Appendix to: Austerity in the Aftermath of the Great Recession*

Christopher L. House
University of Michigan and NBER

Christian Proebsting
EPFL | École Polytechnique Fédérale de Lausanne

Linda L. Tesar
University of Michigan and NBER

August 8, 2018

*House: chouse@umich.edu; Proebsting: Christian.Probsting@epfl.ch; Tesar: ltesar@umich.edu.

Contents

List of Tables

List of Figures

A Details on Estimation Method

A.1 Austerity and Economic Performance

Our main cross-sectional regression (ignoring controls) is

$$\frac{1}{20}\left(\sum_{t=2010:1}^{2014:4} \ln X_{i,t} - \ln \widehat{X}_{i,t}\right) = \alpha_0 + \alpha \frac{G_i}{Y_i}\frac{1}{5}\left(\sum_{t=2010}^{2014} \ln G_{i,t} - \ln \widehat{G}_{i,t}\right) + \varepsilon_i. \tag{A.1}$$

Here, $X_{i,t}$ refers to country i's economic performance at time t (GDP, inflation, consumption,...), and $\widehat{X}_{i,t}$ is its forecast. Note that for consumption and investment, we pre-multiply the left-hand side by X_i/Y_i, the share of consumption / investment in GDP, averaged over 2000:1 - 2010:4. Similarly, $G_{i,t}$ is a government finance variable for country i at time t (e.g. shortfalls in government purchases, shortfalls in govenment outlays, or government revenue). Note that our left-hand-side variables are at quarterly frequency, whereas the right-hand-side variables are at annual frequency. Now, we discuss how we derive estimates of $\ln \widehat{X}_{i,t}$ and $\ln \widehat{G}_{i,t}$.

A.2 Economic Performance

Our forecasting specification for GDP, consumption and investment is

$$\ln \widehat{X}_{i,t} = \begin{cases} \ln X_{i,t-1} + \hat{g}^X_{EU} + \hat{\gamma}^X \left(\ln \widehat{X}_{EU,t-1} - \ln X_{i,t-1}\right) & \forall t-1 \leq 2009{:}4 \\ \ln \widehat{X}_{i,t-1} + \hat{g}^X_{EU} + \hat{\gamma}^X \left(\ln \widehat{X}_{EU,t-1} - \ln \widehat{X}_{i,t-1}\right) & \forall t-1 > 2009{:}4. \end{cases} \tag{A.2}$$

Here, $X_{i,t}$ is country i's GDP, consumption or investment at time t, and $\widehat{X}_{i,t}$ is its forecast. The specification takes last period's value of (the log of) $X_{i,t}$ and adds a country- and time-specific growth rate, which is composed of two parts: a common term capturing the average rate of growth of the core European countries, $\hat{g}^X_{EU}$, and a catch-up term that raises this growth rate for poorer countries and lowers it for richer countries, $\gamma^X \left(\ln \widehat{X}_{EU,t-1} - \ln X_{i,t-1}\right)$. Notice that only data up to 2009:4 is used to construct forecasts for t >2009:4.

This specification is based on the conditional convergence hypothesis. We assume that countries in Europe converge to a common path for GDP per capita. This can be justified on basis of the Single European Act (Article 158), which foresees economic cohesion across all member states as a central goal of the EU. Economic cohesion is typically interpreted as reducing disparities in GDP per capita. This convergence process especially affects our forecasts for Central and Eastern European countries, which, after strong economic growth in the 90s and 2000s, have reduced the gap to Western European countries. For instance, between 1995 and 2014, Estonia increased its GDP per capita from 30% to more than 60% of the EU-12 average.

Estimation of g^X_{EU}. In a first step, we estimate the growth rate g^X_{EU} on data from 1993:1 to 2005:4:

$$\ln X_{EU,t} = \beta_{EU} + g^X_{EU} t + \epsilon^X_{EU,t},$$

Here, X_{EU} is the aggregate of the 12 core European economies (Belgium, Denmark, Germany, Ireland, Spain, France, Italy, Luxembourg, Austria, Netherlands, Portugal and Finland). The estimate of g^Y_{EU} is 0.47 percent with a standard deviation of 0.01 percent, i.e. the average annual growth rate over this time period was about 2 percent. The forecasted value of $\ln X_{EU}$, used in (A.2), is the fitted value of this regression.

Estimation of γ^X. In a second step, we estimate the time-varying part of the growth rate. We assume that the time-varying part is a linear function of the log difference between the predicted EU-12 X and a country's X:

$$g^X_{i,t} - \hat{g}^X_{EU} = \gamma^X \left(\ln \widehat{X}_{EU,t-1} - \ln X_{i,t-1} \right) + \epsilon^X_{i,t}.$$

where $\ln \widehat{X}_{EU,t-1} = \hat{\beta}_0 + \hat{g}^X_{EU}(t-1)$. We estimate a common γ^X for all countries in Central and Eastern Europe (Bulgaria, Czech Republic, Estonia, Greece, Cyprus, Latvia, Lithuania, Hungary, Poland, Romania and Slovenia, Slovak Republic) using 1993:1 (or earliest available data) to 2005:4 as our sample period. Our estimate of γ^Y is 0.58 percent with a standard deviation of 0.04 percent. The positive γ indicates convergence.[1] Figure

[1] We repeat this two-step procedure to forecast private consumption and total investment. The estimated values for g and γ are 0.43 (0.01) percent and 0.77 (0.06) percent for private consumption, and 0.64 (0.03) percent and 1.28 (0.21) percent for total investment.

For future reference, we define the estimated growth rate of country i's X at time t as

$$\hat{g}_{i,t}^{X} = \begin{cases} \hat{g}_{EU}^{X} + \hat{\gamma}^{X}\left(\ln \widehat{X}_{EU,t-1} - \ln X_{i,t-1}\right) & \forall t-1 \leq 2009{:}4 \\ \hat{g}_{EU}^{X} + \hat{\gamma}^{X}\left(\ln \widehat{X}_{EU,t-1} - \ln \widehat{X}_{i,t-1}\right) & \forall t-1 > 2009{:}4. \end{cases} \tag{A.3}$$

This is also our forecast for the growth rate of GDP used in our regression analysis.

Our forecasts for inflation, exchange rates and net exports are:

$$\widehat{X}_{i,t} = \frac{1}{8}\sum_{s=2008:1}^{2009:4} X_{i,s}$$

for all dates t. Note that for these variables, we are using the level instead of the log in regression (A.1).

A.3 Austerity

We also use the 'convergence' estimator to predict government purchases, social benefits, and total revenue. In particular, for any of these three variables, we construct our forecast as

$$\ln \widehat{G}_{i,t} = \begin{cases} \ln G_{i,t-1} + \hat{g}_{i,t}^{Y} + \hat{\theta}^{G}\left(g_{i,t}^{Y} - \hat{g}_{i,t}^{Y}\right) & \forall t-1 \leq 2009 \\ \ln \widehat{G}_{i,t-1} + \hat{g}_{i,t}^{Y} + \hat{\theta}^{G}\left(g_{i,t}^{Y} - \hat{g}_{i,t}^{Y}\right) & \forall t-1 > 2009 \end{cases} \tag{A.4}$$

Here, θ^{G} is an estimated elasticity of the growth rate of the government finance variable $G_{i,t}$ with respect to deviations of GDP growth from its growth trend.

The first part of our forecast adds a country- and time-specific growth rate $\hat{g}_{i,t}^{Y}$ to last year's actual realization of $\ln G_{i,t-1}$ (within sample) or last year's predicted value of $\ln G_{i,t-1}$ (out of sample). This growth rate $\hat{g}_{i,t}^{Y}$ is the estimated growth rate of country i's GDP per capita at time t, calculated as in (A.3), but using annual data for GDP.[2] We prefer using the growth rate of GDP instead of G in this step because countries strongly differ in terms of their ratios of government purchases, social benefits and total revenue to GDP. Economic cohesion in terms of GDP per capita is an explicit goal of the European Union, but the European Union does not try to achieve convergence in the level of all government finance variables.

The second part of our forecast, $\hat{\theta}^{G}(g_{i,t}^{Y} - \hat{g}_{i,t}^{Y})$, adjusts for deviations of GDP growth from its forecast. This is particularly relevant for government revenue variables. For government

[2]The estimated values for g and γ are 0.018 and 0.024.

purchases, we set $\theta^G = 0$, but estimate it for social benefits and total revenue.

Estimation of θ^G: To estimate θ^G, we run the following regression

$$\ln G_{i,t} - \ln G_{i,t-1} - \hat{g}^Y_{i,t} = \theta^G_{0,i} + \theta^G \left(g^Y_{i,t} - \hat{g}^Y_{i,t} \right) + \epsilon^\theta_{i,t} \tag{A.5}$$

on data up to 2005.

Our forecasts for the primary balance and tax rates are

$$\widehat{G}_{i,t} = \frac{1}{2} \sum_{s=2008}^{2009} G_{i,s}.$$

For these variables, we are using the level instead of the log in regression (A.1).

B Additional Empirical Results

B.1 Different Forecast Specifications

Table A2 displays the results of a univariate cross-sectional regression along the lines of (A.1). The explained variable is the forecast error in GDP. Each column corresponds to a different explanatory variable (forecast errors in government purchases, government transfers, total revenue. Every row corresponds to a different forecast specification for both the explanatory and explained variable. Specification 1 is our benchmark specification. In specification 2, our forecasts are based on a linear time trend:

$$\begin{aligned}
\ln Y_{i,t} &= \beta^y_{0,i} + \beta^y_i t + \varepsilon^y_{i,t} \\
\ln G_{i,t} &= \beta^g_{0,i} + \beta^g_i t + \hat{\theta}^G \left(g^Y_{i,t} - \hat{g}^Y_{i,t} \right) + \varepsilon^g_{i,t}.
\end{aligned}$$

In specification 3, we assume an AR(1) process with drift:

$$\begin{aligned}
\ln Y_{i,t} &= \beta^y_{0,i} + \rho^y_i \ln Y_{i,t-1} + \beta^y_i t + \varepsilon^y_{i,t} \\
\ln G_{i,t} &= \beta^g_{0,i} + \rho^g_i \ln G_{i,t-1} + \beta^g_i t + \hat{\theta}^G \left(g^Y_{i,t} - \hat{g}^Y_{i,t} \right) + \varepsilon^g_{i,t}.
\end{aligned}$$

Finally, specification 4 is the same as specification 1, but excluding Greece. For specifications 2 and 3, we set $\hat{\theta}^G = 0$ for government purchases, as in the benchmark, but re-estimate it for social benefits and total revenue along the lines of (A.5). In all specification, the estimated slope coefficient for government purchases is both statistically and economically significant. It is noteworthy that the estimated slope coefficient for social benefits is not robust to the various specifications and that the estimate for revenue even switches signs.

B.2 Austerity and GDP for Different Subsamples

Tables A3a and A3b rerun the regressions underlying Table 2b without the inclusion of Greece and the GIIPS countries. In both cases the coefficient on the shortfall of government purchases without any controls (column 1) and the coefficient in our preferred specification (column 11) remains around 2.

B.3 Additional Scatter Plots

Figures A10a - A10d illustrate the results from regression (3.6) for private consumption, investment, the nominal effective exchange rate and the growth rate of GDP. The specification is the same as the one used for Figure 4a and shows both the empirical results (a) and the results from the simulated data (b).

B.4 Additional Government Finance Variables

Here, we present additional empirical results based on the estimation equation (A.1). We do not include any controls and report the estimates for α for the entire sample, as well as for the subsamples of fixed and floating exchange rates. Results are reported for various government finance variables: shortfall in government purchases (Table A5a), shortfall in social benefits (Table A5b), the government primary balance (measured as government revenue less government expenditure net of net government interest payments, and expressed in percent of nominal GDP; Table A5c), total government revenue (Table A5d), the VAT rate (Table A5e)[3], the statutory income tax rate (Table A5f) and the statutory corporate tax rate (Table

[3] We derive changes in VAT rates from the difference of two consumer price indices: the Harmonized Index of Consumer Prices and the Harmonized Index of Consumer Prices at Constant Taxes. Differences in these indices can be attributed to changes in tax rates on consumer goods (mostly VAT). One advantage of this approach is that it covers all types of consumption tax changes, in both standard and reduced VAT rates, and weights those changes by the weight of the consumption good in the overall consumption basket. We index these changes in the tax rates to the observed statutory standard VAT rate as observed in 2014 in each country (see Data Appendix for sources). A few countries do not publish a price index at constant taxes for the entire time period we are interested in. In those cases, we approximate changes in the VAT by changes

A5g). Note that we omit the term G_i/Y_i in regression (A.1) for the primary balance and all tax rates. The analyzed economic performance measures include all measures discussed in the main body of the text, plus the unemployment rate and the debt-to-GDP ratio (both forecasted using the unit root forecast (A.2)).

C Structural Shocks in Model

C.1 Government Spending Shocks

In our empirical section we estimate deviations for government finance variables from their forecasts constructed from annual data. In the quantitative analysis, we treat those deviations as shocks and feed them into our model. The model, however, is calibrated at quarterly frequency. We use the Chow-Lin method to transform our predicted annual government spending series to quarterly series. As auxiliary high-frequency indicators we solely rely on real, quarterly GDP. Adding quarterly unemployment rates would barely affect the resulting time-series and the estimated coefficients are most of the time statistically non-significant. We estimate the model with maximum likelihood. The government spending shocks that we feed into our model are then the deviations of actual quarterly government spending data from their predicted quarterly levels.

C.2 Monetary Policy Rules

We measure monetary policy shocks as deviations of the central bank interest rates from a monetary policy rule. These deviations are calculated for each country with an independent monetary policy[4] (Czech Repbulic, Hungary, Poland, Romania, Sweden, United Kingdom, Norway, Switzerland and the United States) as well as the ECB.

Clarida, Gali and Gertler (1997) (henceforth CGG) propose a generalized Taylor rule that allows for interest rate smoothing:[5]

$$i_t = \rho i_{t-1} + (1-\rho)\left[\pi_t + r + \phi_\pi\left(\pi_t - \pi^{tar}\right) + \phi_{GDP}\%GDP_t\right],$$

in the statutory standard VAT rate (mostly Norway and Switzerland). For the US, we assume that the VAT rate has not changed over the sample period and set it equal to 8.5 percent.

[4]This includes all countries with central banks that were free or managed floaters or whose monetary policy followed a wide crawling peg, according to the classification in Itzetzki, Reinhart and Rogoff (2004).

[5]In addition, their rule depends on expected inflation and the expected output gap instead of contemporaneous inflation and output gap. Their β coefficient corresponds to $1 + \phi_\pi$ in our setup.

where i_t is the nominal interest rate, r is the long-run real interest rate, π_t is CPI core inflation, π^{tar} is the inflation target, $\%GDP_t$ are percent deviations of real GDP from its trend (output gap), and ϵ_t is an error term. Interest rates and inflation are measured at annual rates.

Estimation We estimate the generalized Taylor rule for the U.S. For the euro area and all countries with floating exchange rates, we us the slope coefficient ϕ from the U.S. regression and estimate a new intercept. We always impose that inflation targets a rate of 2%.[6]

Starting from the generalized Taylor rule

$$i_t = \phi_i i_{t-1} + (1-\phi_i)\left[\pi_t + r + \phi_\pi\left(\pi_t - \pi^{tar}\right) + \phi_{GDP}\%GDP_t + \epsilon_t\right],$$

our estimation equation is

$$\frac{i_t - \phi_i i_{t-1}}{1-\phi_i} - \pi_t = \beta_0 + \beta_1\left(\pi_t - \pi^{tar}\right) + \beta_2\%GDP_t + \epsilon_t. \tag{C.1}$$

Our estimates for r, ϕ_π and ϕ_{GDP} are $\hat{\beta}_0$, $\hat{\beta}_1$ and $\hat{\beta}_2$. We set $\phi_i = 0.79$ for the CGG specification.

When we only estimate the intercept, the estimation equation is

$$\frac{i_t - \phi_i i_{t-1}}{1-\phi_i} - \pi_t - \hat{\phi}_\pi\left(\pi_t - \pi^{tar}\right) - \hat{\phi}_{GDP}\%GDP_t = \beta_0 + \epsilon_t \tag{C.2}$$

Data and estimation periods Data on the central bank interest rates, i_t, directly comes from the central banks' websites (see the Data Appendix for more details). Data sources for the inflation rate, π_t, are explained in the Data Appendix. The output gap, $\%GDP_t$, is measured as the percent deviation of GDP from its potential GDP. Data on potential GDP for the US comes from the Gongressional Budget Office. For all other countries, we rely on annual data published by AMECO and the OECD. We linearly interpolate the log of potential GDP to obtain quarterly estimates.

The estimation periods are as follows. USA: 1985Q1 - 2005Q4, Eurozone: 1999Q2 - 2005Q4, Czech Republic: 2000Q2 - 2005Q4, Hungary: 2002Q2 - 2005Q4, Poland: 2002Q2 - 2005Q4, Romania: 2003Q2 - 2005Q4, Sweden: 1994Q3 - 2005Q4, UK: 1985Q1 - 2005Q4,

[6]Unless we make further restrictions, we cannot estimate r and π^{tar} separately, so we fix one of the two parameters prior to the estimation. CGG assume that r equals its average value of their estimation period and then estimate π^{tar}. They do not report their estimate of r. Their estimate of π^{tar} is 3.56. Here, we us the alternative approach of fixing $\pi^{tar} = 2$ and estimate r.

Norway: 1991Q2 - 2005Q4, Switzerland: 1991Q1 - 2005Q4.

Tables A6a and A6b display the estimated coefficients for the US Monetary policy and the intercepts for all central banks in our sample.

References

Clarida, Richard, Jordi Gali, and Mark Gertler. 1997. "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature*, 37: 1667–1707.

Itzetzki, Ethan O., Carmen M. Reinhart, and Kenneth Rogoff. 2004. "Exchange Rate Arrangenents until the 21st Century: Will the Anchor Currency Hold?" Working Paper.

Table A1a: SUMMARY STATISTICS OF DEVIATIONS FROM FORECAST: GOVERNMENT FINANCE VARIABLES

	Gov't. Purchases	Social Benefits	Primary Balance	Total Revenue	Stand. VAT	Top Income Tax Rate	Top Corp. Tax Rate
Average	−12.66	−9.08	0.30	0.23	1.33	0.92	−0.72
Std. deviation	10.75	7.95	1.99	3.86	1.45	4.99	2.65
			Correlation matrix				
Gov't. Purchases	1.00						
Social Benefits	0.55	1.00					
Primary Balance	−0.38	−0.62	1.00				
Total Revenue	−0.12	0.48	0.10	1.00			
Stand. VAT	−0.68	−0.55	0.54	0.05	1.00		
Top Income Tax Rate	−0.34	0.10	0.03	0.42	−0.07	1.00	
Top Corp. Tax Rate	0.36	0.33	−0.19	−0.10	−0.33	−0.14	1.00

Notes: Table displays statistics of the log-difference between the actual time series and the forecast,averaged over 2010 - 2014, for various variables. The first row displays the average of this difference across countries; the second row displays the standard deviation across countries. The remaining rows display the correlation across the various measures.

Table A1b: SUMMARY STATISTICS OF DEVIATIONS FROM FORECAST: ECONOMIC PERFORMANCE VARIABLES

	GDP	Inflation	Con-sumption	Invest-ment	NX to GDP	Exchange Rate	GDP Growth	Debt to GDP
Average	−4.27	−1.38	−6.15	−12.57	3.90	−1.21	−1.57	17.67
Std. deviation	6.43	1.80	6.68	18.80	4.21	5.00	2.05	15.06
				Correlation matrix				
GDP	1.00							
Inflation	0.20	1.00						
Consumption	0.90	0.12	1.00					
Investment	0.94	0.30	0.85	1.00				
NX to GDP	−0.38	−0.60	−0.52	−0.52	1.00			
Exchange Rate	0.26	−0.11	0.32	0.24	−0.11	1.00		
GDP Growth	0.98	0.24	0.86	0.93	−0.39	0.25	1.00	
Debt to GDP	−0.39	0.07	−0.41	−0.51	0.44	−0.32	−0.31	1.00

Notes: Table displays statistics of the log-difference between the actual time series and the forecast,averaged over 2010 - 2014, for various variables. The first row displays the average of this difference across countries; the second row displays the standard deviation across countries. The remaining rows display the correlation across the various measures.

Table A2: Austerity and GDP: Different Forecast Specifications

	Gov't. Purchases	Social Benefits	Total Revenue
Specification 1			
$\hat{\beta}$	-2.22	-2.60	-1.55
SE	(0.25)	(1.29)	(0.93)
R^2	0.74	0.13	0.09
Corr.	-0.86	-0.36	-0.31
Specification 2			
$\hat{\beta}$	-1.79	-0.75	1.72
SE	(0.34)	(0.66)	(0.34)
R^2	0.50	0.05	0.49
Corr.	-0.71	-0.21	0.70
Specification 3			
$\hat{\beta}$	-1.83	-0.95	1.24
SE	(0.40)	(0.89)	(0.35)
R^2	0.44	0.04	0.32
Corr.	-0.66	-0.20	0.56
Specification 4			
$\hat{\beta}$	-1.96	-0.38	-0.68
SE	(0.33)	(1.23)	(0.77)
R^2	0.58	0.00	0.03
Corr.	-0.76	-0.06	-0.17

Notes: Table displays the regression coefficient of a univariate regression. The explained variable is the forecast error in GDP. Each column corresponds to a different explanatory variable (forecast errors in government purchases, government transfers, total revenue. Every row corresponds to a different forecast specification for both the explanatory and explained variable. Specification 1: Benchmark specification. Specification 2: Linear time trend. Specification 3: AR(1) specification with drift. Specification 4: Same as specification 1, but without Greece.

Table A3a: Austerity and GDP: Without Greece

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Gov't. Purchases	−1.96	−1.98	−1.76	−1.92	−1.86	−2.28	−1.99	−1.67	−1.77	−1.97	−1.79
	(0.33)	(0.32)	(0.29)	(0.33)	(0.31)	(0.46)	(0.32)	(0.26)	(0.28)	(0.42)	(0.29)
Total Revenue		−0.80						−0.84	−0.64	−0.55	−0.68
		(0.50)						(0.39)	(0.43)	(0.47)	(0.49)
TFP			0.39					0.43	0.31	0.34	0.37
			(0.12)					(0.11)	(0.13)	(0.12)	(0.13)
HH Debt to GDP				0.02				0.04			
				(0.02)				(0.01)			
Credit Spread 2010-2014					−0.95				−0.43		
					(0.43)				(0.43)		
Gov't. Bond Rate						0.71				0.38	
						(0.69)				(0.62)	
Gov't Debt to GDP							−0.03				0.00
							(0.02)				(0.02)
R^2	0.58	0.62	0.70	0.59	0.65	0.61	0.61	0.79	0.74	0.73	0.73
Obs.	28	28	28	28	28	27	28	28	28	27	28

Notes: See Table 2b. Sample excludes Greece.

Table A3b: Austerity and GDP: Without GIIPS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Gov't. Purchases	−2.05	−2.18	−1.90	−2.02	−2.12	−2.05	−2.23	−1.87	−2.14	−1.70	−2.05
	(0.36)	(0.35)	(0.32)	(0.39)	(0.31)	(0.46)	(0.36)	(0.32)	(0.28)	(0.39)	(0.32)
Total Revenue		−0.93						−0.87	−0.87	−0.88	−0.79
		(0.48)						(0.40)	(0.38)	(0.46)	(0.48)
TFP			0.33					0.36	0.19	0.34	0.31
			(0.12)					(0.11)	(0.11)	(0.11)	(0.12)
HH Debt to GDP				0.00				0.02			
				(0.02)				(0.02)			
Credit Spread 2010-2014					−1.23				−0.90		
					(0.40)				(0.39)		
Gov't. Bond Rate						−0.01				−1.16	
						(1.02)				(0.90)	
Gov't Debt to GDP							−0.04				−0.01
							(0.02)				(0.03)
R^2	0.59	0.65	0.70	0.59	0.72	0.62	0.65	0.78	0.81	0.78	0.76
Obs.	24	24	24	24	24	23	24	24	24	23	24

Notes: See Table 2b. Sample excludes Greece, Ireland, Italy, Portugal and Spain.

