The Aftermath of Sovereign Debt Crises: A Narrative Approach

Jason Lennard
LSE

Rui Esteves
Graduate Institute Geneva

Seán Kenny
Lund

Introduction

- What are the macroeconomic effects of sovereign debt crises?
- Previous estimates
  - A wide range of roughly 0 to -10% of economic activity
- Previous research designs
  - OLS, GMM, IPWRA, natural experiments
- Our paper is based on a sample of 50 economies between 1870 and 2010 and narrative identification

The Identification Problem

- Crises not only affect, but are affected by, the economy:

$$y_{it} = \beta CRISIS_{it} + e_{it} \tag{1}$$

$$CRISIS_{it} = \lambda y_{it} + z_{it} \tag{2}$$

- Therefore, there is a correlation between $CRISIS_{it}$ and e_{it} that violates the Gauss-Markov assumption of zero conditional mean: $\text{Cov}\left(e_{it}, CRISIS_{it}\right) = 0$
- The bias is given by:

$$\hat{\beta} = \beta + \frac{\text{Cov}\left(CRISIS_{it}, e_{it}\right)}{\text{Var}\left(CRISIS_{it}\right)}$$

Narrative Identification

> *Narrative methods involve constructing a series from historical documents to identify the reason and/or the quantities associated with a particular change in a variable*
>
> (Ramey, 2016)

- The approach was pioneered by Friedman and Schwartz (1963)
- Coined by Romer and Romer (1989)

Narrative Identification

Used to identify the macroeconomic effects of:

- Monetary policy
  - Romer and Romer (1989, 2004), Cloyne and Hürtgen (2016), Lennard (2018)
- Fiscal policy
  - Ramey and Shapiro (1998), Romer and Romer (2010, 2016), Ramey (2011), Cloyne (2013), Crafts and Mills (2013, 2015), Hayo and Uhl (2014), Gujarado et al. (2014), Alesina et al. (2015, 2018), Ramey and Zubairy (2018), Cloyne et al. (2018), Hussain and Liu (2018, 2019), Gil et al. (2019), Carrière-Swallow et al. (forthcoming)
- Banking crises
  - Jalil (2015), Kenny, Lennard and Turner (2020)
- Oil
  - Hamilton (1985)
- Credit
  - Fieldhouse et al. (2018)

A Classification of Sovereign Debt Crises

Classification
Endogenous (N)
Aggregate demand shocks (AD)
Aggregate supply shocks (AS)
Exogenous (X)
Centrally orchestrated moratoria (CM)
Contagion (C)
Legal (L)
Political (P)
Terms of trade (T)
Unclassified (U)

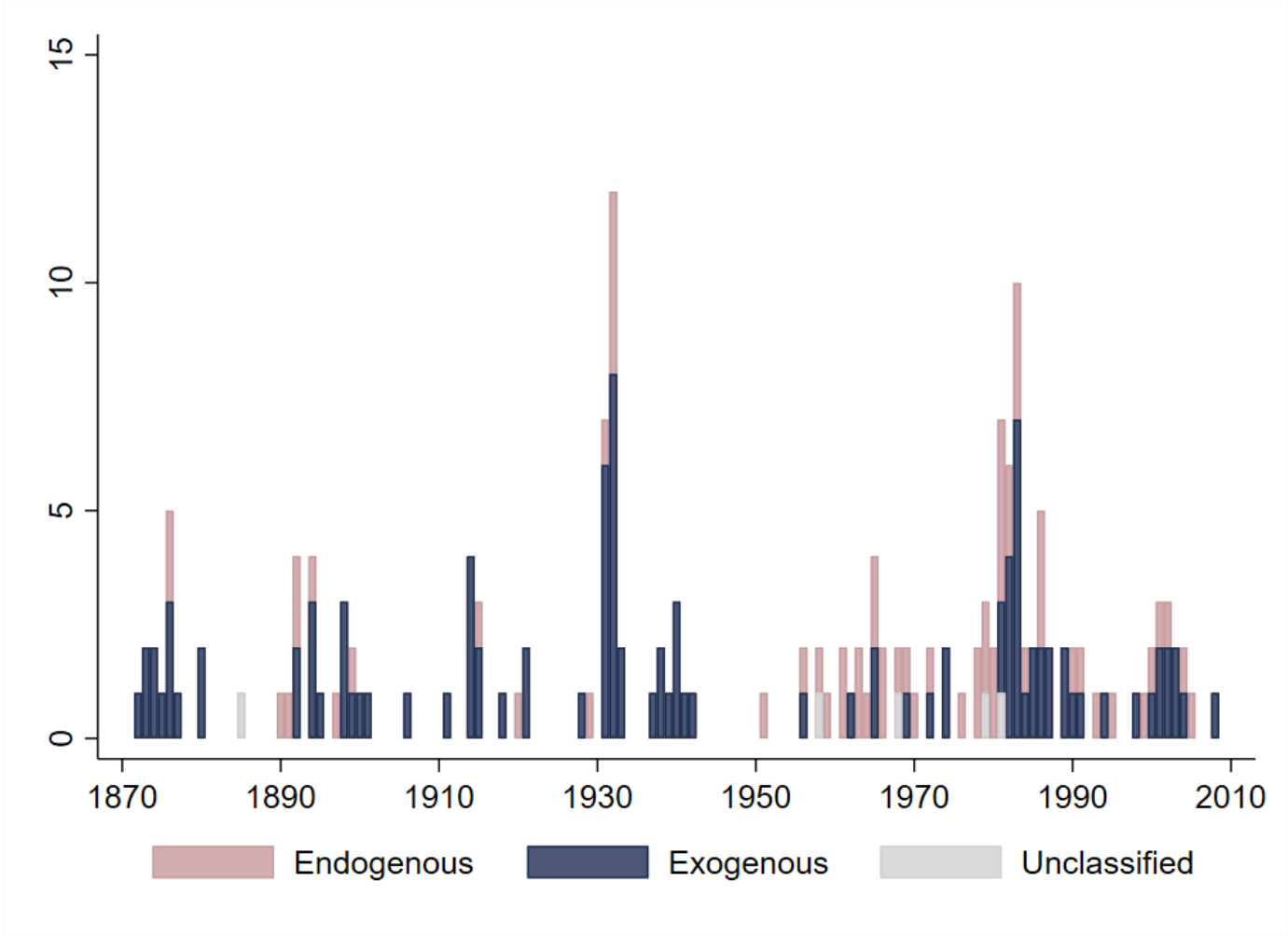
Notes: This table presents a classification of sovereign debt crises.

