"The Core, the Periphery, and the Disaster: Corporate-Sovereign Nexus in Covid-19 Times"

by

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- Background
- Empirics
- Theory
- Comments
- Conclusion

The Bank-Sovereign nexus

- Infamous **Bank-Sovereign doom-loop** during the **European sovereign crisis** in the context of **financial repression**:

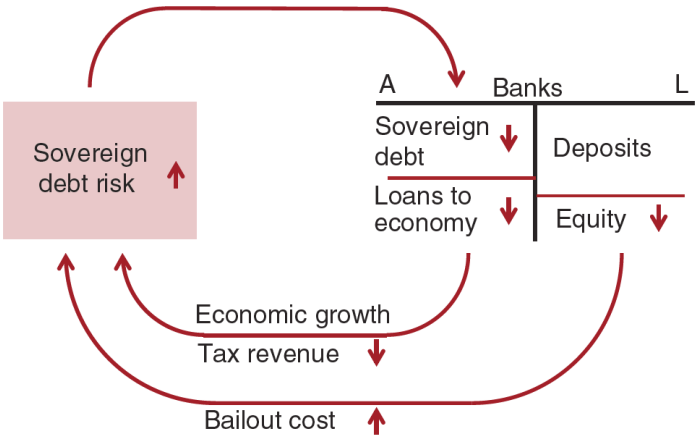


FIGURE 1. TWO DIABOLIC LOOPS

(Brunnermeier, Garicano, Lane, Pagano, Reis, Santos, Thesmar, van Nieuwerburgh, Vayanos (2016), Acharya, Drechlser, Schnabl (2014)...)

- This paper investigates similar **doom-loop** between **non-financial corporation** and sovereigns in the context of the **covid-19 crisis**.

- But different mechanism...

COVID-19 Crisis triggered large widening in Non-Financial firm CDS...

