

Official Lending in Sovereign Crises

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Motivation

- Official lending is prevalent in emerging markets
 - during crises and defaults → crisis lending
 - outside crises → development lending
- Official lenders have different roles. IMF especially prominent as EM crisis lender
 - countercyclical lending
 - often present in default episodes, affects outcomes
 - assistance comes with terms and conditions
- Understanding how IMF operates key for modelling sovereign borrowing and default

What we do

- Document stylized facts about IMF interventions
 - measure IMF involvement via exposure
 - IMF spells with/without debt restructurings (DRs)
 - DRs with/without IMF spells
 - official debt cyclicalities and seniority
 - Build a quantitative sovereign default model with
 - endogenous restructuring
 - official lending in and out of default
 - a value function for the official lender
- to study the determinants and effects of IMF interventions

Literature and contribution

- Quantitative sovereign default with renegotiation

Yue (2007), Benjamin Wright (2013, 2018), Mihalache (2017), Dvorkin et al. (2021, 2022)

- Sovereign default with official (or bilateral) lending

Marchesi Thomas (99), Corsetti et al. (06), Boz (11), Broner et al. (13), Fink Scholl (16), Hatchondo et al. (17), Corsetti et al. (18), Arellano Barreto (25), Liu et al. (25), Wicht (25) Roldan Sosa-Padilla (26), Bianchi et al. (26)

- Empirical work on official debt in & out of default

Barro Lee (05), Erce (13), Schlegl et al. (19), Cheng et al. (16, 17, 18), Reinhart Trebesch (16b, 19), Horn et al. (25)

Motivating facts on IMF and Sovereign Debt Crises

Data from 96 EMs

1. IMF involvement is frequent and large, especially during crises
2. IMF episodes (spells of > 0 exposure) vary in length and size
3. Systematic change in DR features w/ IMF
↪ larger haircuts and longer exclusion spells
4. IMF exposure is countercyclical, much more than other official debt
5. IMF debt is senior

IMF exposure

IMF spells

IMF and DR

Cyclicality

Seniority

Model Environment

- Small open economy issuing external debt
- Hand-to-mouth households with $u(c) = c^{1-\gamma}/(1-\gamma)$
- Benevolent government maximizes expected household utility
- Persistent endowment shock y with transition matrix Γ
- Credit standing: good (G), first period of default (D), rest of default/exclusion spell (E)
- Asset market
 - Private debt b : defaultable, long-term with decay rate δ_b
 - IMF loans τ : risk-free, long-term with decay rate δ_τ , subject to conditions
- Taste shocks to smooth the problem (Dvorkin et al. (2021))

Debt Restructuring Process

- Default on private debt $\Rightarrow$ debt market exclusion + output losses
- Exclusion ends endogenously through a restructuring process as in Dvorkin et al. (2021)
 - in each exclusion period, lenders offer a new face value b'/δ_b
 - the sovereign accepts the offer or remains in autarky
- IMF lending possible at any point, subject to endogenous restrictions.

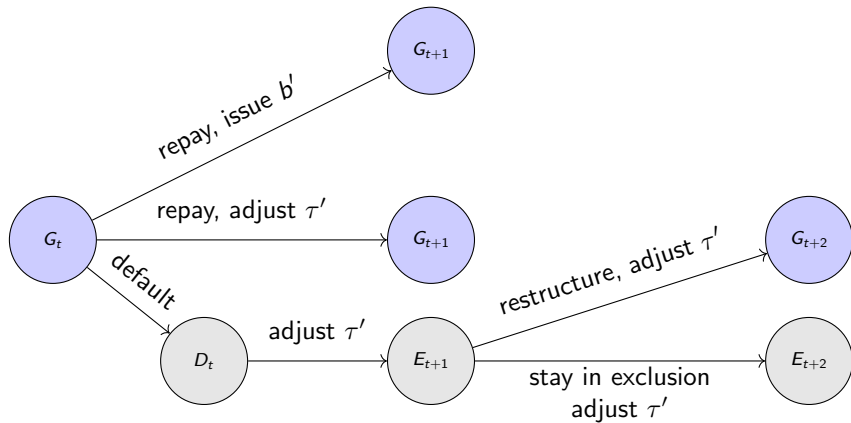
IMF Lending

- IMF debt is risk-free and priced as a perpetuity:

$$p = \frac{1}{r + \delta_\tau}$$

- Positive net issuance $\tau' - (1 - \delta_\tau)\tau > 0$ is subject to terms
 - fixed *utility* adjustment cost $C(\tau', \tau)$, larger if $\tau = 0$
 - must be feasible ($\tau' \in T(y, b)$, similar to DSA)
- Net repayment $\tau' \in [0, (1 - \delta_\tau)\tau]$ always feasible and costless

Timeline Structure



Sovereign Problem: Good Record

With good record, choose b/w repaying and default.

$$V(y, b, \tau) = \max \left\{ \underbrace{V^B(y, b, \tau)}_{\text{adjust pvt debt}}, \underbrace{V^I(y, b, \tau)}_{\text{adjust IMF debt}}, \underbrace{V^D(y, b, \tau)}_{\text{default}} \right\}$$

$$\begin{aligned} V^I(y, b, \tau) &= \max_{\tau'} u(c) - C(\tau', \tau) + \beta \mathbb{E} \left[V(y', b(1 - \delta_b), \tau') \right] \\ \text{s.t. } c &= y - b - \tau + p(\tau' - (1 - \delta_\tau)\tau), \\ \tau' &\in T(y, b) \cup [0, (1 - \delta_\tau)\tau] \end{aligned}$$