Table A4: AVERAGE FORECAST ERRORS

	Gov't. Purchases	Primary Balance	Total Revenue	Stand. VAT	Top Income Tax Rate	Top Corp. Tax Rate	GDP
Belgium	−4.5	−0.8	2.7	0.0	0.0	0.0	−3.7
Bulgaria	−19.1	−0.6	−4.6	0.0	0.0	0.0	−9.2
Czech Republic	−15.6	1.2	4.1	1.4	2.8	−1.5	−6.9
Denmark	−5.2	−1.7	1.9	0.0	−6.8	−0.1	−0.4
Germany	0.4	0.1	−0.8	0.0	−0.0	0.0	3.0
Estonia	−9.8	3.0	−7.0	1.5	0.0	0.0	1.8
Ireland	−19.3	−0.2	0.7	0.9	4.3	0.0	1.8
Greece	−44.8	3.3	5.8	3.7	7.8	−11.8	−26.0
Spain	−23.8	0.4	4.1	3.2	5.8	0.0	−9.9
France	−5.6	0.1	3.9	0.1	3.1	2.1	−3.0
Italy	−16.9	0.7	−0.4	0.9	2.1	0.0	−7.8
Cyprus	−26.6	−3.4	−4.2	1.7	4.0	1.0	−14.2
Latvia	−10.6	4.2	3.1	1.8	0.8	0.0	−0.5
Lithuania	−13.4	2.6	−10.8	2.2	−4.5	−2.5	3.8
Luxembourg	−4.4	−0.2	−2.1	0.0	3.0	−0.2	2.1
Hungary	−14.2	0.9	−4.1	4.9	−17.4	−0.7	−8.4
Netherlands	−7.1	−1.1	1.8	0.9	0.0	−0.4	−3.4
Austria	−6.8	0.7	1.0	0.0	0.0	0.0	−1.5
Poland	−6.5	1.0	2.2	0.8	−4.0	0.0	−4.7
Portugal	−26.1	0.7	2.8	2.2	9.6	4.0	−11.0
Romania	−36.2	4.1	0.2	4.5	0.0	0.0	−11.2
Slovenia	−14.2	−2.7	−0.8	0.6	3.6	−3.1	−8.5
Slovak Republic	−7.2	1.3	1.8	0.8	2.4	1.4	−4.1
Finland	−4.4	−2.6	3.0	1.3	0.4	−1.8	−2.3
Sweden	−0.9	−1.7	−2.8	0.0	0.2	−2.6	2.1
United Kingdom	−10.5	1.3	2.3	3.4	8.0	−4.6	−2.6
Norway	−6.4	−2.3	−1.8	0.0	−0.2	−0.2	−0.2
Switzerland	2.0	−1.4	−1.8	0.3	0.0	−0.0	0.9
United States	−9.4	1.6	6.3	*NaN*	1.7	−0.1	0.2

Notes: Table displays the log-difference (×100) between the actual time series and the forecast,averaged over 2010 - 2014, for various government finance variables and GDP.

Table A5a: Univariate Regressions: Government Purchases (Shortfall)

	Government Purchases (Shortfall)					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−2.22	0.74	−2.39	0.74	−1.78	0.81
	(0.25)		(0.33)		(0.32)	
Inflation	−0.22	0.09	−0.22	0.07	−0.20	0.30
	(0.13)		(0.18)		(0.12)	
Consumption	−1.37	0.66	−1.47	0.73	−1.05	0.46
	(0.19)		(0.21)		(0.43)	
Investment	−1.45	0.72	−1.60	0.76	−0.95	0.67
	(0.17)		(0.21)		(0.25)	
NX to GDP	0.91	0.29	0.87	0.27	0.84	0.34
	(0.27)		(0.34)		(0.44)	
Exchange Rate	−0.65	0.11	0.13	0.05	−2.77	0.54
	(0.36)		(0.14)		(0.97)	
GDP Growth	−0.65	0.63	−0.69	0.62	−0.52	0.73
	(0.10)		(0.13)		(0.12)	
Unemployment	0.96	0.63	1.23	0.88	0.05	0.05
	(0.14)		(0.11)		(0.09)	
Debt to GDP	3.60	0.35	3.73	0.42	2.42	0.18
	(0.93)		(1.03)		(1.92)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5b: UNIVARIATE REGRESSIONS: SOCIAL BENEFITS (SHORTFALL)

	Social Benefits (Shortfall)					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−2.60	0.13	−2.00	0.07	−5.15	0.61
	(1.29)		(1.66)		(1.56)	
Inflation	−1.11	0.30	−1.18	0.30	−0.71	0.33
	(0.32)		(0.42)		(0.38)	
Consumption	−1.85	0.16	−1.31	0.08	−4.04	0.60
	(0.83)		(1.02)		(1.23)	
Investment	−1.74	0.13	−1.34	0.08	−3.18	0.67
	(0.85)		(1.09)		(0.84)	
NX to GDP	2.34	0.25	2.10	0.23	2.80	0.34
	(0.78)		(0.91)		(1.48)	
Exchange Rate	−0.97	0.03	0.67	0.18	−8.09	0.41
	(1.06)		(0.34)		(3.67)	
GDP Growth	−0.79	0.12	−0.59	0.07	−1.58	0.59
	(0.41)		(0.53)		(0.50)	
Unemployment	1.41	0.17	1.53	0.20	0.26	0.11
	(0.59)		(0.73)		(0.28)	
Debt to GDP	2.99	0.03	2.99	0.04	0.17	0.00
	(3.18)		(3.50)		(7.11)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5c: Univariate Regressions: Primary Balance

	Primary Balance					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−0.41	0.02	0.13	0.00	−1.80	0.60
	(0.62)		(0.83)		(0.55)	
Inflation	−0.28	0.10	−0.38	0.13	−0.09	0.05
	(0.17)		(0.23)		(0.16)	
Consumption	−0.40	0.04	−0.16	0.01	−1.07	0.34
	(0.40)		(0.51)		(0.56)	
Investment	−0.10	0.00	0.21	0.01	−0.96	0.49
	(0.41)		(0.55)		(0.37)	
NX to GDP	0.66	0.10	0.54	0.06	1.14	0.45
	(0.39)		(0.49)		(0.48)	
Exchange Rate	−0.75	0.09	0.31	0.16	−3.44	0.59
	(0.46)		(0.16)		(1.07)	
GDP Growth	−0.08	0.01	0.09	0.01	−0.55	0.57
	(0.20)		(0.26)		(0.18)	
Unemployment	0.16	0.01	0.25	0.02	0.09	0.10
	(0.29)		(0.39)		(0.10)	
Debt to GDP	1.69	0.05	0.54	0.01	5.20	0.61
	(1.42)		(1.73)		(1.56)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5d: Univariate Regressions: Total Revenue

	Total Revenue					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−1.55	0.09	−1.90	0.13	−0.34	0.01
	(0.93)		(1.17)		(1.52)	
Inflation	0.47	0.11	0.56	0.13	0.20	0.07
	(0.26)		(0.34)		(0.28)	
Consumption	−0.70	0.04	−0.98	0.09	0.25	0.01
	(0.62)		(0.74)		(1.20)	
Investment	−0.83	0.06	−1.04	0.09	−0.08	0.00
	(0.63)		(0.79)		(0.90)	
NX to GDP	−0.93	0.08	−1.31	0.17	0.21	0.01
	(0.61)		(0.69)		(1.11)	
Exchange Rate	−0.71	0.03	−0.33	0.08	−1.87	0.06
	(0.75)		(0.26)		(2.84)	
GDP Growth	−0.41	0.07	−0.50	0.09	−0.11	0.01
	(0.30)		(0.38)		(0.47)	
Unemployment	0.32	0.02	0.37	0.02	0.08	0.02
	(0.45)		(0.59)		(0.18)	
Debt to GDP	4.64	0.15	3.58	0.11	7.67	0.44
	(2.10)		(2.46)		(3.26)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5e: Univariate Regressions: Standard VAT Rate

	Standard VAT Rate					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−2.42	0.29	−3.66	0.32	−1.87	0.64
	(0.74)		(1.25)		(0.57)	
Inflation	−0.13	0.01	−0.35	0.03	−0.05	0.01
	(0.25)		(0.44)		(0.17)	
Consumption	−1.51	0.28	−2.13	0.29	−1.32	0.62
	(0.47)		(0.79)		(0.42)	
Investment	−1.39	0.22	−2.36	0.31	−1.04	0.57
	(0.51)		(0.84)		(0.37)	
NX to GDP	0.97	0.11	1.54	0.16	1.05	0.36
	(0.54)		(0.84)		(0.57)	
Exchange Rate	−1.55	0.19	0.29	0.04	−3.50	0.57
	(0.62)		(0.32)		(1.25)	
GDP Growth	−0.68	0.23	−1.06	0.27	−0.53	0.56
	(0.24)		(0.41)		(0.19)	
Unemployment	0.81	0.15	2.35	0.60	0.05	0.03
	(0.38)		(0.45)		(0.11)	
Debt to GDP	4.25	0.16	7.78	0.34	4.07	0.46
	(1.88)		(2.56)		(1.81)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5f: Univariate Regressions: Top Personal Income Tax Rate

	Top Personal Income Tax Rate					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	−0.36	0.08	−1.23	0.41	0.25	0.14
	(0.24)		(0.35)		(0.24)	
Inflation	0.05	0.02	0.09	0.03	0.04	0.12
	(0.07)		(0.13)		(0.04)	
Consumption	−0.18	0.05	−0.78	0.43	0.27	0.26
	(0.16)		(0.21)		(0.17)	
Investment	−0.24	0.08	−0.82	0.42	0.20	0.26
	(0.16)		(0.23)		(0.13)	
NX to GDP	0.03	0.00	0.21	0.03	−0.22	0.20
	(0.16)		(0.27)		(0.17)	
Exchange Rate	0.19	0.04	0.03	0.01	0.40	0.10
	(0.19)		(0.10)		(0.46)	
GDP Growth	−0.10	0.06	−0.34	0.32	0.08	0.14
	(0.08)		(0.12)		(0.07)	
Unemployment	0.22	0.13	0.47	0.27	−0.03	0.12
	(0.11)		(0.18)		(0.03)	
Debt to GDP	1.61	0.29	2.59	0.42	0.65	0.11
	(0.49)		(0.71)		(0.68)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A5g: UNIVARIATE REGRESSIONS: TOP CORPORATE TAX RATE

	Top Corporate Tax Rate					
	All Countries		Fixed XRT		Floating XRT	
	α	R^2	α^{fix}	R^2	α^{fl}	R^2
GDP	0.97	0.16	1.17	0.25	−0.51	0.03
	(0.43)		(0.48)		(1.09)	
Inflation	0.10	0.02	0.16	0.06	−0.33	0.35
	(0.13)		(0.16)		(0.17)	
Consumption	0.66	0.17	0.76	0.27	0.05	0.00
	(0.28)		(0.29)		(0.87)	
Investment	0.55	0.12	0.69	0.20	−0.33	0.04
	(0.29)		(0.33)		(0.64)	
NX to GDP	−0.08	0.00	−0.21	0.02	0.57	0.07
	(0.30)		(0.33)		(0.78)	
Exchange Rate	−0.12	0.00	−0.12	0.05	0.07	0.00
	(0.36)		(0.12)		(2.12)	
GDP Growth	0.25	0.11	0.31	0.17	−0.13	0.02
	(0.14)		(0.16)		(0.34)	
Unemployment	−0.51	0.20	−0.62	0.31	0.01	0.00
	(0.20)		(0.22)		(0.13)	
Debt to GDP	−1.17	0.04	−1.15	0.06	−3.11	0.14
	(1.07)		(1.12)		(2.93)	

Notes: Table displays the estimated coefficient on the government finance variable from regression (3.6) without any controls as well as its R^2. Regressions are run for the whole set of countries, only fixed exchange rate countries, or only floating exchange rate countries. Reported standard errors in parentheses are (untreated) OLS errors.

Table A6a: US Monetary Policy Coefficients

	r	ϕ_π	ϕ_{GDP}	ϕ_i
CGG	2.35	1.15	0.93	0.79
	(0.24)	–	–	–
Estimated CGG	2.98	0.22	1.08	0.79
	(0.29)	(0.23)	(0.15)	–

Notes: First row displays the estimated coefficients from the original CGG study. The second row displays our estimated results for the U.S, where we impose the coefficient $\phi_i = 0.79$. Reported standard errors are (untreated) OLS errors. See text for estimation period.

Table A6b: Estimated Intercepts

USA	ECB	CZE	HUN	POL	ROM	SWE	GBR	NOR	CHE
2.98	0.07	0.15	0.27	6.90	−1.98	4.11	3.42	3.70	1.25
(0.29)	(0.24)	(0.48)	(1.48)	(0.51)	(2.65)	(0.37)	(0.35)	(0.48)	(0.27)

Notes: Coefficients are estimated intercepts for the CGG rule. The intercept corresponds to the real interest rate, r. See text for estimation period.

Table A7: Interest Rates and Spreads

	CB rate			Taylor deviation			Spread		
	04-07	08-09	10-14	04-07	08-09	10-14	04-07	08-09	10-14
Belgium	2.7	2.6	0.8	0.1	-0.1	1.8	1.6	1.9	1.6
Bulgaria	2.7	2.6	0.8	0.1	-0.1	1.8	7.9	8.5	7.8
Czech Republic	3.3	3.5	1.1	−1.3	-4.1	1.3	1.4	1.6	2.2
Denmark	2.9	3.1	0.6	0.1	-0.1	1.8	2.0	2.9	3.6
Germany	2.7	2.6	0.8	0.1	-0.1	1.8	2.4	2.3	2.5
Estonia	2.7	2.6	0.8	0.1	-0.1	1.8	2.3	3.5	3.0
Ireland	2.7	2.6	0.8	0.1	-0.1	1.8	2.3	2.7	3.6
Greece	2.7	2.6	0.8	0.1	-0.1	1.8	2.9	3.1	5.5
Spain	2.7	2.6	0.8	0.1	-0.1	1.8	1.7	2.5	3.8
France	2.7	2.6	0.8	0.1	-0.1	1.8	1.5	1.8	1.7
Italy	2.7	2.6	0.8	0.1	-0.1	1.8	1.9	2.1	3.2
Cyprus	4.7	2.6	0.8	0.1	-0.1	1.8	2.4	4.4	5.8
Latvia	4.4	5.3	2.5	0.1	-0.1	1.8	3.5	8.5	2.8
Lithuania	2.7	2.6	0.8	0.1	-0.1	1.8	3.2	5.9	4.3
Luxembourg	2.7	2.6	0.8	0.1	-0.1	1.8	1.8	1.7	1.6
Hungary	8.3	8.7	5.0	−0.4	2.2	4.3	2.6	3.1	3.2
Netherlands	2.7	2.6	0.8	0.1	-0.1	1.8	1.4	2.0	2.5
Austria	2.7	2.6	0.8	0.1	-0.1	1.8	1.4	1.6	1.6
Poland	4.9	4.7	3.5	−1.4	-6.5	−5.9	2.1	2.7	2.2
Portugal	2.7	2.6	0.8	0.1	-0.1	1.8	3.5	4.1	5.5
Romania	11.8	9.4	5.2	−1.0	-0.9	5.4	6.3	7.6	4.6
Slovenia	3.8	2.6	0.8	0.1	-0.1	1.8	2.5	3.7	4.8
Slovak Republic	4.1	2.6	0.8	0.1	-0.1	1.8	1.6	2.5	3.2
Finland	2.7	2.6	0.8	0.1	-0.1	1.8	1.5	1.6	2.1
Sweden	2.4	2.4	1.0	−2.3	-3.2	−1.8	1.5	1.6	2.3
United Kingdom	4.8	2.7	0.5	0.6	-0.7	−0.7	1.0	1.7	2.0
Norway	2.7	3.5	1.7	−1.1	-3.6	−2.6	2.0	2.4	2.7
Switzerland	1.5	1.2	-0.1	0.3	-2.8	−0.7	0.7	0.9	1.8
United States	3.6	1.0	0.1	−0.4	-0.9	0.4	1.8	2.1	2.3
Average	3.5	3.2	1.2	−0.1	-0.8	1.2	2.4	3.1	3.2

Notes: Table displays the average central bank interest rates (CB rate, in percent), the average central bank interest rate less the rate implied by a monetary policy rule (Taylor deviations, in percentage points) and the spread between lending rates to businesses and the central bank interest rate (Spread, in percentage points). Averages are taken over 2004 - 2007, 2008 - 2009 and 2010 - 2014. See text for details on the monetary policy rule.

Table A8: STEADY-STATE GOVERNMENT PURCHASES AND TAX RATES

	Purchases	Cons Tax	Labor Tax	Capital Tax
Belgium	24.6	20.6	53.7	34.0
Bulgaria	22.8	18.1	18.4	12.0
Czech Republic	24.4	16.5	25.2	23.0
Denmark	28.1	23.9	62.3	26.2
Germany	20.5	18.5	46.2	35.3
Estonia	22.4	16.4	22.2	22.2
Ireland	20.3	21.1	42.4	12.5
Greece	25.5	17.5	40.0	31.2
Spain	22.3	17.7	43.8	32.5
France	27.2	19.5	47.0	34.5
Italy	22.5	20.7	44.6	34.9
Cyprus	21.1	15.8	30.0	10.0
Latvia	22.5	15.7	24.6	15.0
Lithuania	23.1	16.7	25.2	17.4
Luxembourg	19.2	13.8	39.0	29.6
Hungary	25.3	21.6	38.8	19.8
Netherlands	26.9	18.6	52.0	27.5
Austria	21.9	19.5	50.0	25.0
Poland	22.0	20.3	38.4	19.0
Portugal	24.9	19.8	41.6	26.9
Romania	21.0	17.3	16.0	16.0
Slovenia	22.7	19.0	44.6	23.2
Slovak Republic	22.2	18.7	19.0	19.0
Finland	25.9	21.8	50.3	26.0
Sweden	29.2	24.6	56.5	27.7
United Kingdom	22.7	17.4	40.0	29.6
Norway	23.6	24.4	40.7	28.0
Switzerland	14.0	7.6	41.9	21.3
United States	19.4	8.5	41.6	39.3
RoW	18.1	8.5	41.6	39.3
Average	22.9	18.0	39.3	25.3

Notes: Table displays the steady-state values for the share of government purchases in GDP, the consumption tax rate, the labor tax rate, and the capital tax rate, as they are used in the model. For government purchases, the average is taken over 2000 - 2010; for tax rates, the average is taken over 2005 - 2009.

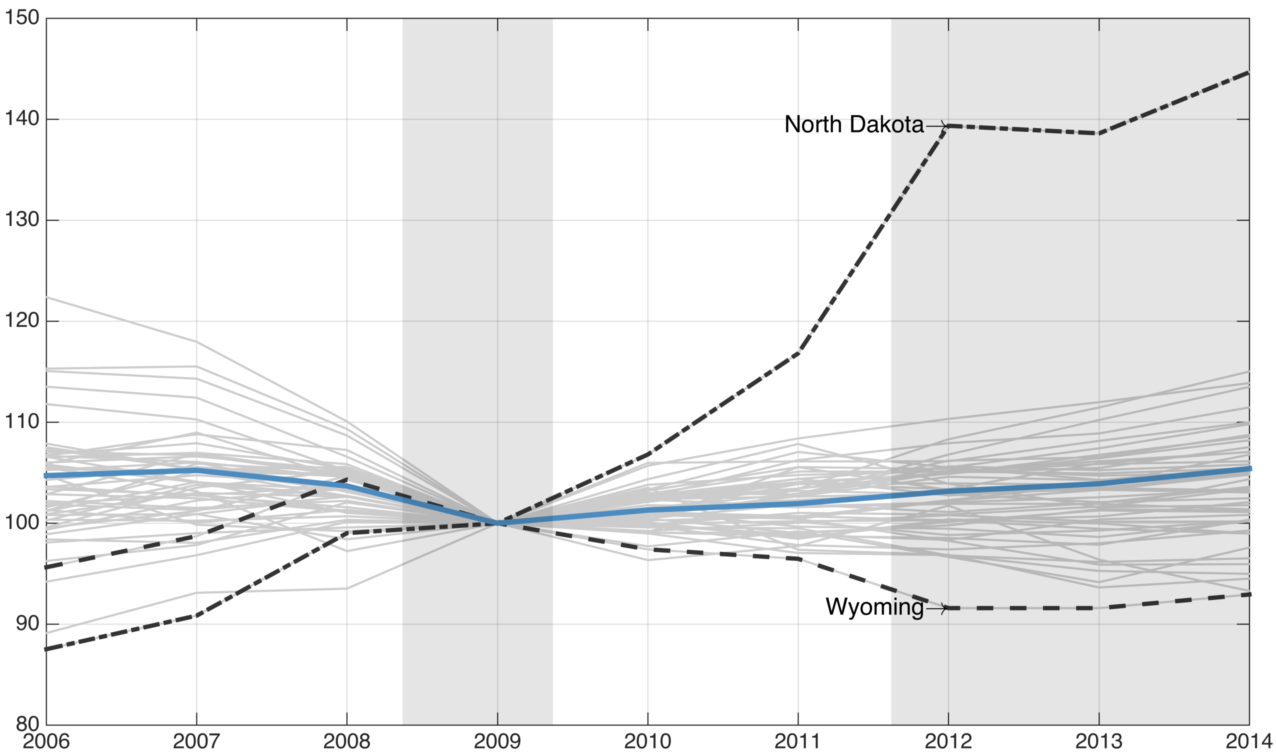


Figure A1: Real per Capita GDP Before, During and After the Crisis: US States

Note: The figure plots the time paths of real per capita GDP for the period 2006-2014 for all US States. The paths are indexed to 100 in 2009. The time path for the US as a whole is marked blue.

