The Costs of Sovereign Default: Evidence from Argentina

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Discussion by

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THE PAPER

- Paper exploits legal rulings in *NML Capital vs. Argentina* as a natural experiment to measure the impact of sovereign risk on stock prices

- Two main results

  1. Increase in the probability of an Argentinian default *cause* a decline in Argentinian stock prices

  2. Cross-sectional patterns: financial firms, export-intensive firm, and foreign-owned firms more affected by increase in the risk of a sovereign default

- Important addition to the literature: serious empirical analysis on the size and nature of the economic costs of a sovereign default

Overview of Discussion

- Place paper into perspective using two-period model of sovereign debt
  - Why are default costs important in this class of models?
  - Why is it hard to measure them?
  - Approaches in the literature prior to H&S (2016)
- Review authors' approach through the lens of the model
  1. What does the elasticity of stock prices to (risk neutral) sovereign default probabilities tells us about the size of default costs?
  2. What are the cross-sectional patterns telling us about the nature of these default costs?
- Few remarks along the way

A MODEL OF SOVEREIGN DEBT AND DEFAULT

- Two periods, $t = 0, 1$
- Government
  - Receives output $Y_t \sim \mu(.|Y_{t-1})$
  - Preferences over government consumption $\{G_t\}$

$$\mathbb{E}_0 \left[\sum_{t=0}^{1} U(G_t) \right]$$

  - Issues defaultable bonds at $t = 0$, decides whether to repay at $t = 1$ ($\delta_1 = 1$). Budget constraint at $t = 0$,

$$G_0 + q(b_1, Y_0)b_1 = Y_0$$

- Lenders evaluate stream of payouts using a discount factor M. No arbitrage condition

$$q(b_1, Y_0) = \mathbb{E}_0[M\delta_1(b_1, Y_1)]$$

THE DEFAULT DECISION

In period 1, the government decides whether to repay or not

- If it repays $(d_1 = 1)$, government's utility is

$$U(Y_1 - b_1)$$

- If it defaults, government's utility is

$$U((1 - \tau)Y_1)$$

τ represents the proportion of output lost in a default

Government defaults if

$$Y_1 \leq \frac{b_1}{\tau} \equiv Y_1^{\star}$$

THE COSTS OF DEFAULT

Why are the costs of default important in this model?

- Without them ($\tau = 0$), $q(b_1, Y_0) = 0$ if $b_1 > 0$. Zero debt, zero spreads, and no default in equilibrium
- More generally, literature finds that *size* and *shape* of default costs critical for fitting debt and interest rate spreads in quantitative models of sovereign debt (Arellano, 2008; Aguiar and Gopinath, 2006; Chatterjee and Eyigungor, 2012)

However, hard to measure them in the data

- We observe a default only if $Y_1 \leq Y_1^*$
- Conditional on default, we observe $\tilde{Y}_1 = (1 - \tau)Y_1$

Approach in the literature so far

- Free parameter used to fit debt and interest rate spreads
- Structural models (Mendoza and Yue, 2012; Bocola, 2016; ...)

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INTRODUCING JUDGE GRIESA IN THE MODEL

Look for exogenous variation in the likelihood of a default

- After borrowing and lending at $t = 0$ occurs, shock ε_1 realizes. Government utility in default becomes $U((1-\tau)Y_1 + \varepsilon_1)$. The government defaults at $t = 1$ if

$$Y_1 \leq \frac{b_1}{\tau} + \varepsilon_1 \equiv Y_1^*(\varepsilon_1)$$

- Interest rate spreads at $t = 0$ are then

$$s_0 = M\text{Prob}\left\{ Y_1 \leq Y_1^*(\varepsilon_1) \middle| Y_0, \varepsilon_1 \right\}$$

- The price of a claim on the country's endowment (stock price) is

$$p_0 = M\mathbb{E}[\tilde{Y}_1 | Y_0, \varepsilon_1] = M\left\{ \int_{Y_1^*(\varepsilon_1)}^{\infty} Y_1 f(Y_1|Y_0) dY_1 + \int_0^{Y_1^*(\varepsilon_1)} (1-\tau) Y_1 f(Y_1|Y_0) dY_1 \right\}$$

