.002\*\* | (0.001) | -0.001\* | (0.001) | -0.001 | (0.001) |
| ΔDebt ratio t-1 | 0.001\* | (0.000) | 0.002\*\*\* | (0.001) | 0.001\* | (0.001) | 0.001 | (0.001) |
|  *LRM* ΔDebt ratio | *0.000* | *(0.000)* | *0.001* | *(0.001)* | *-0.000* | *(0.001)* | *0.000* | *(0.001)* |
| Real GDP growth t |  |  | -0.001 | (0.002) | -0.001 | (0.001) | -0.001 | (0.001) |
| Unemployment t |  |  | 0.001 | (0.001) | 0.001 | (0.001) | 0.001 | (0.001) |
| ΔUnemployment t |  |  | 0.005 | (0.003) | 0.003 | (0.003) | 0.003 | (0.003) |
| Fiscal pressure t |  |  | -0.000\*\*\* | (0.000) | -0.000\*\*\* | (0.000) | -0.000\*\* | (0.000) |
| Coalition government t |  |  |  |  | -0.199\*\*\* | (0.012) | -0.201\*\*\* | (0.012) |
| Coalition government t-1 |  |  |  |  | 0.150\*\*\* | (0.013) | 0.146\*\*\* | (0.013) |
|  *LRM Coalition government* |  |  |  |  | *-0.263\*\*\** | *(0.005)* | *-0.276\*\*\** | *(0.006)* |
| Election year t |  |  |  |  |  |  | -0.010 | (0.006) |
| Election year t-1 |  |  |  |  |  |  | -0.019\*\*\* | (0.006) |
|  *LRM Election year* |  |  |  |  |  |  | *-0.145\*\*\** | *(0.011)* |
| Government duration t |  |  |  |  |  |  | 0.000 | (0.000) |
| Government duration t-1 |  |  |  |  |  |  | -0.000 | (0.000) |
|  *LRM Government duration* |  |  |  |  |  |  | *-0.000\*\*\** | *(0.000)* |
| Minority government t |  |  |  |  |  |  | -0.001 | (0.006) |
| Left cabinet share t |  |  |  |  |  |  | -0.000 | (0.000) |
| Presidentialism t |  |  |  |  |  |  | 0.003 | (0.002) |
| Federalism t |  |  |  |  |  |  | 0.008\* | (0.004) |
| Bicameralism t |  |  |  |  |  |  | -0.004 | (0.003) |
| Time-trend |  |  | -0.001 | (0.003) | -0.003 | (0.003) | -0.002 | (0.003) |
| Time-trend2 |  |  | 0.000 | (0.000) | 0.000 | (0.000) | 0.000 | (0.000) |
| Time-trend3 |  |  | -0.000 | (0.000) | -0.000 | (0.000) | -0.000 | (0.000) |
| Constant | 0.102\*\*\* | (0.020) | 0.130\*\*\* | (0.037) | 0.219\*\*\* | (0.038) | 0.252\*\*\* | (0.043) |
| *R*2 | 1,326 |  | 1,210 |  | 1,210 |  | 1,210 |  |
| *N* | 0.75 |  | 0.76 |  | 0.81 |  | 0.81 |  |

*Note*: \* *p*<0.1; \*\* *p*<0.05; \*\*\* *p*<0.01 (two-sided tests), panel-corrected standard errors in parentheses.

## **Robustness test: varying assumptions of “prospective cooperation” measure**

The measure of prospective cooperation makes an assumption about the weight of past cooperation patterns, using a depreciation rate of 0.95. In Figures A1 and A2, I re-analyzed Models 4, 5 and 6 using twenty variations of the depreciation rate: From *δ*=0.8 to *δ*=0.99. The former leads to a quickly decreasing weight of past observations (20% depreciation for the second-nearest time point, 1-0.82=36% for the third, 1-0.83=49% for the fourth, etc.). Conversely, the latter weights almost all time points in the data equally, so that the prospective cooperation score is strongly influenced by cooperation patterns in the distant past.

Figure A1 shows that the effects of prospective cooperation within coalitions are not influenced by the choice of the depreciation rates. The long-run effects of prospective cooperation on debt changes are significant on the 95%-level (indicated by the dark-grey bars) both in the unconditional setting (panel b.), outside election years (d.), under low fiscal pressure (e.), and under high fiscal pressure (f.). The short-run effects of prospective cooperation, in contrast, are only significant on the 90%-level (indicated by the light-grey bars) in the unconditional setting, and significant on the 95%-level only in non-election years. Figure A2 shows that coalitions have significantly lower debt increases compared to single-party governments when they have high values of prospective cooperation. Overall, this robustness test provides strong support for an effect of prospective cooperation independent of operationalization assumptions.

 **Total effect of prospective cooperation (without interactions)**

 a. Short-run effect b. Long-run effect

 

 **c. Election year d. No election year**

 Short-run effect Long-run effect Short-run effect Long-run effect

 

 **e. Low fiscal pressure f. High fiscal pressure**

 Short-run effect Long-run effect Short-run effect Long-run effect

 

## **Figure A1**:Effects of prospective cooperation on debt changes varying the depreciation rate δ

*Note*: Black dots are coefficients for prospective cooperation based on Models 4 to 6. Dashed lines are 95% confidence intervals (two-sided tests). Dark-grey bars indicate coefficients significant on the 95%-level, light-grey bars on the 90%-level.

 **Prospective Prospective Prospective Prospective**

 **cooperation = 1 cooperation = 0.95 cooperation = 0.90 cooperation = 0.85**



 **Prospective Prospective Prospective Prospective**

 **cooperation = 0.80 cooperation = 0.75 cooperation = 0.70 cooperation = 0.65**



## **Figure A2**: Long-run effects of coalition governments’ debt changes compared to single-party governments, varying the depreciation rate δ (at given levels of prospective cooperation)

*Note*: Black dots are coefficients for the long-run group difference between coalition and single-party governments based on Model 4. Dashed lines are 95% confidence intervals (two-sided tests). Dark-grey bars indicate coefficients significant on the 95%-level, light-grey bars on the 90%-level.



## **Figure A3**: Long-run effect of prospective cooperation excluding each country at a time (jackknife analysis)

*Note*: Hollow circles indicate 95% confidence intervals. Based on Model 4.

 

 

## **Figure A4**: Impulse response functions for main effects on debt changes

*Note*: Reaction of debt changes over time (in years) in response to a one-unit change of prospective cooperation (left and bottom-right figures) and a change from single-party to coalition government (top-right figure). Estimations based on Model 4 (figures at the top), Model 5 (bottom-left figure), and Model 6 (bottom-right figure).