Sources

Contemporary reports from:

- Creditor organisations, such as the Corporation of Foreign Bondholders and Foreign Bondholders Protective Council
- Financial newspapers, such as the *Economist* and the *Financial Times*

A Decomposition of Sovereign Debt Crises



Notes: This figure shows a decomposition of sovereign debt crises into endogenous, exogenous and unclassified categories for 50 defaulting countries between 1870 and 2010.
Source: Appendix A and Reinhart and Rogoff (2011).

The Causes of Sovereign Debt Crises

	1870-1945	1946-2010	1870-2010
Endogenous (*N*)	21.3	47.9	35.6
Aggregate demand (*AD*)	12.5	10.1	11.2
Aggregate supply (*AS*)	8.8	37.8	24.4
Exogenous (*X*)	77.5	47.9	61.5
Centrally orchestrated moratoria (*CM*)	1.9	2.1	2.0
Contagion (*C*)	1.9	5.9	4.0
Legal (*L*)	3.5	0	1.6
Political (*P*)	46.7	21.3	33.0
Terms of trade (*T*)	23.5	18.6	20.9
Unclassified (*U*)	1.3	4.3	2.9

Notes: This table summarizes the causes of sovereign debt crises in a sample of 50 defaulting countries between 1870 and 2010.
Source: Appendix A and Reinhart and Rogoff (2011).

Endogenous Crises

Uruguay, 1876:

> *The facts of numerous failures including that of one of the principal banks [...] show a state of crises so severe that nothing more need be said. Perhaps no commercial community has ever passed through a worse crisis than that of Uruguay during the last few months*

(*Economist*, 15 May 1875)

Ghana, 1970:

> *Ghana's special difficulties arise largely from the extravagances of the Nkrumah period. The problem is that credits were given to Ghana in the expectation that they would accelerate the pace of growth. This growth has not materialised*

(*Economist*, 4 July 1970)

Exogenous Crises

Brazil, 1937:

> *It was reported from Rio di Janeiro last night that Dr. Getulio Vargas, who made himself dictator on Wednesday, intends to remain in power until 10th of November, 1943*
>
> (*Financial Times*, 13 November 1937)
>
> *No sufficient economic justification for a suspension of existing payments*
>
> (*Financial Times*, 17 November 1937)

Zimbabwe, 1965:

> *Mr Smith will not honour debts of £108 million citing Prime Minister Wilson's 'misappropriation of our bank reserves' as justification for his retaliation*
>
> (*Economist*, 9 December 1965)

Predicting Crises

	Endogenous	Exogenous
Real GDP growth		
Lag		
1	-8.25 (2.71)	-2.31 (1.92)
2	-4.12 (2.90)	1.31 (2.29)
3	0.82 (2.07)	2.72 (2.34)
Inflation		
Lag		
1	1.80 (0.51)	-0.07 (0.42)
2	0.11 (0.57)	0.07 (0.48)
3	-0.77 (0.52)	-0.39 (0.45)
F-statistic	32.95	4.49
N	2,694	4,013