Value functions

Sovereign Problem: Bad Record

With bad record and an offer b' , choose b/w accepting and default.

$$V^E(y, b, \tau; b') = \max \left\{ \underbrace{V^I(y, b', \tau)}_{\text{accept DR offer \& adjust } \tau'}, \underbrace{\tilde{V}^D(y, b, \tau)}_{\text{reject DR offer \& adjust } \tau'} \right\}$$

$$\begin{aligned} \tilde{V}^D(y, b, \tau) &= \max_{\tau'} u(c) - C(\tau', \tau) + \beta \mathbb{E} [V^E(y', b(1 - \delta_b), \tau')] \\ \text{s.t. } c &= y - \phi_E(y) - b - \tau + p(\tau' - (1 - \delta_\tau)\tau), \\ \tau' &\in T^E(y, b) \cup [0, (1 - \delta_\tau)\tau] \end{aligned}$$

Value functions

Sovereign Problem: Restructuring

Lenders choose the restructured debt b' , taking as given

- sovereign acceptance policy $\mathcal{H}(y, b, \tau; b')$
- future sovereign IMF borrowing $\mathcal{I}(y, b', \tau)$

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- future sovereign IMF borrowing $\mathcal{I}(y, b', \tau)$

$$\max_{b' \leq b} \mathcal{H}(y, b, \tau; b') \underbrace{[q(y, b', \mathcal{I}(y, b', \tau)) b']}_{\text{offer accepted}} + (1 - \mathcal{H}(y, b, \tau; b')) \underbrace{[q^D(y, b, \mathcal{I}^D(y, b', \tau)) b]}_{\text{offer rejected}}$$

Details

The Value Function of the IMF

- Receives risk-neutral **flows** depending on sovereign credit standing
 - $x_G = 1$ in good standing
 - $x_D < 0$ when defaulting
 - $x_E \in [x_D, x_G]$ in exclusion
- IMF value function is the PDV of these payoffs
 - $W(y, b', \tau')$ if in good standing
 - $W^E(y, b', \tau')$ if in exclusion
- Allowed IMF loan sizes for the sovereign
 - $T(y, b) = \{\tau' : W(y, (1 - \delta_b)b, \tau') \geq 0\}$
 - $T^E(y, b) = \{\tau' : W^E(y, (1 - \delta_b)b, \tau') \geq 0\}$

Equilibrium Prices

- Lenders are standard, risk-neutral, deep pockets
- Zero profit conditions pin down debt prices
 - $q(y, b', \tau')$ if in good standing
 - $q^D(y, b', \tau')$ if in default/exclusion

Price functions

Taking Stock

- Standard model + endogenous restructuring + IMF in and out of default
- IMF loans have pros and cons relative to private debt b'
 - + No risk premium
 - Obligation to repay, costly to increase
 - Must be feasible ($W, W^E \geq 0$)
- Sovereign internalizes future IMF conditions when choosing debt, default, restructuring
Lenders too!

Calibration

- We choose externally/estimate $\gamma, r, \delta_b, \rho_y, \sigma_y$, and $x_D = -30, x_E = x_G = 1$
- Mostly standard functions, parameters [Details](#)
- Taste shocks to smooth the problem (Dvorkin et al. (2021)) [Taste shocks](#)
- Model calibrated targeting average EM features

Parameter	Value	Target	Data	Model
π_D	0.83	Def. rate	1.8%	2.7%
π_E	1.9	Exclusion duration (years)	5.6	5.5
β	0.94	Debt-to-output ratio	30%	19%
δ_τ	0.5	Avg. duration of IMF exposure (years)	17.0	8.0
f_0	0.085	New IMF program w no prior exposure	2.1%	0.6%
f_1	15	New IMF program w positive exposure	37.6%	35.3%

Results

IMF statistics

Panel A: New programs

	<i>Data</i>	<i>Model</i>
Prob. new IMF exp. = 0*	3.3	0.6
Default	19.2	0.8
Good times	2.6	0.6
Prob. new IMF exp. > 0*	37.6	35.3
Default	56.2	91.9
Good times	33.3	27.8

Panel B: Exposure growth

	<i>Data</i>	<i>Model</i>
Prob. IMF exp. > 0	36.0	4.7
Default	75.6	4.0
Good times	31.9	4.8
Prob. grows prior growth	59.4	45.2
Default	69.4	90.5
Good times	55.8	28.4

* $\equiv$ targeted

Results

IMF spell statistics

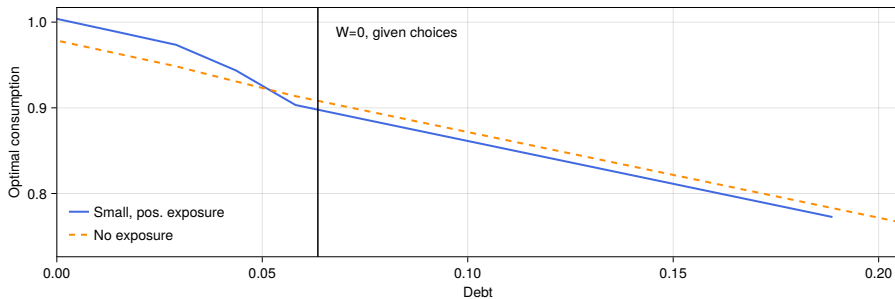
	<i>Data</i>	<i>Model</i>
Duration (years)		
Overall*	17.0	8.0
Including DR	22.5	16.0
Not including DR	13.9	6.6
Peak size (% GDP)		
Overall*	6.2	6.2
Including DR	8.4	8.1
Not including DR	5.0	5.9

