# Chasing the Storm - Debt Distress, Arrears, and Defaults

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# Motivation

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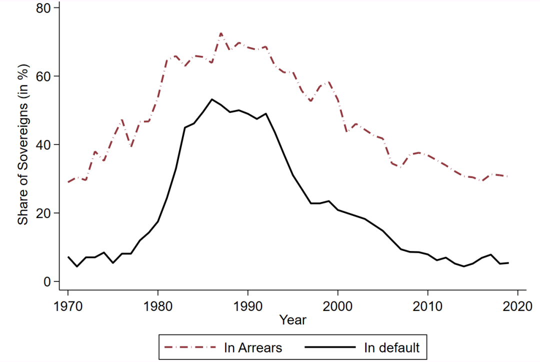
Approaches to identify debt crises:

1. On the basis of credit events (defaults and restructurings)
2. On the basis of arrears




IDS Data, Authors' Calculations. Note: Unbalanced panel.

# Motivation: Main Questions

1. Why do the occurrence of arrears and default differ so much?

2. Can they be reconciled to arrive at a composite indicator of debt crises/debt distress, that relies on data-driven thresholds?

# Roadmap

1. Main takeaways
2. The big empirical picture of arrears and default
3. Explaining the disconnect: arrears without default
4. A data driven composite indicator of debt crises

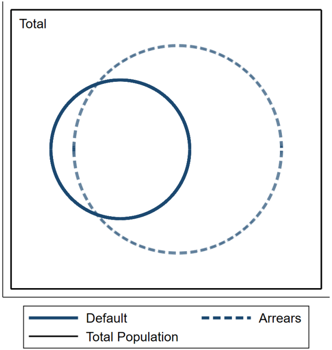
# Main takeaways

- Arrears data are informational, but noisy: Incidents of arrears exceed incidents of credit events by factor 2.4
- We present four drivers of arrears accumulation which are not associated with debt crises.
- Arrears data need filtering to tackle the noise: A threshold of 0.8% $\frac{Arrears}{GNI}$ improves fit with credit events and helps identify additional debt crises.
- Compared to credit events only, the composite index identifies 22 additional debt crises since 1970, and adds additional information on crisis-duration in 18.
- Many of the newly discovered crisis happened in unrated sovereigns without market access

# The Big Picture - Data

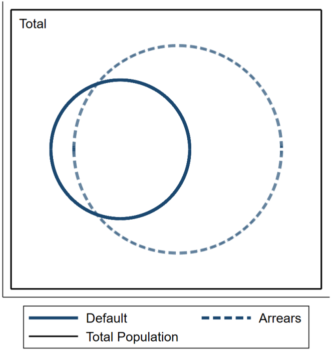
1. Data on credit events from Farah Yacoub et al. (2022)
2. Data on arrears
   - Time span: 1970 - 2019
   - Countries included: 124
   - Arrears are reported by countries to the World Bank
   - Debt included: obligations to foreign creditors, with at least one year to maturity.
   - Creditors included: bond holders, financial institutions and suppliers that offer credit financing.

# The Big Picture




| | Not in Default | In Default | Total |
|---|---|---|---|
| **Not in Arrears** | 2 529 | 107 | 53% |
| **In Arrears** | 1 466 | 917 | 47% |
| Total | 80 % | 20 % | |

# The Big Picture

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# Arrears without debt crises

What are some of the potential reasons for the significant prevalence of arrears over credit events in the data?

1. Chronic, low-level arrears
2. Post-restructuring or overhang arrears
3. Liquidity management arrears
4. Economically optimal arrears

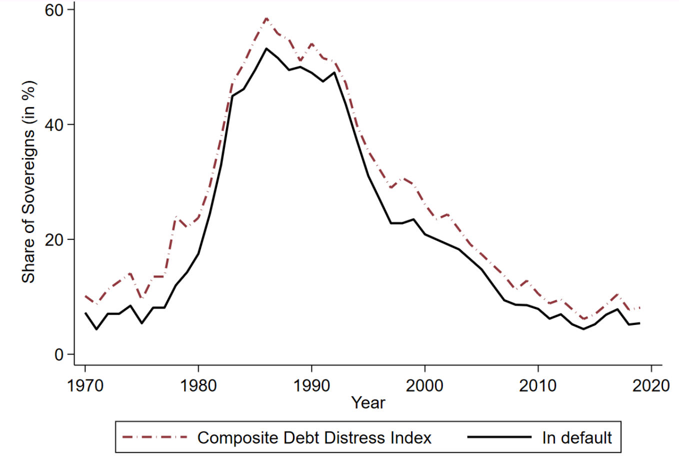
# Filtering the noise: Composite index of debt crises