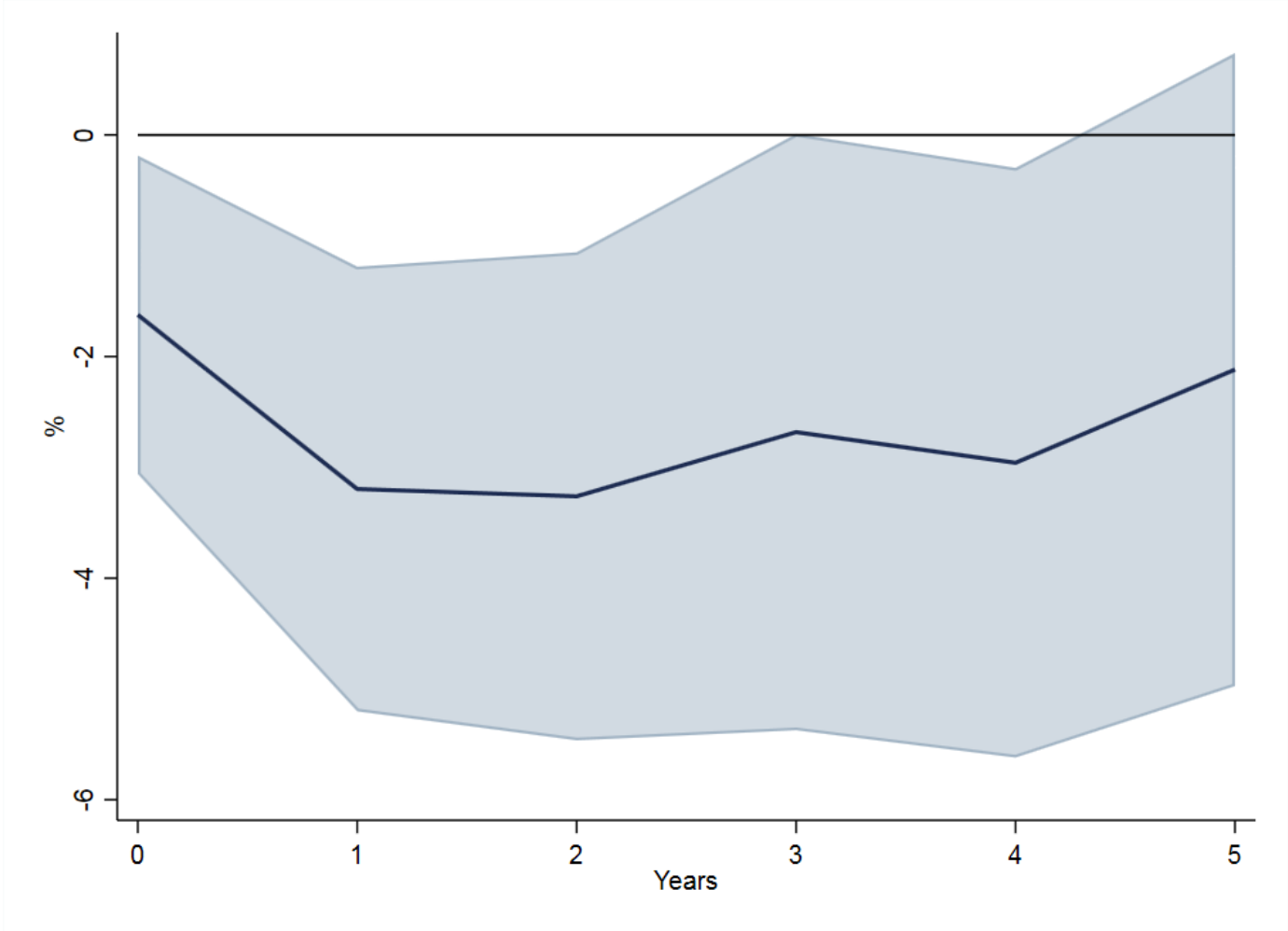
Notes: This table shows the results of a logit model of endogenous or exogenous defaults for 50 defaulting countries between 1870 and 2010 based on estimation of equation (7). Standard errors are in parentheses.