IMF and Restructuring Outcomes: Haircuts and Exclusion Duration

	<i>Data</i>	<i>Model</i>
Haircut (%)	34.3	30.4
By IMF exposure		
with IMF exposure	34.7	35.4
without IMF exposure	31.6	30.2
By IMF growth		
with IMF growth	35.4	34.9
without IMF growth	29.4	30.3
Exclusion duration (years)*	5.6	5.5
By IMF exposure		
with IMF exposure	6.0	6.0
without IMF exposure	3.4	5.5
By IMF growth		
with IMF growth	6.3	5.9
without IMF growth	2.8	5.5

- When IMF is involved:
 - Larger haircuts
 - Longer exclusion
- Mechanisms: the IMF
 1. improves exclusion periods
 2. requires private debt sustainability

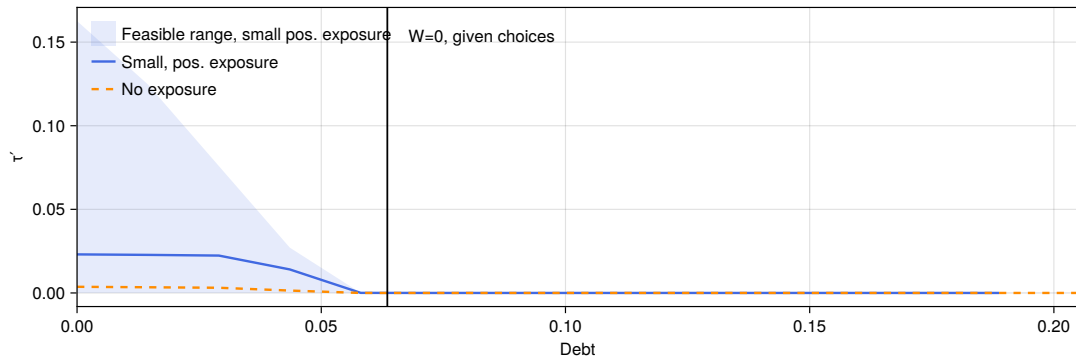
The Implications of IMF Access



- Consumption (& value fn) more elastic to debt if IMF access is *easier*

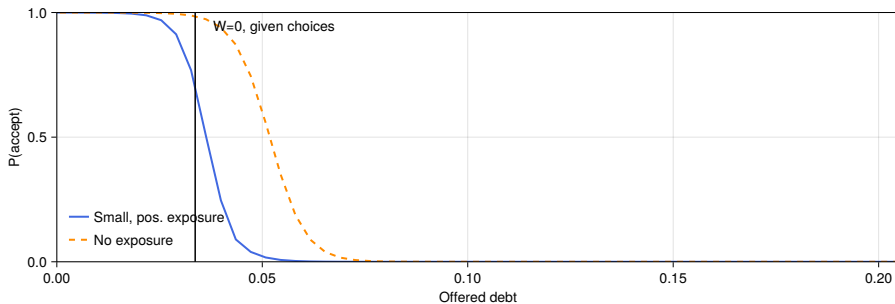
Value fn

IMF Debt Policy and Feasibility



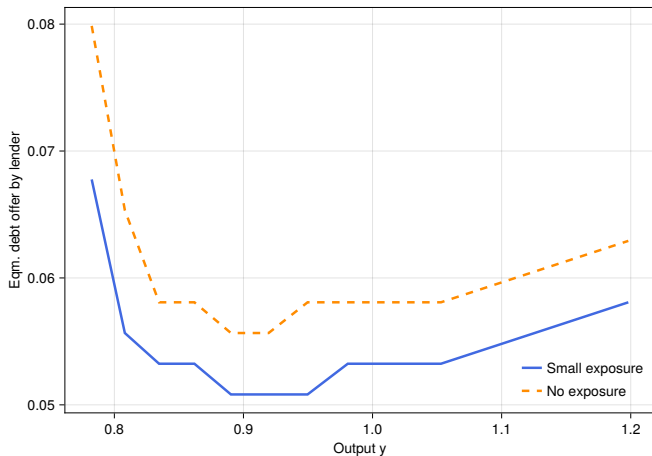
- Both are shrinking in debt levels

Restructuring Offer: Acceptance Probability



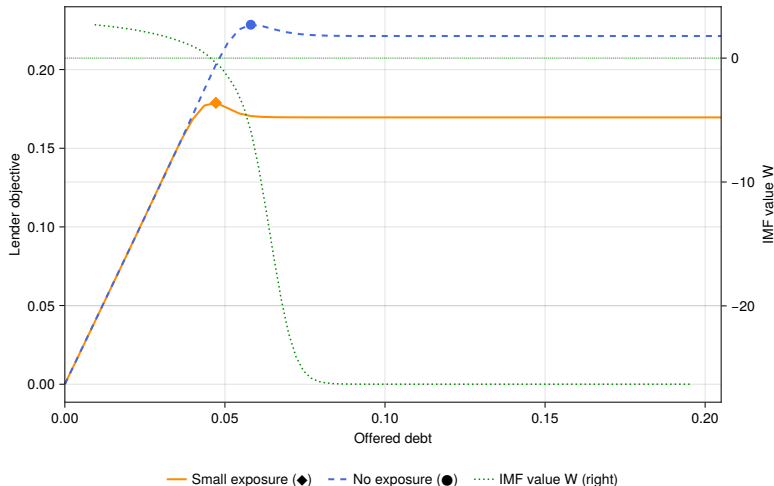
- Acceptance region lower with IMF access

