Market discipline? Sovereign spreads, fiscal adjustments and political turnover

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"If the spread gets out of hand, we'll have to adjust the fiscal stance."

Paolo Savona, Italian Minister of European Affairs (October 2018)

The spread and the economy: interdependence

Financial markets demand larger spreads...

- whenever the sustainability of public finances is in doubt
- country-specific fundamentals are weak

At the same time, rising spreads can...

- feed back into the economy
- induce policymakers to adjust fiscal policy

Research question

Do rising sovereign spreads impact a) economic activity, b) the policy stance, and c) election outcomes?

Data

Empirical investigation based on a unique data set:

- Quarterly time-series for 38 advanced and emerging economies since early 1990s until 2017
- Variety of macroeconomic and political indicators and sovereign yield spreads

Spread...

- fluctuates widely across time and countries
- co-moves significantly with economic activity, less so with fiscal indicators

Identification strategy

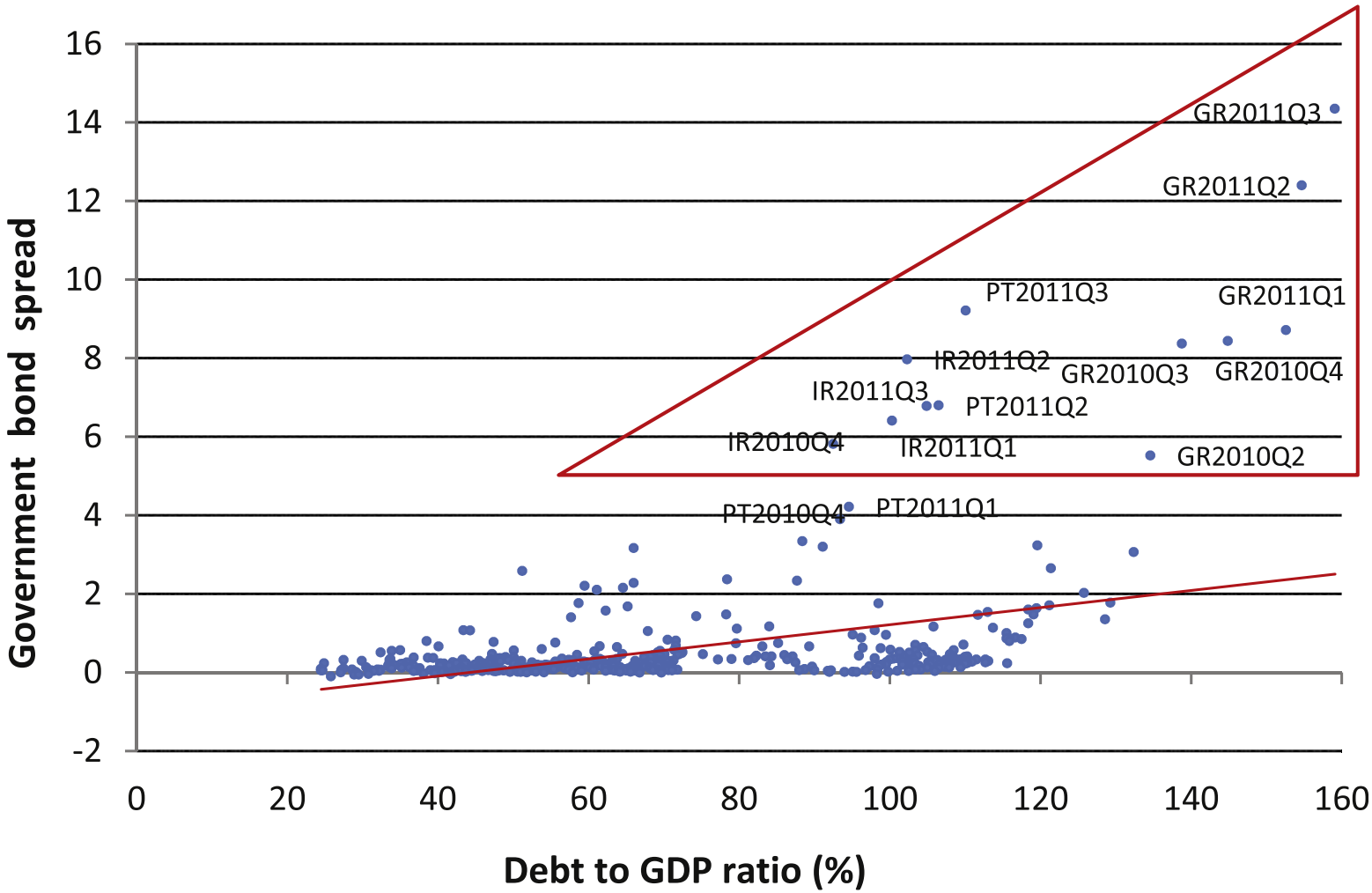
Issue

- Spread generally responds to changes in fundamentals

But also exogenous fluctuations in sovereign spreads due to...

- global factors (Longstaff et al. 2011; Mauro, Sussman, et al. 2002)
- market sentiments (Calvo 1988; Cole and Kehoe 2000; Lorenzoni and Werning 2014)

Spreads and fundamentals



Spreads and debt-to-GDP ratio in Eurozone (2000Q1–2011Q3)
Source: De Grauwe and Ji (2013)

Approach: Estimation of an average treatment effect

First step

- Isolate large increases of sovereign spreads: some 220 "treatments"
- Arguably, sharp increase of spread more likely to reflect market sentiments

Second step

- Control for "selection into treatment" based on fundamentals
- Estimate probability of treatment given fundamentals

Approach: Estimation of an average treatment effect

Third step

- Estimate average treatment effect on output and fiscal and political outcomes
- Make use of augmented inverse propensity score weighted (AIPW) estimator (Jordà and Taylor 2016)
- AIPW includes regression adjustment to control for impact of fundamentals on outcome variables

Results

Treatment (Sharp increase of sovereign spread)

- Sovereign spread rises persistently
- Output and government spending decline
- Probability of political turnover increases

Robust across range of alternative specifications

Literature

Several studies on "market discipline"

- Bayoumi et al. (1995), Mauro, Romeu, et al. (2015), Debrun and Kinda (2016), Dell' Erba et al. (2015), Groot et al. (2015) and Theofilakou and Stournaras (2012)

Effect of interest rate shocks on macroeconomic performance

- Neumeyer and Perri (2005) and Uribe and Yue (2006)

Evidence on the impact of economic conditions on election outcomes

- Scholl (2017) and Funke et al. (2016). See Dassonneville and Lewis-Beck (2014) for a more general discussion

Sovereign yield spreads

Quarterly data for 38 emerging and advanced economies starting in early 1990s until 2017

- Based on Born et al. (2018)

Spreads measure financial markets' assessment of government solvency

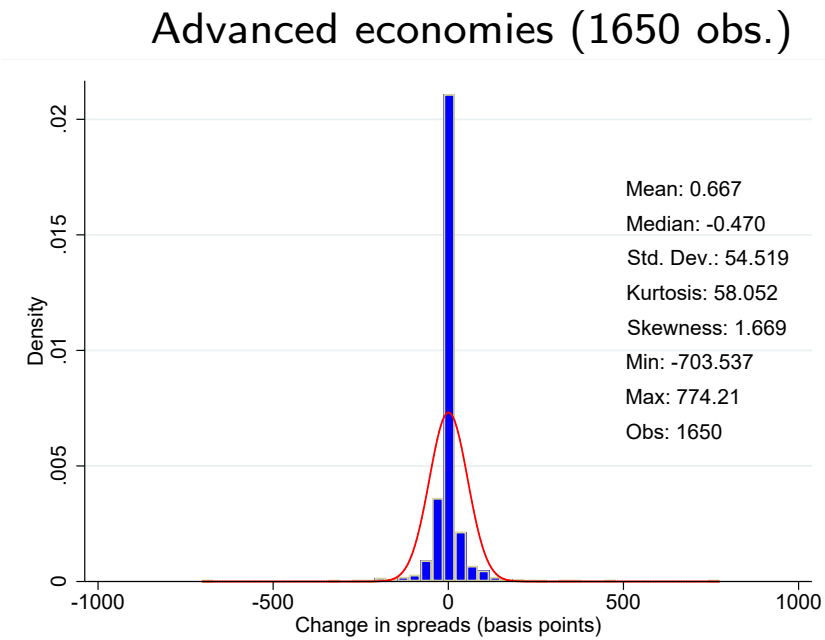
- Affect real financing costs of countries