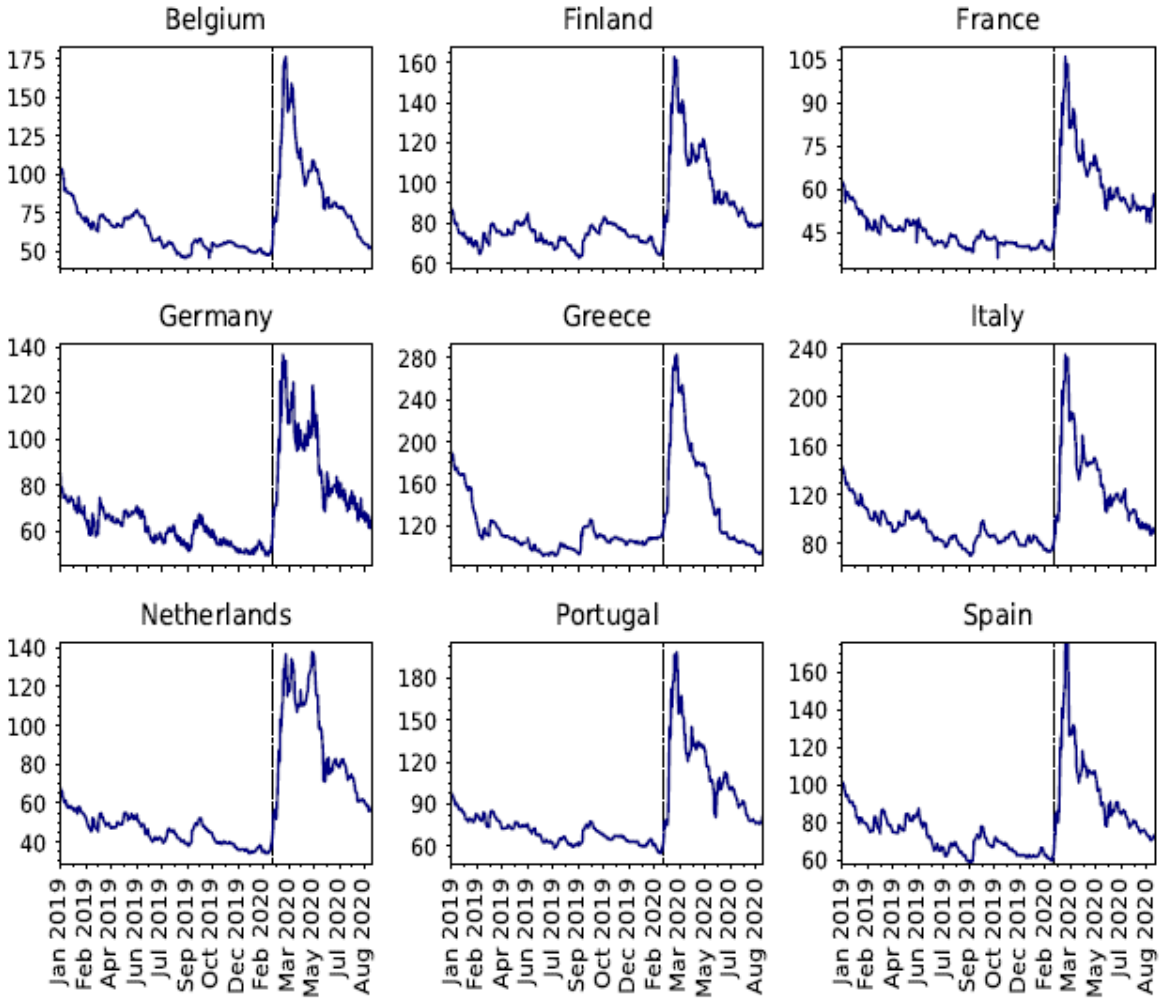


FIGURE 1: **Euro Area corporate CDS**: This figure plots the value-weighted average corporate CDS spread in basis points for firms headquartered in the nine countries in our sample over the period from January 1, 2019 to September 10, 2020 (443 trading days). The dashed vertical line marks the beginning of the first Italian lockdown on February 24, 2020.

and in sovereign CDS...