The Macroeconomic Effects of Sovereign Debt Crises

$$y_{it+h} = \alpha_{ih} + \gamma_{th} + \beta_h CRISIS_{it} + \theta_h W_{it} + e_{it+h}$$

- The subscripts i, t and h index countries, time and horizon, respectively
- y_{it+h} is the natural logarithm of real GDP
- $CRISIS_{it}$ is a dummy that equals 1 in the first year of default and 0 otherwise
- The αs and γs are country and time fixed effects
- W is a vector of control variables (contagion, debt-GDP, policy scores, terms of trade, wars)
- We estimate the equation using 2SLS, where $CRISIS_{it}$ is instrumented using the new series of exogenous defaults, z_{it}

The Effect of Sovereign Default on Real GDP



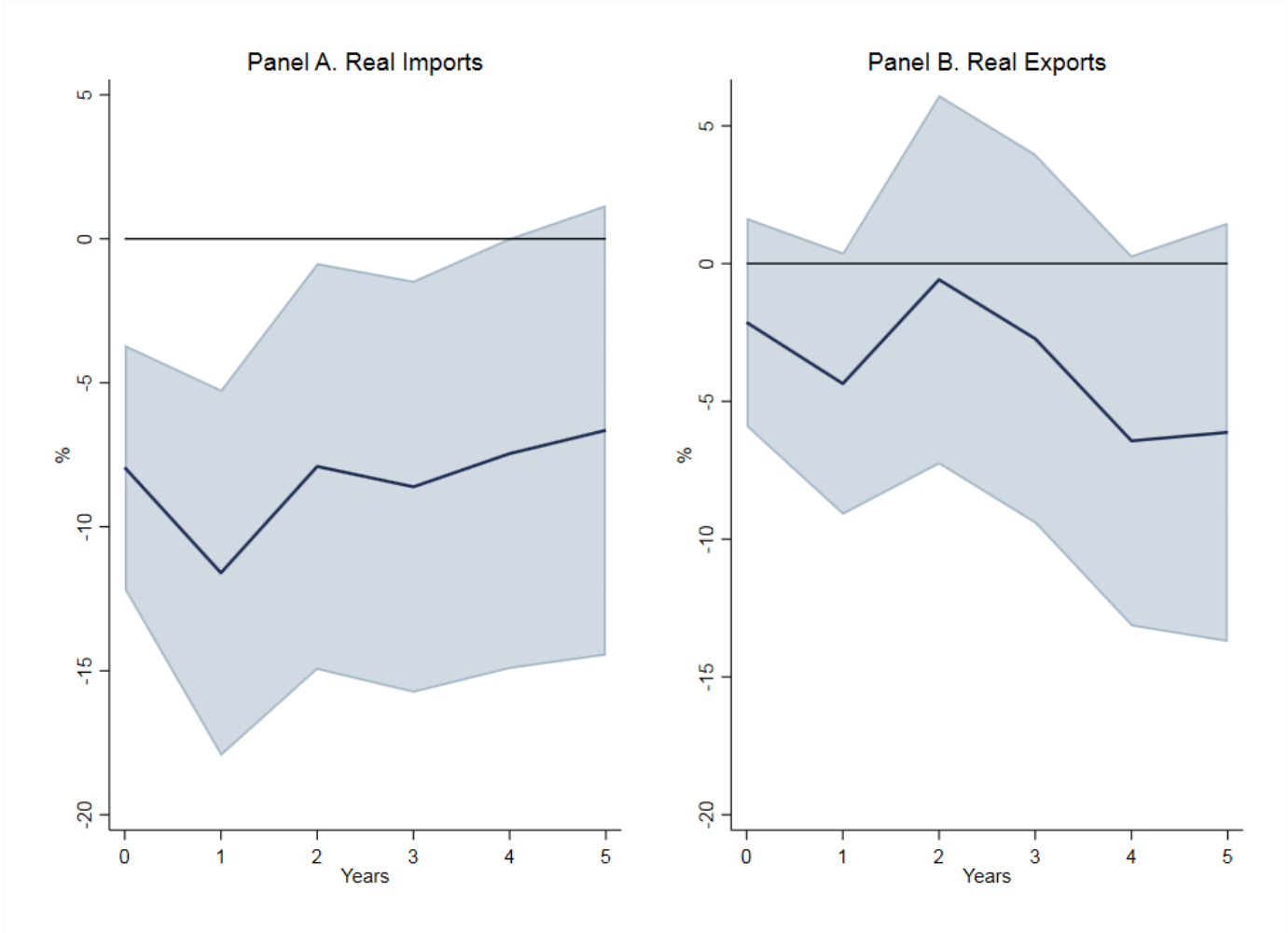
Notes: This figure shows the response of real GDP to sovereign default based on 2SLS estimation of equation (5) and a sample of 50 defaulting countries between 1870 and 2010. The shaded area spans the 90% confidence interval based on robust standard errors.