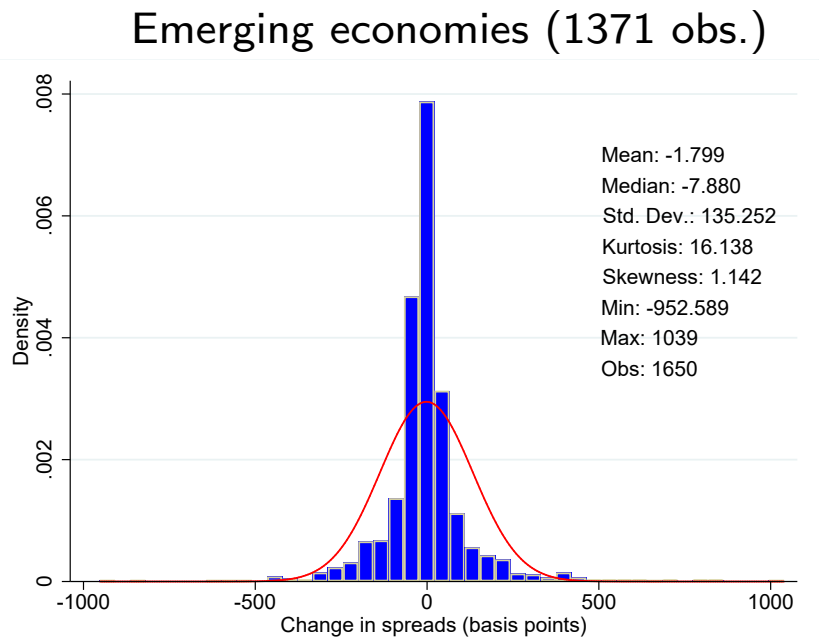
Computed as difference in sovereign yield vis-à-vis risk-free bond issued in common currency

▸ Details ▸ Example

- Eliminates effect of inflation and exchange rate depreciation expectations

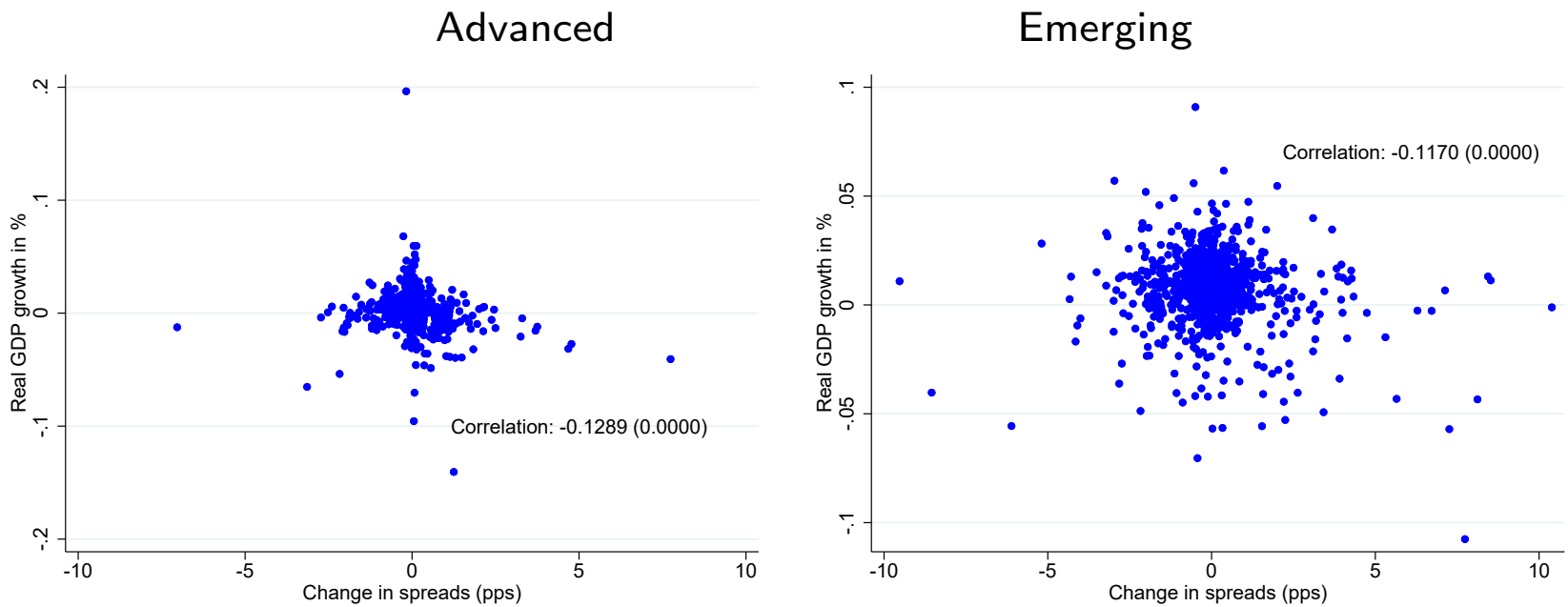
Quarterly spread changes (basis points)





- Spread changes exhibit large excess kurtosis (> 3)
  $\rightarrow$ "fat tails"
- Skewness $> 1 \rightarrow$ presence of large positive "outliers"

Spreads and economic activity: a first look



- Slight negative correlation of spread changes and output growth
- No systematic co-movement with fiscal variables

▸ Details

Empirical strategy

1. Define sharp sovereign spread increase: "treatment"

2. Control for country-specific fundamentals by estimating a logit model $\rightarrow$ Delivers propensity score (probability of treatment)

3. Estimate average treatment effect (ATE) using augmented inverse propensity score weighted estimator (Jordà and Taylor 2016; Lunceford and Davidian 2004) for a set of macroeconomic and political indicators

Definition of treatment

Quarter-country observation which satisfies:

$$D_{i,t} = \mathbb{1}(\Delta s_{i,t} >= \sigma_i \wedge \Delta s_{i,t} >= 25bp)$$

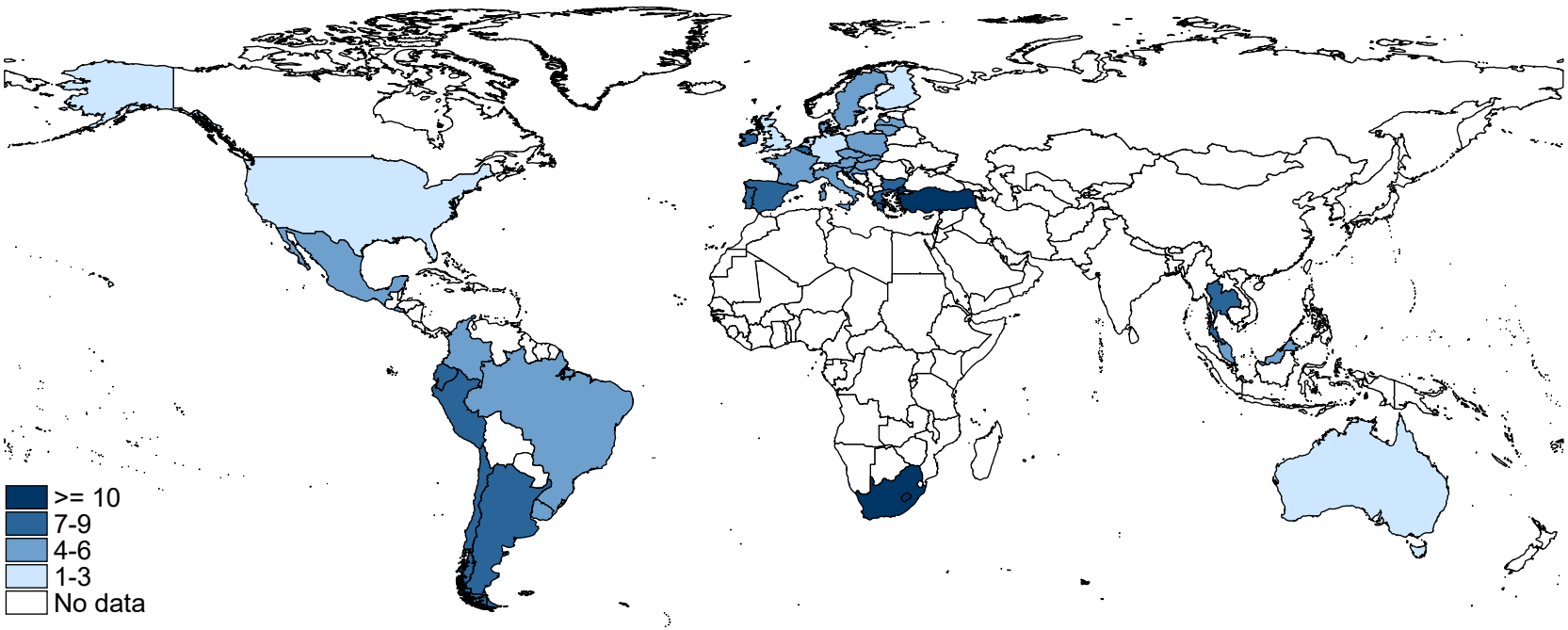
- $D_{i,t}$: treatment at time t for country i
- $\Delta s_{i,t}$: sovereign spread change of country i at time t
- σ_i: distributional standard deviation of $\Delta s_{i,t}$

220 treatments distributed over 47 out of 152 quarters

$\rightarrow$ 7 percent of total observations for sovereign spread changes

$\rightarrow$ every 3 quarters at least one country faces a "treatment"