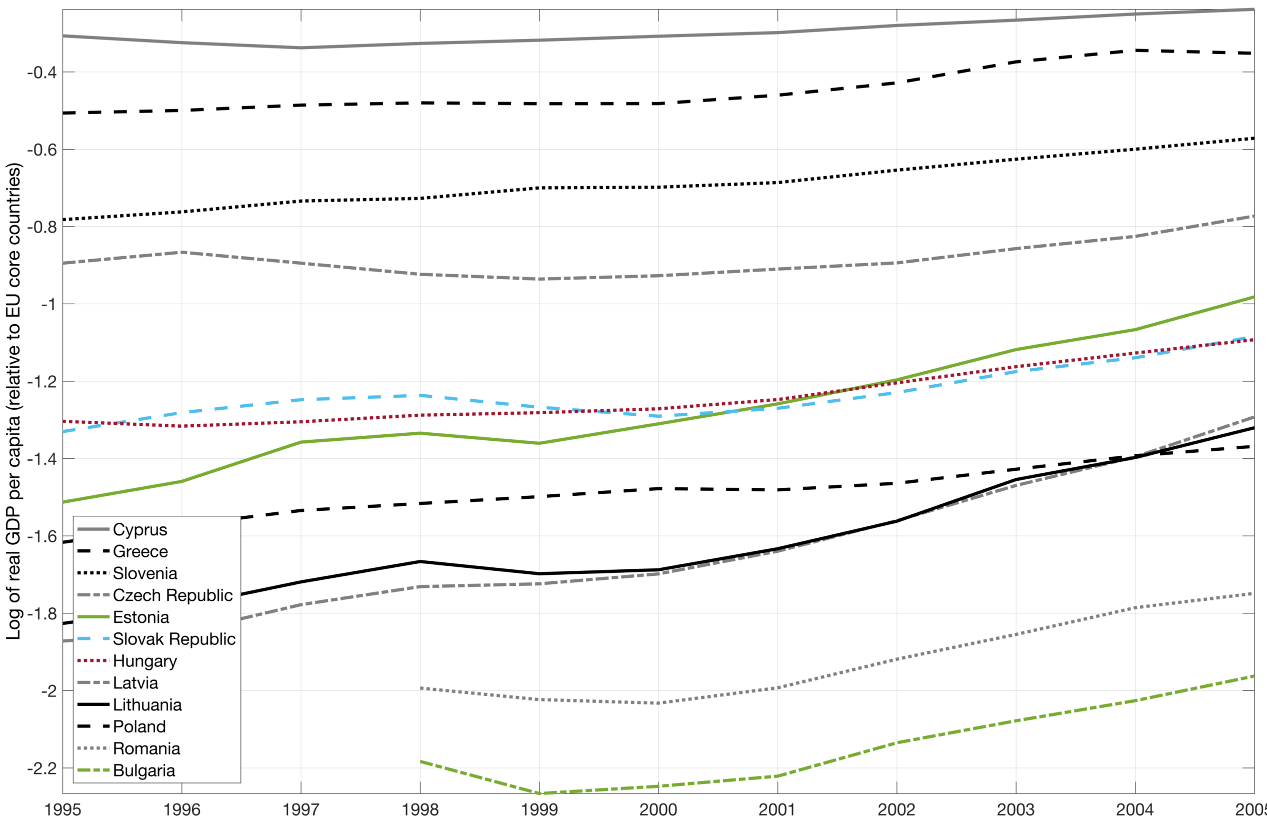


Figure A2: Convergence in Real GDP

Note: The figure plots the time paths of the log of real per capita GDP for Central and Eastern European countries relative to real per capita GDP of the core EU countries, $\ln Y_{i,t} - \ln Y_{EU,t}$.

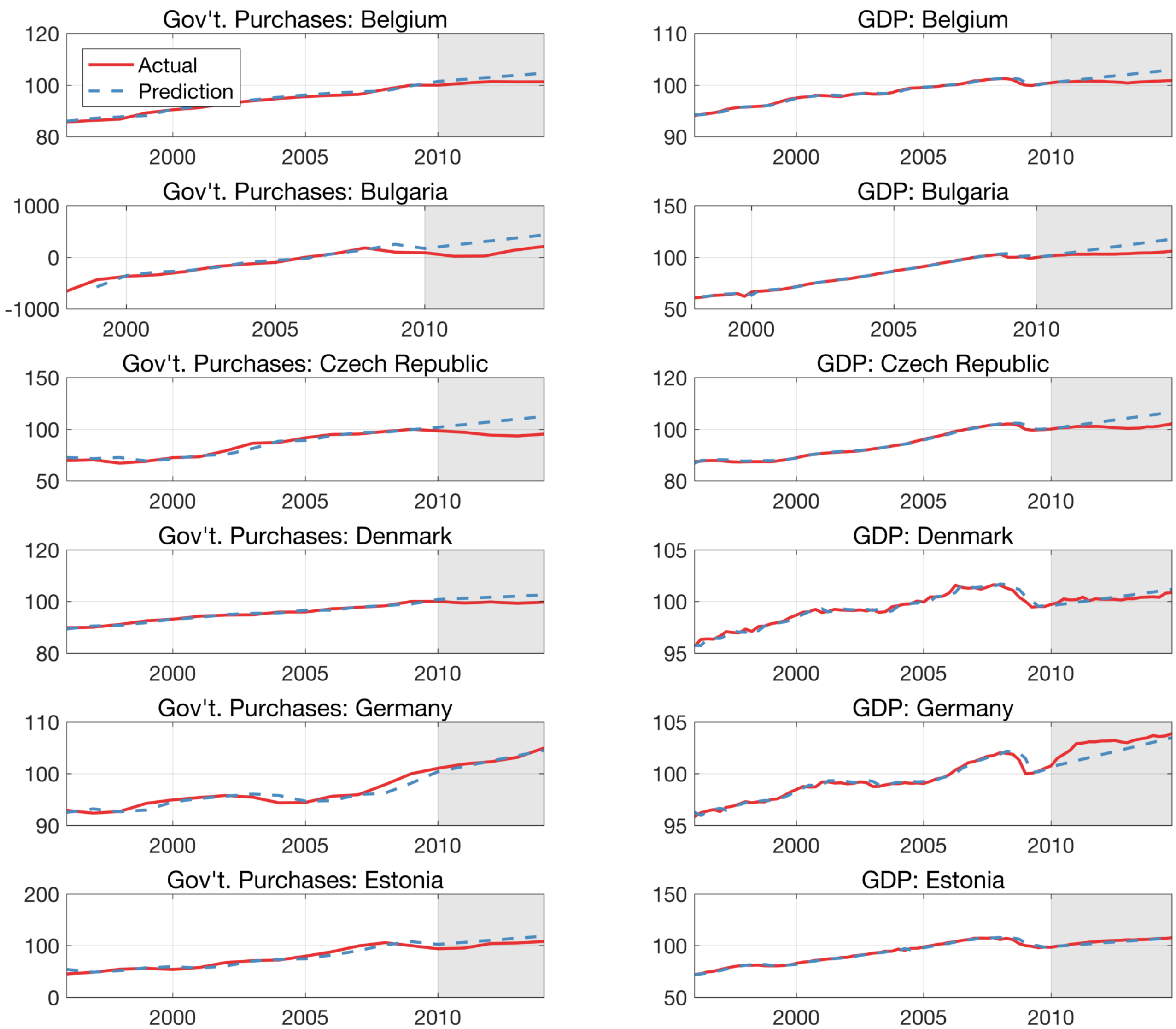


Figure A3a: Government Purchases and GDP (1)

Note: Left column panels display real government purchases for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real GDP per capita.

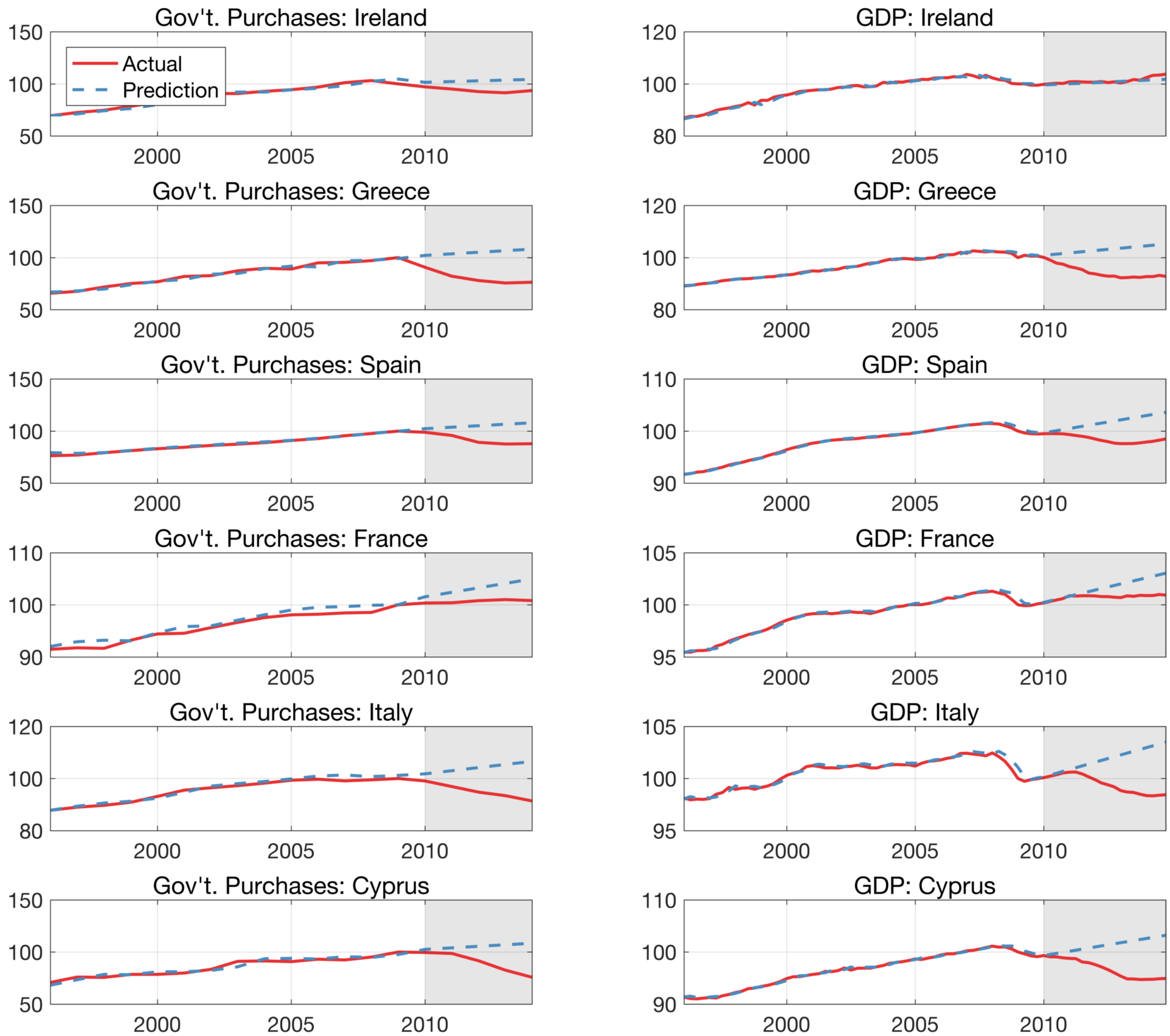


Figure A3b: Government Purchases and GDP (2)

Note: Left column panels display real government purchases for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real GDP per capita.

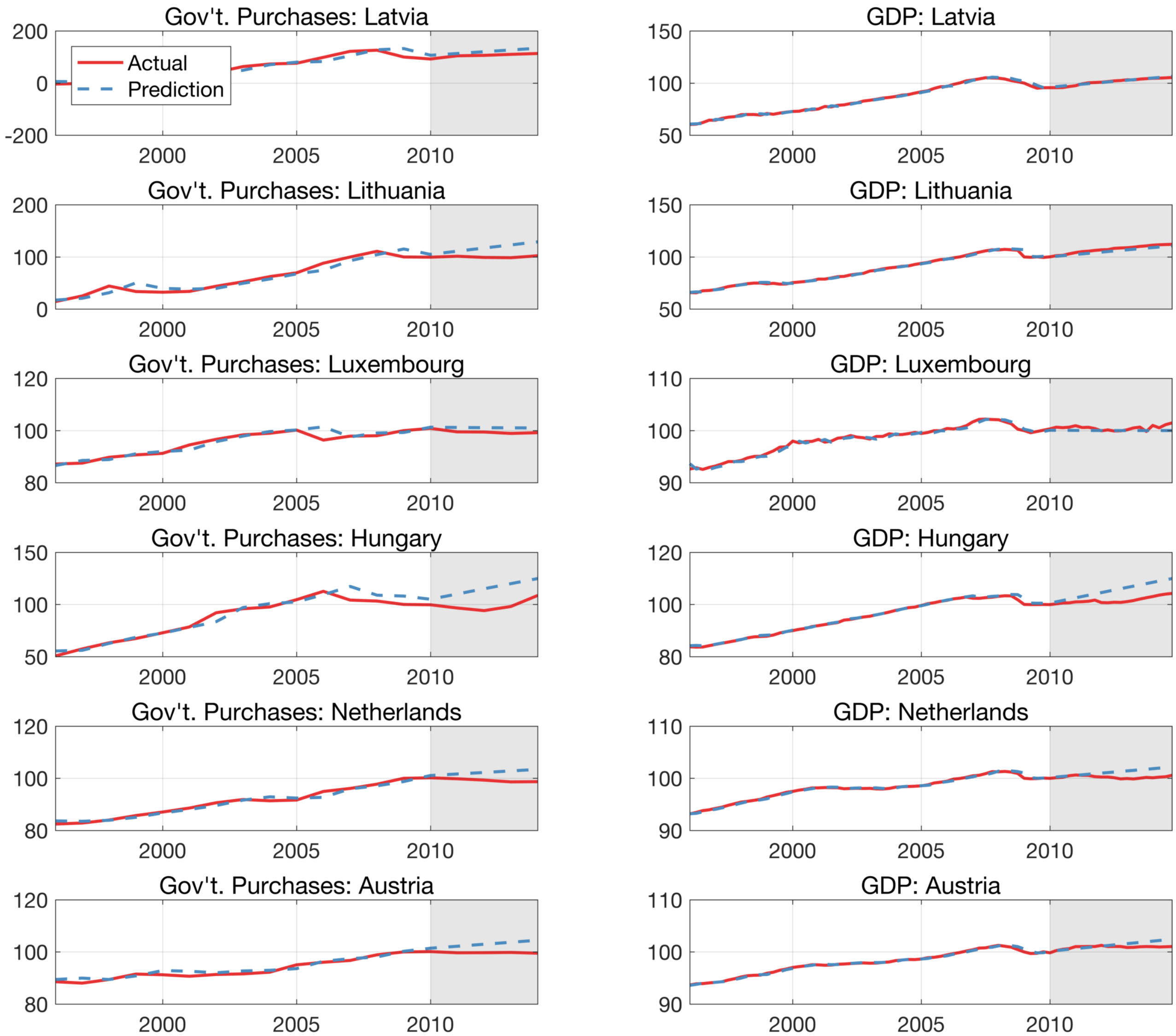


Figure A3c: Government Purchases and GDP (3)

Note: Left column panels display real government purchases for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real GDP per capita.

Figure A3d: Government Purchases and GDP (4)

Note: Left column panels display real government purchases for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real GDP per capita.

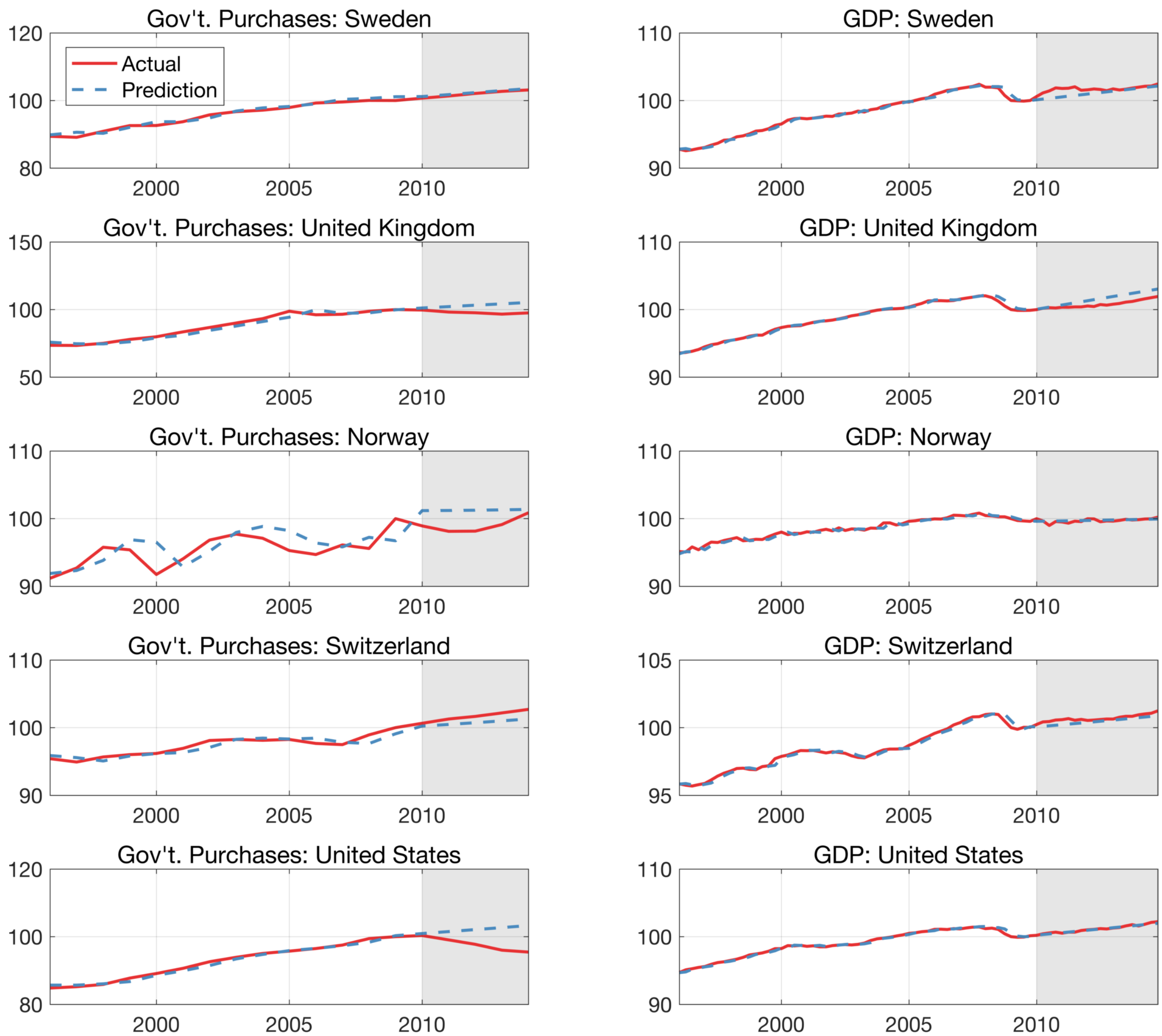


Figure A3e: Government Purchases and GDP (5)

Note: Left column panels display real government purchases for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real GDP per capita.

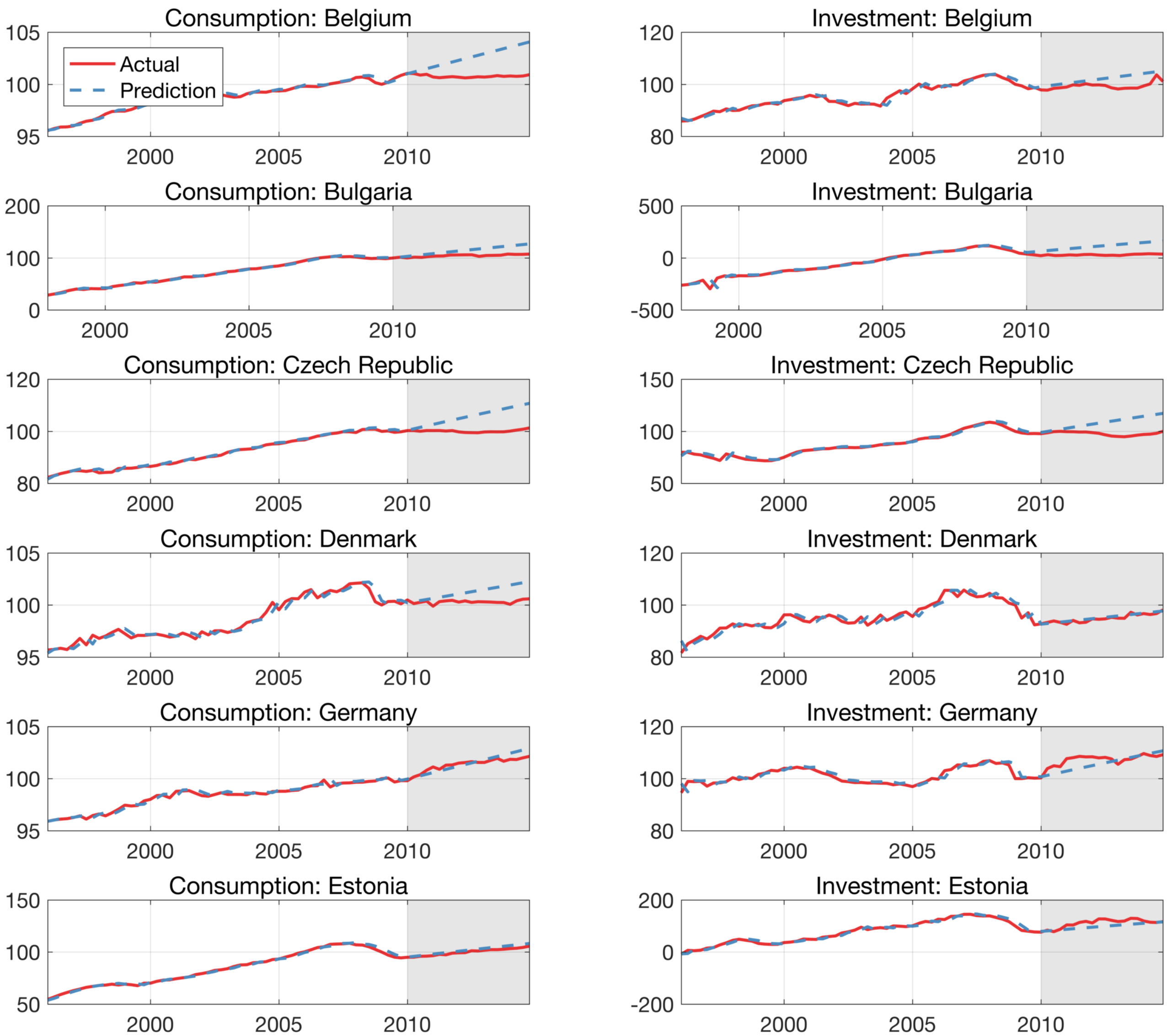


Figure A4a: Consumption and Investment (1)

Note: Left column panels display real private consumption per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real investment per capita.

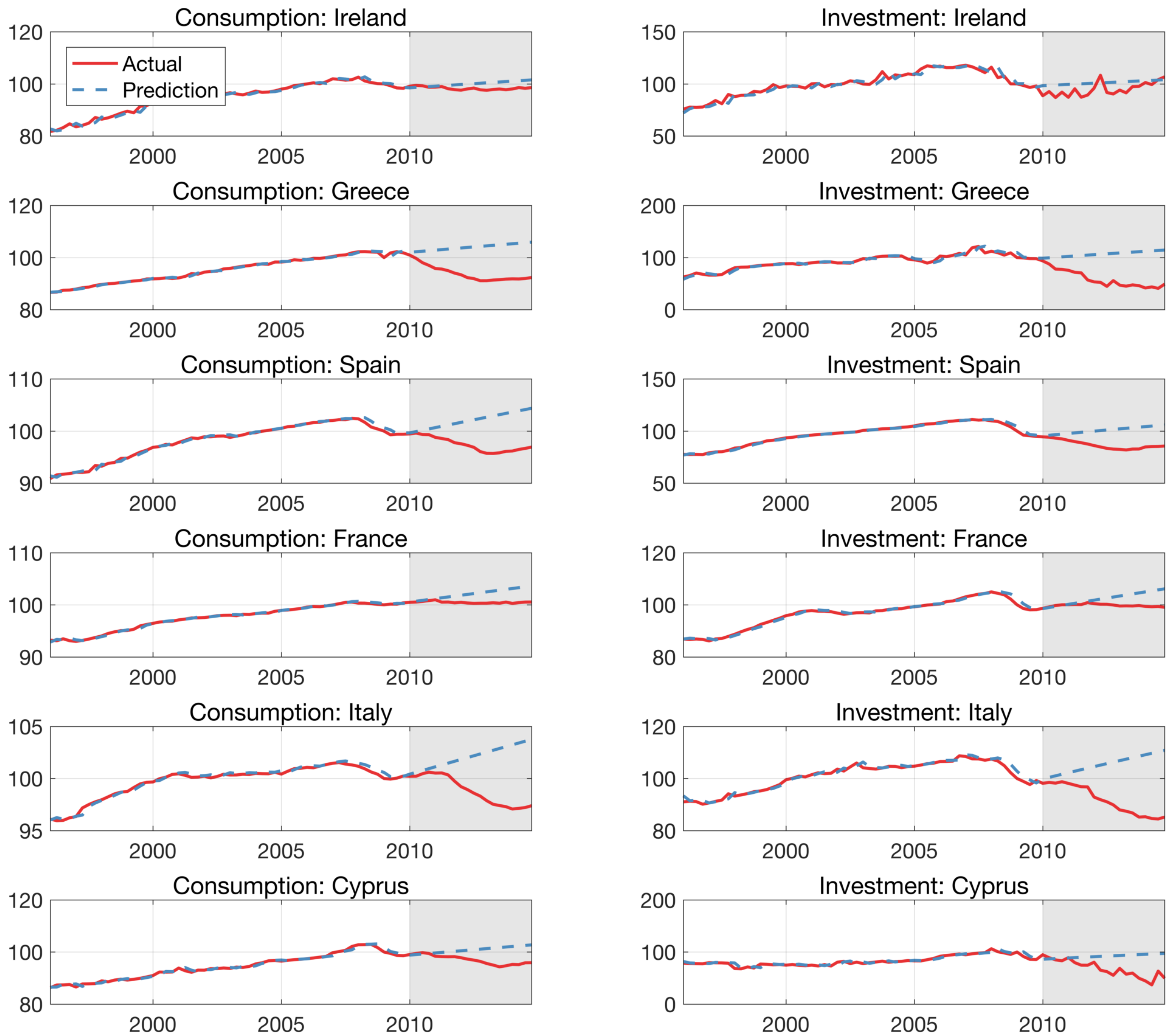


Figure A4b: Consumption and Investment (2)

Note: Left column panels display real private consumption per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real investment per capita.