Comparison to the Literature

Source	Short-run	Medium-run
Esteves et al. (2021)	**-1.6**	**-3.3 (2 years) to 0 (5 years)**
Levy-Yeyati and Panizza (2011)	0	0
Borensztein and Panizza (2008)	-2.6	0
Tomz and Wright (2007)		-1.5
Kuvshinov and Zimmermann (2019)	-3	-4.4 (5 years) to 0 (thereafter)
Reinhart and Rogoff (2011)	-3	-5
Furceri and Zdzienicka (2012)	-6	-10

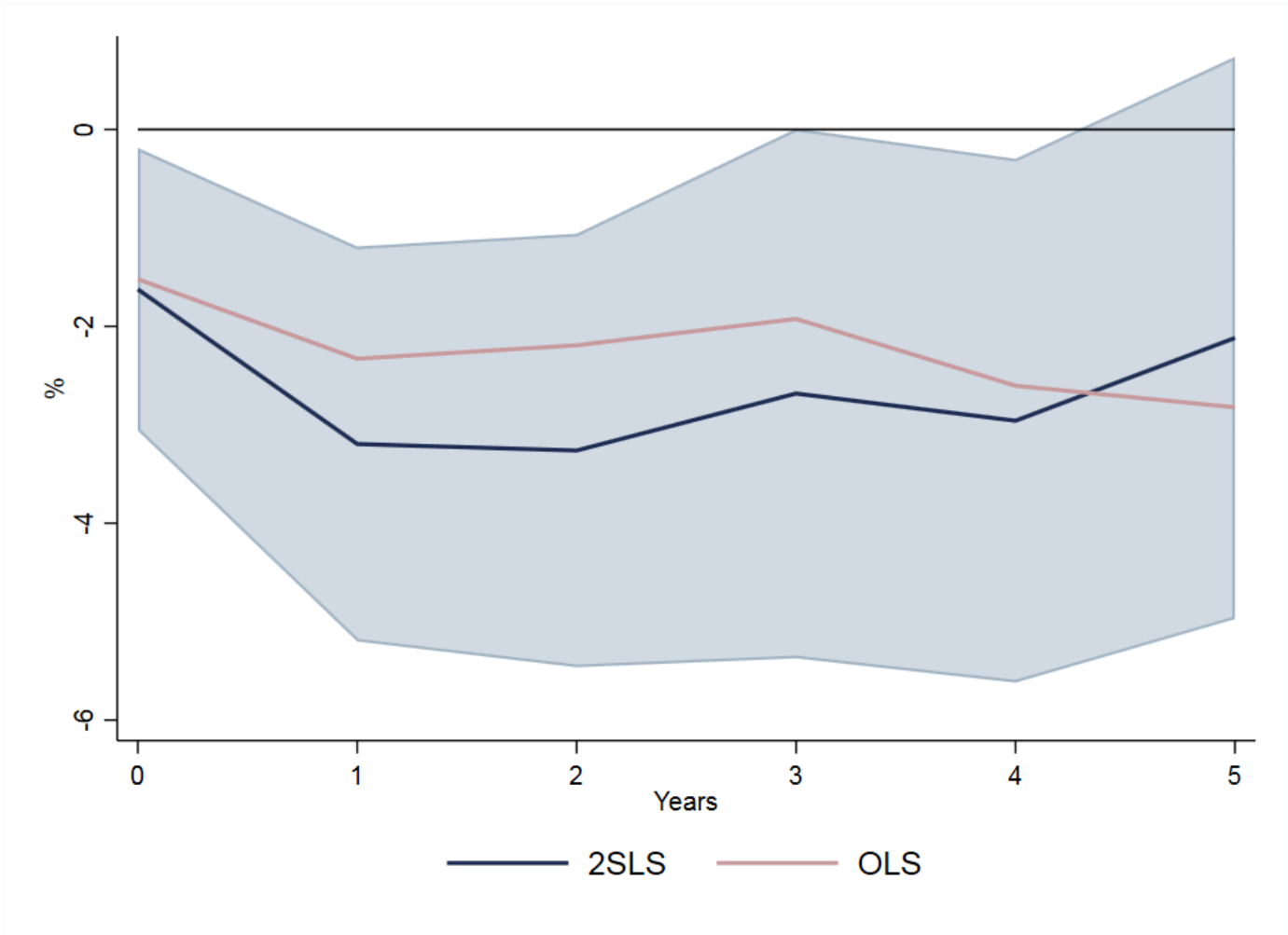
Notes: This table compares the response of real GDP to sovereign default in a sample of previous studies.