Treatments across the world



▸ Zoom Europe

Estimation of propensity score

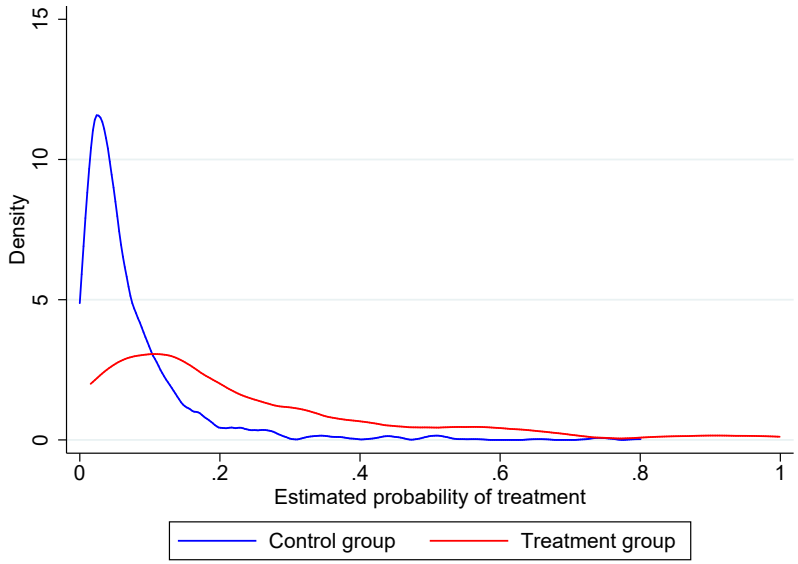
Quarterly logit model

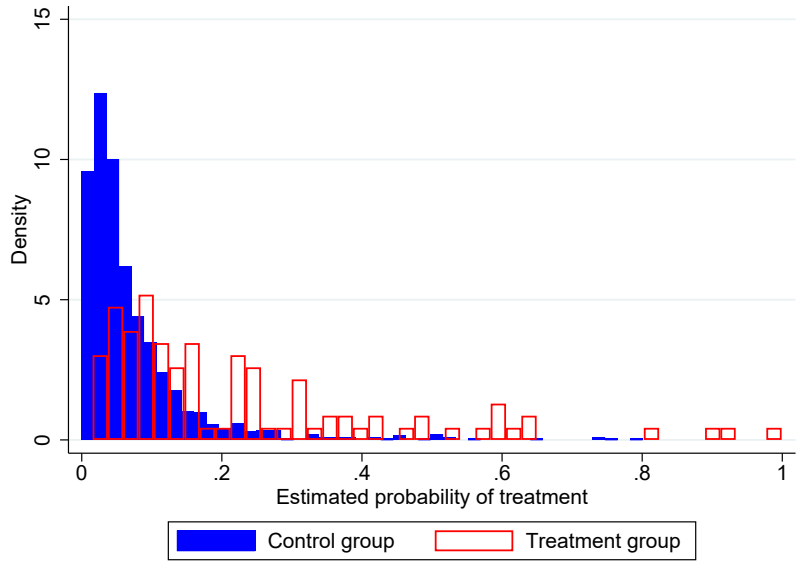
$$D_{i,t} = \alpha + \beta X_{i,t} + \gamma Z_{i,t} + \delta V_{i,t-1} + \kappa_i + \varepsilon_{i,t}$$

- $X_{i,t}$: Country-specific fundamentals (debt-to-GDP, GDP growth, inflation, ...)
- $Z_{i,t}$: Dummy variables (IMF assistance, ...)
- $V_{i,t-1}$: Lagged values of some country-specific fundamentals
- κ_i: Country-fixed effects ▸ Details

$\rightarrow$ Compute propensity scores $\hat{p}(D_{i,t} = 1 | X_{i,t}, Z_{i,t}, V_{i,t-1})$

Propensity score: treated vs untreated





Significant overlap between treatment and control group

- Treatment assigned randomly

Conditional independence assumption

$$Y_{i,t+h} - Y_{i,t-1} \perp D_{i,t} \quad | \quad p(D_{i,t} = 1 | X_{i,t}, Z_{i,t}, V_{i,t-1}) \quad \text{for } h >= 0$$

Intuition: outcome and allocation into treatment and control group are independent conditional on the propensity score (Rosenbaum and Rubin 1983)

Econometric approach: "Re-randomization" of treatment by means of inverse propensity-score weighting

Average treatment effect

Augmented inverse propensity score weighted (AIPW) estimator

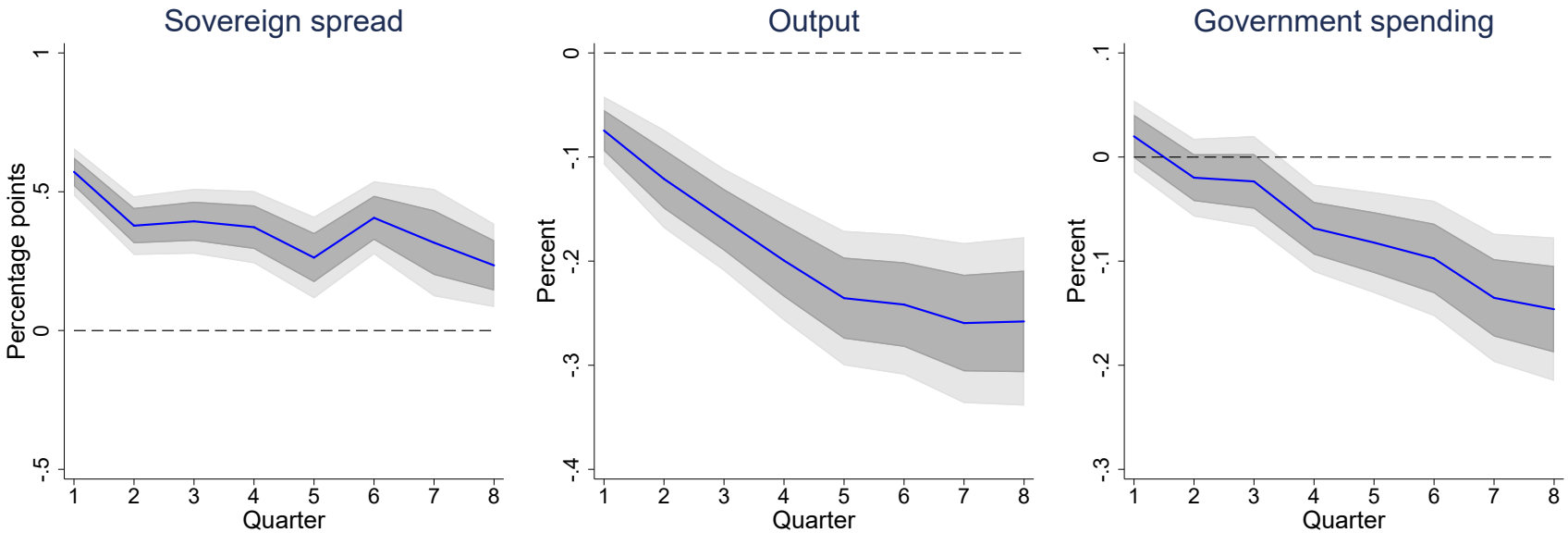
$$ATE^{h}_{AIPW} = \frac{1}{N}\sum_{t=1}^{N}\frac{D_t(Y_{t+h} - Y_{t-1})}{\widehat{p}_t(X_t, Z_t, V_{t-1})} - \frac{1}{N}\sum_{t=1}^{N}\frac{(1-D_t)(Y_{t+h} - Y_{t-1})}{1-\widehat{p}_t(X_t, Z_t, V_{t-1})}$$

which additionally includes a regression adjustment (not shown)

