

# The Legal Side of Sovereign Default

Aitor Erce, Enrico Mallucci and Mattia Picarelli<sup>1</sup>

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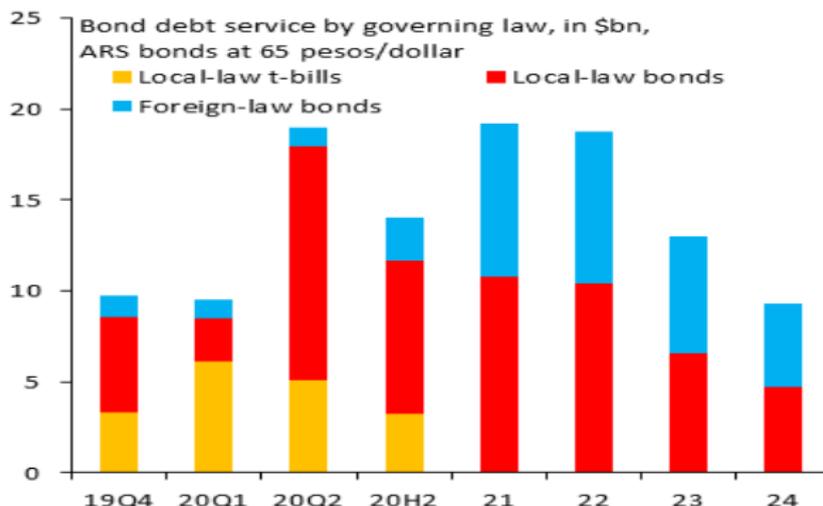
<sup>1</sup>Aitor is with Navarra Public University, Enrico with the Board of Governors of the Federal Reserve System, and Mattia with the European Stability Mechanism.

**Disclaimer:** The views in this paper are solely our own and need not reflect the views of the Board of Governors of the Federal Reserve System or the European Stability Mechanism.

## Focus

- ▶ Domestic sovereign debt is likely to play an important role on the coming wave of defaults (IMF 2020).
  - ▶ Good news: Broader investor base, diminished mismatches
  - ▶ Flip side: Feedback loops and financial stability
- ▶ Understanding the spillovers of domestic and foreign debt restructuring can help design operations that minimize risks to both growth and financial stability
  - ▶ Creditor residence, currency, governing law?
- ▶ Evidence on sovereign restructuring of domestic debt and its consequences is sparse.
- ▶ Against this background, we introduce a new database on domestic sovereign defaults
  - ▶ We code episodes involving instruments governed by local law

## Argentina: bonded-debt repayment profile



Source: Institute of International Finance

- ▶ Governments have different tools depending on the debt's governing law
  - ▶ Local-law instruments may be more easily amended
  - ▶ Are at the heart of the domestic financial system

# Road Map

1. Present empirical regularities about local-law debt restructuring
2. Compare local- and foreign-law debt restructuring
3. Discuss the growth effect of local-law restructuring
4. Discuss the financial stability consequences of domestic debt restructuring
  - ▶ Law, currency and residence

# The Literature

## ▶ Theory

- ▶ Broner et al. (2010, 2013), Mallucci (2015), Mendoza and D'Erasmus (2016), Abad (2019)

## ▶ Empirics

- ▶ Kohlscheen (2009), Jeanneret and Souissi (2016) study local currency default
- ▶ Sturzenegger and Zettelmeyer (2008), Reinhart and Rogoff (2011), Erce (2012) focus on default on resident creditors
- ▶ Chamon et al. (2018) study the price effect of governing law
- ▶ Maggiori et al. (2020) show that local currency and residence are closely linked

## Local law defaults: Database

- ▶ Novel database
- ▶ 67 episodes in 46 countries between 1980-2019
- ▶ Worldwide coverage
- ▶ Different types of instruments
- ▶ Additional information: Volumes, terms, currency denomination and residence of creditors
- ▶ Companion paper details each domestic debt restructuring episode

## Data Sources

- ▶ Starting point: Reports from rating agencies (Moody's and SP), and Reinhart and Rogoff (2011)
- ▶ Additional information obtained from
  - ▶ IMF Article IV reports and program documents
  - ▶ Reports from Development Banks
  - ▶ Parliamentary resolutions
  - ▶ Accounts from Ministries and Central Banks
  - ▶ Books and academic articles
  - ▶ Local and international press