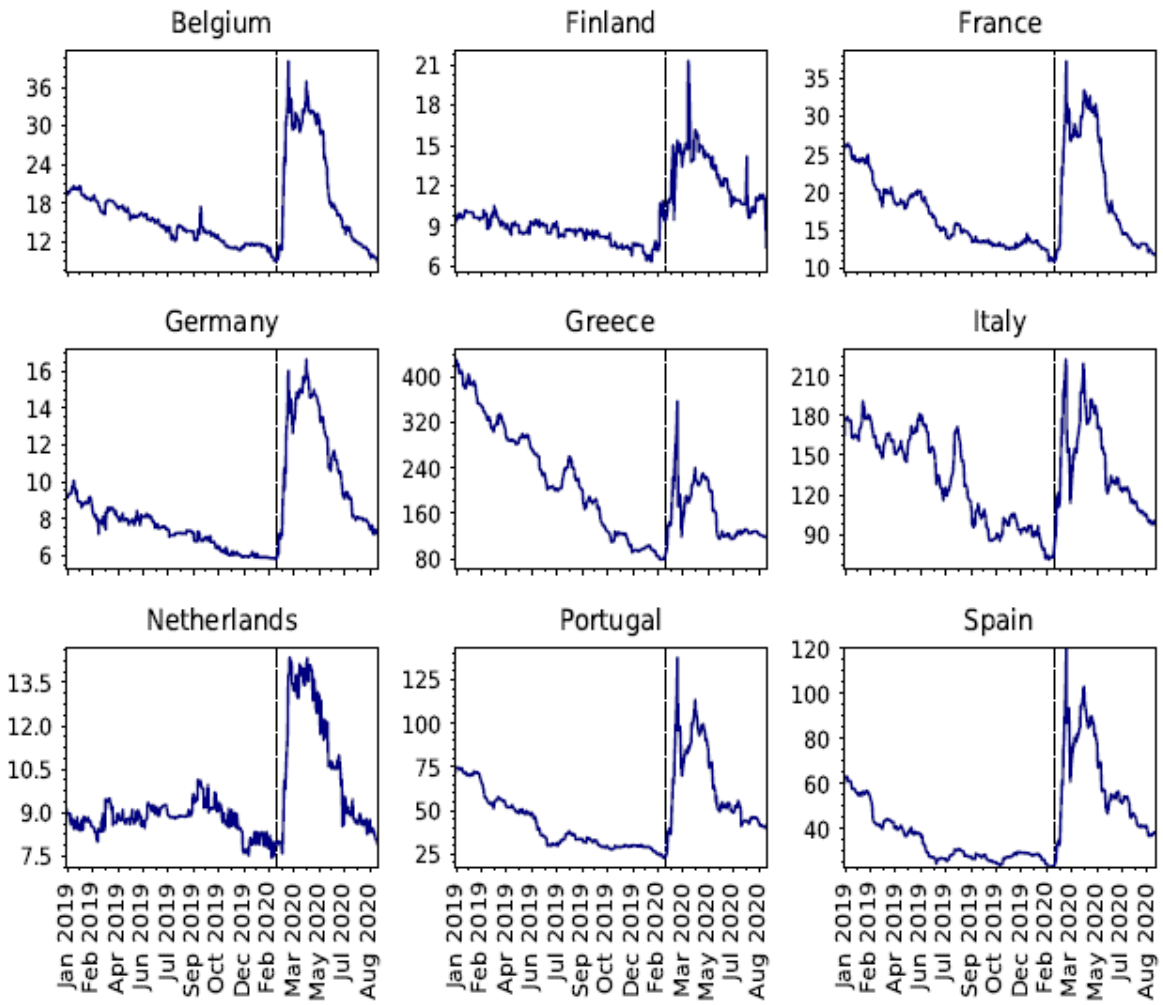
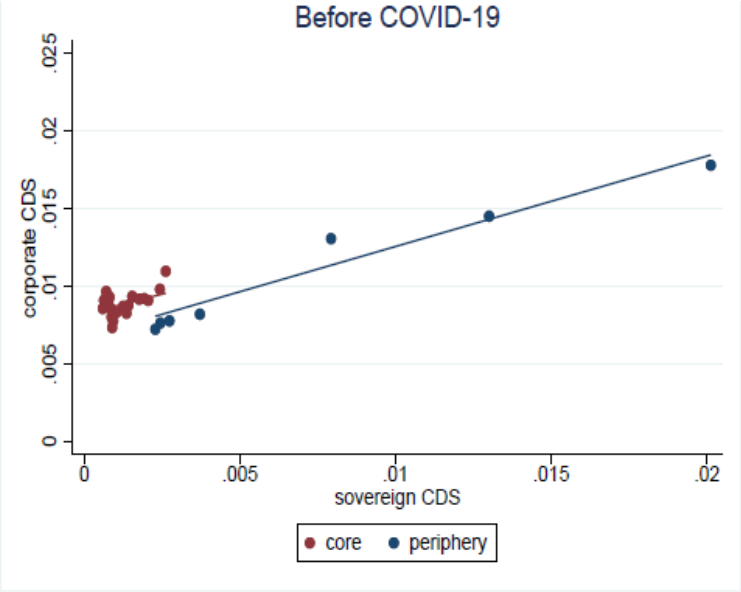
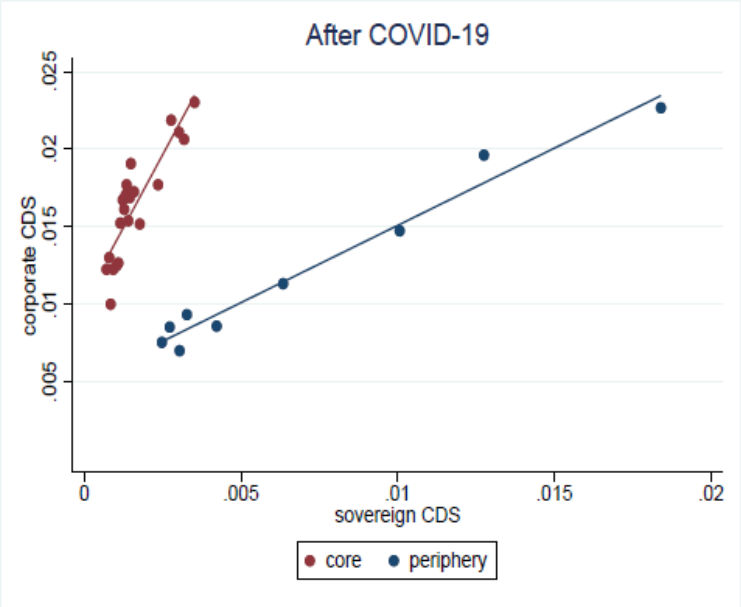