Intuition: weight observations with high propensity score $\widehat{p}$ less

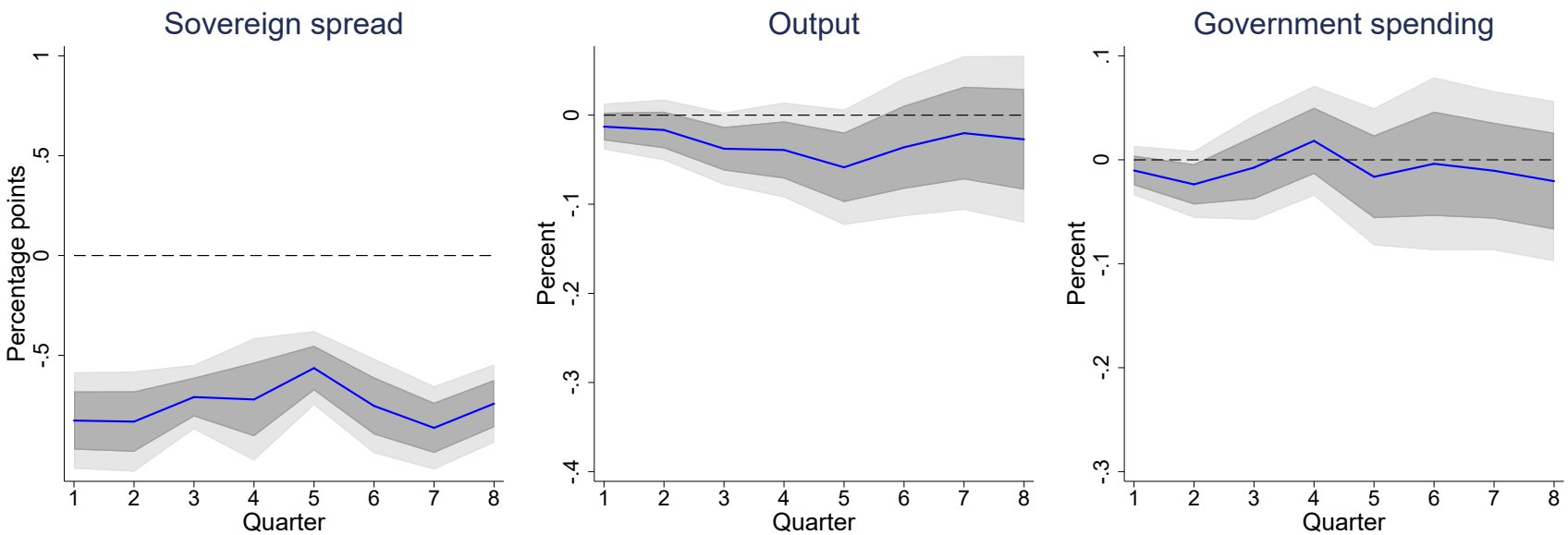
$\rightarrow$ sovereign spread increase likely caused by fundamentals

Results: response to spread shock

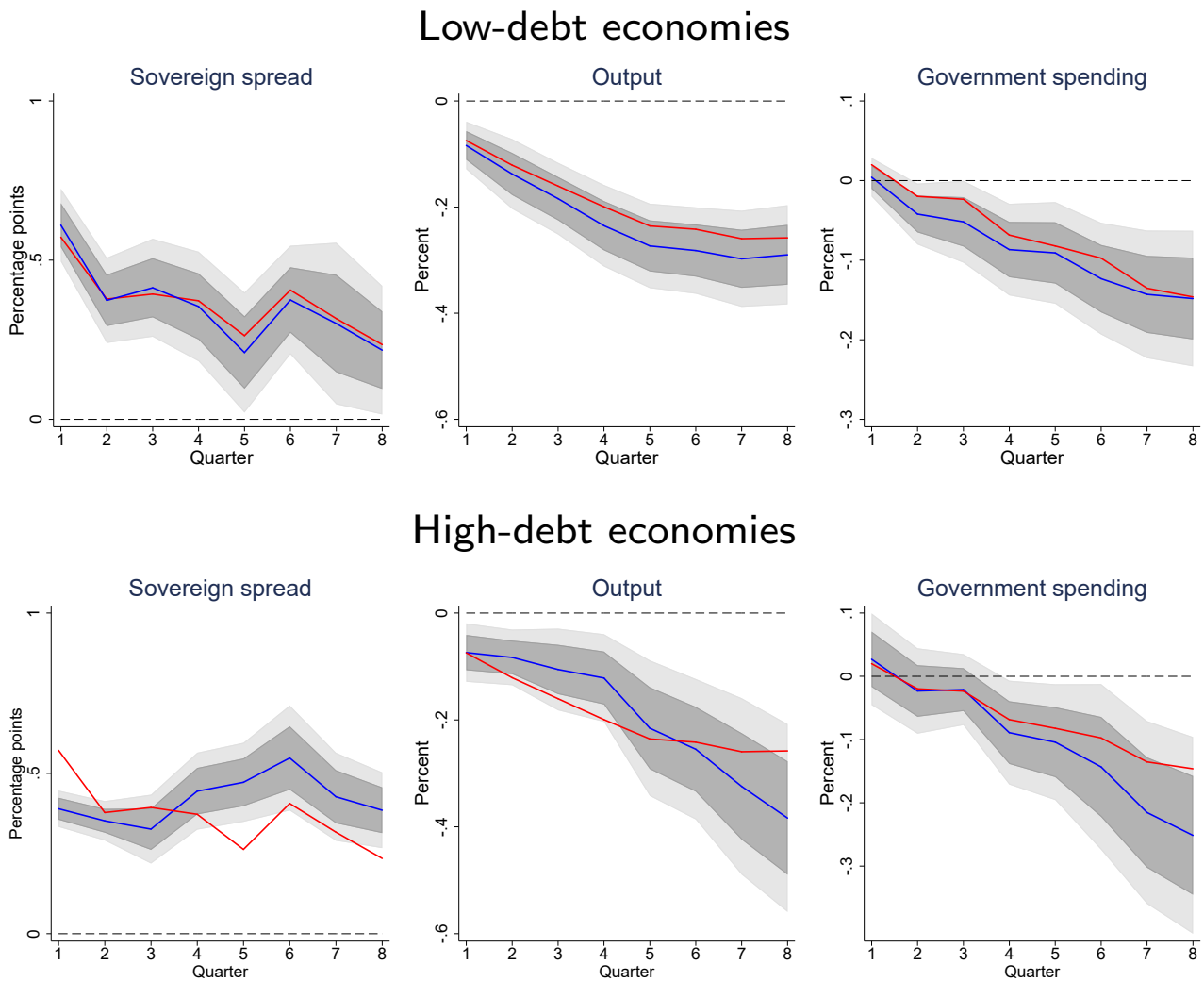


▸ Additional outcome variables

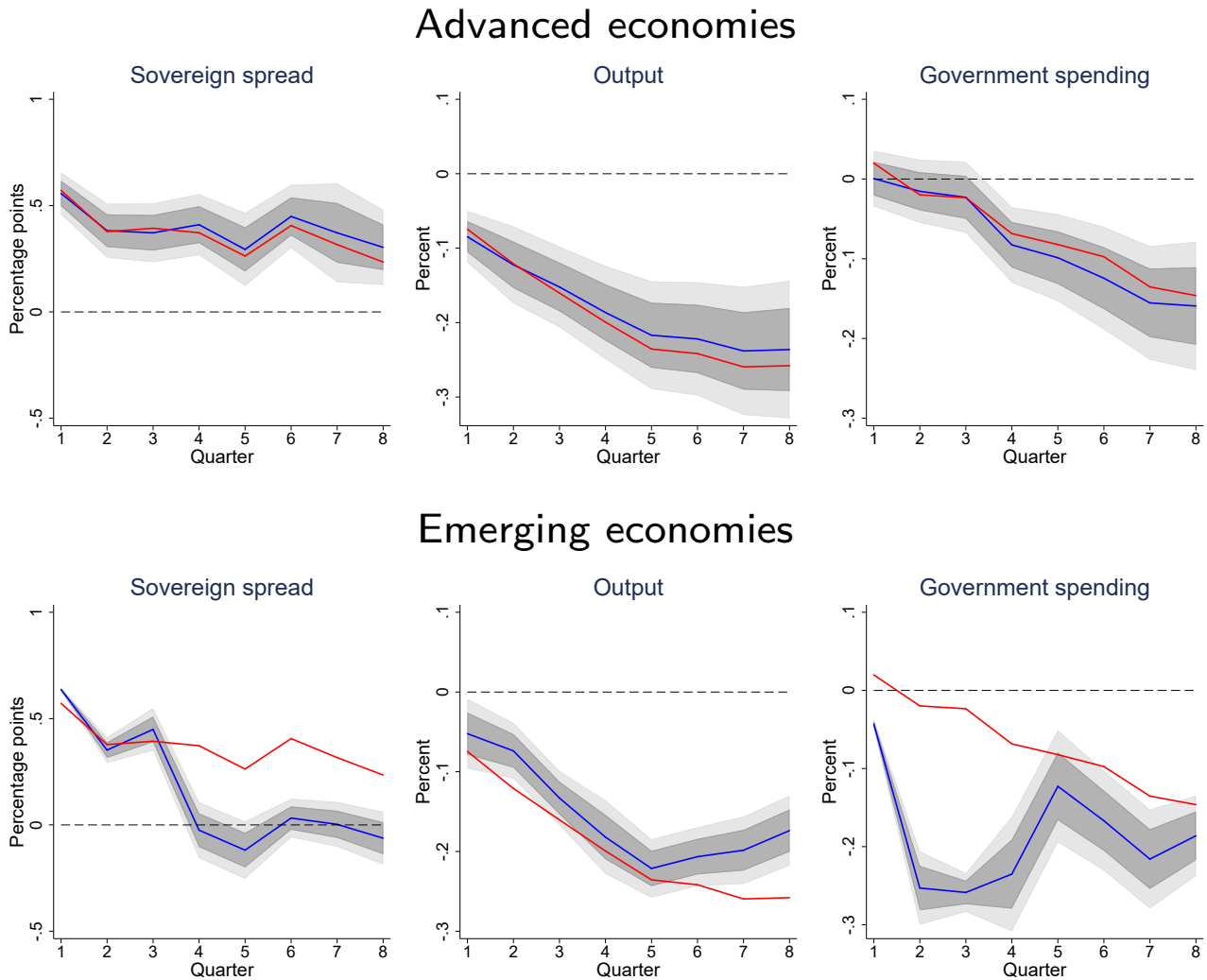
Output and spending don't respond to spread reduction: Asymmetry



Low- and high-debt economies behave similarly...