ELASTICITIES CONDITIONAL ON GRIESA'S SHOCK

Increase in ε_1 increase likelihood of default

- Sovereign spreads increase

$$\frac{\partial s_0}{\partial \varepsilon_1} = f(Y_1^* | Y_0)$$

- Stock prices decline

$$\frac{\partial p_0}{\partial \varepsilon_1} = -\tau Y_1^* f(Y_1^* | Y_0)$$

- Elasticity of stock prices to changes in default probabilities informative about output costs of default

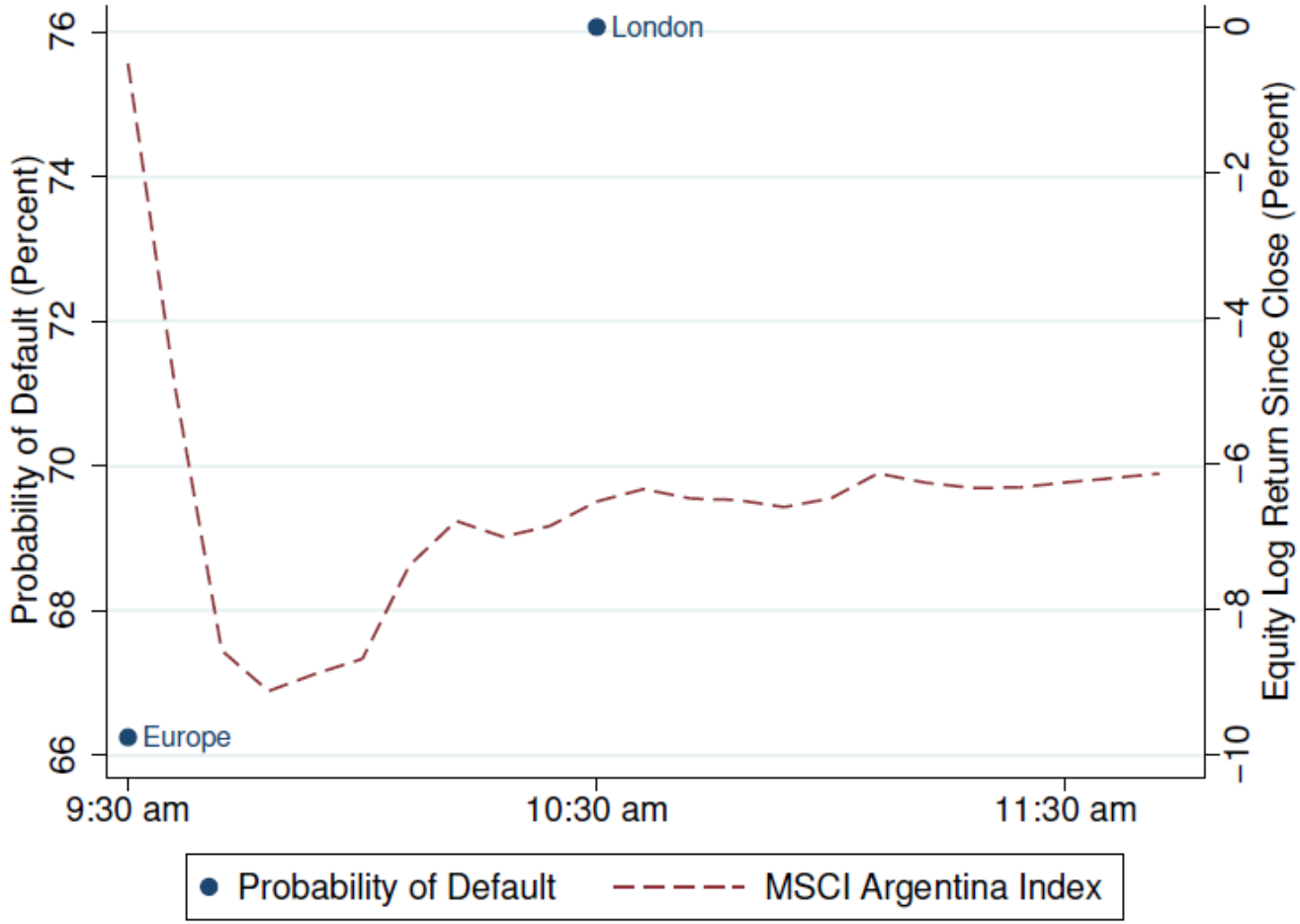
$$\left.\frac{\partial p_0}{\partial s_0}\right|_{\varepsilon_1} = -\tau Y_1^*$$