Lenders' Optimal Restructuring Offer



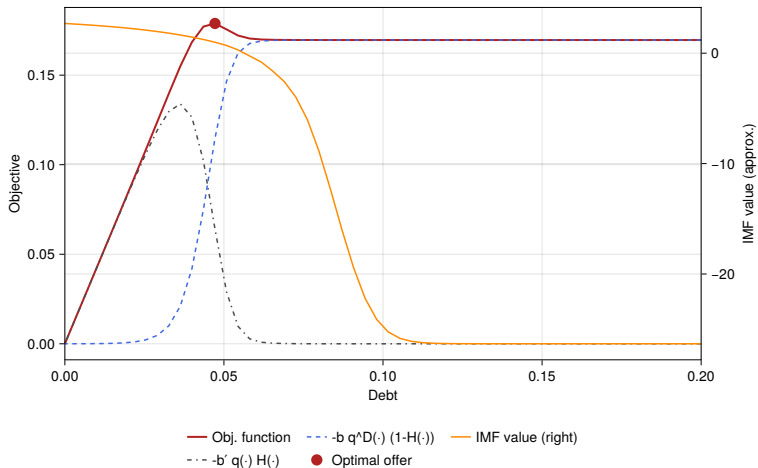
- Lenders offer larger haircuts if sovereign has IMF access

Lenders' Optimal Restructuring Offer



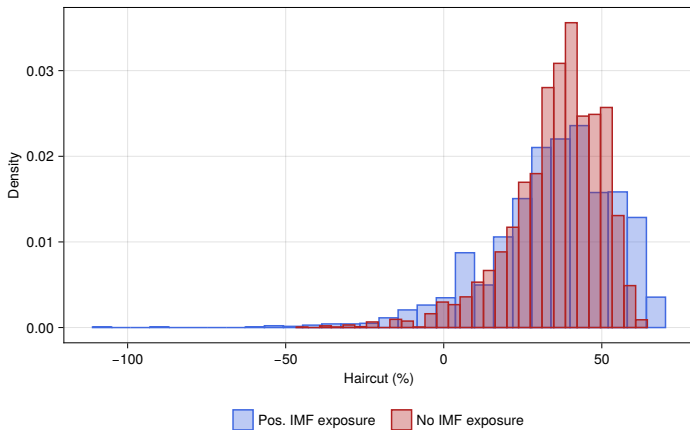
- Lenders offer lower haircuts without IMF

Restructuring process, lenders' objective function



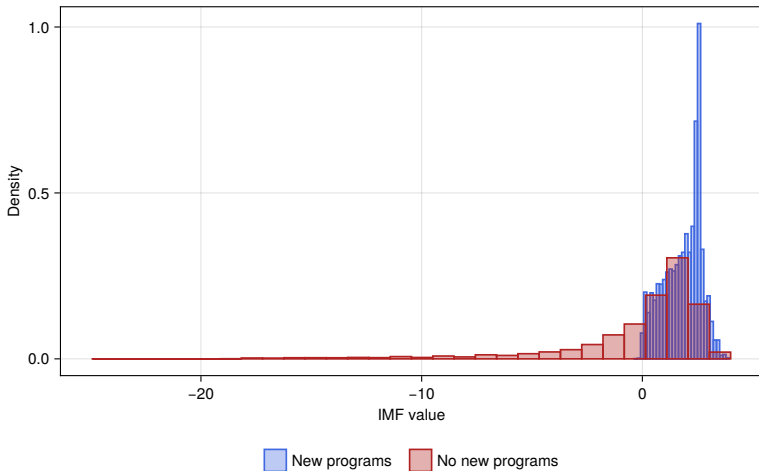
- The steep change in acceptance prob. coincides with the steep decline in IMF value

Default Haircuts



- Larger haircuts with existing IMF exposure

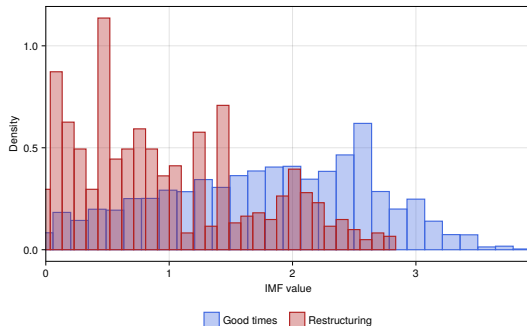
IMF Value Distribution



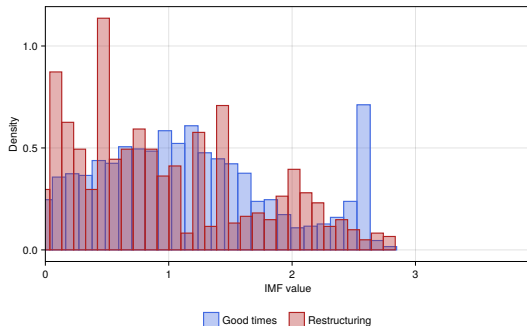
- Negative around 30% of the time, key for new loans

IMF Value Distribution: New Programs

Unconditional



Spreads above median



- New deals in normal times suffer less from IMF restrictions than restructuring times
- This is because of the higher default probability in restructuring times

IMF Value: Counterfactual

- Still work in progress
- Counteracting forces! IMF
 - makes default less painful ($\downarrow b/y, \uparrow \text{DR}$)
 - provides an extra source of financing ($\downarrow b/y, \downarrow \text{DR}$)