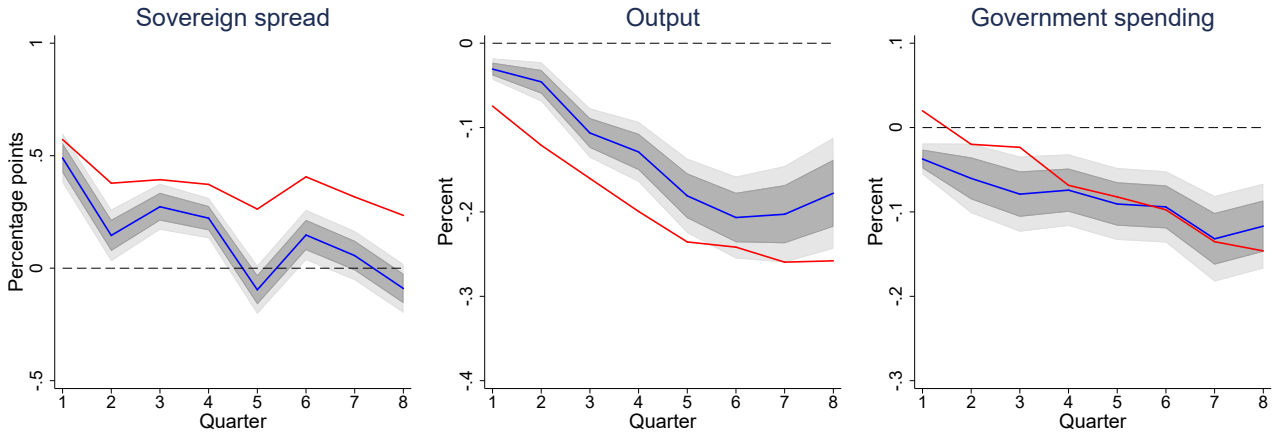


. . . as do advanced and emerging economies

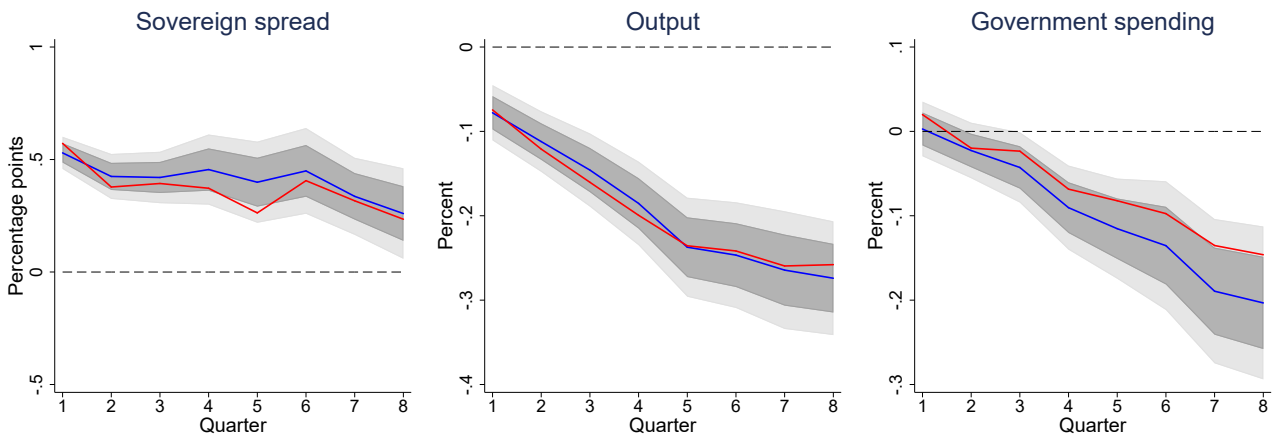


Financial / European sovereign debt crises not main driver

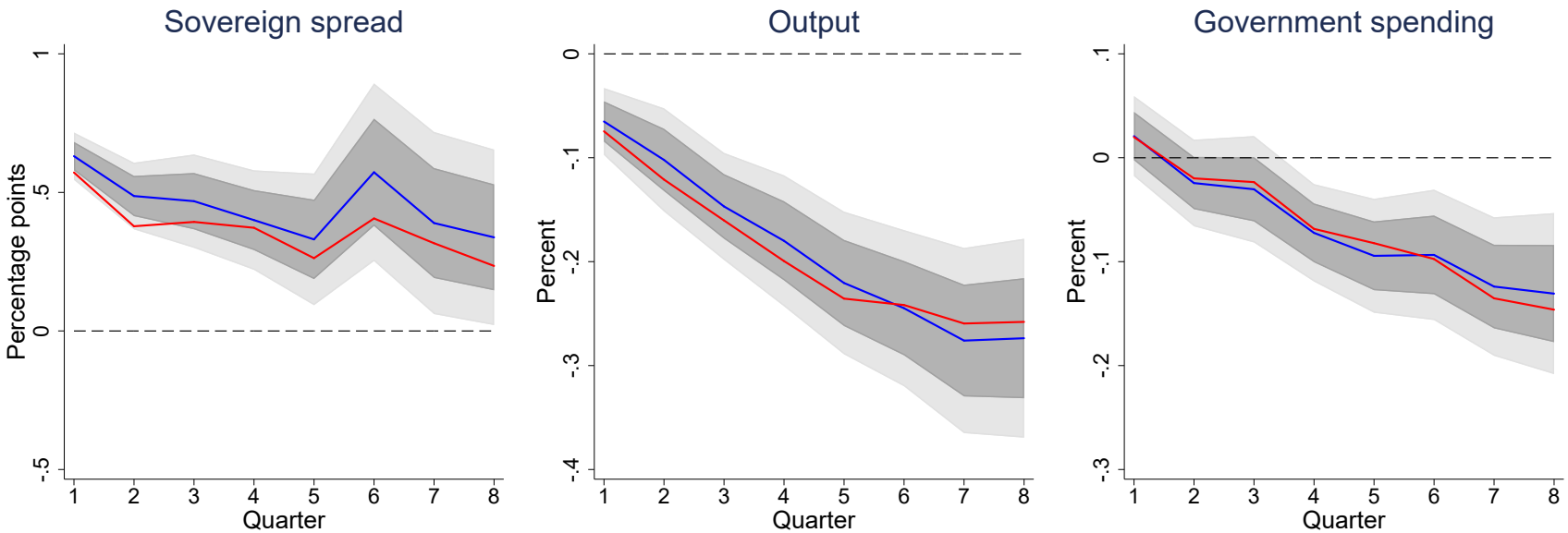
Sample up until 2007



Euro area countries only



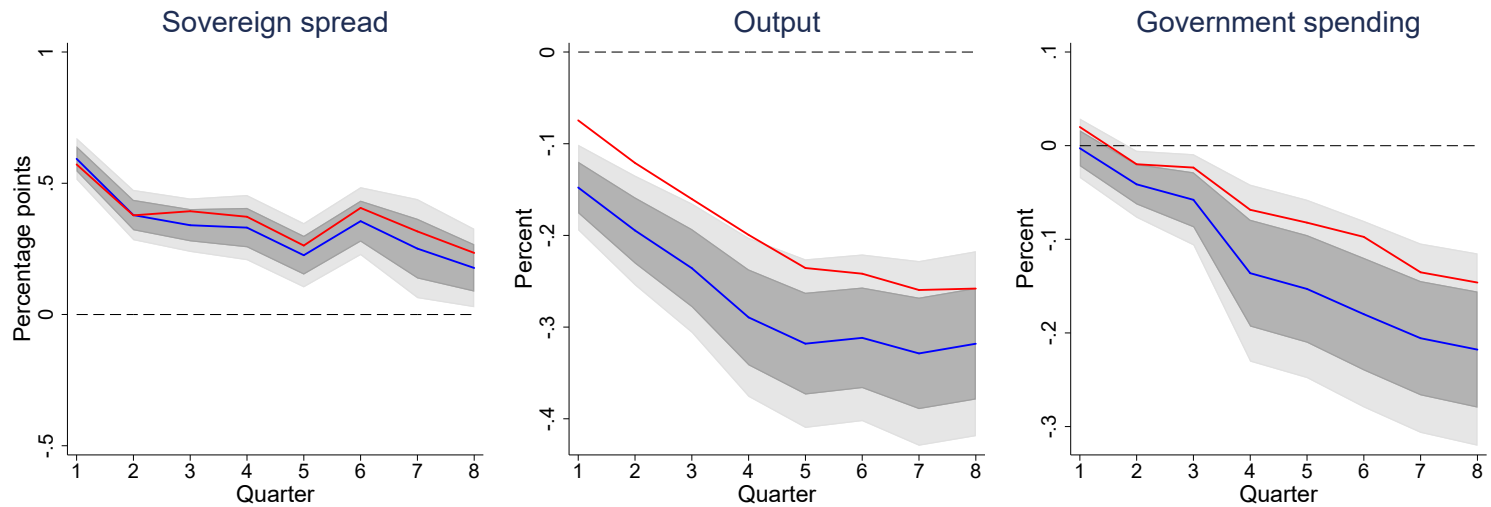
ATE of sovereign spread shock: conservative treatment



Quarter-country observation which satisfies:

$$D_{i,t} = \mathbb{1}(\Delta s_{i,t} >= \sigma_i \wedge \Delta s_{i,t} >= 50bps)$$

ATE of sovereign spread shock: richer logit model



Additional controls in first stage logit model

- Forecasts for government spending and output, credit growth in private nonfinancial sector

Can financial markets induce political turnover?