FIGURE 2: **Euro Area sovereign CDS**: This figure plots sovereign CDS spreads in basis points for the nine countries in our sample over the period from January 1, 2019 to September 10, 2020 (443 trading days). The dashed vertical line marks the beginning of the first Italian lockdown on February 24, 2020.

and also in **sensitivity** of CDS of core firms w.r.t. their sovereigns





Empirical Methodology

- Estimate Panel regression on **daily changes in Log-CDS** for 99 Core and 24 Periphery non-financial firms:

$$\Delta log(\text{CDS Corp})_{ijt} = \alpha_0 + \alpha_1 \times E + \delta_i + \beta_1 \Delta log(\text{CDS Sov})_{jt} + \beta_2 \Delta log(\text{CDS Sov})_{jt} \times E + \gamma_1 X_{ijt} + \gamma_2 X_{ijt} \times E + \varepsilon_{ijt}, \quad (1)$$

- Baseline results

	Equally Weighted	
Variables	Core	Periphery
$\Delta log(\text{CDS sovereign})_{jt}$	0.127***	0.208***
	(0.013)	(0.036)
$\Delta log(\text{CDS sovereign})_{jt} \times E$	0.125***	0.052
	(0.016)	(0.032)

→ Core firms' **sensitivity** doubles pre to post covid and becomes similar to periphery.

- Very robust :
  - many controls (equity returns, leverage, volatility, size, liquidity, profitability, . . .)
  - in subsamples (within countries, within sectors).
  - for larger sample of corporate bond spreads . . .

Proposed explanation: Larger Fiscal Slack of Core Countries

- Larger fiscal slack of core countries allows them to increase government debt to help domestic firms through the crisis

→ sovereign CDS ↑ and higher comovement with domestic corp CDS.

- Empirical support:
  Replace core vs periphery dummy with a continuous measure of fiscal capacity and control for many other country and firm characteristics.

- Theoretical support:
  Propose a theoretical **reduced-form** model of the corporate-sovereign default that can reproduce the findings.

The reduced-form model of the private-public 'nexus'

- Firm **risk-neutral** default intensity:
$$\lambda_t^c = \nu^c + \phi_c \sigma_i \eta_t + \sigma_c \epsilon_t + \mathbf{1}_{\{disaster\}} \kappa_c \min\{J_t^\lambda, \underline{J}\}$$
- Sovereign **risk-neutral** default intensity:
$$\lambda_t^g = \nu^g + \phi_g \sigma_i \eta_t + \mathbf{1}_{\{disaster\}} \max\{J_t^\lambda - \underline{J}, 0\}$$
- where:
  - $\eta_t, \epsilon_t \sim N(0,1)$ are independent common and idiosyncratic shocks.
  - $J_t^\lambda \sim N(\theta, \delta^2)$ is aggregate **consumption disaster** shock ($\rightarrow$ no pricing kernel?)
  - the **probability of disaster** follows a discrete state **stationary Markov chain**:
$$E^Q[\mathbf{1}_{\{disaster\}}] = p_i \;\; i = 1, \ldots, S \text{ and } Prob[p_j \mid p_i] = \pi_{ij}.$$
- The **fiscal policy slack** is captured by the **cap** $\underline{J}$ on the jump in default intensity:

  $\downarrow \underline{J}$ reduces impact of consumption disaster on firm's default intensity but increases impact on sovereign default intensity.
- Derive pricing formulas for sovereign and corp CDS and show, using some approximations, that when there is a transition from low (p_{low}) to high (p_{high}) disaster probability state then, for some choices of parameters, increasing the guarantee ($\downarrow \underline{J}$) increases the covariance between corporate and sovereign CDS.