# The geography of local-law debt restructuring

- ▶ 20 episodes in Africa
- ▶ 4 in Asia
- ▶ 13 in Europe
- ▶ 30 in South and Central America

## Local-law debt restructuring overtime: 1980-2019

Decade	Number of events
1980 – 1990	11
1990 – 2000	25
2000 – 2010	21
2000 – 2019	10
Total	67

## Local-law debt restructurings involve different types of instruments

1980-2019	Bonds	Bank Loans	Deposits
Obs.	45	26	17
Pct. in which included	67%	39%	25%

- ▶ We identified additional 25 episodes of default and arrears accumulation vis-a-vis non-financial resident sectors
  - ▶ This type of default, often structural, I wont considered today
  - ▶ Cristina Checherita et al. have done some terrific work on the implications of the payment performance of the public sector

## Selective Defaults Are The Norm

1980-2014	Local law	Foreign law	Non-Selective
Obs.	34	145	33

- ▶ Foreign law defaults from Asonuma & Trebesch: 178 defaults in 70 countries between 1978-2019
- ▶ Episodes involving bonds and/or bank loans

## The Cost of Selective Default - Panel Approach

We estimate the following panel regressions

$$\Delta y_{it} = \gamma_0 + \gamma_1 D_{i,t-1}^L + \gamma_2 D_{i,t-1}^F + \gamma_4 X_{i,t-1} + \epsilon_{i,t}$$

- ▶  $y_{it}$ : GDP growth, credit to the private sector, and trade
- ▶  $D_{i,t-1}^L, D_{i,t-1}^F$ : debt restructuring dummies
- ▶  $X_{i,t-1}$ : Control variables

## The Cost of Selective Default - Panel results

	GDP growth	Net imports	$\Delta$ Private credit
Foreign Default (t-1)	-1.86*** (0.53)	-2.10* (1.19)	-1.37* (0.77)
Local Law Default (t-1)	-2.13** (0.89)	-1.57 (1.44)	-3.33** (1.37)
Fed Funds rate (t-1)	0.03 (0.13)	0.47** (0.23)	-0.04 (0.09)
Real GDP growth (t-1)	0.18*** (0.04)	0.12** (0.05)	0.07*** (0.02)
Bank crisis (t-1)	-2.80** (1.09)	-2.06** (0.81)	0.85 (1.87)
Private sector credit (t-1)	-0.03*** (0.01)	0.02 (0.03)	-0.12*** (0.04)
Observations	1758	1655	1656
Country Fixed-Effects	Yes	Yes	Yes
Time Fixed-Effects	Yes	Yes	Yes

- ▶ Growth declines after defaults
- ▶ Credit drops more following defaults that involve local law debt

## The Cost of Default - Local Projections

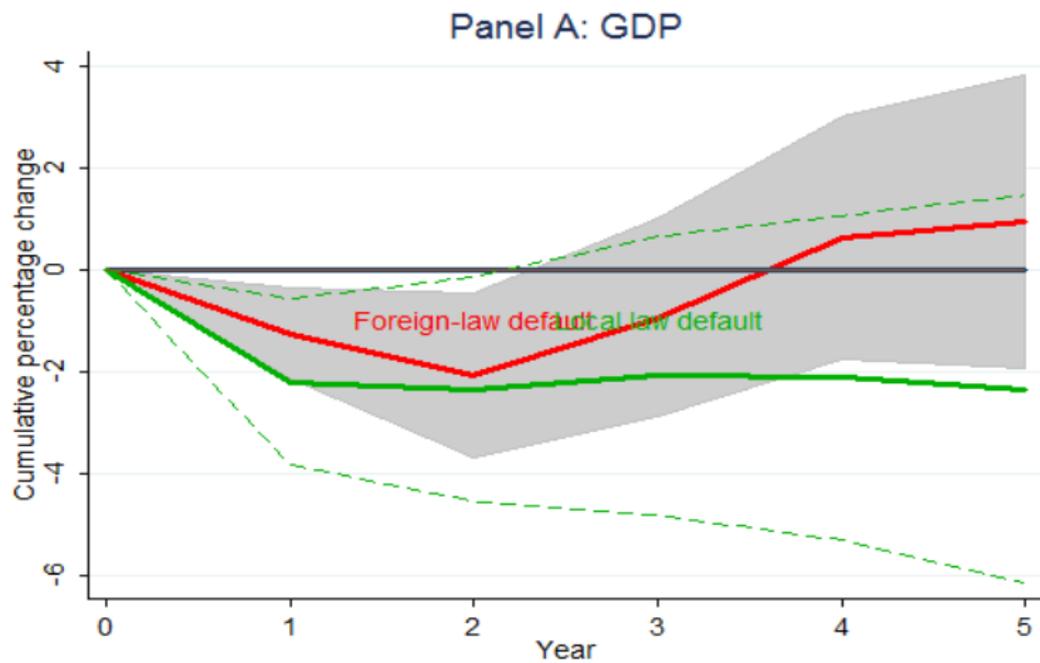
We estimate local projections as follows:

$$g_{i,t+h} = \alpha_i^h + \beta^{L,h} D_{i,t-1}^L + \beta^{F,h} D_{i,t-1}^F + \lambda^h X_{i,t-1} + \epsilon_{i,t+h},$$

for  $h = 1, 2, \dots, 5$

where  $g_{i,t+h}$  is the cumulative percentage GDP growth from time  $t$  to  $t+h$  in country  $i$ .  $X_{i,t-1}$  includes the same variables as in Asonuma et al. (2019). Dummy variable  $D_{i,t}^L$  ( $D_{i,t}^F$ ) takes unity if there is a local-law (foreign-law) debt restructuring at year  $t$  in country  $i$ ; and  $\epsilon_{i,t+h}$  is the error term. We also include fixed effects,  $\alpha_i^h$ .

## The Cost of Defaults - OLS IRFs



## Default “Drivers”

- ▶ What factors explain the observed default patterns?
- ▶ Logit Model:

$$P(D_{i,t}^k = 1) = \Phi(\beta X_{i,t-1}) + \epsilon_{i,t}$$

- ▶  $P(D_{i,t}^k = 1)$ : probability that a default of type  $k$  occurs at time  $t$
- ▶  $X_{i,t-1}$  set of explanatory variables

## Default “Drivers”

	Foreign-law	Local-law
Real GDP growth (t-1)	-0.034 (0.042)	-0.065* (0.037)
Fed Funds rate (t-1)	0.268*** (0.089)	0.079 (0.089)
Bank crisis (t-1)	-0.443 (1.095)	-0.271 (1.065)
Private sector credit (t-1)	0.016*** (0.005)	0.003 (0.007)
External debt (t-1)	0.266 (0.373)	-0.002 (0.405)
Oil price (t-1)	0.001 (0.009)	-0.012 (0.009)
Observations	1195	1195

Standard errors in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

- ▶ Countries that grow less default more in local-law, and those with larger credit markets do so less

## Augmented Inverse Probability Weighting

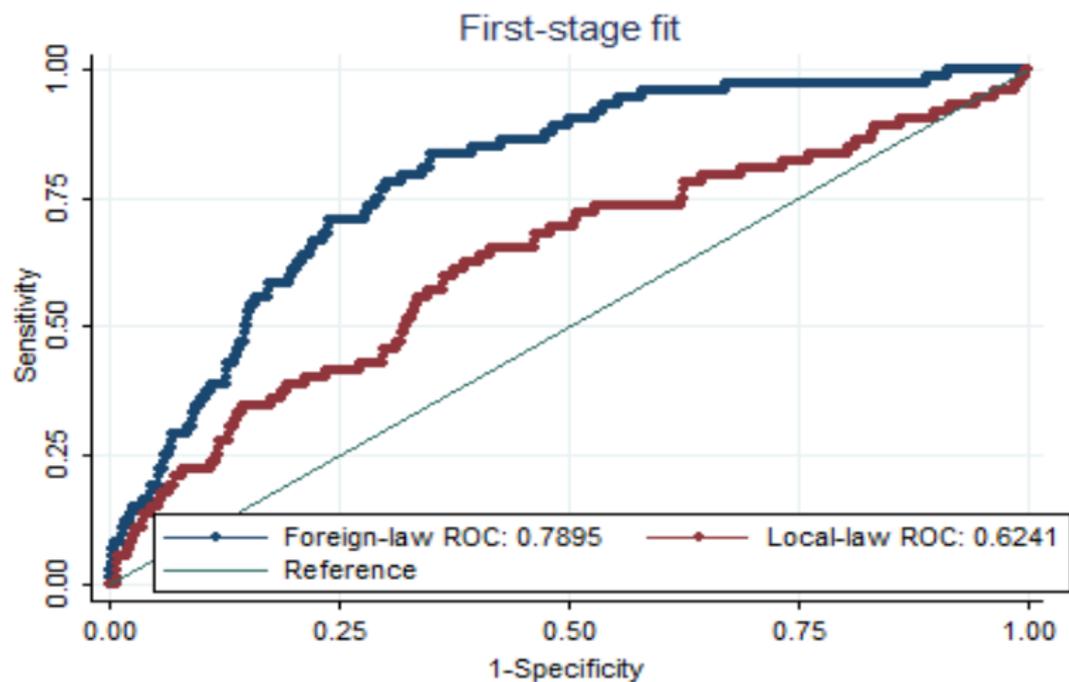
To mitigate selection biases, we re-weight the observations with the inverse of the estimated propensity scores obtained as follows