Data

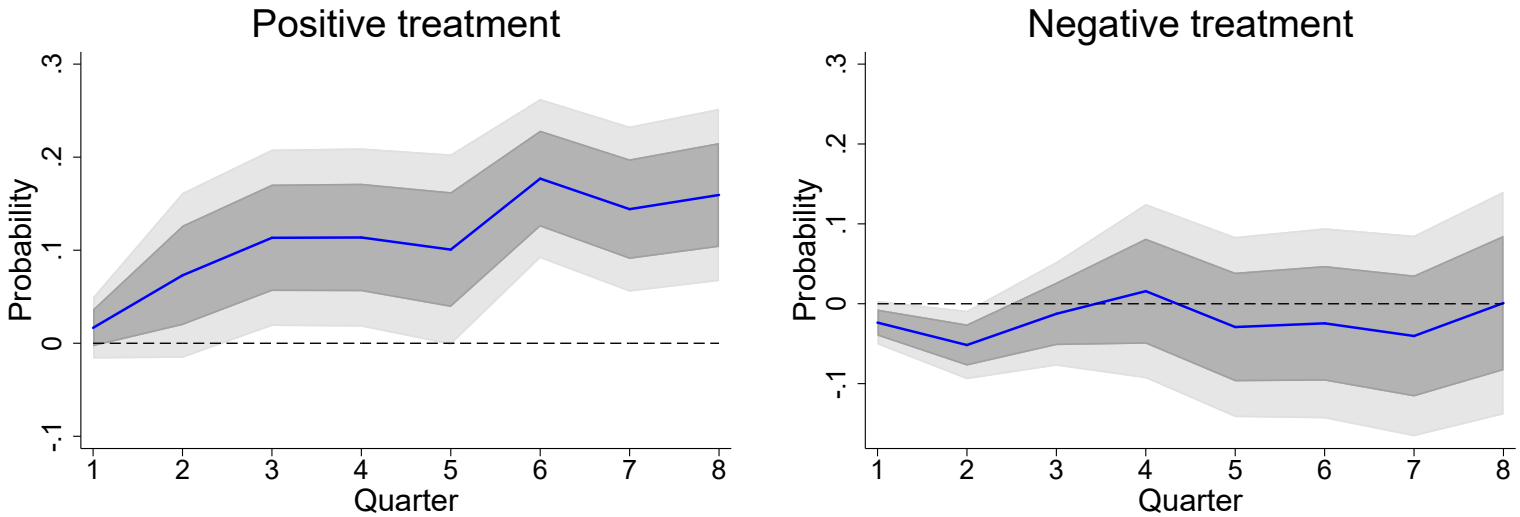
- Archigos database of political leaders (Goemans et al. 2009)
- Political turnover based on entry and exit of political leaders
- 283 changes of government in our sample

Estimation strategy

- Logit model including inverse propensity score as weights

  $\rightarrow$ controls for country-specific fundamentals

Average marginal effect of spread shock: political turnover



- Sharp spread increase leads to higher probability of political turnover over the next h quarters

  $\rightarrow$ about 15 percentage points over the next 2 years

- Sharp spread decreases do not have much of an effect

Conclusion

Do rising sovereign spreads impact a) economic activity, b) the policy stance, and c) election outcomes?

- Yes: output falls
- Yes: government spending is cut
- Yes: political turnover becomes more likely

Conclusion

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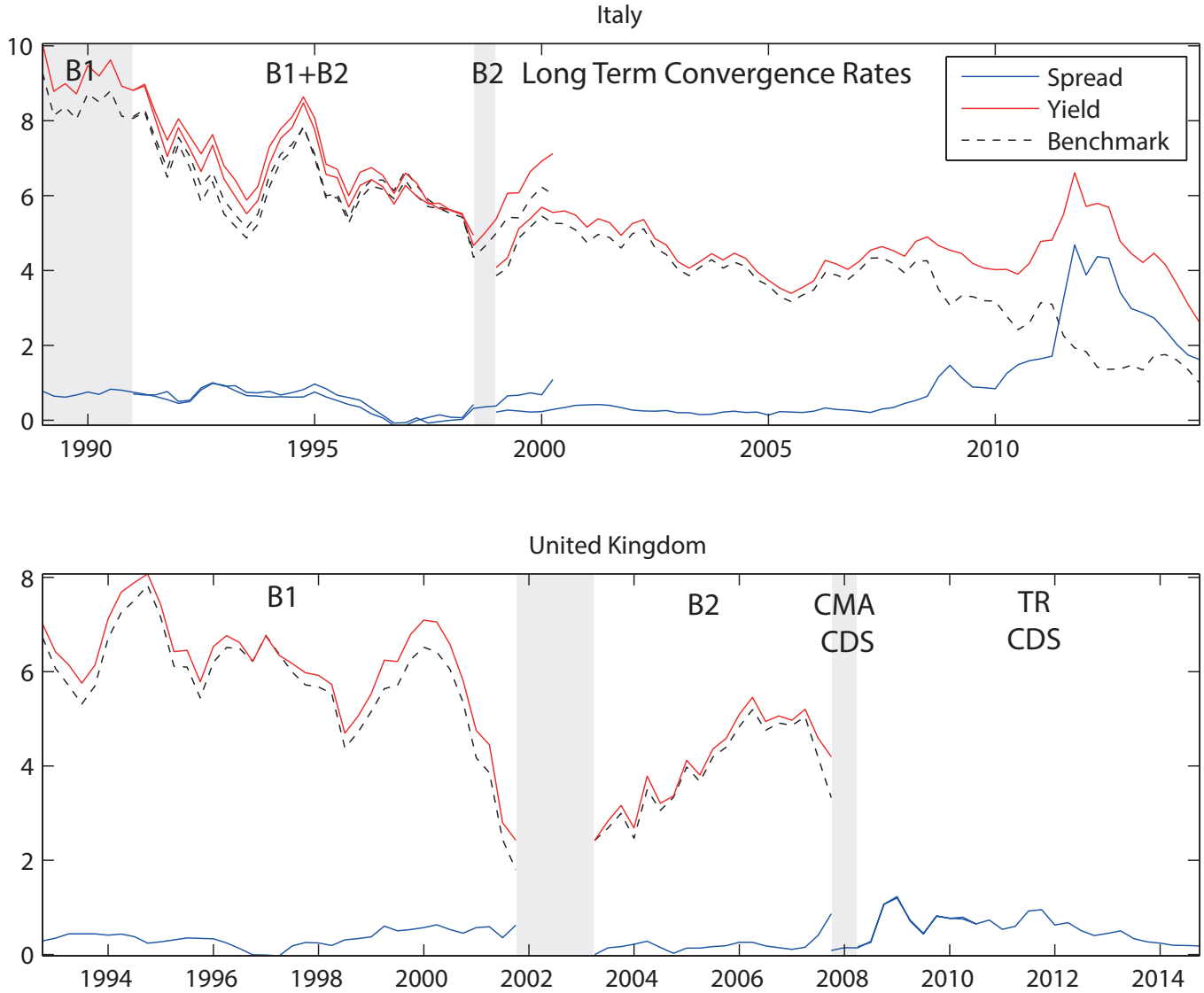
Market discipline? Results consistent with two alternative views

- Benign view: important to get economies back on track
- Critical view: markets enforce untimely austerity