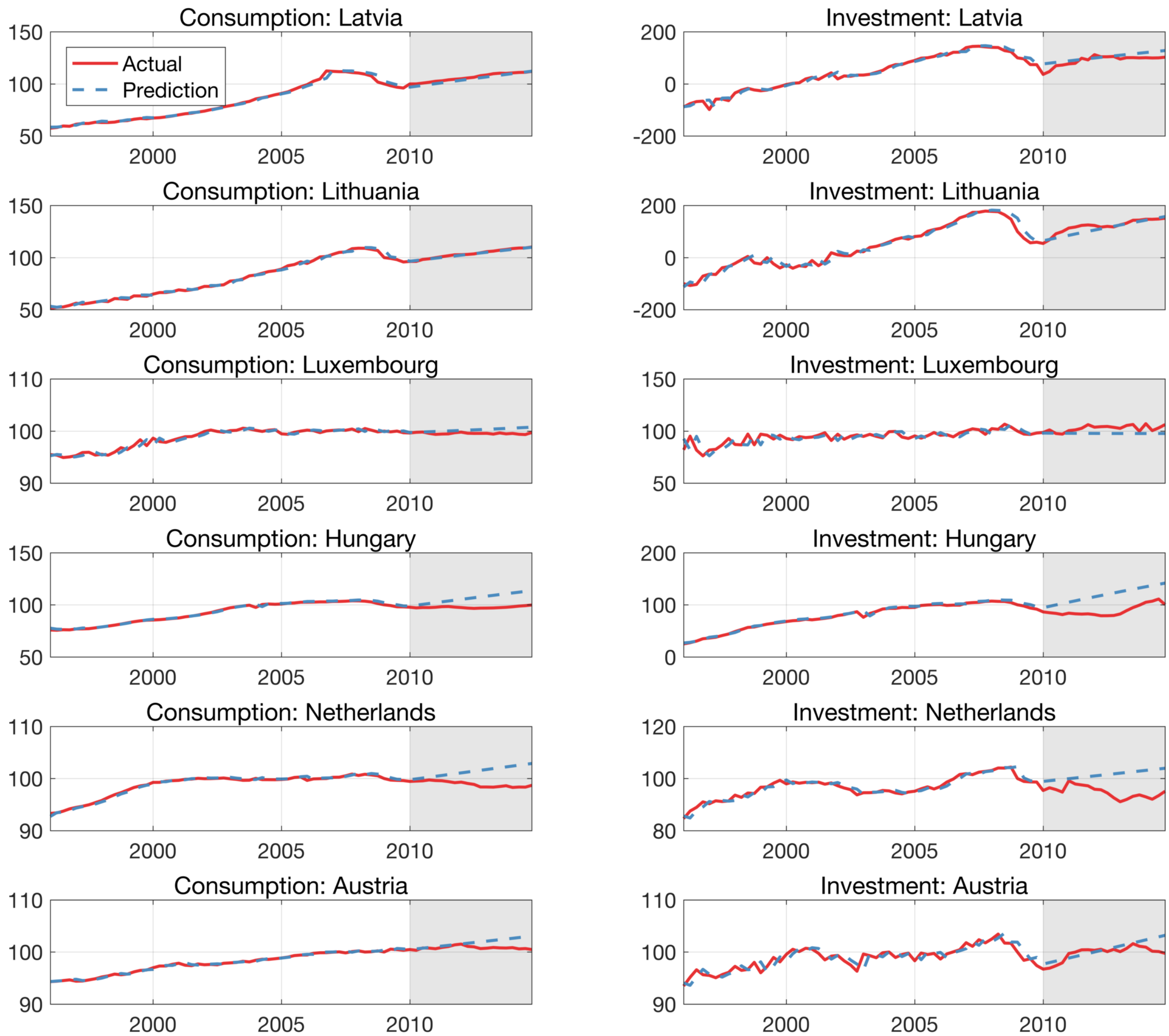


Figure A4c: Consumption and Investment (3)

Note: Left column panels display real private consumption per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real investment per capita.

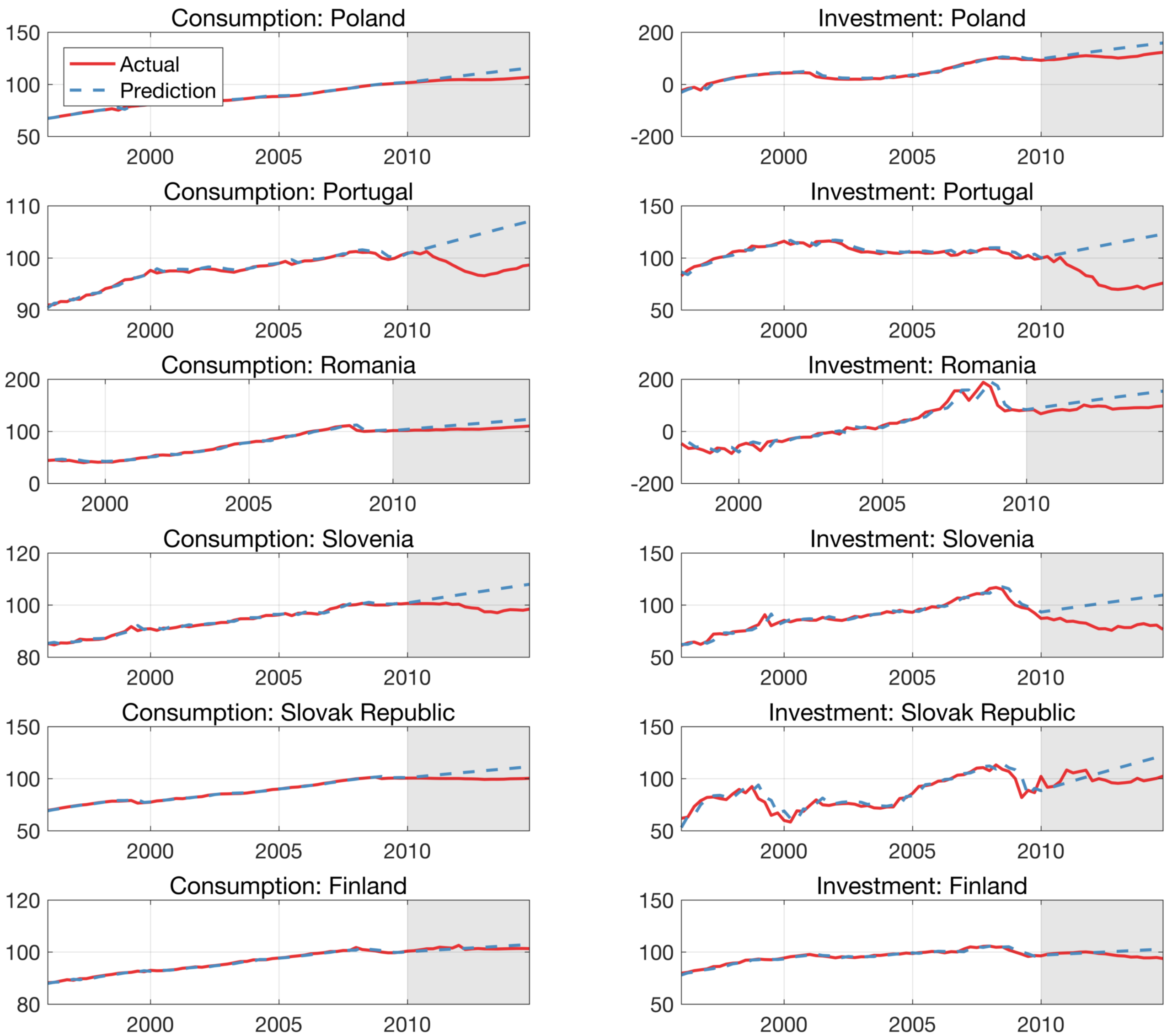


Figure A4d: Consumption and Investment (4)

Note: Left column panels display real private consumption per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real investment per capita.

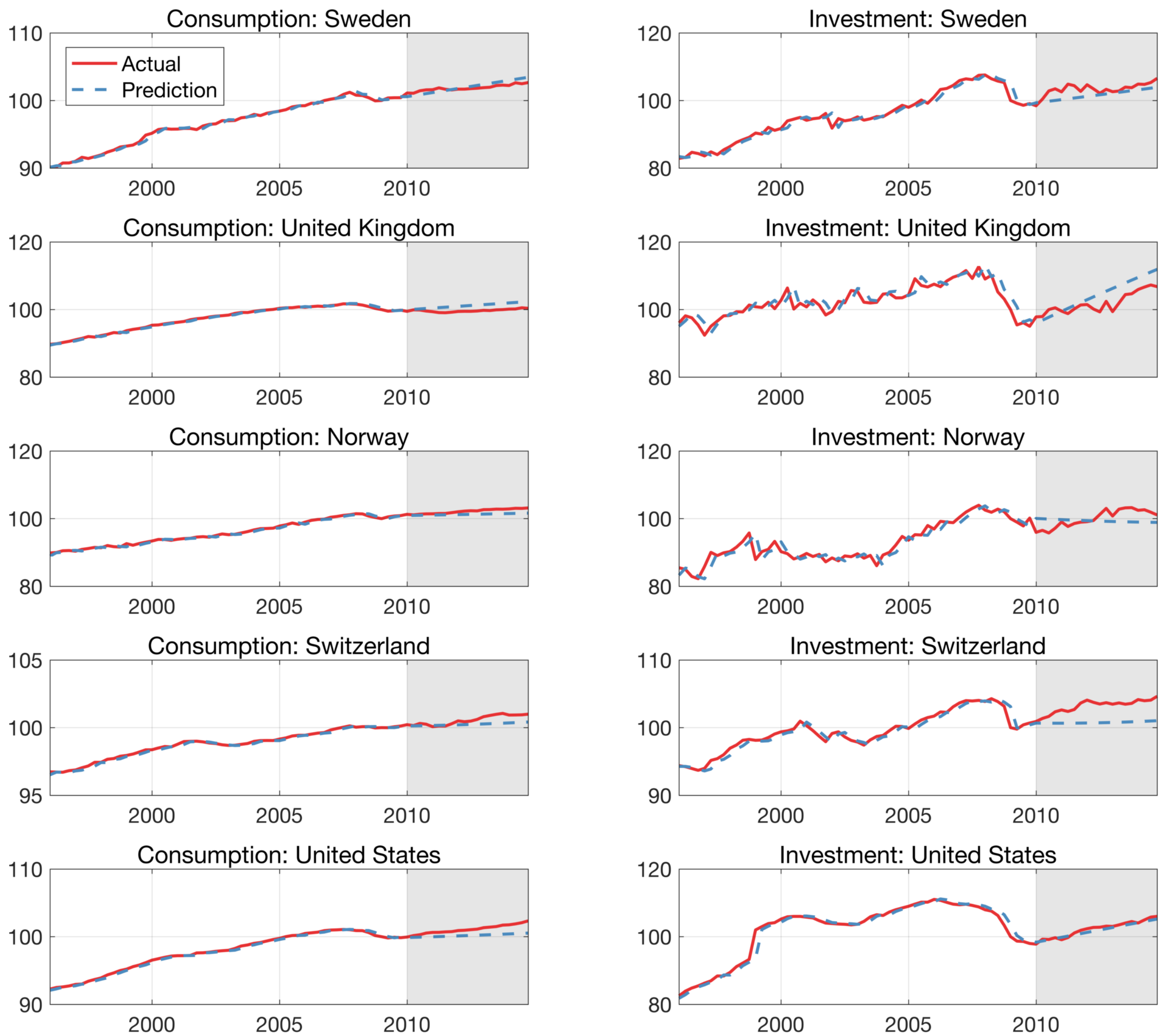


Figure A4e: Consumption and Investment (5)

Note: Left column panels display real private consumption per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real investment per capita.

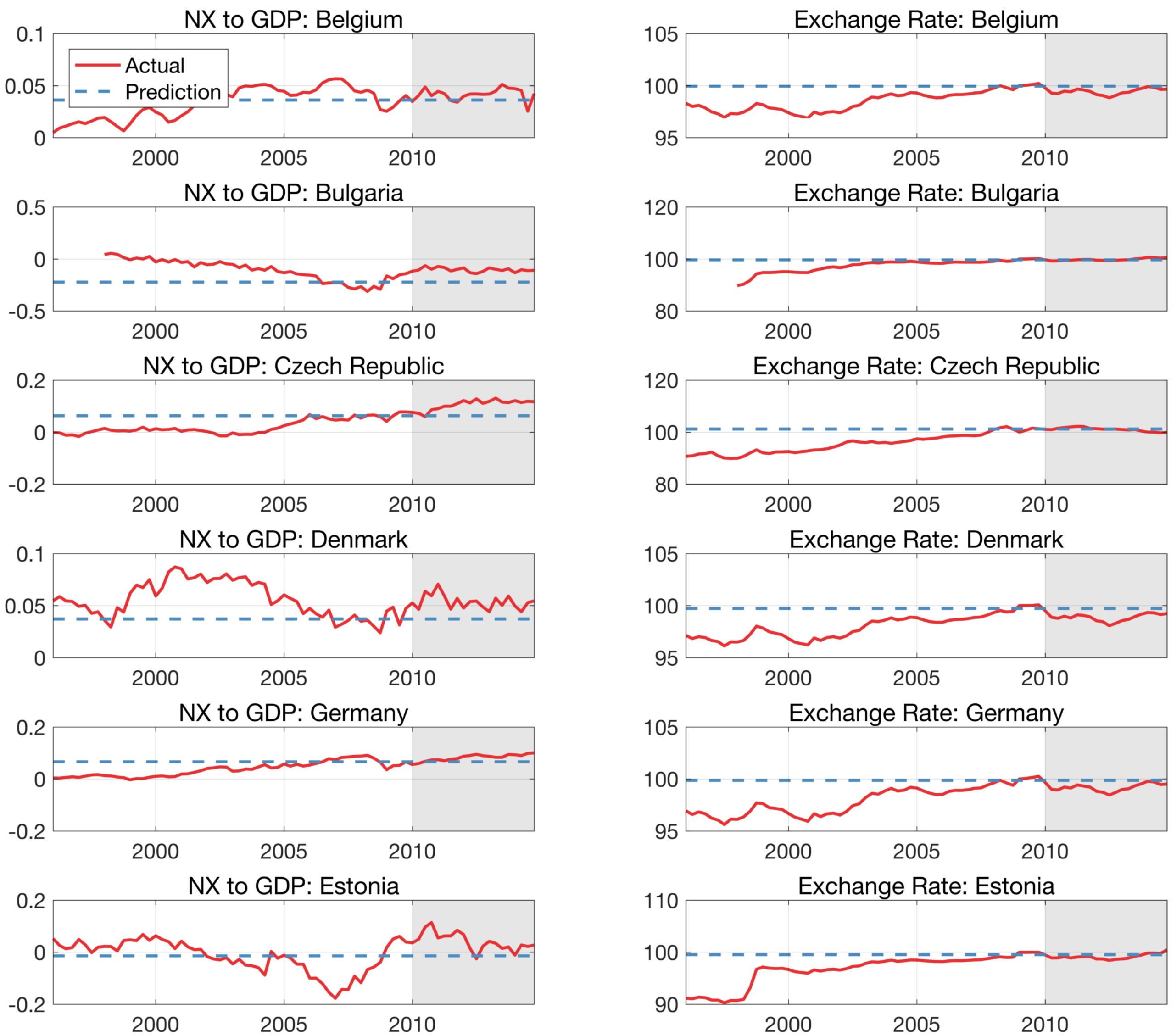


Figure A5a: Net Exports and Exchange Rates (1)

Note: Left column panels display net exports to GDP for various countries, together with their predicted values. Right column panels display the corresponding series for the nominal effective exchange rates.

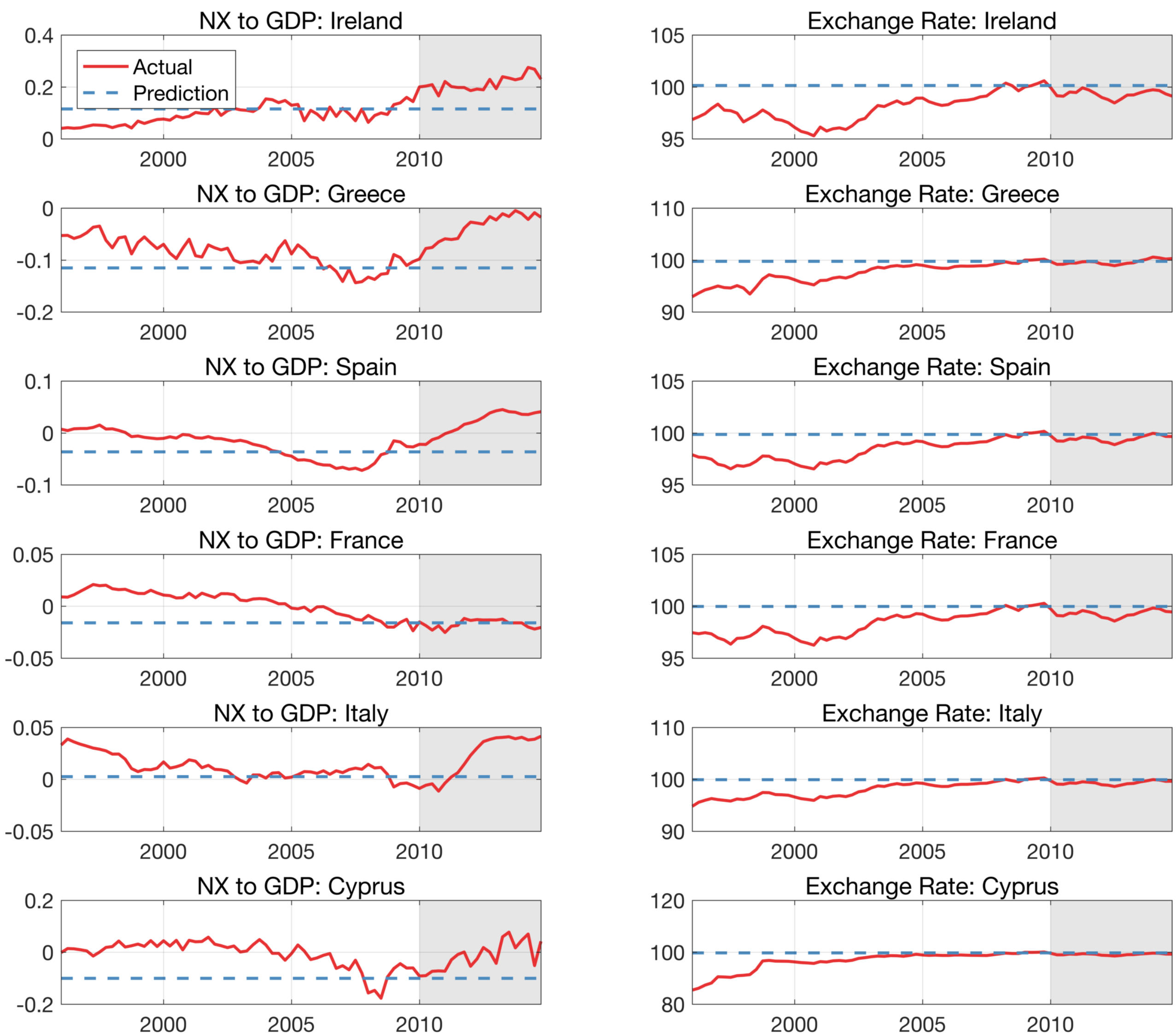


Figure A5b: Net Exports and Exchange Rates (2)

Note: Left column panels display net exports to GDP for various countries, together with their predicted values. Right column panels display the corresponding series for the nominal effective exchange rates.

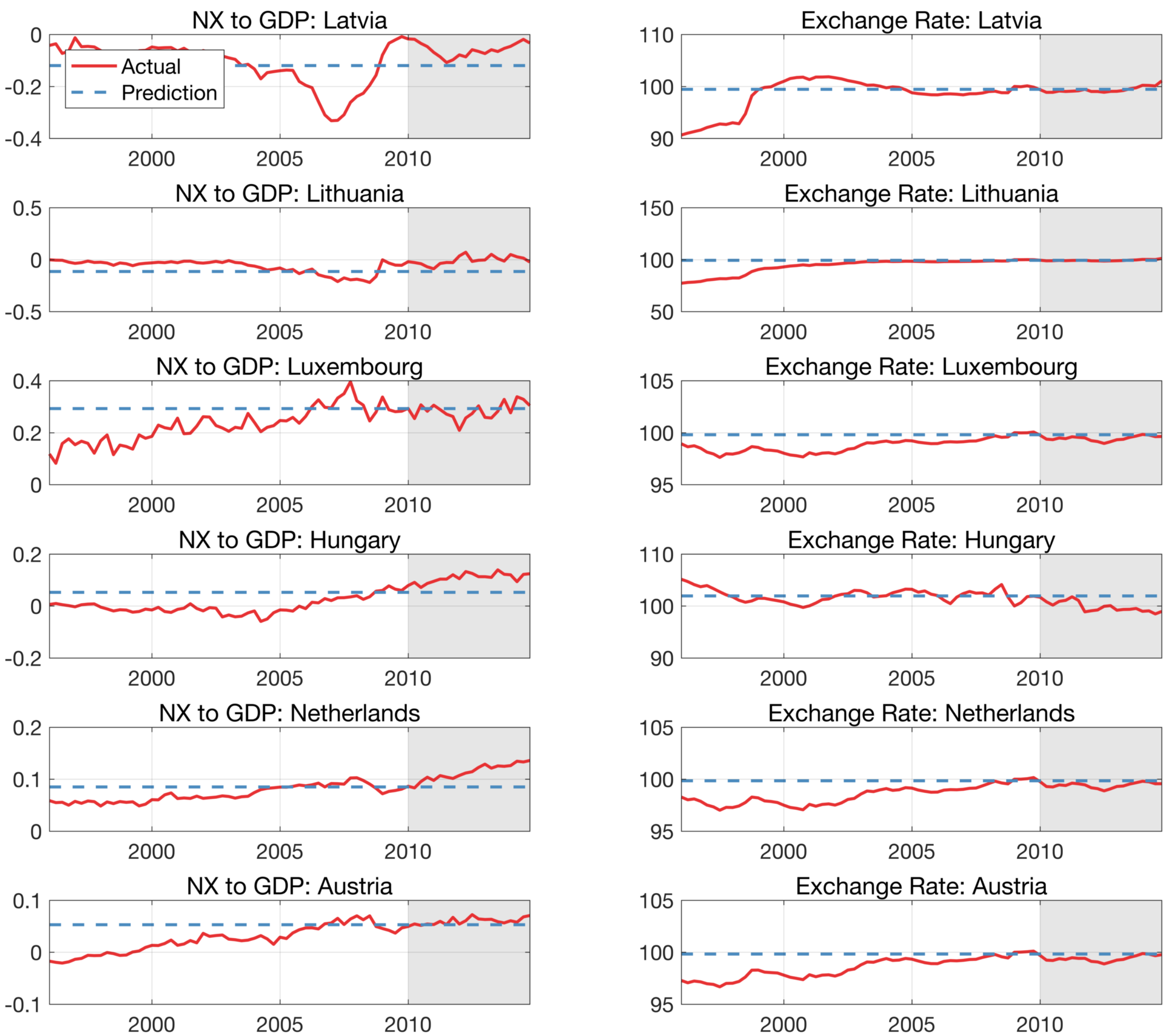


Figure A5c: Net Exports and Exchange Rates (3)

Note: Left column panels display net exports to GDP for various countries, together with their predicted values. Right column panels display the corresponding series for the nominal effective exchange rates.