The Effect of Sovereign Default on International Trade



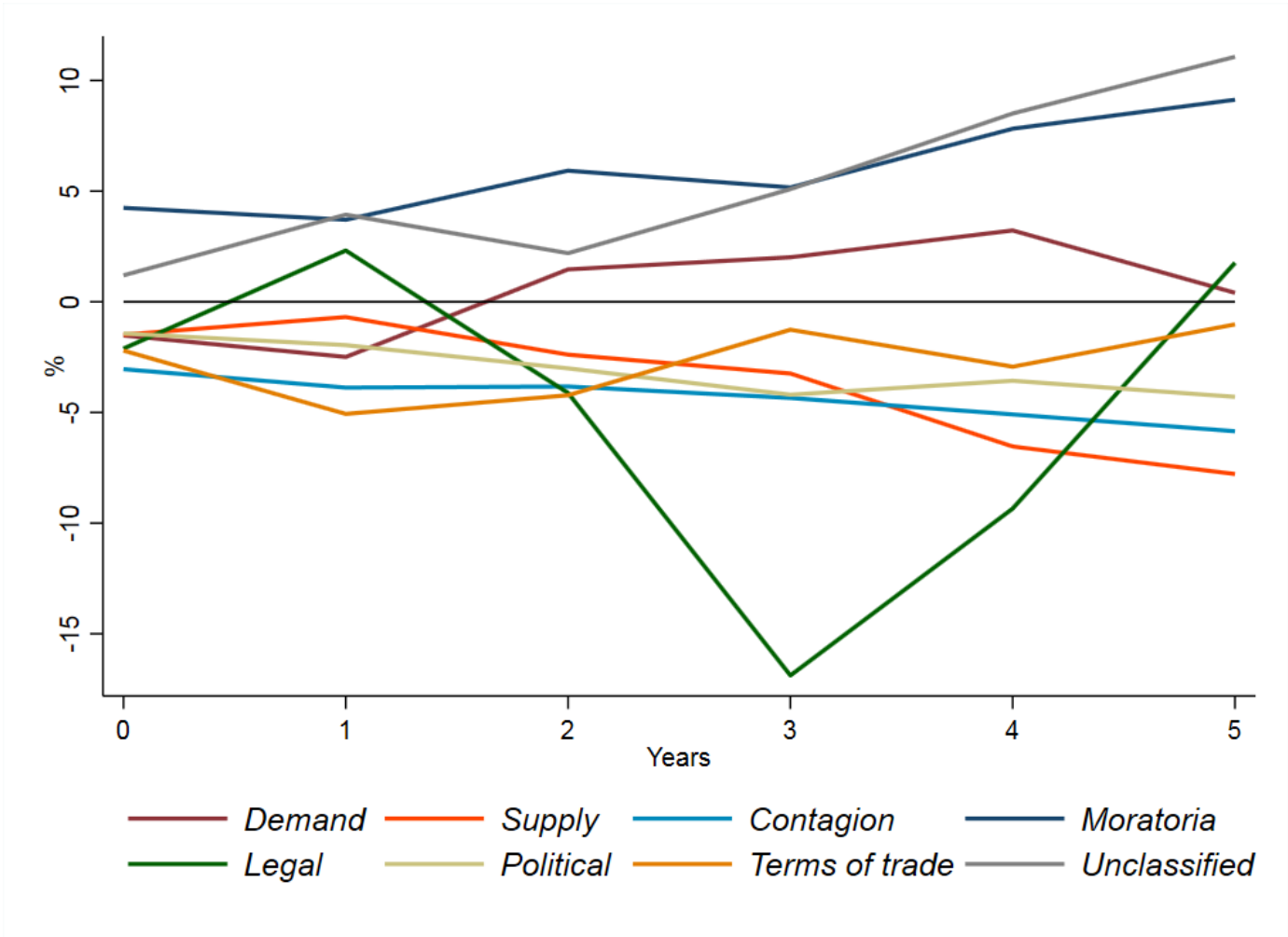
Notes: This figure shows the response of real imports and exports to sovereign default based on 2SLS estimation of equation (5) and a sample of 50 defaulting countries between 1870 and 2010. The shaded areas span the 90% confidence interval based on robust standard errors.

The Effect of Sovereign Default on Real GDP: 2SLS versus OLS



Notes: This figure shows the response of real GDP to sovereign default based on estimation of equation (5) and a sample of 50 defaulting countries between 1870 and 2010. The navy line is the 2SLS estimates. The pink line is the OLS estimates. The shaded area spans the 90% confidence interval based on the baseline model and robust standard errors.

The Effect of Sovereign Default on Real GDP: Heterogeneity



Notes: This figure shows the response of real GDP to sovereign default by cause based on OLS estimation of equation (8) and a sample of 50 defaulting countries between 1870 and 2010.