- Key assumption: ε_1 affects cash-flows only through effect on default

Hébert and Schreger (2016) approach

H&S (2016) measure this elasticity using high frequency variation in stock prices and interest rate spreads around legal rulings in the *NML Capital vs. Argentina* case

Example: June 16, 2014 (U.S. supreme court ruling)



Hébert and Schreger (2016) approach

- More generally, H&S (2016) have 15 events
- They estimate the simultaneous equation model

$$\begin{aligned} \Delta D_t &= \gamma r_t + \kappa_D F_t + \varepsilon_t \\ r_t &= \alpha \Delta D_t + \kappa F_t + \varepsilon_t, \end{aligned}$$

  applying Rigobon and Sachs (2004) methodology (also other approaches)
- The parameter α is the elasticity of interest, ≈ -0.8
- Many robustness checks (the appendix is longer than the actual paper)

WHAT CAN GO WRONG?

Two distinct problems may arise

1. Exclusion restriction fails, and the causal effect of sovereign risk on stock prices is improperly measured
   - Example: rulings against Argentina might increase support toward populist anti-market policies. This might affect cash-flows independently on the likelihood of a default

2. Even if properly measured, the elasticity of stock prices to a pure change in sovereign risk may tell us little about default's costs
   - Example: elasticity might reflect changes in risk premia

$$
\begin{aligned}
s_0 &= \mathbb{E}_0[M_{0,1}]\text{Prob}_0\left\{Y_1 \leq Y_1^*\right\} - \text{Var}_0[M_{0,1}]\text{Var}_0[\delta_1]\text{Corr}_0[M_{0,1}, \delta_1] \\
p_0 &= \mathbb{E}_0[M_{0,1}]\mathbb{E}_0[\tilde{Y}_1] - \text{Var}_0[M_{0,1}]\text{Var}_0[\tilde{Y}_1]\text{Corr}_0[M_{0,1}, \tilde{Y}_1]
\end{aligned}
$$

WHY ARE SOVEREIGN DEFAULTS COSTLY?