$$P(D_{i,t}^k = 1) = \Phi(\beta Z_{i,t-1}) + \epsilon_{i,t}$$

$P(D_{i,t}^k)$  stands for the probability that a type  $k$  restructuring occurs in country  $i$  in year  $t$ ;  $Z_{i,t-1}$  is a vector of predictors of restructuring events which, in addition to the variables shown before include the VIX index, a natural disaster dummy and a serial default dummy.

Under this scheme, observations less likely associated with a restructuring receive a greater weight

## ROC Curves



## Average Treatment Effects

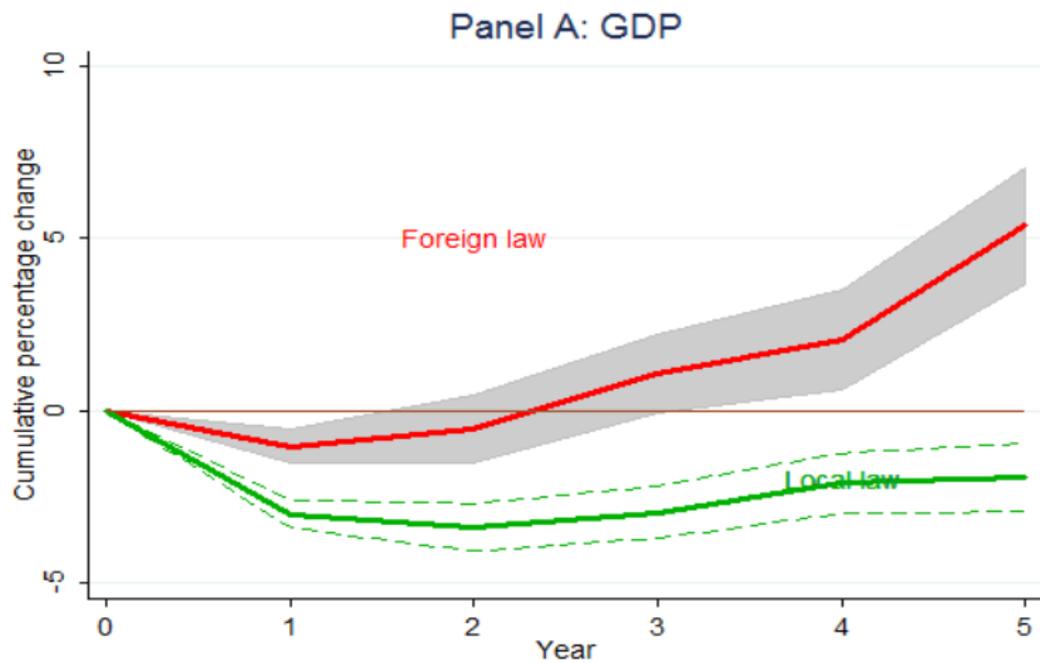
Using AIPW, we compute the average treatment effect on cumulative GDP growth  $h$ -years ahead as follows

$$ATE(\beta^{R,h}) = \frac{1}{N_R} \sum_i \sum_t \frac{\widehat{g}_{i,t+h}^R D_{i,t-1}^R}{\widehat{Pr}(R)_{i,t-1}} -$$
$$\frac{1}{N_{Non-R}} \sum_i \sum_t \frac{\widehat{g}_{i,t+h}^R (1 - D_{i,t-1}^R)}{1 - \widehat{Pr}(R)_{i,t-1}}$$

for  $R = L, F$  and  $h = 1, 2, \dots, 5$

where  $N_R$  indicates the number of type  $R$  restructurings,  $N_{Non-R}$  the number of remaining observations. The estimated probability of type  $R$  restructuring is denoted by  $\widehat{Pr}(R)_{i,t}$ .