Decomposing OLS Estimates of β_h

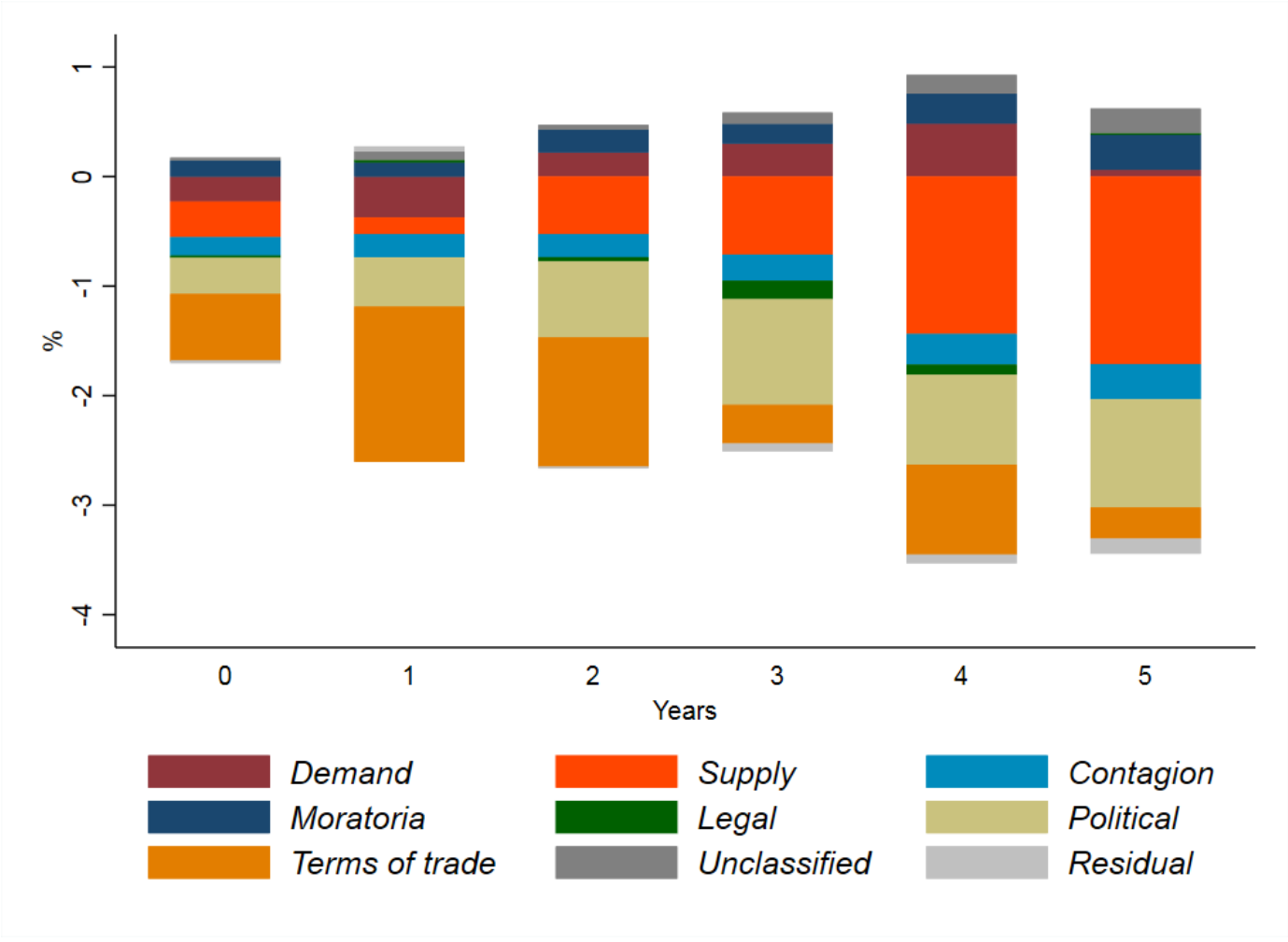
- We can decompose the OLS estimates of β_h as a weighted-average of the cause-specific effects:

$$\beta_h = B_{1h}\frac{\overline{AD}_{it}}{\overline{CRISIS}_{it}} + B_{2h}\frac{\overline{AS}_{it}}{\overline{CRISIS}_{it}} + B_{3h}\frac{\overline{C}_{it}}{\overline{CRISIS}_{it}} + B_{4h}\frac{\overline{CM}_{it}}{\overline{CRISIS}_{it}}$$

$$+B_{5h}\frac{\overline{L}_{it}}{\overline{CRISIS}_{it}} + B_{6h}\frac{\overline{P}_{it}}{\overline{CRISIS}_{it}} + B_{7h}\frac{\overline{T}_{it}}{\overline{CRISIS}_{it}} + B_{8h}\frac{\overline{U}_{it}}{\overline{CRISIS}_{it}} + \vartheta_h$$