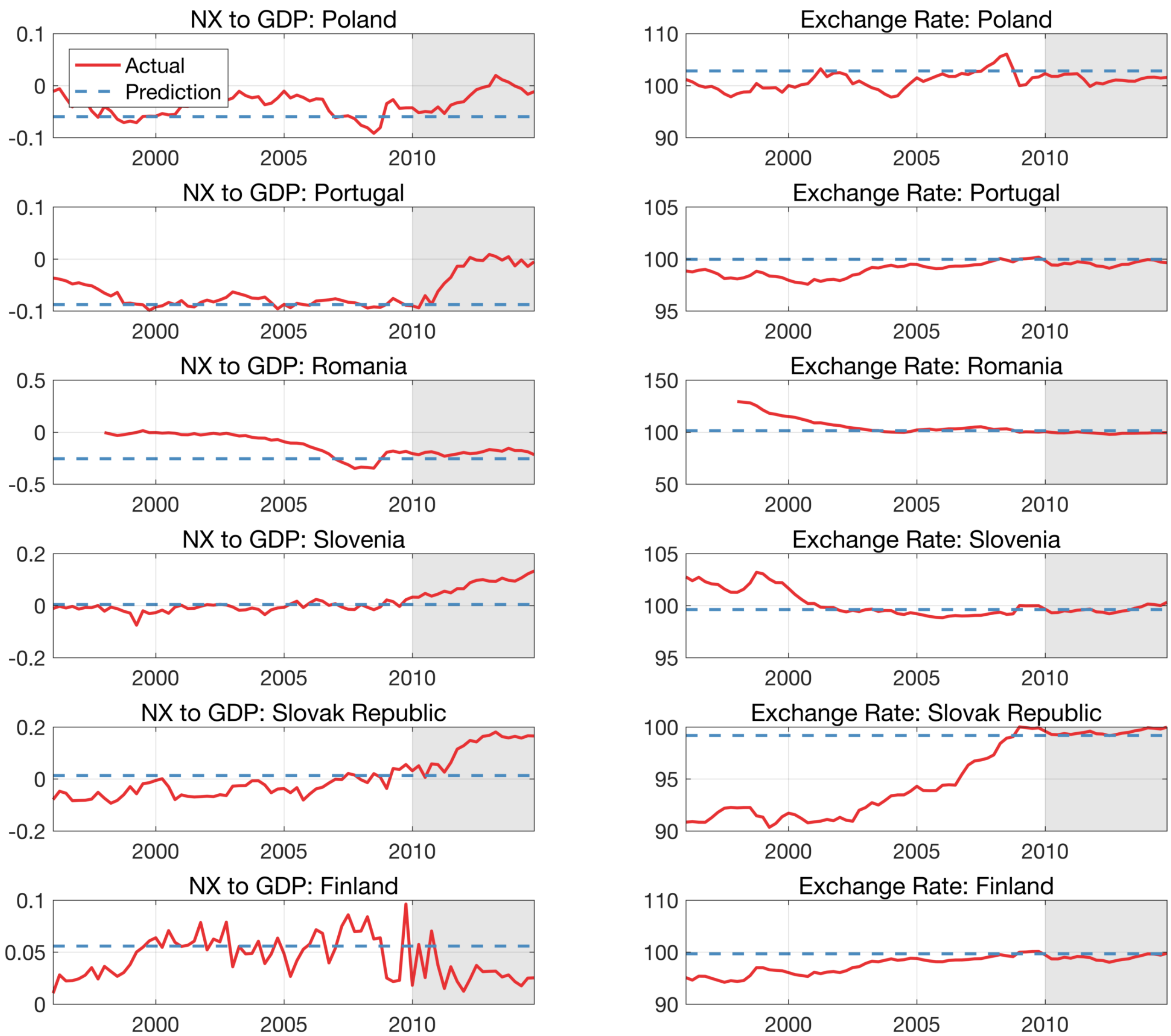


Figure A5d: Net Exports and Exchange Rates (4)

Note: Left column panels display net exports to GDP for various countries, together with their predicted values. Right column panels display the corresponding series for the nominal effective exchange rates.

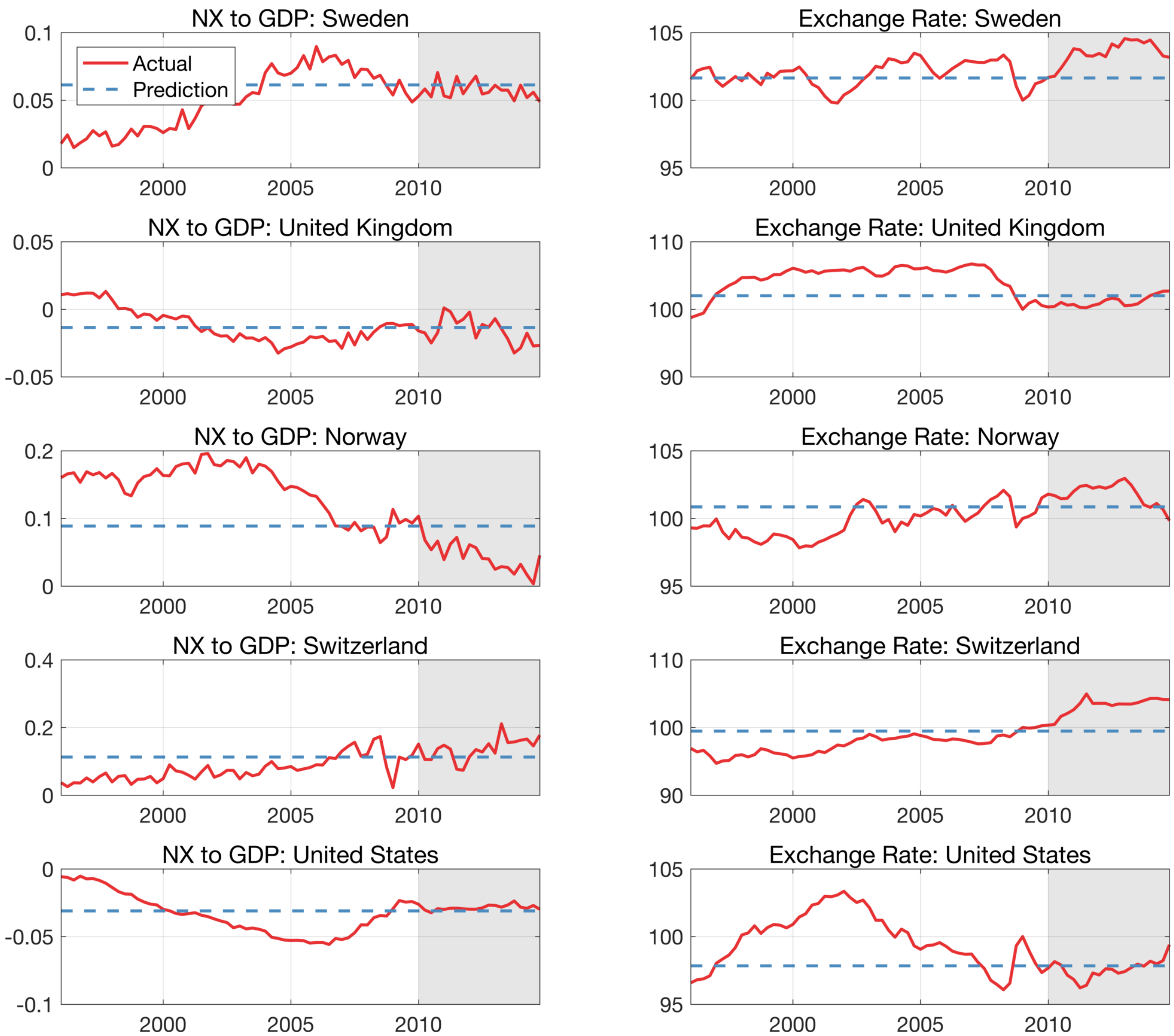


Figure A5e: Net Exports and Exchange Rates (5)

Note: Left column panels display net exports to GDP for various countries, together with their predicted values. Right column panels display the corresponding series for the nominal effective exchange rates.

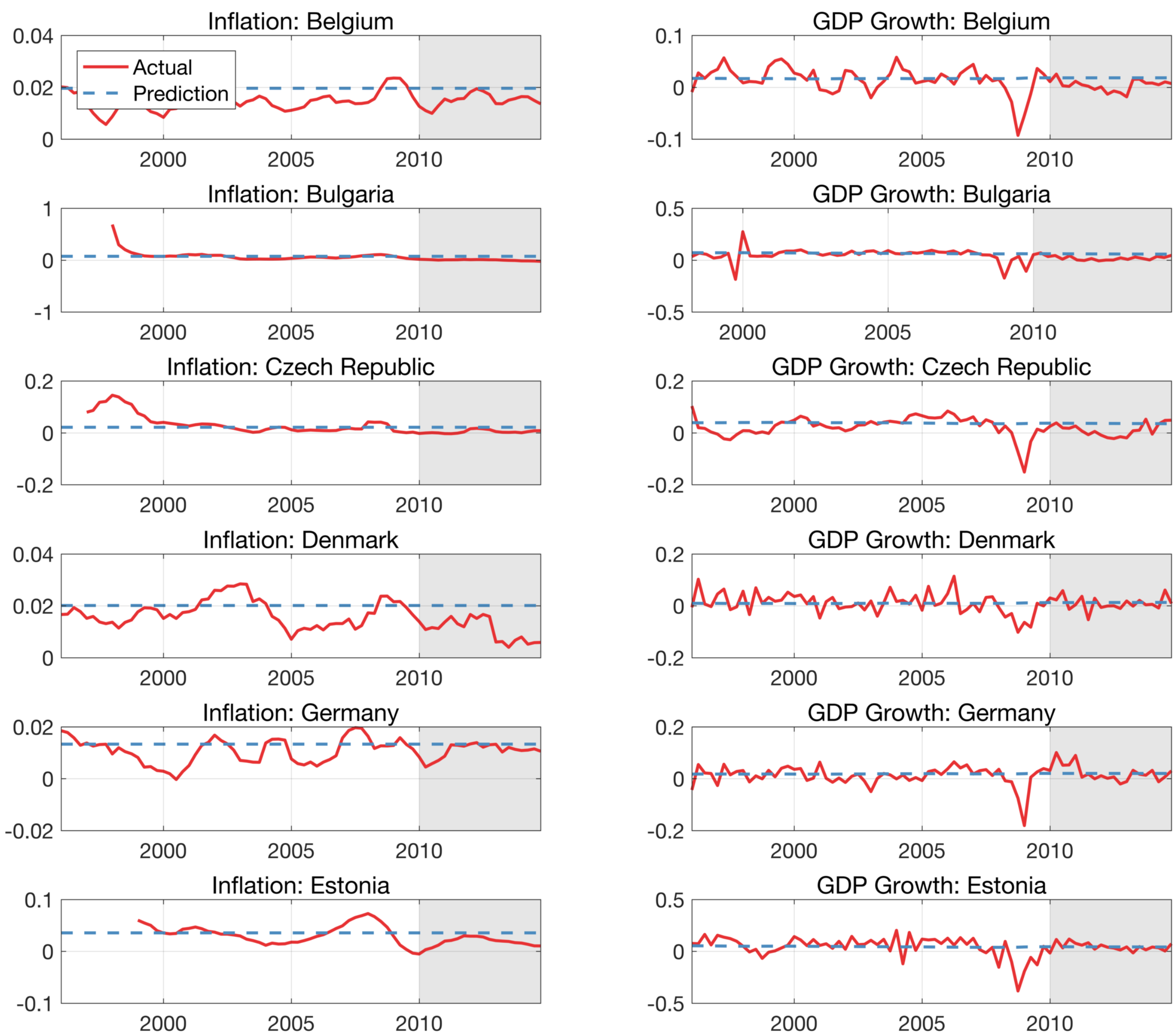


Figure A6a: Inflation and GDP Growth (1)

Note: Left column panels display year-to-year inflation rates for various countries, together with their predicted values. Right column panels display the corresponding series for growth rates of real GDP.

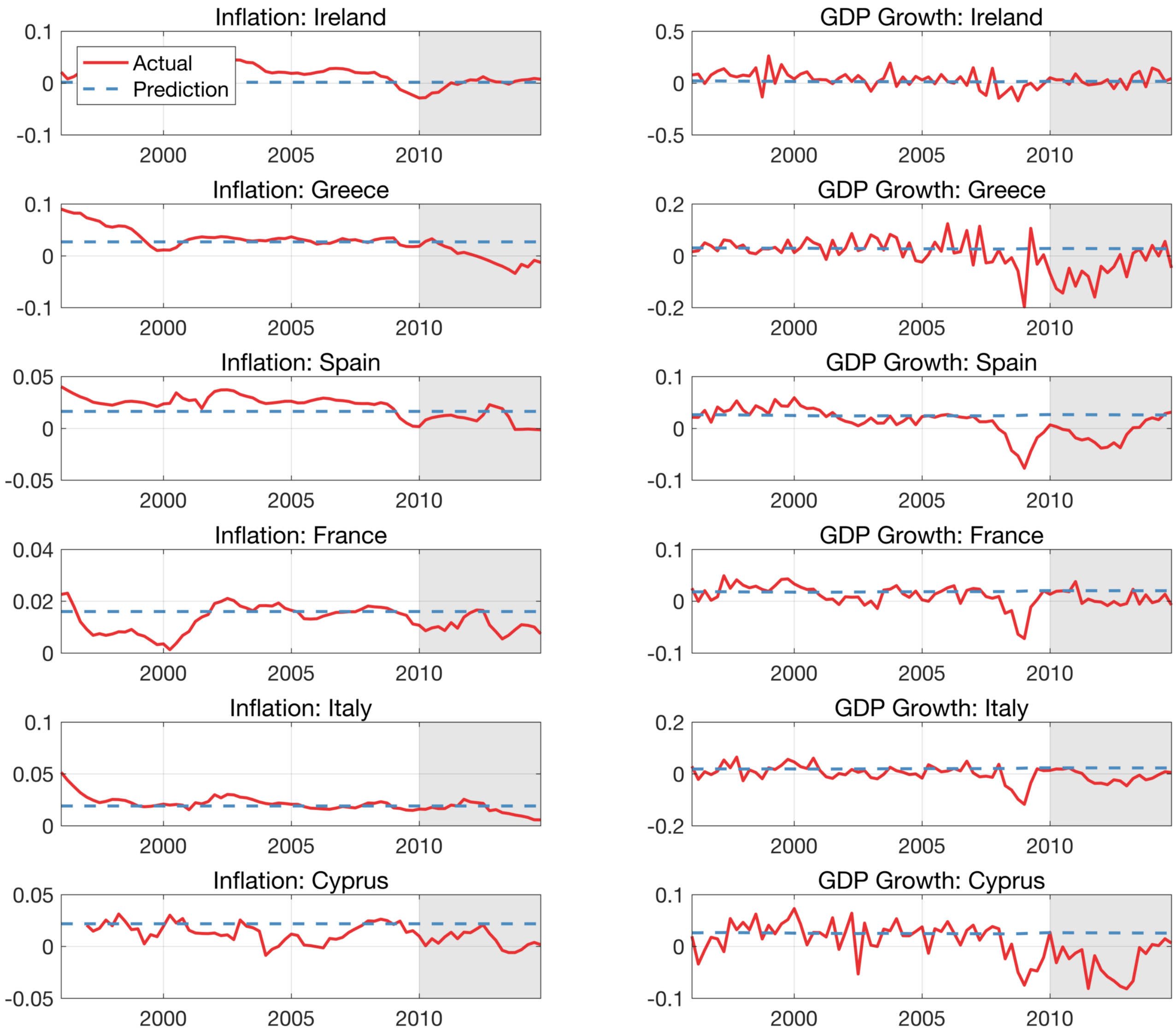


Figure A6b: Inflation and GDP Growth (2)

Note: Left column panels display year-to-year inflation rates for various countries, together with their predicted values. Right column panels display the corresponding series for growth rates of real GDP.

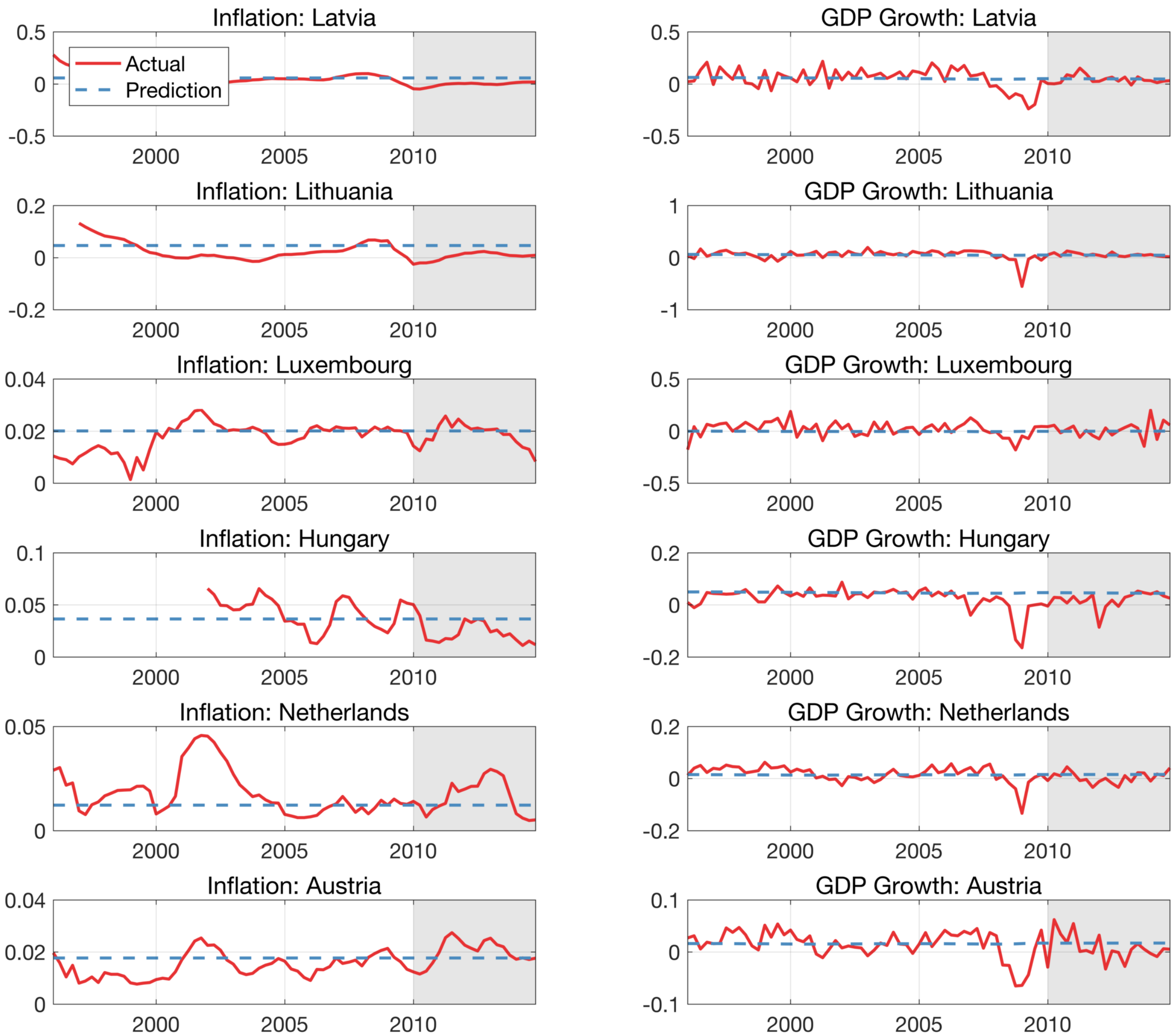


Figure A6c: Inflation and GDP Growth (3)

Note: Left column panels display year-to-year inflation rates for various countries, together with their predicted values. Right column panels display the corresponding series for growth rates of real GDP.

Figure A6d: Inflation and GDP Growth (4)

Note: Left column panels display year-to-year inflation rates for various countries, together with their predicted values. Right column panels display the corresponding series for growth rates of real GDP.

Figure A6e: Inflation and GDP Growth (5)

Note: Left column panels display year-to-year inflation rates for various countries, together with their predicted values. Right column panels display the corresponding series for growth rates of real GDP.