IMF Value: Counterfactual

- Still work in progress
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 - makes default less painful ($\downarrow b/y, \uparrow \text{DR}$)
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	Benchmark	No IMF Allowed
Def. rate (%)	2.7	0.4
Haircut	30.4	19.8
Restructured debt/GDP (%)	35.9	40.0
Debt/GDP (%)	19.1	21.6
Mean IMF value	-0.1	2.4
Median IMF value	1.0	2.6

More results

Final remarks

- Empirically, hard to think of debt & default without IMF
- Quantitative framework to evaluate determinants and effects of IMF presence

In progress

1. More granular empirical analysis
2. Conditionality

APPENDIX

Data

1980 to 2018, Emerging Market economies (96 countries)

Sovereign defaults

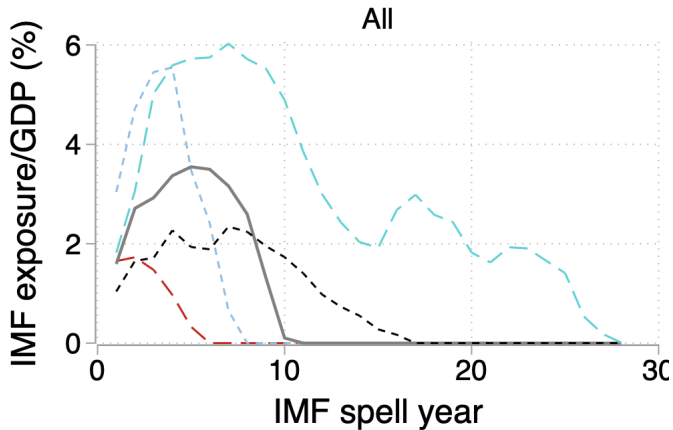
- Asonuma, Trebesch (2016), Erce, Mallucci, Picarelli (2024)
- external defaults for now

IMF lending

- IMF member countries' debt exposures (IMF Fund Accounts)
- focus on GRA and PRGT debt outstanding
- simpler alternative to MONA data (specific program signing & disbursement)

Debt to other official & private creditors and GDP from WB IDS and WDI

IMF Exposure



DR-related $\equiv$ there is overlap between IMF and DR spell

IMF Exposure

IMF Exposure: Descriptive Statistics

Measure	Mean	St. Dev.
Number of IMF spells	105	
Spell length	12.8	8.9
Exposure/GDP	1.3	3.5
Max exposure/GDP by spell	5.8	8.2

IMF Exposure

IMF Exposure: Descriptive Statistics

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IMF Exposure: Event Frequencies

Measure	Total	Conditioning sets			
		Not in default	Default	Def. start	Def. end
Prob(IMF exp > 0)	36.0	31.9	75.6	66.1	82.0
Prob(IMF spell start)	3.3	2.6	19.2	28.6	23.1
Prob(IMF exposure grows "significantly")	7.7	5.9	24.0	36.8	23.0

Note: "Significant" growth = new exposure/GDP > 1% or Δ (exposure/GDP) > 25%

Debt Restructurings

Share of DRs with some IMF involvement

Measure	Total	Share of obs. when IMF exposure		
		positive	new	big increase
Default spell start	1.7	66.1	12.9	36.8
Default spell dummy	9.5	75.6	5.6	24.0
Default spell end	1.6	82.0	4.9	23.0

Note: "Big" increase = new expo/GDP > 1% or Δ (expo/GDP) > 25%

Debt Restructurings

Share of DRs with some IMF involvement

Measure	Total	Share of obs. when IMF exposure		
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Features of DRs with/without IMF involvement

Measure	All DRs		Conditional on IMF exposure					
			positive		new		big increase	
	Mean	St. Dev.	yes	no	yes	no	yes	no
Number of DRs	62							
Spell length	5.7	4.9	6.0	4.4	6.6	5.4	6.9	3.5
Restructured debt/GDP	28.0	26.7	29.6	18.5	34.7	24.8	33.2	17.9
NPV haircut	34.9	24.1	34.7	35.9	36.6	34.0	37.0	30.6

Note: "Big" increase = new expo/GDP > 1% or Δ (expo/GDP) > 25%

Cyclicalilty

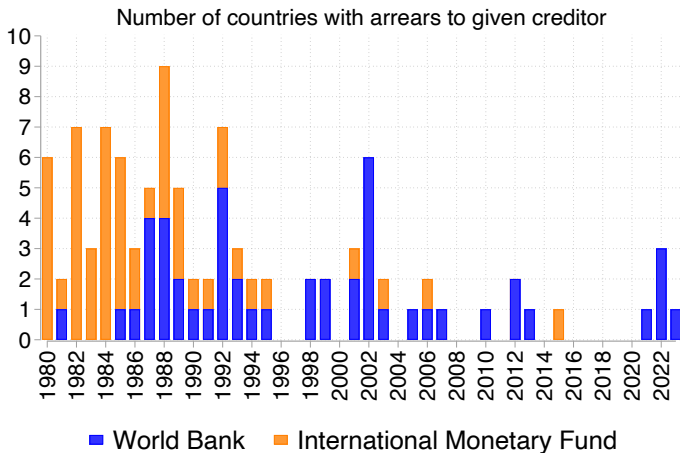
	Log debt changes					
	(1)	(2)	(3)	(4)	(5)	(6)
	Senior	WB	IMF	Senior	WB	IMF
Real GDP growth	-1.288*** (0.160)	-0.792*** (0.184)	-2.570*** (0.315)			
GDP cycle				-1.622*** (0.282)	-1.046*** (0.315)	-4.255*** (0.584)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Robust SE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2004	1971	1660	2007	1973	1662
Within R-sq	0.036	0.012	0.046	0.016	0.006	0.032