## The Cost of Defaults - IRFs



## Financial instability and sovereign default

- ▶ Do local and foreign-law defaults affect financial stability differently?
- ▶ Logit model of the likelihood of a bank crisis (LV data):

$$P(B_{i,t} = 1) = \Phi(\beta \cdot Z_{i,t-1}) + \epsilon_{i,t}$$

- ▶  $P(B_{i,t} = 1)$ : probability that a bank crisis occurs at time  $t$
- ▶  $Z_{i,t-1}$  set of explanatory variables, including different indicators of sovereign default dummies

## Foreign- and Local-law Defaults and Bank Crises

	Probit	Logit	Logit	Logit	Logit	With large banks
Foreign Default	0.07 (0.21)	0.15 (0.48)	0.25 (0.49)	-0.05 (0.49)	-0.87 (1.05)	-0.56 (1.12)
Local Law Default	0.44 (0.30)	0.96 (0.62)	0.95 (0.63)	1.17* (0.63)	1.20* (0.65)	2.10*** (0.75)
Real GDP growth (t-1)			0.01 (0.03)	0.02 (0.03)	0.01 (0.04)	0.05 (0.05)
Fed Funds rate (t-1)				0.12*** (0.03)	0.20** (0.08)	0.12 (0.11)
Oil price					-0.01 (0.01)	-0.01 (0.01)
Vix Index					0.00 (0.03)	0.07* (0.04)
Constant	-1.94*** (0.05)	-3.62*** (0.13)	-3.64*** (0.17)	-4.31*** (0.25)	-4.11*** (0.69)	-5.32*** (0.92)
Observations	2513	2513	2338	2338	1730	865

Bank crises are more likely following local-law default than foreign-law default

## Is it the law?

- ▶ Most of the literature operates under the assumption of a so-called “triple coincidence”: currency, residence and law assumed to match
- ▶ What does the data say? Using Reinhart’s (residence) and SP (currency) datasets we obtain the following correlations:

Correlation	Local law	Local currency	Domestic Residents
Local law	1		
Local currency	0.58	1	
Domestic Residents	0.73	0.79	1

## Triple coincidence across domestic default datasets

Type of default (-2,2)	total	Local law	Local currency	Domestic Residents	Triple coincidence
Local law	67	67	45	62	43
Local currency	63	45	63	58	
Domestic Residents	81	63	58	81	

## Defaults and Bank Crises: Is it the law?

	Currency All	Currency Large banks	Residency All	Residency Large banks	Triple All	Triple Large banks
Foreign Default	-0.83 (1.05)	-0.51 (1.13)	-0.87 (1.05)	-0.64 (1.15)	-0.82 (1.05)	-0.58 (1.15)
Local Law Default	1.56* (0.94)	2.31** (1.17)	1.19 (0.87)	1.85* (1.02)	1.47 (0.99)	2.15* (1.21)
Real GDP growth (t-1)	0.01 (0.04)	0.05 (0.05)	0.01 (0.04)	0.05 (0.05)	0.01 (0.04)	0.05 (0.05)
Fed Funds rate (t-1)	0.20** (0.08)	0.12 (0.11)	0.20** (0.08)	0.11 (0.11)	0.20** (0.08)	0.12 (0.11)
Oil price (t-1)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Vix Index	0.00 (0.03)	0.07* (0.04)	0.00 (0.03)	0.08* (0.04)	0.00 (0.03)	0.07* (0.04)
Domestic Residents Default	-0.56 (1.14)	-0.33 (1.39)			-0.76 (1.31)	-0.67 (1.56)
Local Currency Default			0.02 (1.06)	0.46 (1.24)	0.39 (1.27)	0.72 (1.38)
Constant	-4.08*** (0.69)	-5.32*** (0.92)	-4.11*** (0.69)	-5.33*** (0.92)	-4.09*** (0.69)	-5.34*** (0.93)
Observations	1730	865	1730	865	1730	865

## Implications for Theory and Policy

- ▶ Sovereign defaults on local-law debt are recurrent and macroeconomically relevant
- ▶ Selective defaults are the norm (yes, they are!)
- ▶ Both local and foreign law defaults affect output, but have different ways to spread:
  - ▶ Foreign capital vs. domestic credit?
  - ▶ Local law default is more likely to accompany financial instability
- ▶ Our results inform policy makers (many will be involved in the coming wave of sovereign debt restructuring) in the need to design debt restructuring operations while minimizing their growth and financial stability implications.