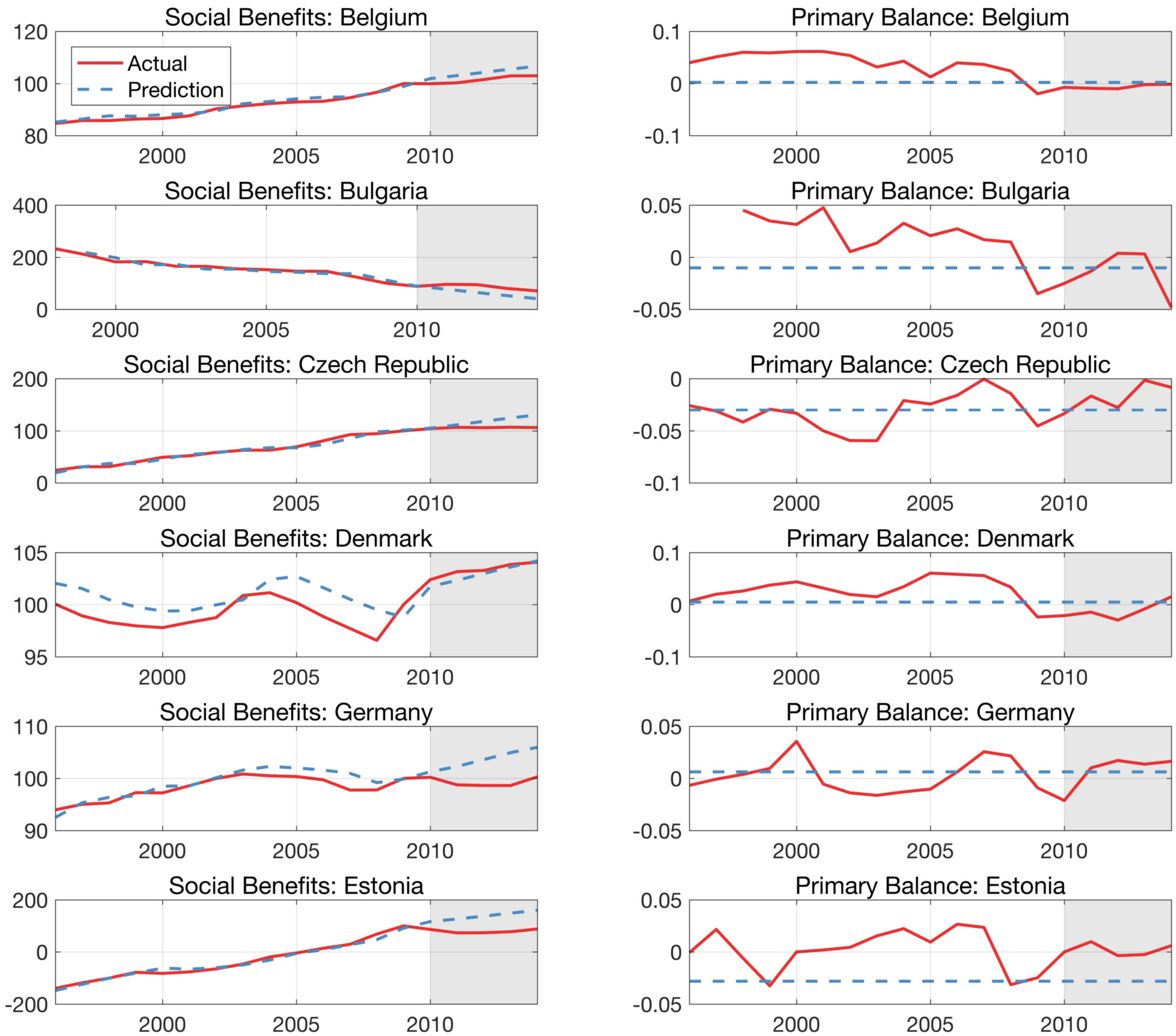


Figure A7a: Social Benefits and Total Outlays (1)

Note: Left column panels display real social benefits per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real total outlays per capita.

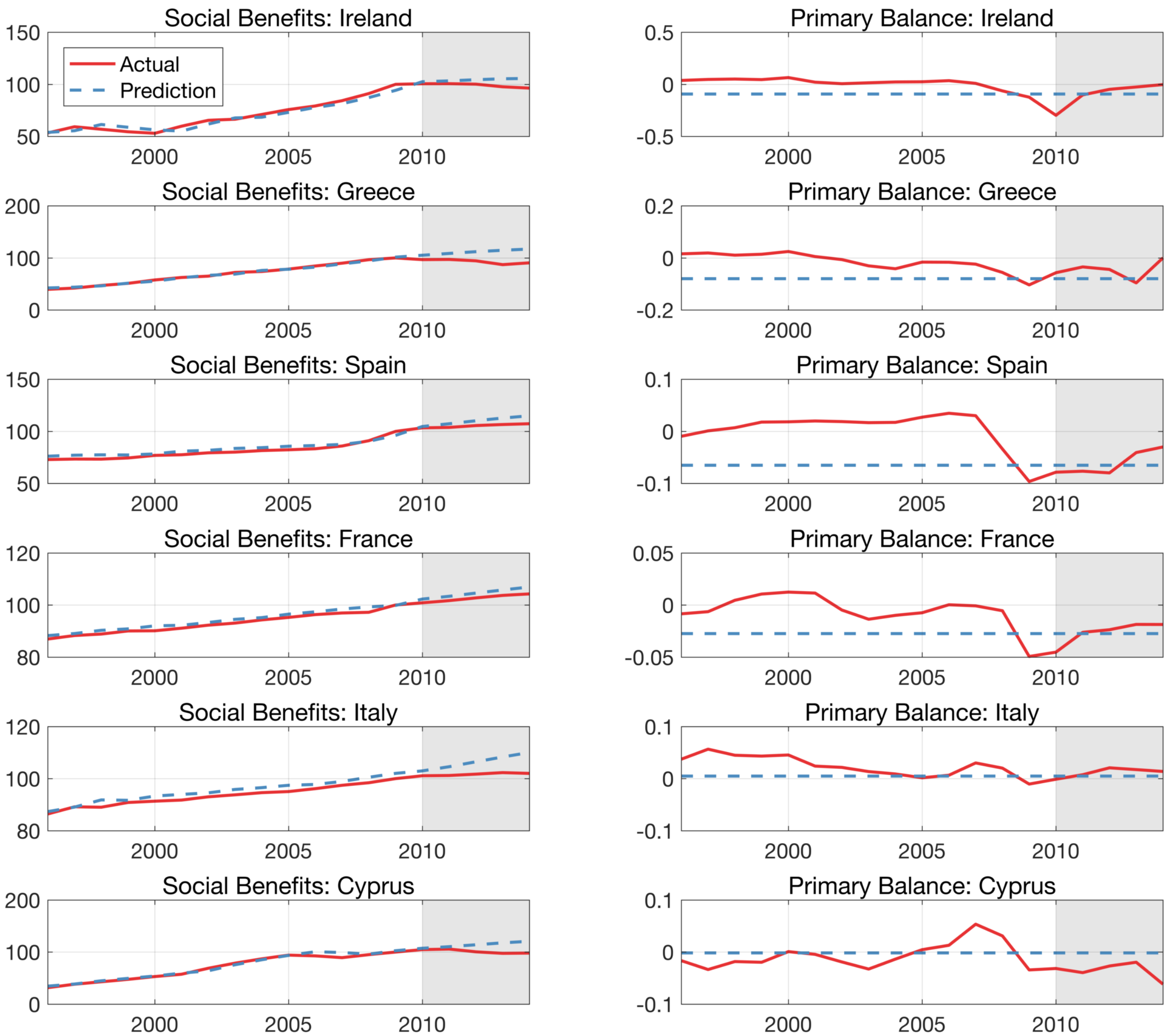


Figure A7b: Social Benefits and Total Outlays (2)

Note: Left column panels display real social benefits per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real total outlays per capita.

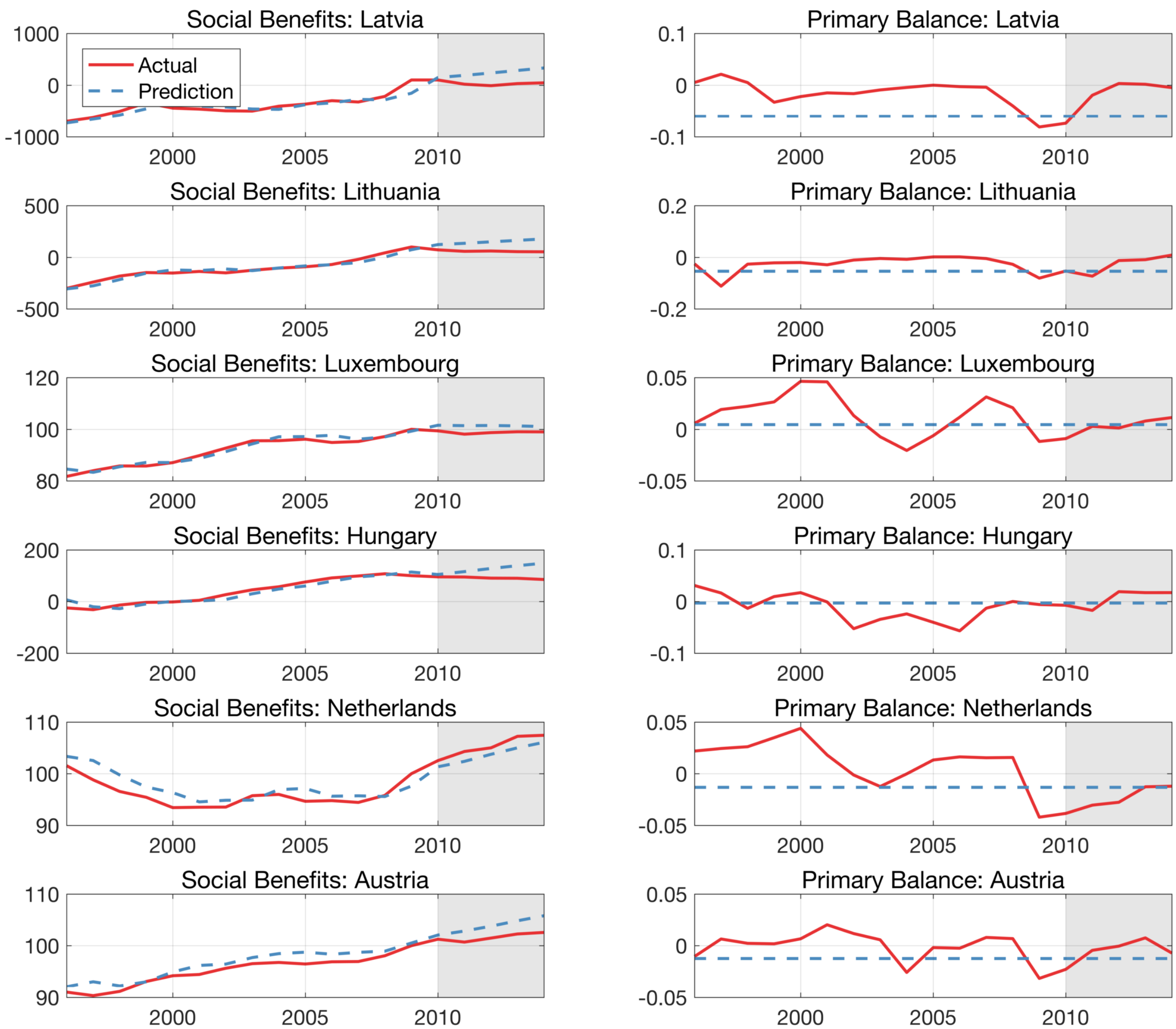


Figure A7c: Social Benefits and Total Outlays (3)

Note: Left column panels display real social benefits per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real total outlays per capita.

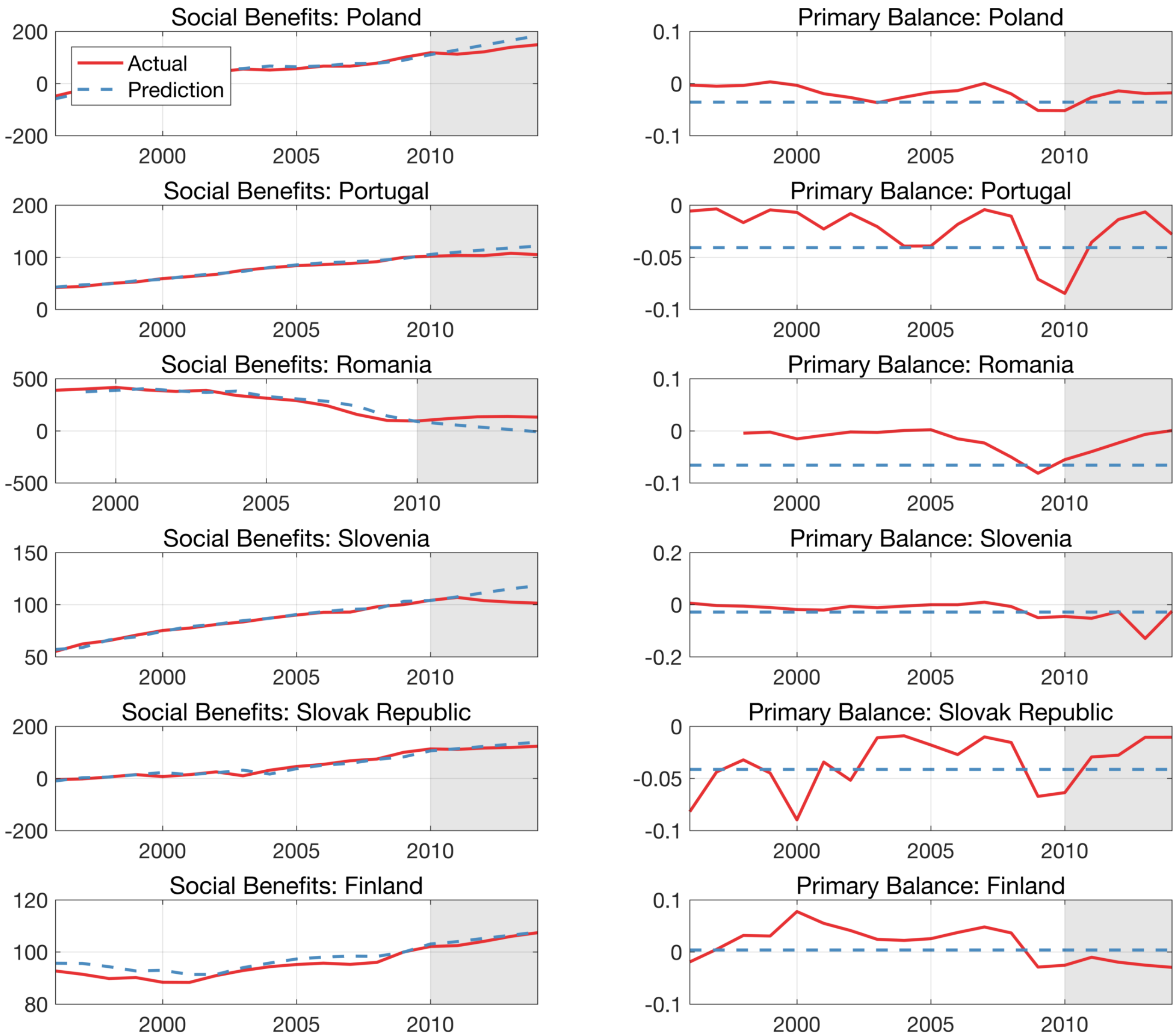


Figure A7d: Social Benefits and Total Outlays (4)

Note: Left column panels display real social benefits per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real total outlays per capita.

Figure A7e: Social Benefits and Total Outlays (5)

Note: Left column panels display real social benefits per capita for various countries on a log scale (normalized to 2009=100), together with their predicted values. Right column panels display the corresponding series for real total outlays per capita.

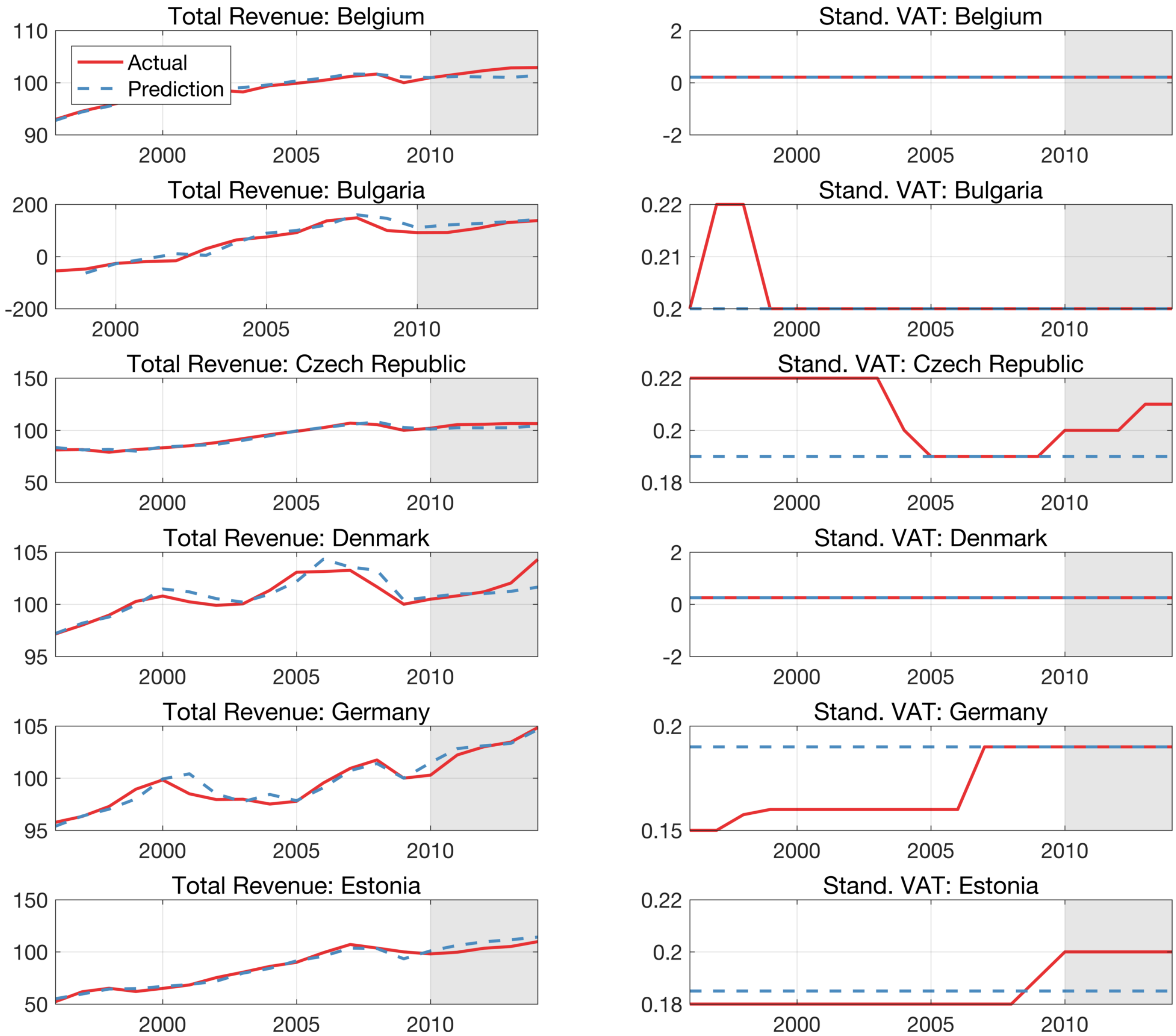


Figure A8a: Primary Balance and Total Revenue (1)

Note: Left column panels display the primary balance in percent of GDP for various countries, together with its predicted value. Right column panels display the corresponding series for real total revenue per capita, on a log scale (normalized to 2009=100)

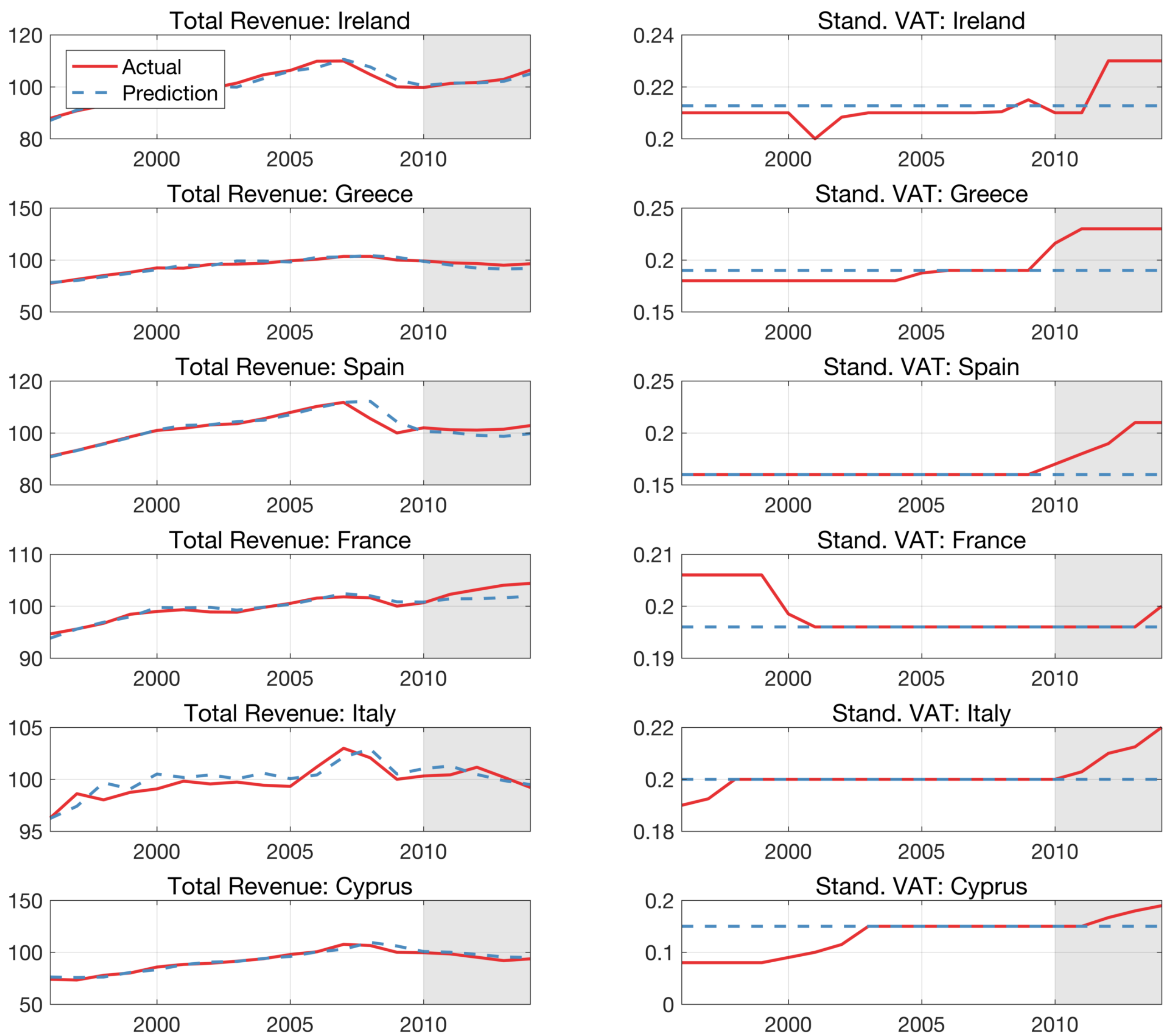


Figure A8b: Primary Balance and Total Revenue (2)

Note: Left column panels display the primary balance in percent of GDP for various countries, together with its predicted value. Right column panels display the corresponding series for real total revenue per capita, on a log scale (normalized to 2009=100)