$\rightarrow$ Consistent with the findings if core has lower $\underline{J}$ than periphery.

The model specification

- Default intensity is normally distributed with $\lim_{T\to\infty} V[\int_0^T \lambda_s ds] = \infty$:
  - Negative default intensities (and credit spreads)?
  - Negative consumption 'disasters'?
  - Credit spread curves?
  - Comparative statics w.r.t $\underline{J}$?

  $\Rightarrow$ useful to extend the model to (i) mean-reversion, (ii), positive intensity, and (iii) positive 'disaster' jumps (using standard Duffie-Kan (1996) affine toolbox).
- The economic intuition is developed using simple ($\sim$ first-order Taylor) approximations .

$\rightarrow$ Would be useful to calibrate/estimate the reduced-form model parameters using sovereign, core, and periphery CDS curves, using pre and post Covid-19 data, and then simulate from the model to see whether it can generate the increase in spread-covariance for Core firms.

- In the model the increase in covariance is generated by the common jumps in Corp and Sovereign intensities due to disaster jumps. In the absence of disaster jump, the covariance is only generated through the 'standard' shock (η_t).

$\rightarrow$ What frequency of disasters do we need in the post-covid regime to generate high co-jumps in **log-spread changes**?

Model interpretation

- Did market participants properly anticipate the covid crisis?
  - If yes → prices reflected the expected effect of the low probability event before the crisis.
  - If no → prices will shift, perhaps permanently, to reflect 'learning a new regime'
- Example: the out of the money put premium appeared in **1987** (Rubinstein (1994))

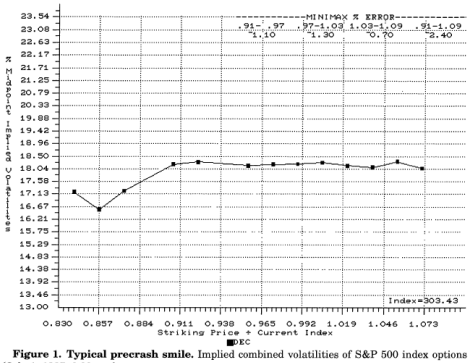


Figure 1. Typical precrash smile. Implied combined volatilities of S&P 500 index options (July 1, 1987; 9:00 A.M.).

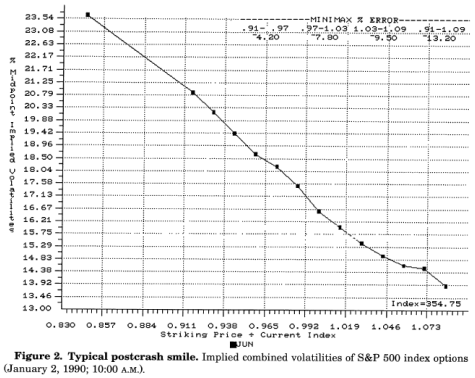


Figure 2. Typical postcrash smile. Implied combined volatilities of S&P 500 index options (January 2, 1990; 10:00 A.M.).

- A **structural model with learning** may be able to capture the **non-linear** impact of such a (possibly permanent) **regime-shift** on prices better than a reduced-form model (Benzoni et al. (JFE 2011))?
- Perhaps useful to look at derivatives (OTM options on different sectors) to infer **revisions in market expectations** about covid-like crisis.

Conclusion

- Interesting and robust empirical findings.
- Convincing explanation based on fiscal slack and private-public 'nexus'
- Reduced-form model seems promising:

→ 'beefed-up' version could be calibrated to match sovereign/corp CDS curves, pre/post Covid to see if it can replicate the change in sensitivity for core countries.

- Many open questions, that perhaps call for more structural approach:
  - What is optimal government bail-out mechanism for non-financial firms (tax cuts, labor subsidies, to some or all firms...)?
  - What is feedback mechanism to sovereign risk (negative through higher debt and future taxes, but positive through higher future growth...)?
  - ≠ Bank-Sovereign doom loop...
  - What will be the consequences for future default rates?