Construction of default premium: two examples



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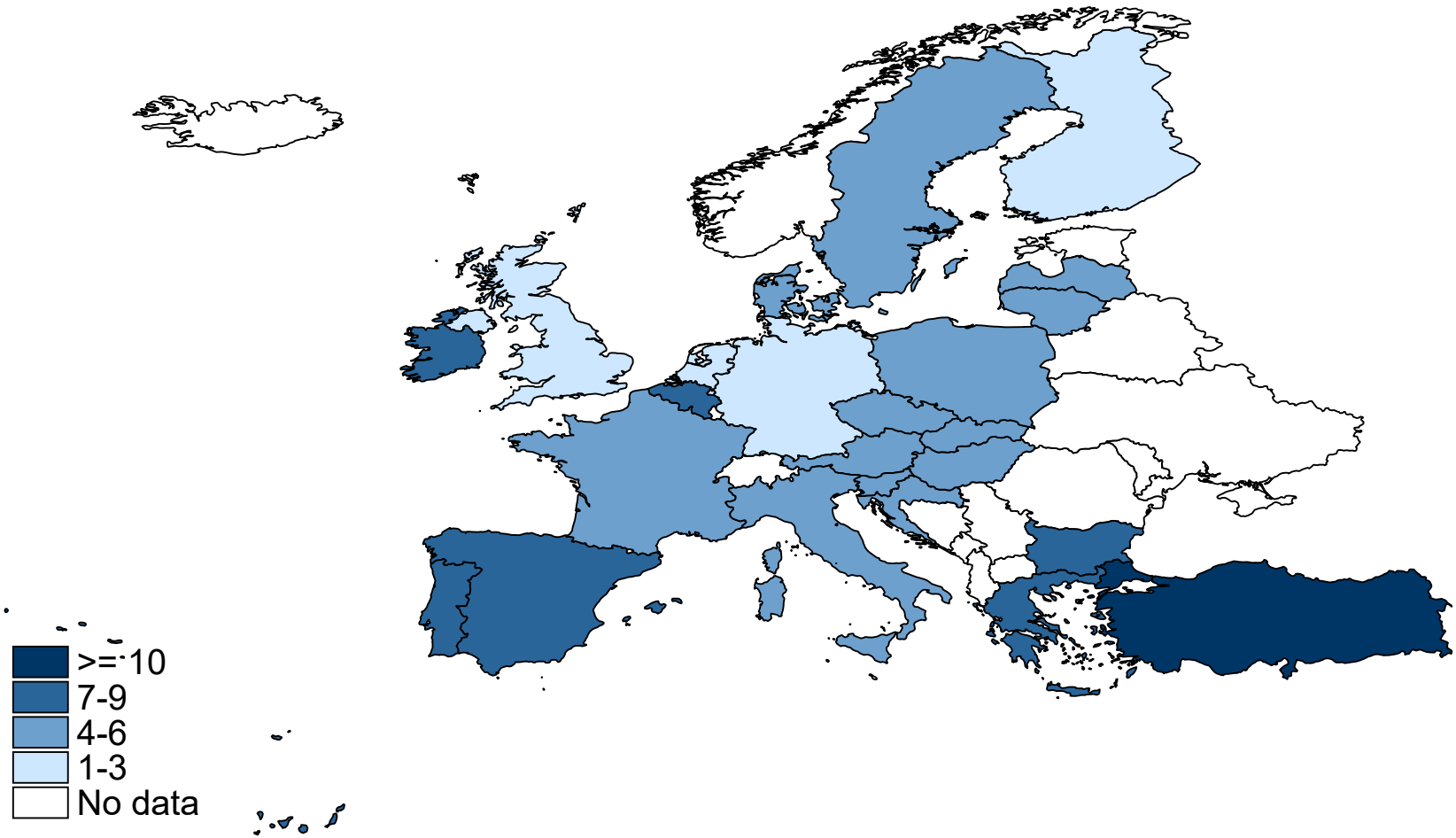
Treatments across Europe



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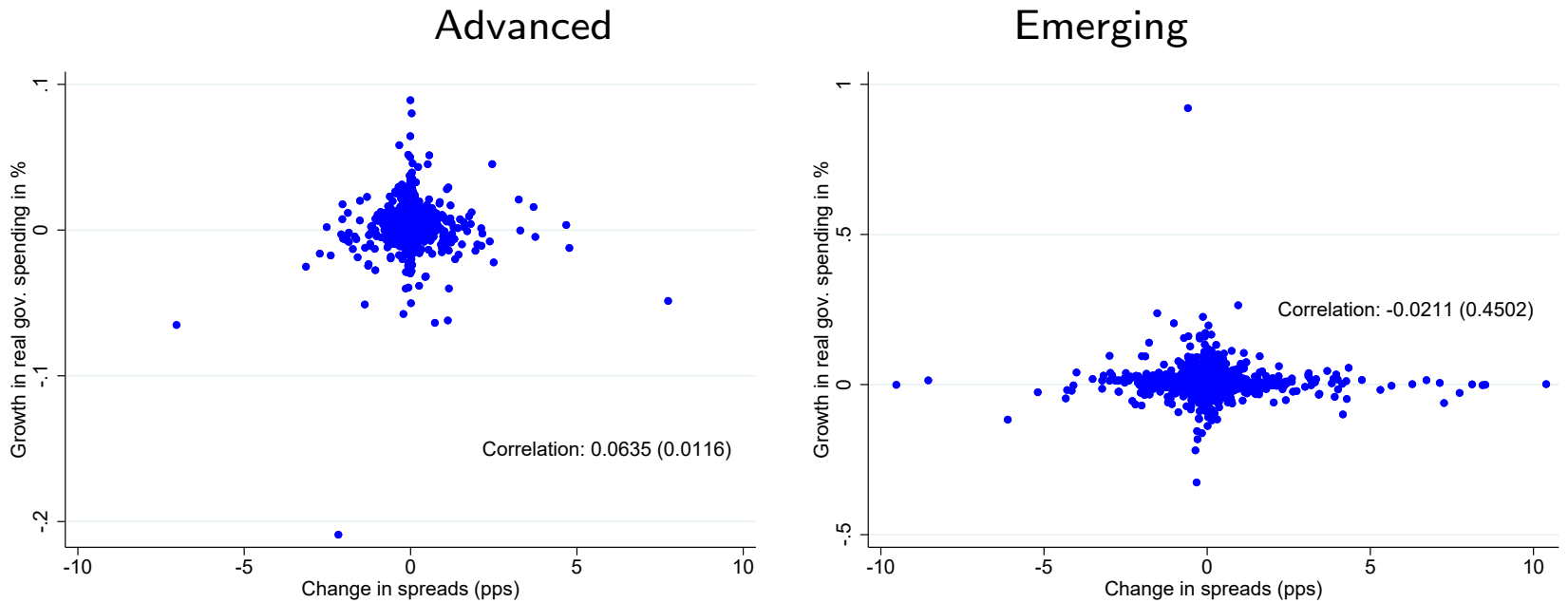
Logit model estimation results

Dependent variable	Logit model
$D_{i,t}$	Average marginal effects
Debt-to-GDP	.9276483* (.4083627)
GDP growth	-3.219265*** (.7655932)
Growth in gov. spending	.6208748 (.4680838)
Tax revenue	-.2393848 (.2619834)
Deficit-to-GDP	.1965439 (.212037)
Nom. interest rate	.002392 (.0050141)
NFA	-.0841168* (.0396131)
Trade balance	-.8204448** (.2985934)
Inflation	-.370373 (.7852661)
Log eff. nom. FX	.047433 (.1815818)
Lagged debt-to-GDP	-.7821325 (.4058027)
Lagged GDP growth	.5353401 (.6055954)
Lagged growth in gov. spending	-.5445016 (.512149)
Lagged tax revenue	.2211327 (.2619832)
Lagged deficit-to-GDP	.3280623 (.1858253)
Lagged spread change in bp	.0002213* (.0000974)
N	1251
ROC	0.8078
	(0.0215)

Logit model estimation results to predict propensity scores. Country-fixed effects are included but not reported. Standard errors in parenthesis. ****/**/* indicate statistical significance at the 1/5/10 percent level back