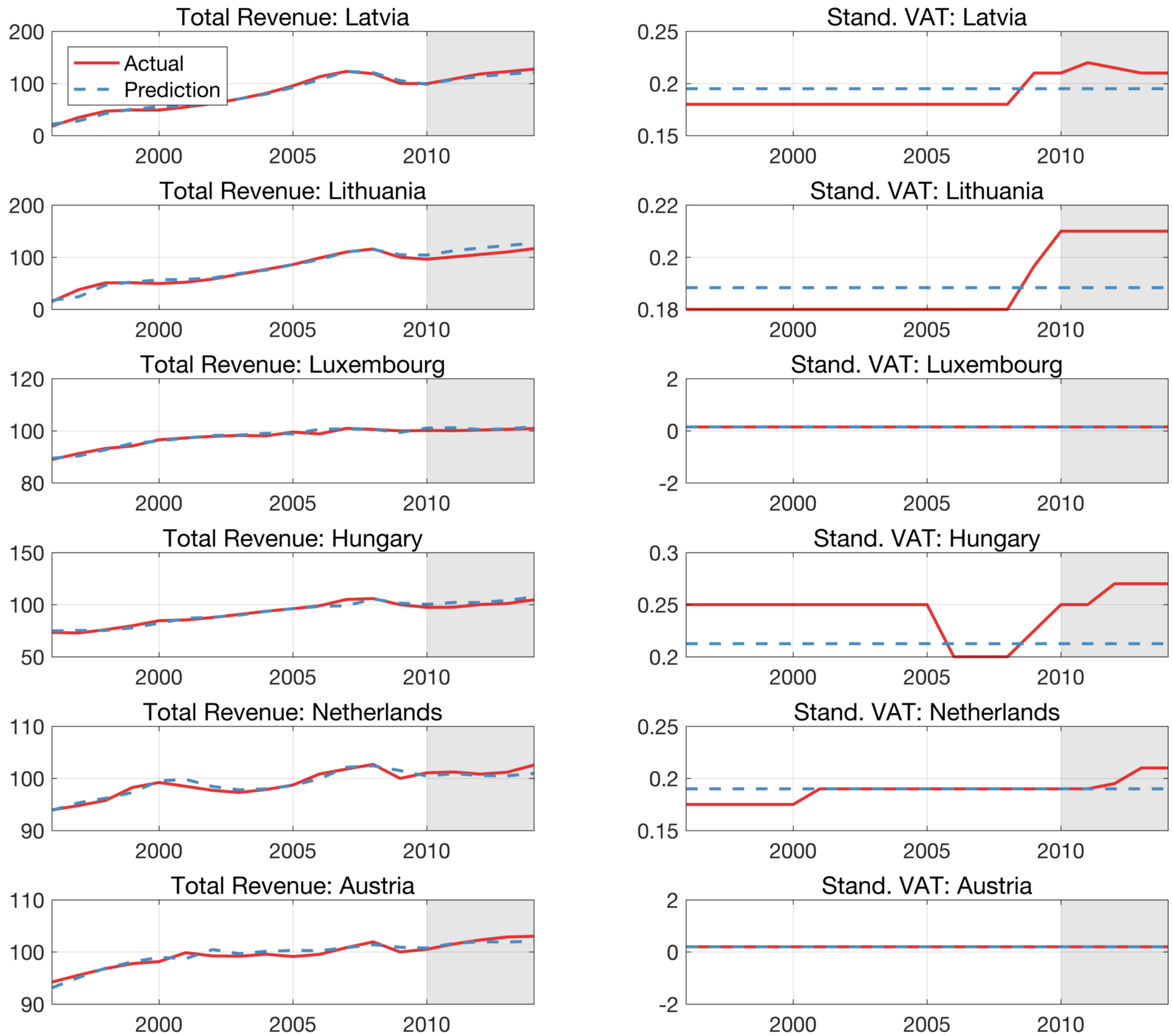


Figure A8c: Primary Balance and Total Revenue (3)

Note: Left column panels display the primary balance in percent of GDP for various countries, together with its predicted value. Right column panels display the corresponding series for real total revenue per capita, on a log scale (normalized to 2009=100)

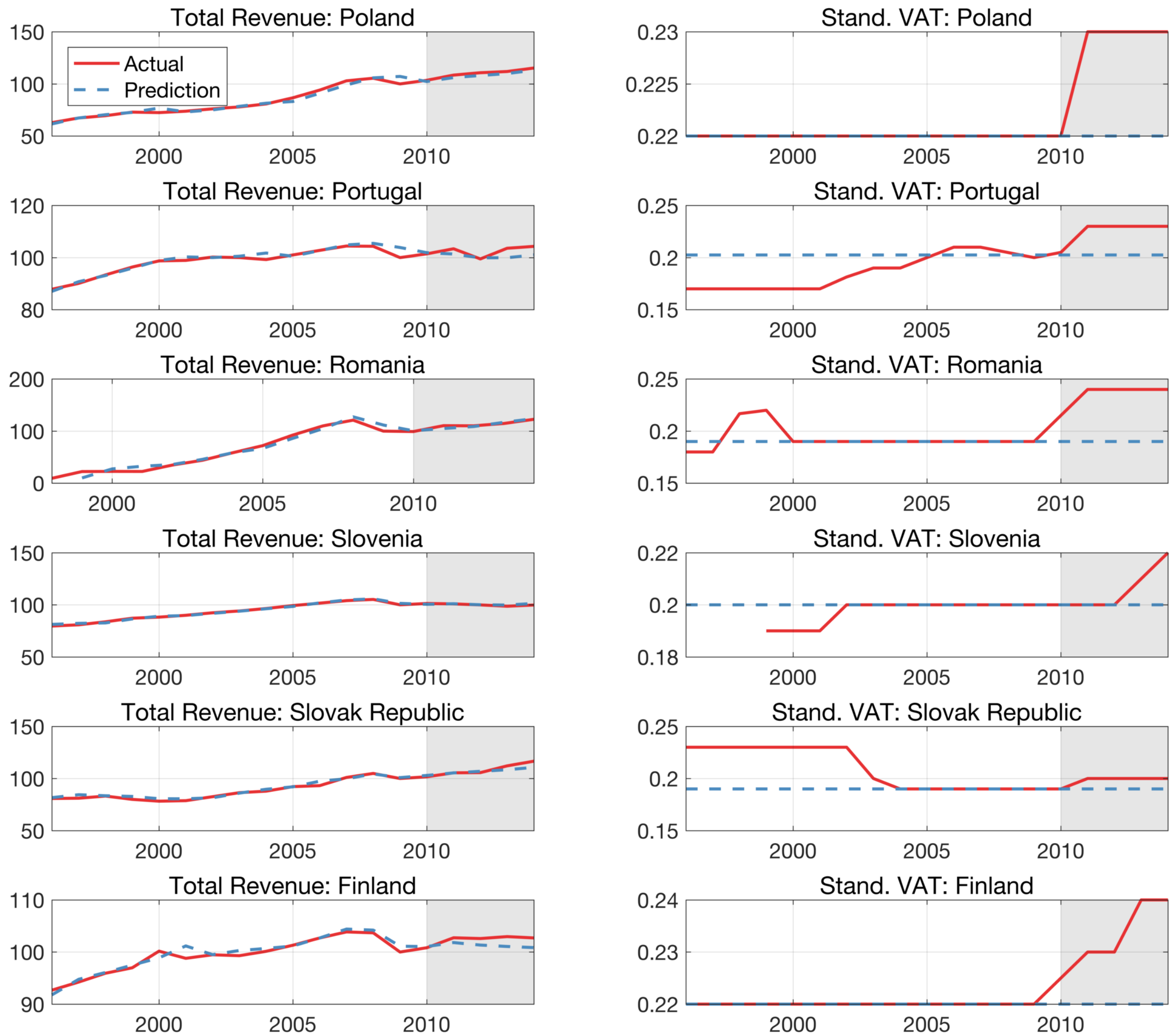


Figure A8d: Primary Balance and Total Revenue (4)

Note: Left column panels display the primary balance in percent of GDP for various countries, together with its predicted value. Right column panels display the corresponding series for real total revenue per capita, on a log scale (normalized to 2009=100)

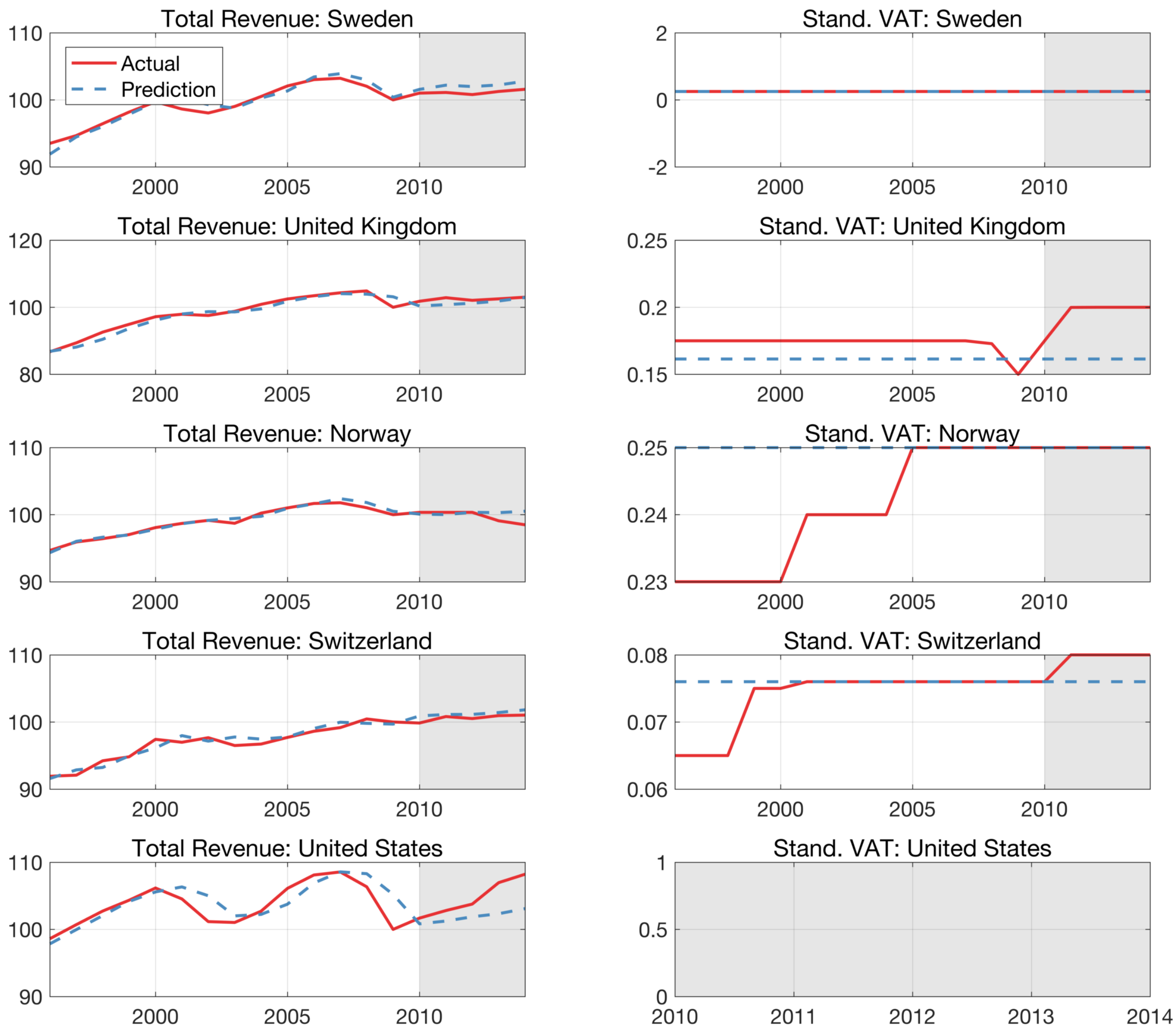


Figure A8e: Primary Balance and Total Revenue (5)

Note: Left column panels display the primary balance in percent of GDP for various countries, together with its predicted value. Right column panels display the corresponding series for real total revenue per capita, on a log scale (normalized to 2009=100)

Figure A9a: Tax Rates (1)

Note: Left column panels display the standard VAT for various countries, together with its predicted value. Center column panels display the corresponding series for the top income tax rate. Right column panels display the corresponding series for the top corporate tax rate.

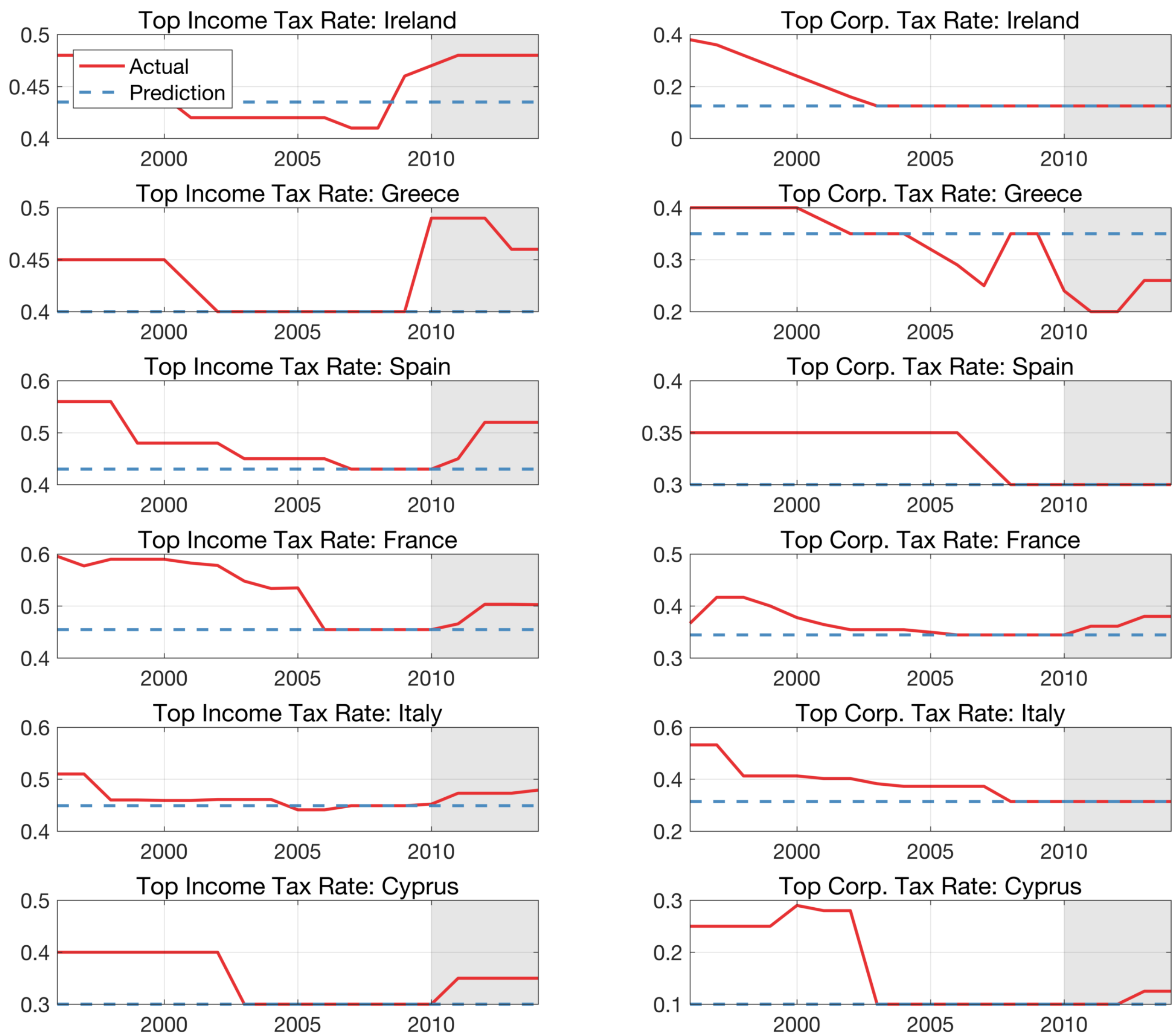


Figure A9b: Tax Rates (2)

Note: Left column panels display the standard VAT for various countries, together with its predicted value. Center column panels display the corresponding series for the top income tax rate. Right column panels display the corresponding series for the top corporate tax rate.

Figure A9c: Tax Rates (3)

Note: Left column panels display the standard VAT for various countries, together with its predicted value. Center column panels display the corresponding series for the top income tax rate. Right column panels display the corresponding series for the top corporate tax rate.

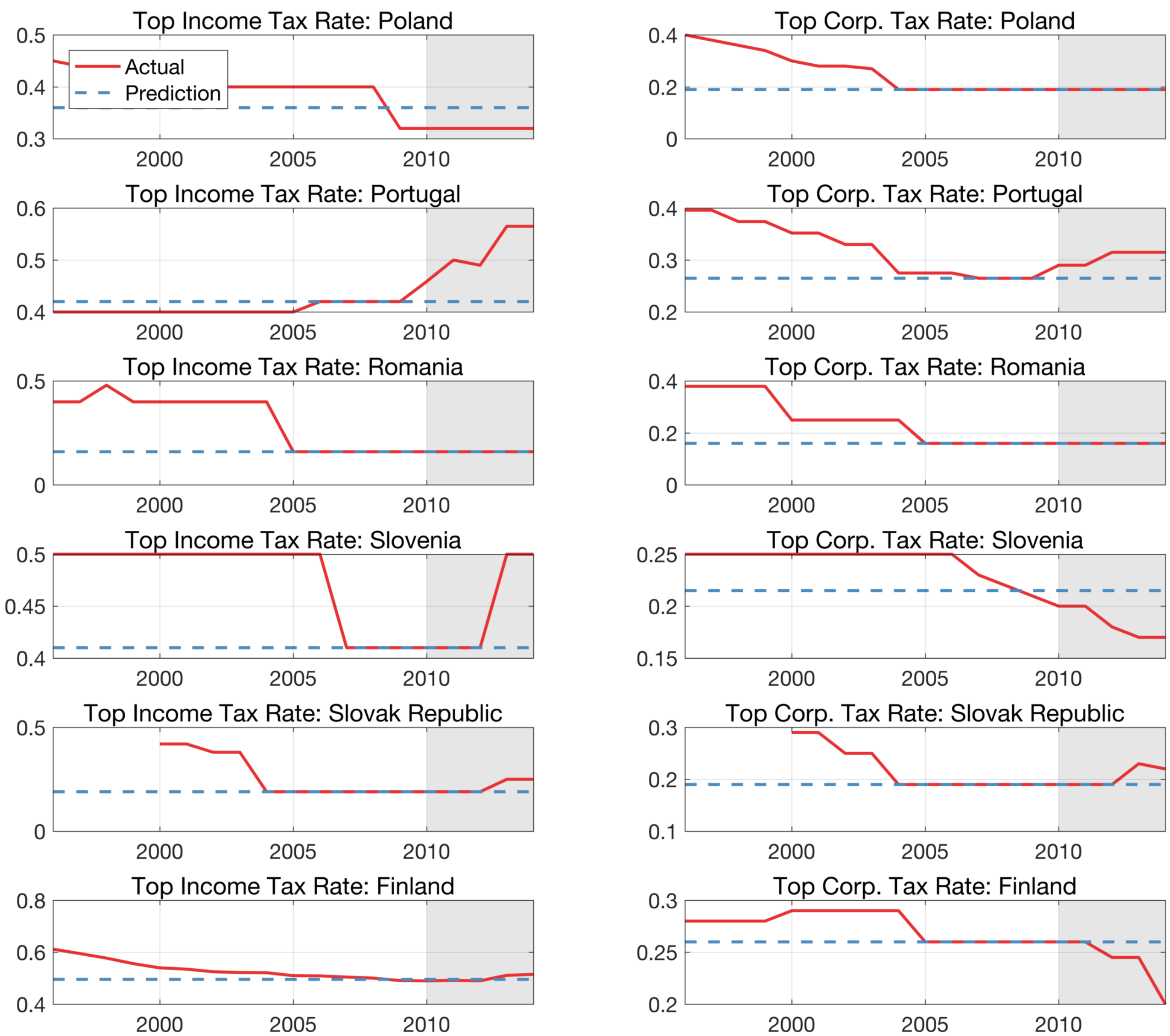


Figure A9d: Tax Rates (4)

Note: Left column panels display the standard VAT for various countries, together with its predicted value. Center column panels display the corresponding series for the top income tax rate. Right column panels display the corresponding series for the top corporate tax rate.

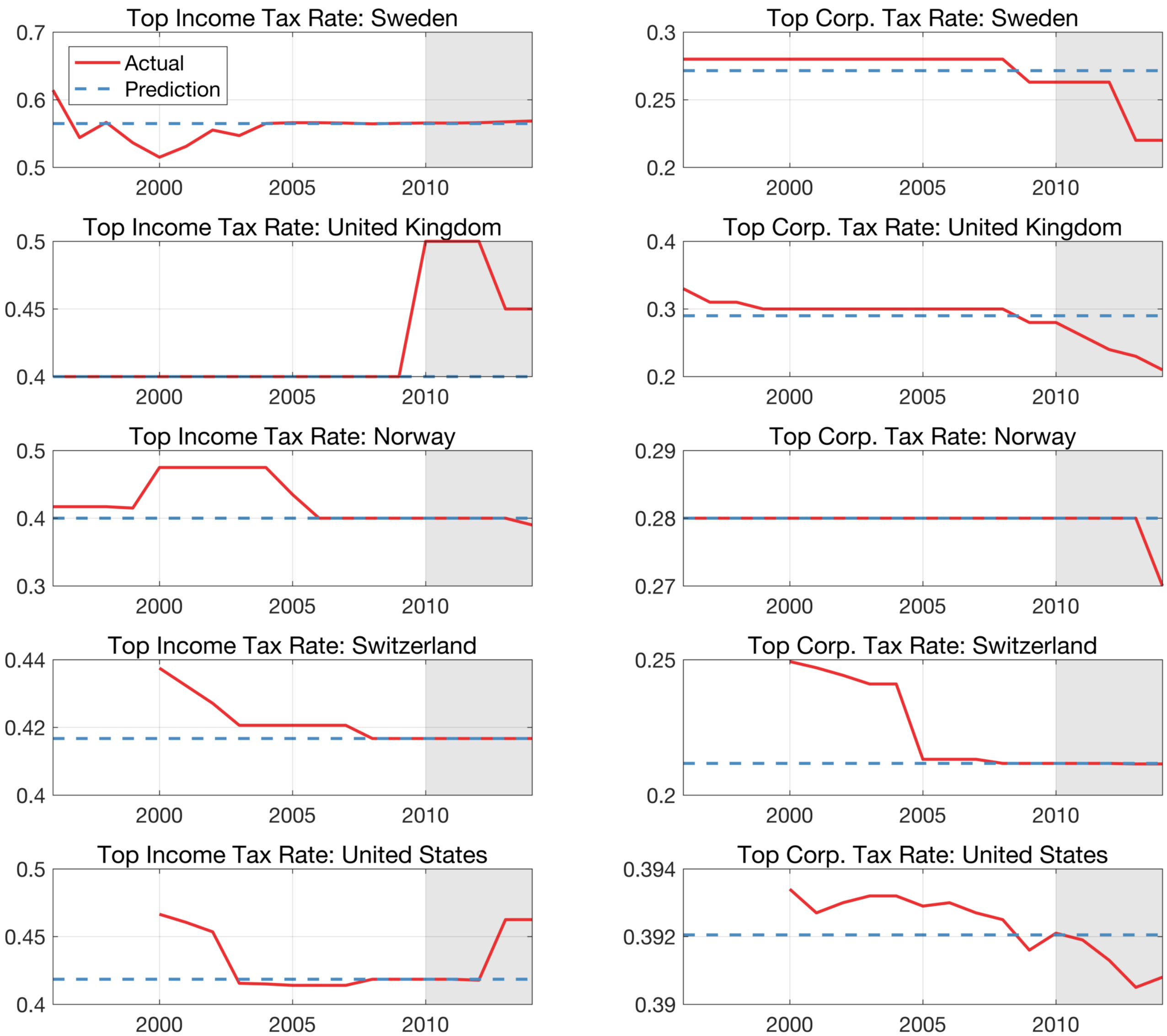


Figure A9e: Tax Rates (5)

Note: Left column panels display the standard VAT for various countries, together with its predicted value. Center column panels display the corresponding series for the top income tax rate. Right column panels display the corresponding series for the top corporate tax rate.