Cyclicalilty

Debt shares		
	(1)	(2)
	IMF/Senior	IMF/Senior
Real GDP growth	-0.580*** (0.107)	
GDP cycle		-0.843*** (0.183)
Country FE	Yes	Yes
Time FE	Yes	Yes
Robust SE	Yes	Yes
Observations	1813	1846
Within R-sq	0.016	0.012

Note: Senior = IMF + WB

Seniority



BoC–BoE dataset on debt in arrears (Beers et al. (2024))

Sovereign Problem: Good Times

$$V(y, b, \tau) = \max \left\{ \underbrace{V^B(y, b, \tau)}_{\text{adjust pvt debt}}, \underbrace{V^I(y, b, \tau)}_{\text{adjust IMF debt}}, \underbrace{V^D(y, b, \tau)}_{\text{default}} \right\}$$

$$\begin{aligned} V^B(y, b, \tau) &= \max_{b' \geq 0} u(c) + \beta \mathbb{E} \left[V(y', b', \tau(1 - \delta_\tau)) \right] \\ \text{s.t. } c &= y - b - \tau + q(y, b', (1 - \delta_\tau)\tau) (b' - (1 - \delta_b)b) \end{aligned}$$

$$\begin{aligned} V^I(y, b, \tau) &= \max_{\tau'} u(c) - C(\tau', \tau) + \beta \mathbb{E} \left[V(y', b(1 - \delta_b), \tau') \right] \\ \text{s.t. } c &= y - b - \tau + p(\tau' - (1 - \delta_\tau)\tau), \\ \tau' &\in T(y, b) \cup [0, (1 - \delta_\tau)\tau] \end{aligned}$$

Sovereign Problem: Default

$$\begin{aligned} V^D(y, b, \tau) &= \max_{\tau'} u(c) - C(\tau', \tau) + \beta \mathbb{E} [V^E(y', b(1 - \delta_b), \tau')] \\ \text{s.t. } c &= y - \phi_D(y) - b - \tau + p(\tau' - (1 - \delta_\tau)\tau), \\ \tau' &\in T^E(y, b) \cup [0, (1 - \delta_\tau)\tau] \end{aligned}$$

Upon default (= first period of missed debt service payment)

- debt market exclusion
- output penalty
- can use IMF
- price of debt in default: $q^D(y, b, \tau)$

Sovereign Problem: Exclusion

In each period, lenders make restructuring offer = new face value b'

The sovereign faces

$$V^E(y, b, \tau; b') = \max \left\{ \underbrace{V^I(y, b', \tau)}_{\text{accept DR offer \& adjust } \tau'}, \underbrace{\tilde{V}^D(y, b, \tau)}_{\text{reject DR offer \& adjust } \tau'} \right\}$$

Sovereign Problem: Exclusion

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where

$$\begin{aligned} \tilde{V}^D(y, b, \tau) = \max_{\tau'} & u(c) - C(\tau', \tau) + \beta \mathbb{E} [V^E(y', b(1 - \delta_b), \tau')] \\ \text{s.t. } & c = y - \phi_E(y) - b - \tau + p(\tau' - (1 - \delta_\tau)\tau), \\ & \tau' \in T^E(y, b) \cup [0, (1 - \delta_\tau)\tau] \end{aligned}$$

$V^I(y, b', \tau)$ is as before

The Value Function of the IMF

Receives risk-neutral payoffs as a function of the sovereign credit standing

In good times/repayment

$$[s' = (y', b', \tau')]$$

$$W(y, b', \tau') = \frac{1}{1+r} \mathbb{E} \left[(1 - \mathcal{D}(s')) \left(x_G + W(y', \mathcal{B}(s'), \mathcal{I}(s')) \right) \right. \\ \left. + \mathcal{D}(s') \left(x_D + W^E(y', b', (1 - \delta_\tau)\tau') \right) \right]$$

$$\text{and } T(y, b) = \{ \tau' : W(y, (1 - \delta_b)b, \tau') \geq 0 \}$$

During both default and exclusion states

$$[s' = (y', b', \tau')]$$

$$W^E(y, b', \tau') = \frac{1}{1+r} \mathbb{E} \left[\mathcal{H}(s') \left(x_G + W(y', \mathcal{B}^R(s'), \mathcal{I}(y', \mathcal{B}^R(s'), \tau')) \right) \right. \\ \left. + (1 - \mathcal{H}(s')) \left(x_E + W^E(y', b', (1 - \delta_\tau)\tau') \right) \right]$$

$$\text{and } T^E(y, b) = \{ \tau' : W^E(y, (1 - \delta_b)b, \tau') \geq 0 \}$$

Back

Equilibrium prices

Good standing/repayment

$[s' = (y', b', \tau')]$

$$q(y, b', \tau') = \frac{1}{1+r} \mathbb{E} \left[(1 - \mathcal{D}(s')) \left(1 + (1 - \delta_b) q(y', \mathcal{B}(s'), \mathcal{I}(s')) \right) + \mathcal{D}(s') q^D(y', b', (1 - \delta_\tau) \tau') \right].$$

Default

$[s' = (y', b', \tau')]$

$$q^D(y, b', \tau') = \frac{1}{1+r} \mathbb{E} \left[\mathcal{H}(s') \frac{\mathcal{B}^R(s')}{b'} q(y', \mathcal{B}^R(s'), \mathcal{I}(y', \mathcal{B}^R(s'), \tau')) + (1 - \mathcal{H}(s')) q^D(y', b', (1 - \delta_\tau) \tau') \right].$$