Unconditional correlations

Growth in real government spending



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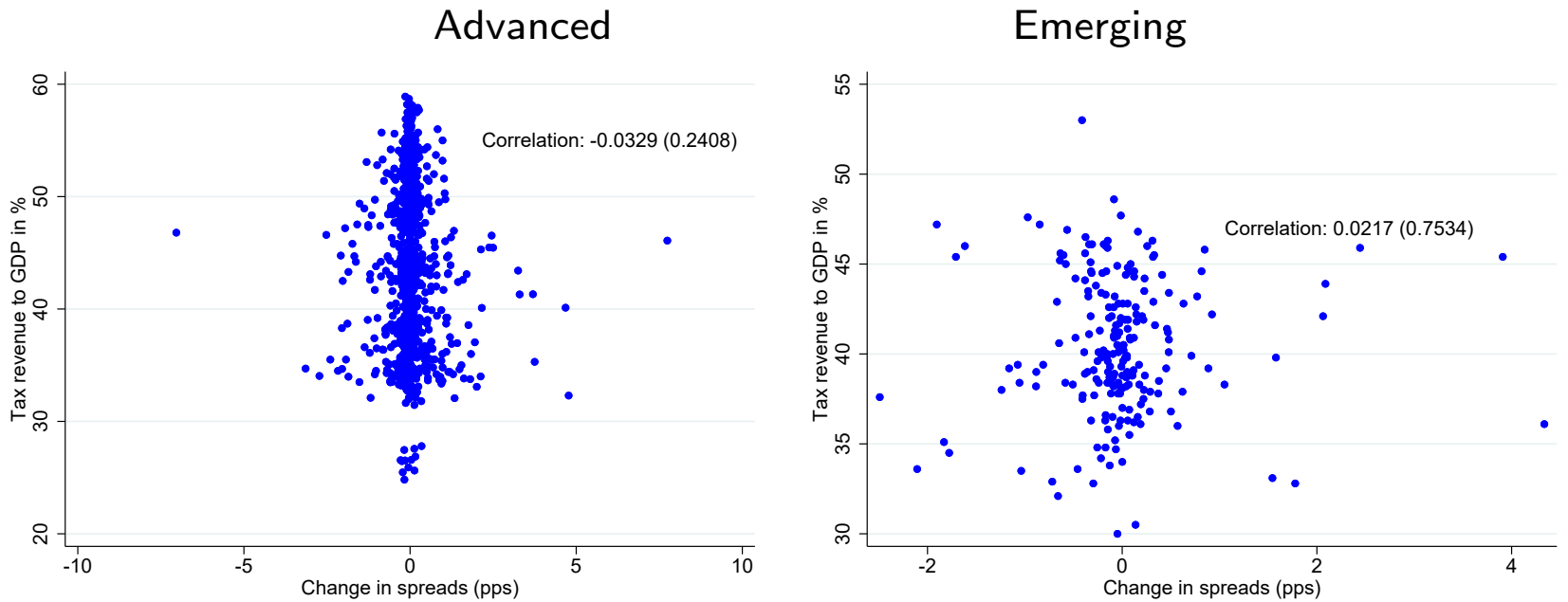
Unconditional correlations

Tax-revenue-to-GDP ratio



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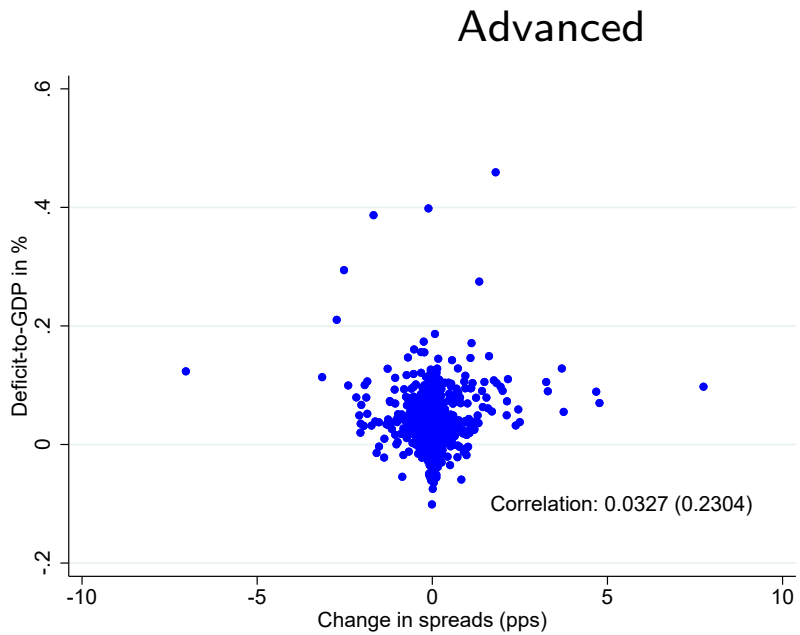
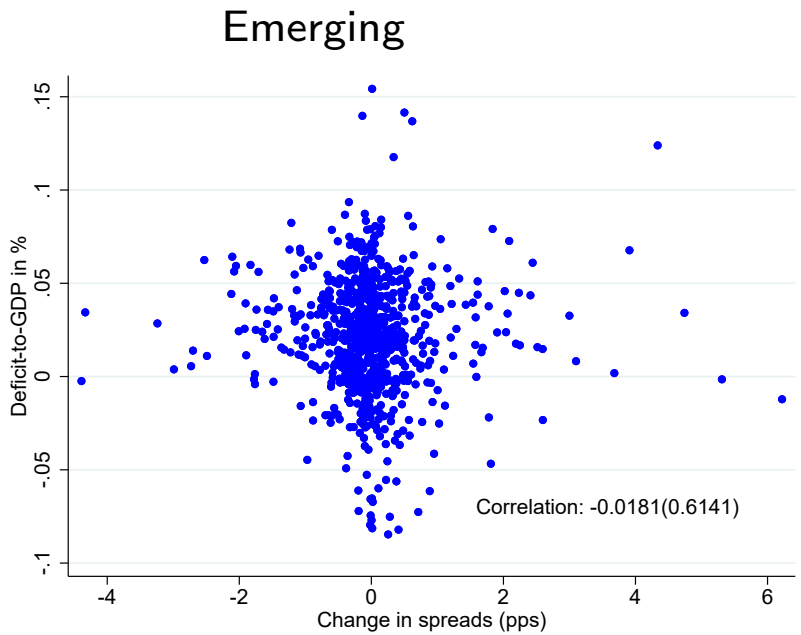
Unconditional correlations

Deficit-to-GDP ratio





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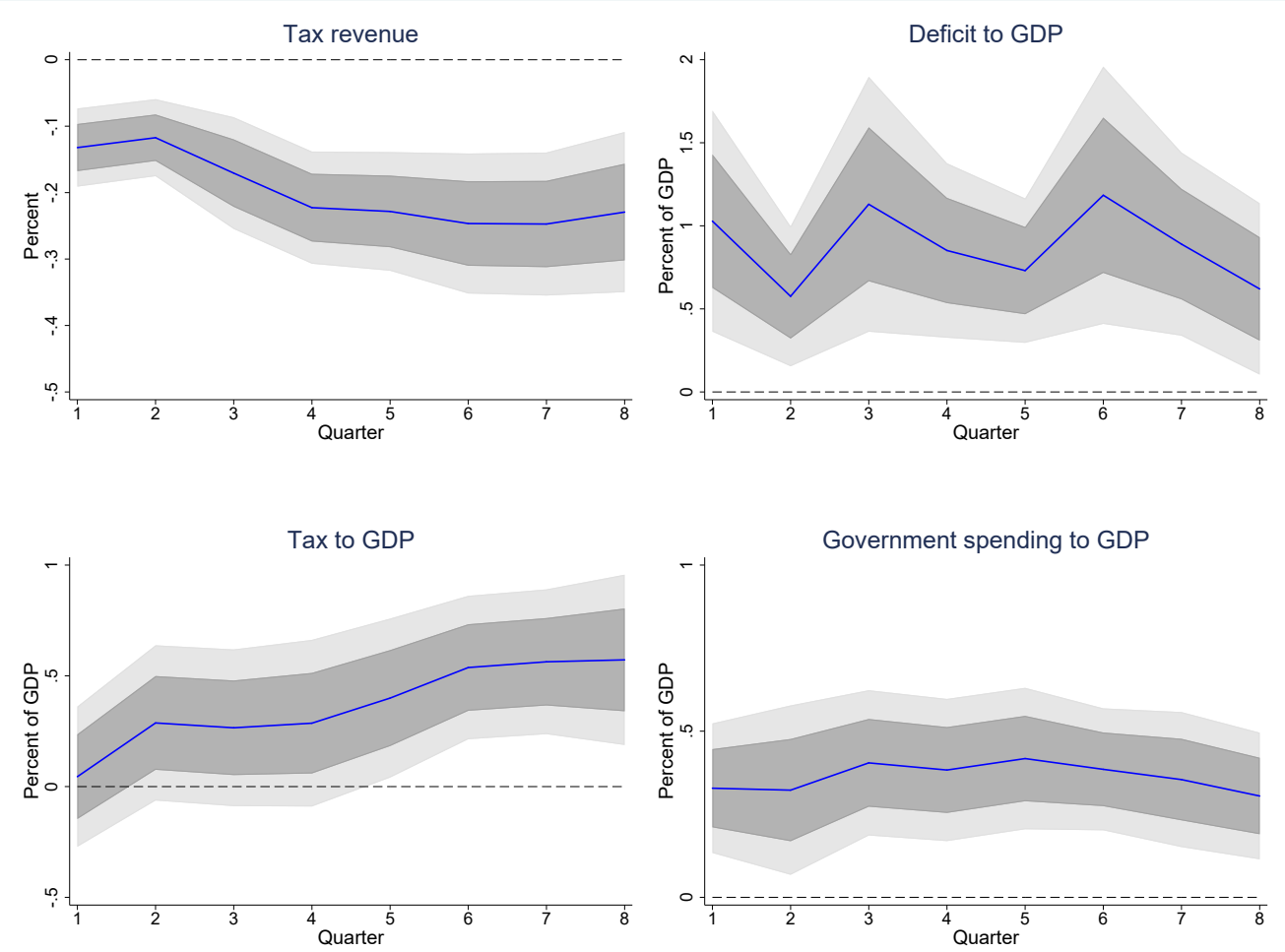
Additional outcome variables



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