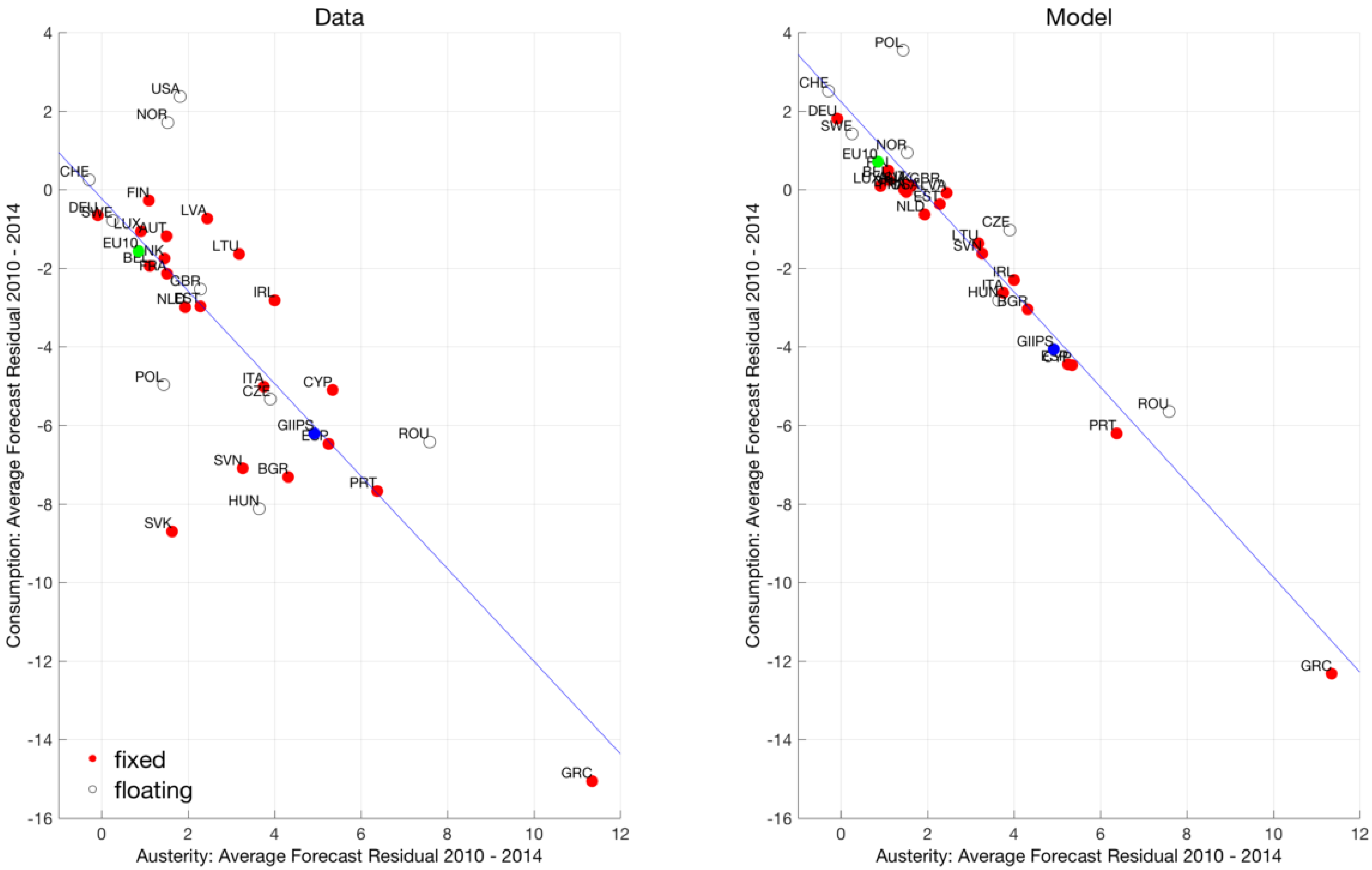


Figure A10a: Consumption and Austerity: Data vs. Model

Note: See Figure 4a.

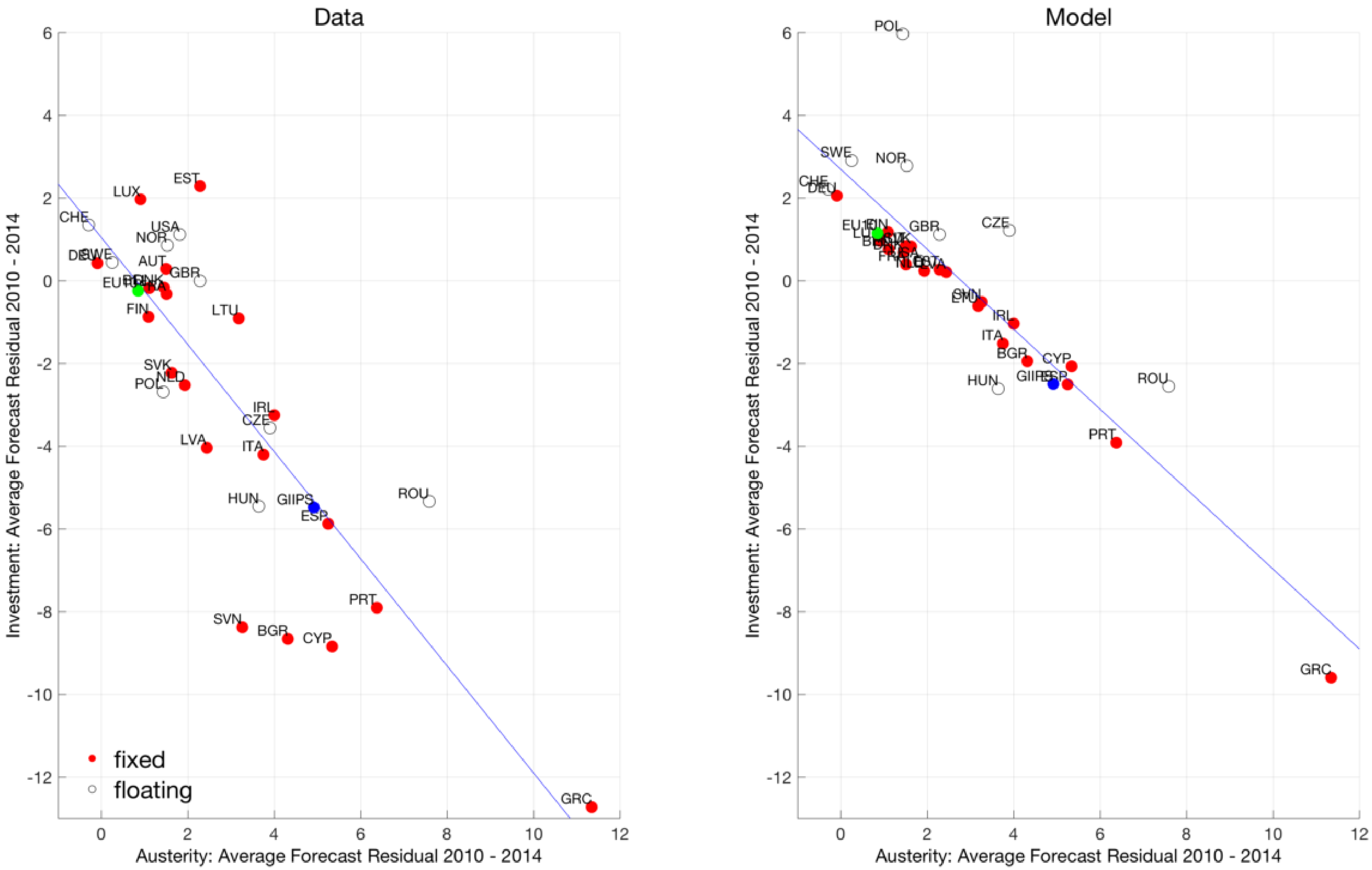


Figure A10b: Investment and Austerity: Data vs. Model

Note: See Figure 4a.

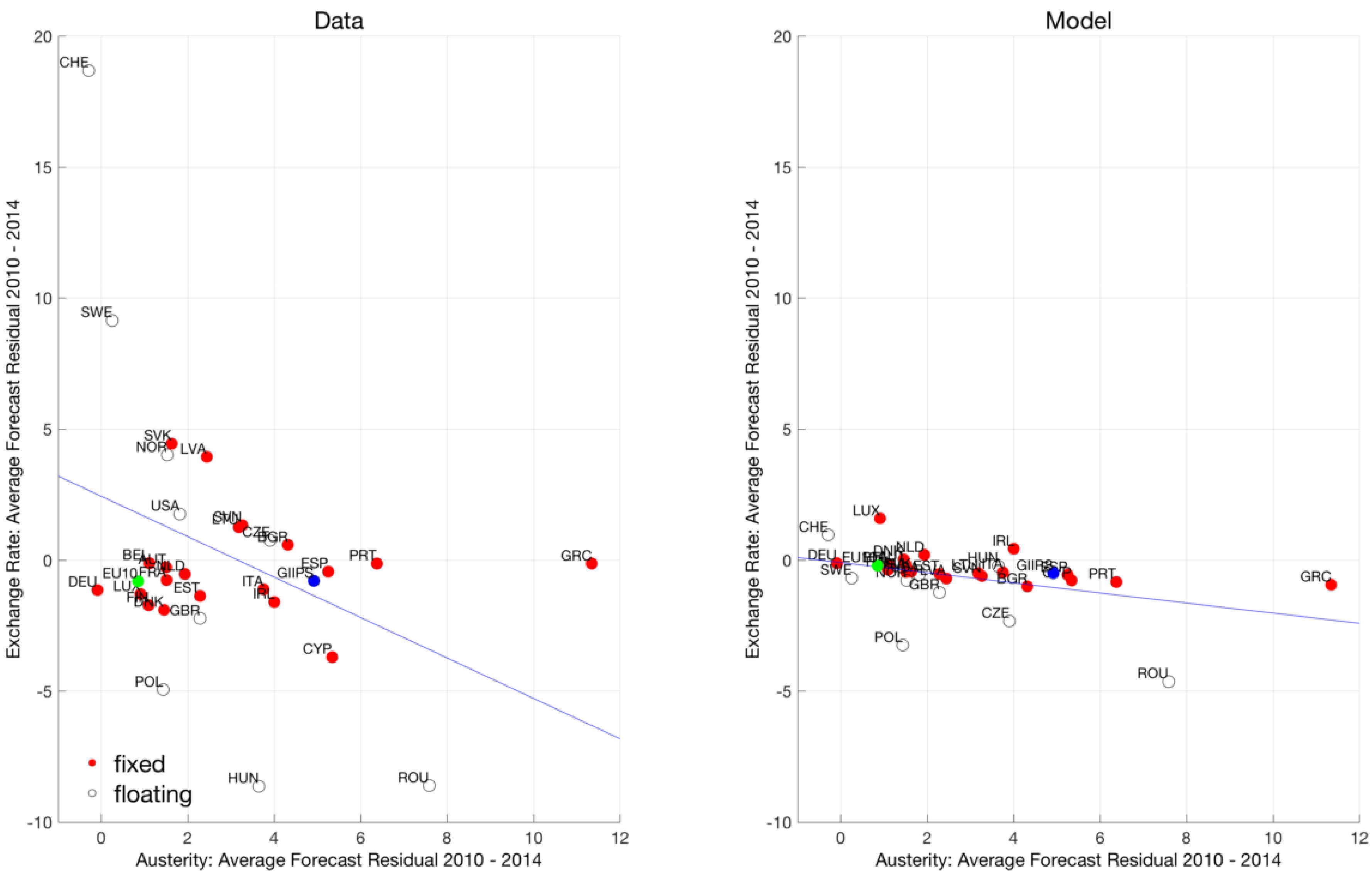


Figure A10c: Nominal Effective Exchange Rate and Austerity: Data vs. Model

Note: See Figure 4a.

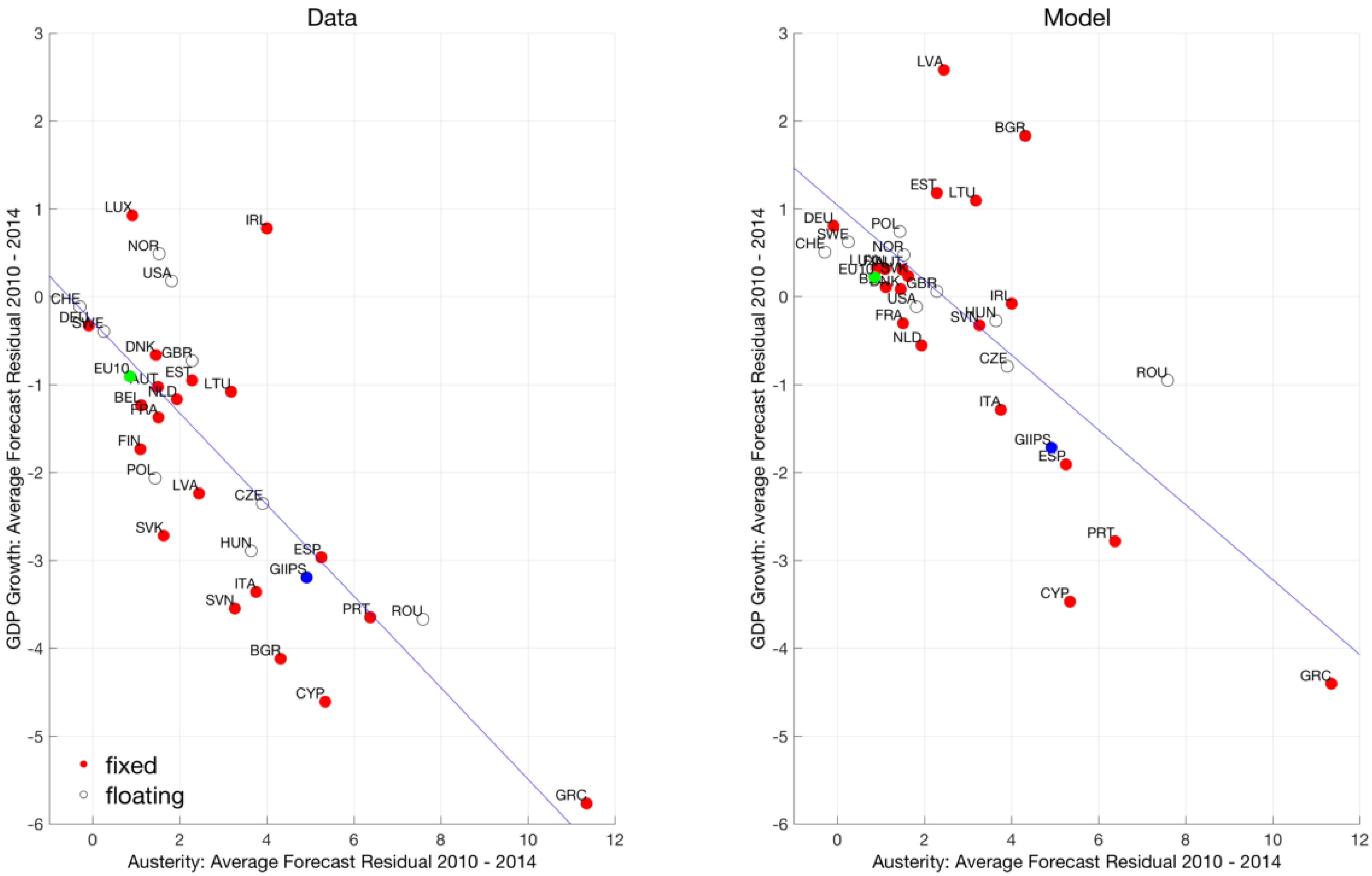
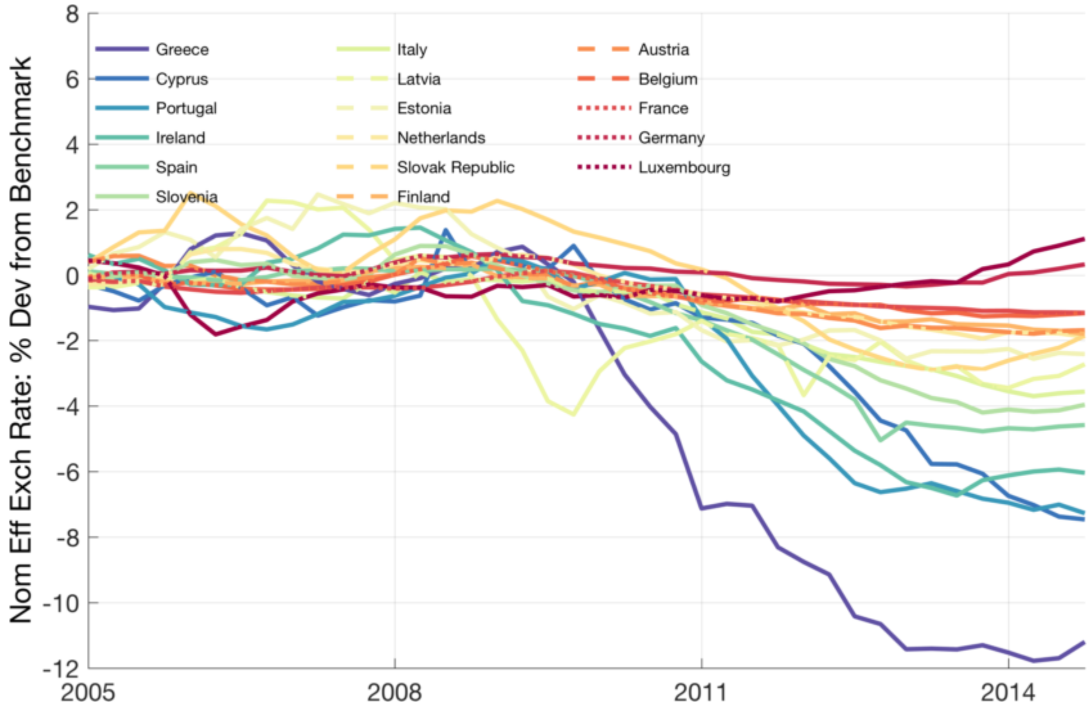
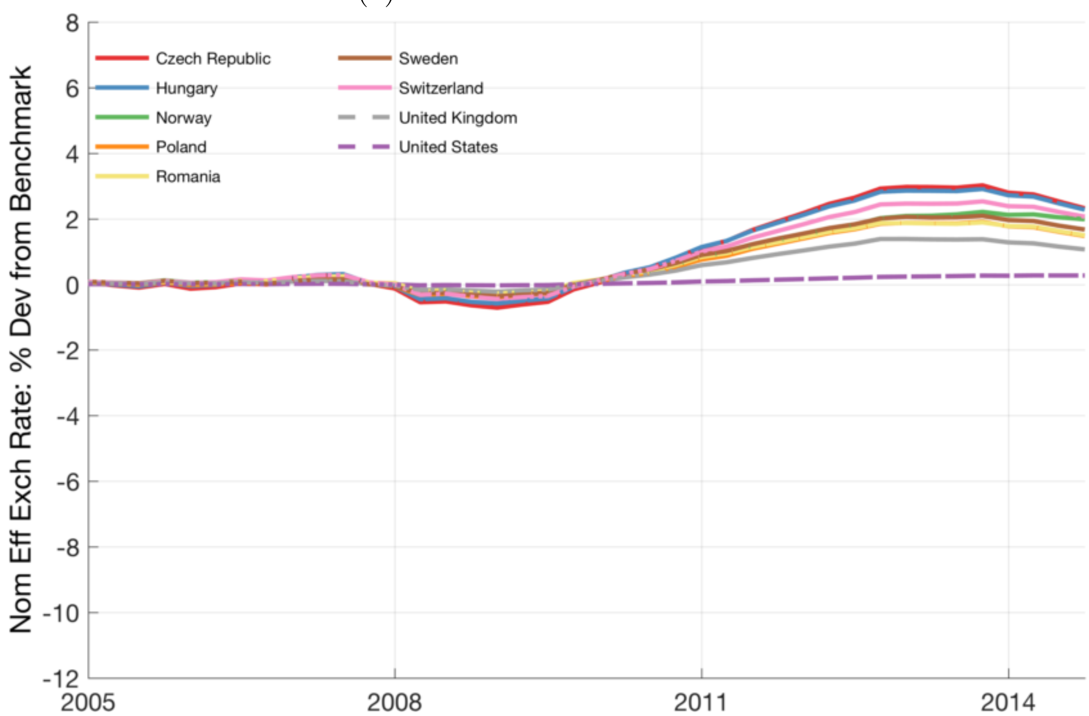


Figure A10d: GDP Growth and Austerity: Data vs. Model

Note: See Figure 4a.



(a) Eurozone Countries



(a) Floating Countries

Figure A11: Nominal Effective Exchange Rate: 'No Euro' Relative to Benchmark

Note: Figures display effective nominal exchange rates under the 'No Euro' experiment relative to the benchmark (in percent). Positive values mean that the nominal effective exchange is stronger relative to the benchmark.

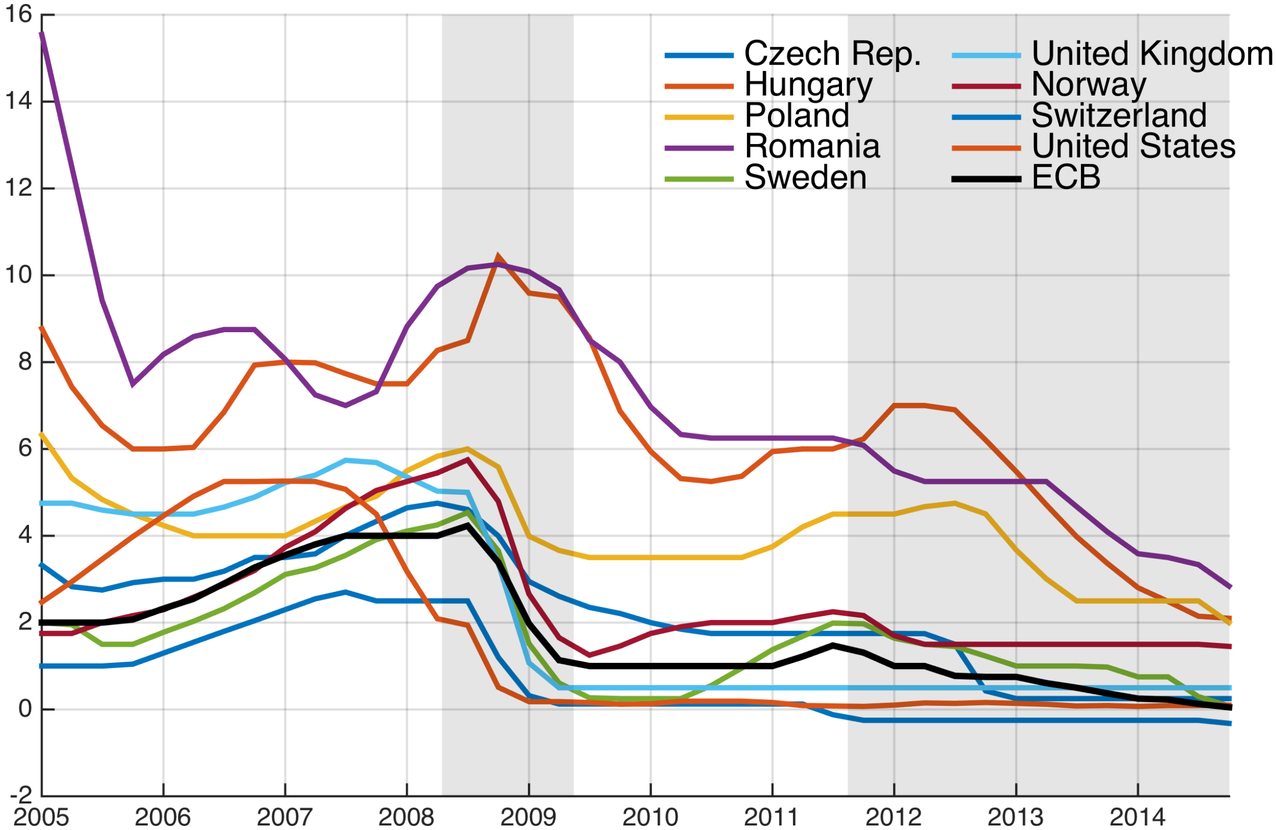


Figure A12: Central Bank Policy Interest Rates

Note: The figure plots the policy interest rates of the central banks in Europe and the U.S.