Sovereign's problem: IMF costs and feasibility

$$C(\tau', \tau) = \begin{cases} f_0, & \text{if } \tau' > (1 - \delta_\tau)\tau \text{ and } \tau = 0, \\ f_1, & \text{if } \tau' > (1 - \delta_\tau)\tau \text{ and } \tau > 0, \\ 0, & \text{otherwise,} \end{cases}$$

$$T^G(y, b) = \{\tau' \geq 0 : W(y, (1 - \delta_b)b, \tau') \geq 0\},$$

$$T^D(y, b) = \{\tau' \geq 0 : W^D(y, (1 - \delta_b)b, \tau') \geq 0\}.$$

Back

Sovereign's problem: Restructuring

$$\begin{aligned}\tilde{V}^E(y, b, \tau; b') &= \max\{V^I(y, b', \tau), V^N(y, b, \tau)\}, \\ b^R(y, b, \tau) &\in \arg \max_{\tilde{b} \leq b} H(y, b, \tau; \tilde{b}) \tilde{b} q(y, \tilde{b}, I^R(y, \tilde{b}, \tau)) \\ &\quad + (1 - H(y, b, \tau; \tilde{b})) b q^D(y, b, \tau), \\ V^E(y, b, \tau) &= \tilde{V}^E(y, b, \tau; b^R(y, b, \tau)).\end{aligned}$$

Back

Equilibrium prices

- $s' = (y', b', \tau')$ is the next-period state
- $D(\cdot)$: default policy in good standing
- $B(\cdot)$: private debt issuance policy in good standing
- $I^G(\cdot)$: IMF loan adjustment policy in good standing
- $O(\cdot)$: policy for proposing a restructuring deal tomorrow
- $I^R(\cdot)$: IMF loan adjustment policy after successful restructuring

Numerical implementation

Functional forms

- CRRA utility:

$$u(c) = \frac{c^{1-\gamma}}{1-\gamma},$$

- Exogenous output losses as in Arellano (2008)

$$y - \phi_i(y) = \begin{cases} y, & \text{if } y < \pi_i \\ \pi_i, & \text{otherwise.} \end{cases}$$

- Output process AR(1) with persistence ρ_y and volatility σ_y
- IMF debt adjustment cost

$$C(\tau', \tau) = \begin{cases} f_0 + f_1(\tau' - (1 - \delta_\tau)\tau)^2 & \text{if } \tau' > 0, \tau = 0 \\ f_1(\tau' - (1 - \delta_\tau)\tau)^2 & \text{if } \tau' > (1 - \delta_\tau)\tau > 0 \\ 0 & \text{otherwise} \end{cases}$$

- Taste shocks to smooth the problem (Dvorkin et al. (2021))

Details

Numerical implementation

Calibrated outside the model

- Calibration targeting averages of 151 non-Advanced Economies

Parameter	Value	Basis
γ	2	Risk aversion
r	0.042	Risk-free rate
δ_b	0.2	Avg. maturity = 5 years
ρ_y	0.72	Estimate in sample
σ_y	0.045	Estimate in sample
x_D	-30	Relevant IMF constraints
x_E	1	Relevant IMF constraints
x_G	1	Relevant IMF constraints

Numerical implementation

Calibrated in the model

Parameter	Value	Basis	Data	Model
π_D	0.83	Def. rate	1.8%	2.7%
π_E	1.9	Exclusion duration (years)	5.6	5.5
β	0.94	Debt-to-output ratio	30%	19%
δ_τ	0.5	Avg. duration of IMF exposure (years)	17.0	8.0
f_0	0.085	New IMF program w no prior exposure	2.1%	0.6%
f_1	15	New IMF program w positive exposure	37.6%	35.3%

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Numerical implementation

Taste shocks

- Taste shock for each choice of private debt, IMF loan, default (Dvorkin et al. (2021))
- The government draws $n_b + n_\tau + 1$ shocks each period, each corresponds to the value of one discrete choice
- Convexify the government problem, facilitates convergence
- We assume a Generalized Extreme Value distribution for the shocks
- Size of the shocks set as small as possible s.t. model converges

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Results

Relevant model moments.

Panel A: National accounting

$\sigma(c)/\sigma(y)$	1.47
$\sigma(tb)/\sigma(y)$	1.12
$\rho(c, y)$	0.63
$\rho(tb, y)$	0.05

Panel B: Frequencies

Default rate* (%)	2.7
Debt adjustment (%)	89.4
IMF loan adjustment (%)	7.9

IMF and Default

Distribution of Cases

Data

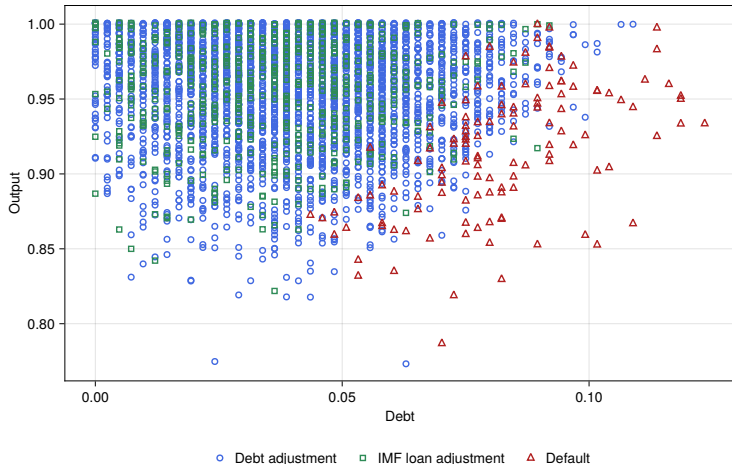
	IMF	No IMF
Good times	37.5%	53.6%
Default	7.6%	1.3%