Several theories

1. Sovereign defaults may interfere with trade (Bulow and Rogoff, 1989; Mendoza and Yue, 2012)

2. Sovereign defaults harms financial sector (Gennaioli, 2014; Bocola, 2016; . . .)

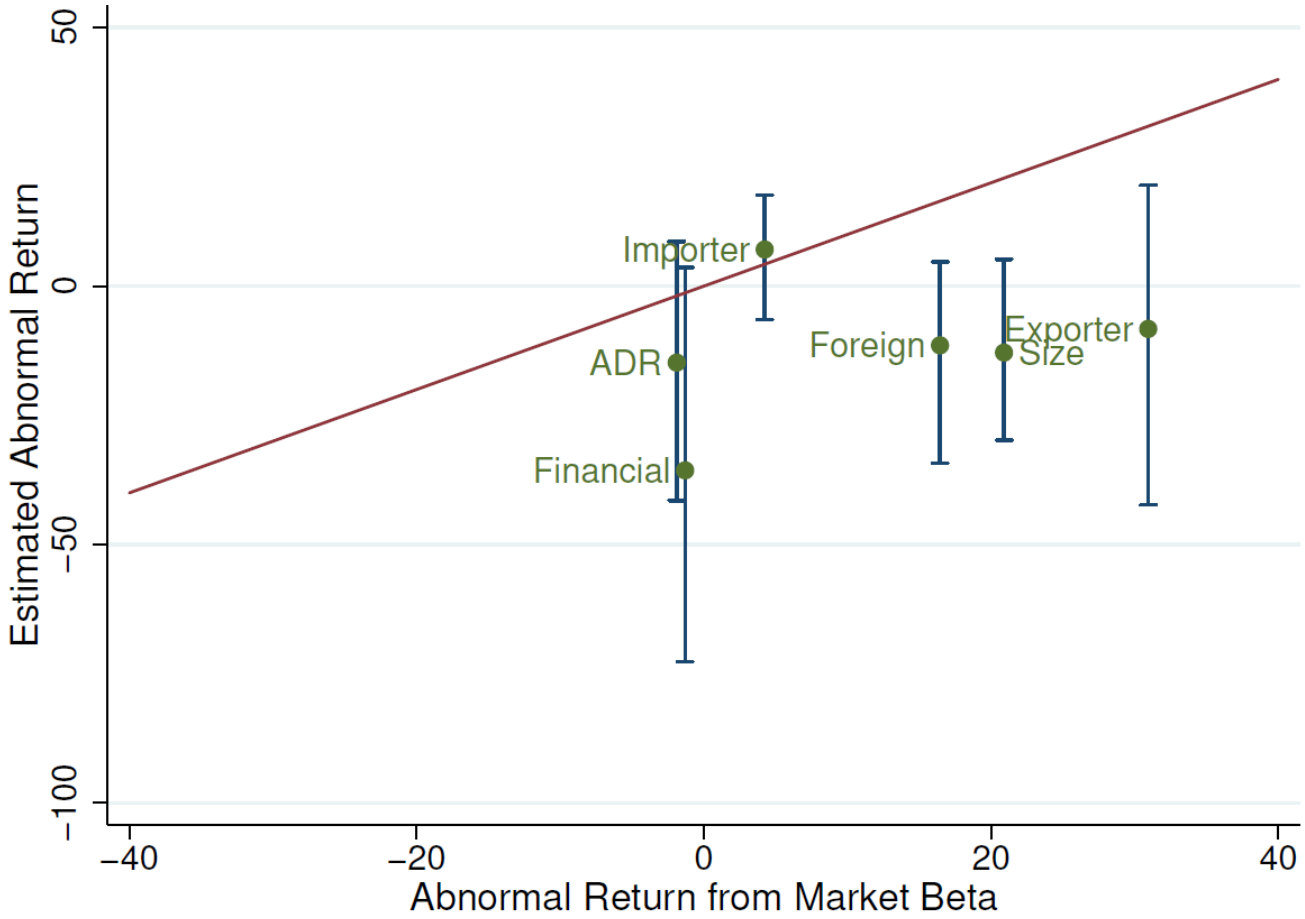
3. Sovereign defaults may lead government to interfere with private contracts (Cole and Kehoe, 1998; Amador et al., 2009; Arellano et al., 2015)

Implications for the exposure of different types of firms to a default

Idea in the paper: which sector responds more to an exogenous increase in sovereign risk? It should be informative about origin of default costs

Cross-Sectional Patterns

Use listed firms in Argentina (only 33 firms included in the analysis)



Market value of foreign-onwed firms, exporters and financial firms more harmed by legal rulings

Conclusion

- Great paper, important contribution
- Evidence that sovereign risk has negative effects on the market value of domestic firms. Need more assumptions to say more
  - Main suggestion is to say something more about exclusion restrictions: can we rule out other stories?
- Practically, it might be difficult to extrapolate to other countries, time periods, etc.
- Some ideas likely to have an impact on the literature
  - Arellano et al. (2016) use a structural model along with firm-level data to measure how costly was debt crisis in Europe