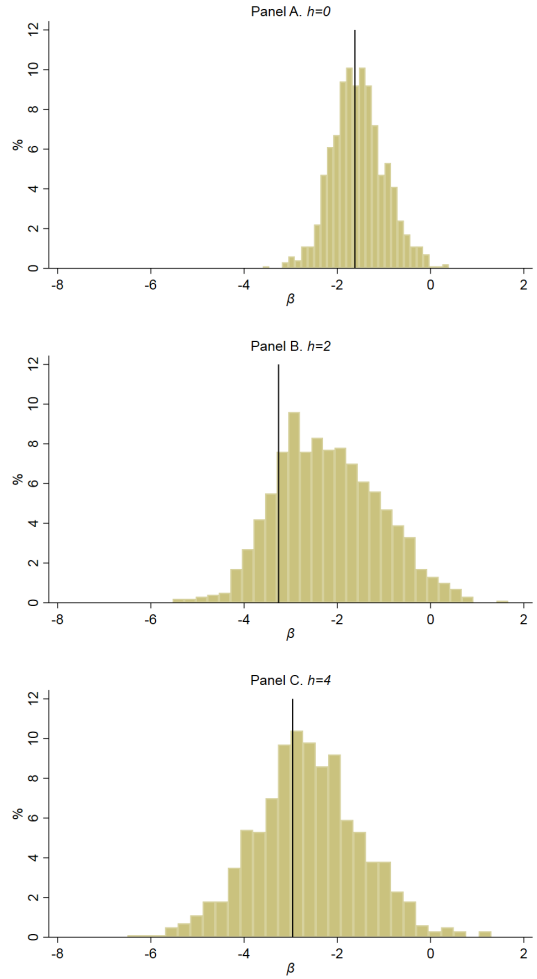
- Where the weights are the cause-specific contribution to the frequency of all-cause default

Decomposing OLS Estimates of β_h



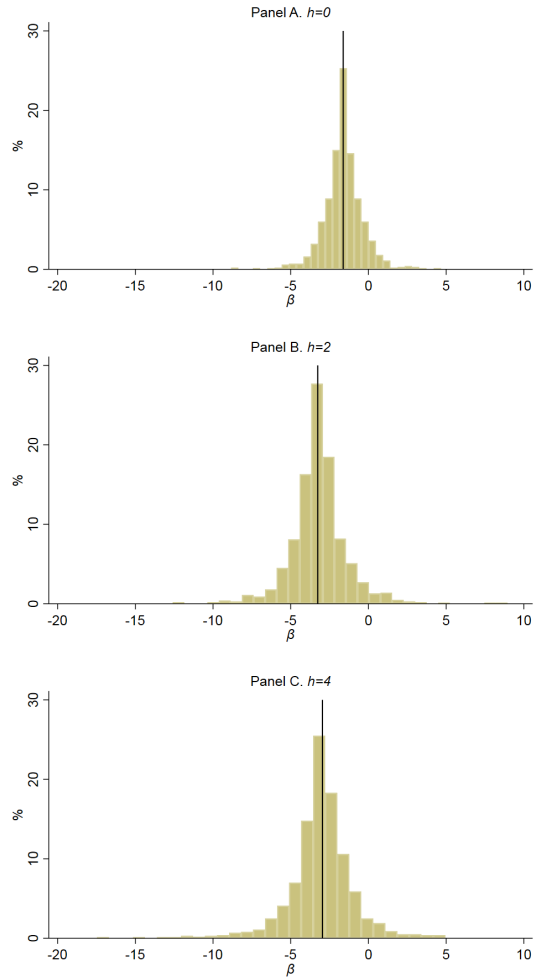
Notes: This figure shows a decomposition of the OLS estimates of β_h by cause based on equations (5), (8) and (9) and a sample of 50 defaulting countries between 1870 and 2010.

The Distribution of β: Two-way Reclassification



Notes: This figure shows the distribution of β from 1,000 runs, where z_{it} is randomly reclassified from endogenous to exogenous or from exogenous to endogenous, based on 2SLS estimation of equation (5) and a sample of 50 defaulting countries between 1870 and 2010. The black line is the baseline estimate.

The Distribution of β: One-way Reclassification



Notes: This figure shows the distribution of β from 1,000 runs, where z_{it} is randomly reclassified from exogenous to endogenous, based on 2SLS estimation of equation (5) and a sample of 50 defaulting countries between 1870 and 2010. The black line is the baseline estimate.

Other Robustness Exercises

- Alternative samples
  - 1970-2010
  - Excluding outlying observations
  - Excluding outlying countries (Chile, Greece and Nicaragua)
  - Excluding outlying periods (World Wars and Great Depression)
- Alternative chronologies
  - Reinhart and Rogoff (2011): alternative timing
  - Lindert and Morton (1989)
  - Purcell and Kaufman (1993)
  - Reinhart and Rogoff (2009)
  - Suter (1992)
- Alternative control variables
  - No controls
  - 2 lags
  - Different measures of contagion
  - Controlling for other economic crises

Conclusions

- Our narrative approach nests existing identification strategies as special cases, such as focusing on centrally orchestrated moratoria and court rulings
- Sovereign defaults matter
- Heterogeneity a bigger empirical issue than endogeneity