Model

	IMF	No IMF
Good times	4.1%	82.4%
Default	0.5%	13.0%

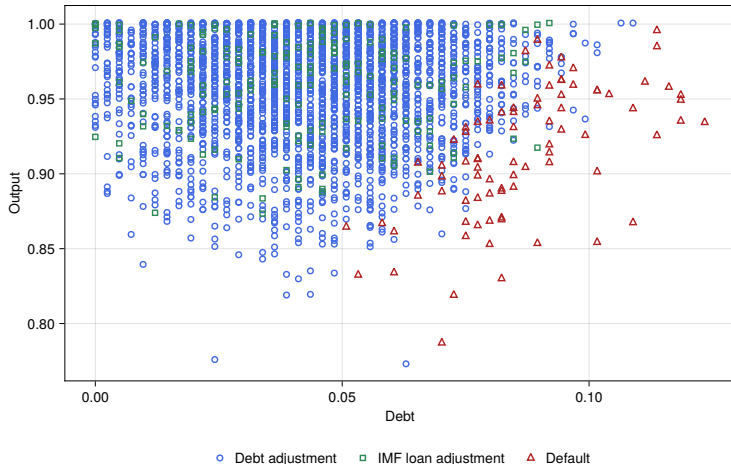
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Borrowing & Default Choices, Unconditional



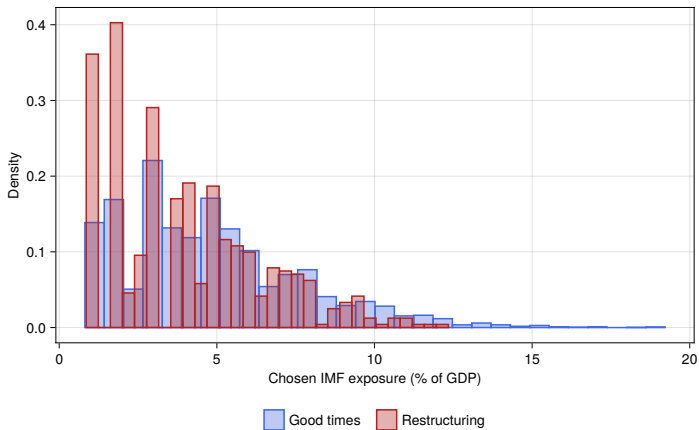
- **Default** with high debt, low output
- **IMF loan** with intermediate debt, output

Borrowing & Default Choices, $\tau = 0$



- **Default** with high debt, low output
- **IMF loan** with intermediate debt, output

Distribution of IMF programs



- Larger programs in good times

Results

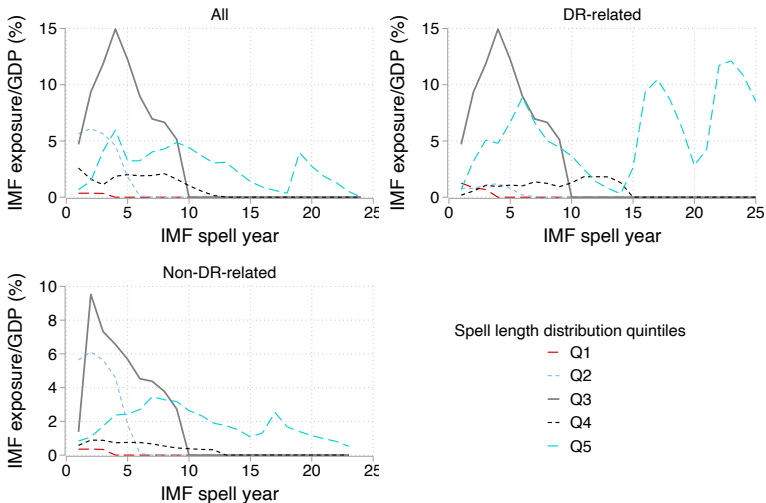
Default statistics

Moment	Data	Model
<i>Panel A: Prob. new default (%)</i>		
Overall	1.8	2.7
With IMF program	1.6	1.9
W/o IMF program	1.8	2.8
<i>Panel B: Haircut (%)</i>		
Overall	42	30
With IMF program	43	35
W/o IMF program	42	30

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References

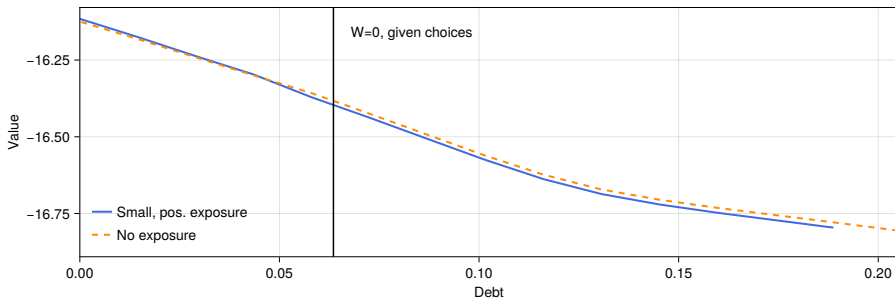
IMF Exposure



DR-related = there is overlap between IMF and DR spell.

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The Implications of IMF Access



- Value function more elastic to debt if IMF access is *easier*

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