- We apply a training / evaluation sample split to identify optimal threshold maximising fit of credit events and arrears. Measured using a Quadratic Probability Score:

$$QPS_i = \frac{1}{T}\sum_{t=1}^{T}(A_{it} - D_t)^2$$

- We find a 0.8% $\frac{Arrears}{GNI}$ to be optimal and robust to out-of-training-sample testing, as well as sub-sampling by income group etc.
- T-tests of differences in GDP growth, inflation etc.; and event studies confirm that years with arrears above threshold are akin to debt crises identified with credit event approach.

# The composite indicator of debt crises



# Conclusion

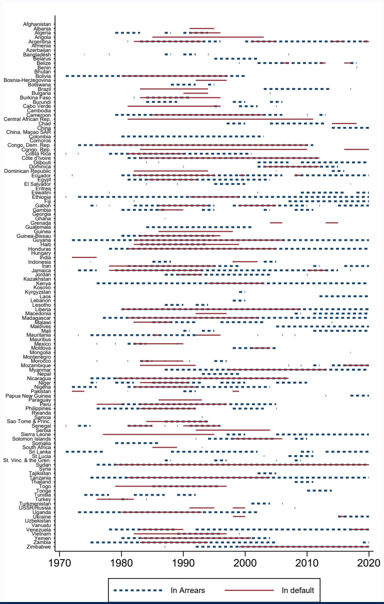
# Appendix

# Rating Agencies' credit event definition

For rating agencies, defaults include:

- missed payments beyond the grace period;
- material changes to the contract affecting creditors, including distressed debt exchanges that reduce the debtors obligations;
- unilateral changes imposed by the debtor resulting in diminished financial obligation, such as a forced currency re-denomination.[1]

# Stripplot - Arrears vs Default



# Contracts with incentives for arrears financing

Table: Contracts with incentives to apply arrears financing

| Borrower | Concept | Face value (in USD) | Repayment period or tenor | Defined Credit Event | Rate | Penalty Rate |
|---|---|---|---|---|---|---|
| Ghana | Military housing construction | 100 MM | 7 years | No | 6-month-Libor + 4% | 2% |
| Congo, Rep. | Power transmission network | 551 MM | 17 years | No | 0.2% | 0.25% |
| PDVSA (Ven.) | Arrears conversion into IOU | 120 MM | 3 years | Yes | 6.5% | No |
| PDVSA (Ven.) | Supplies acquisition | 96 MM | 2 years | Yes | 7.5% on disbursements | 2% |
| PDVSA (Ven.) | Supplier invoices | 4 MM | Net 30-days | No | N/A | N/A* |
| PDVSA (Ven.) | Supplier invoices | 5 MM | Net 30-days | No | N/A | N/A* |

Note: * Subject to court decision; Sources: Gelpern et al. (2021), US Federal Court Litigation Documents; Authors Calculations. See Appendix 4.

# Supplier Contract Example

**Article 6 : Conditions du Crédit :**

Le crédit fournisseur d'un montant de 551,507 millions de dollars US est octroyé à l'Emprunteur par le Prêteur aux conditions ci-après :

| | |
|---|---|
| * durée du crédit : | dix sept (17) ans |
| * délai de grâce : | cinq (5) ans |
| * taux d'intérêt annuel : | 0,20% |
| * modalités de remboursement : | 24 semestres. |

Le règlement de la première échéance interviendra 60 mois après la date d'entrée en vigueur du contrat et l'Emprunteur dispose , à compter de cette date d'échéance, de 10 jours ouvrables pour assurer le paiement de ladite échéance. Les autres échéances seront payées sur une base semi-annuelle conformément au tableau d'amortissement en annexe.

**Article 7 : Intérêt de retard**

Un intérêt de retard de 0,25% sera appliqué en cas de non paiement à bonne date de toute échéance du crédit fournisseur.

Figure: Source: Gelpern et al. (2021); Accessible under: `https://www.documentcloud.org/documents/20488096-cog_2005_490`

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# The Composite Indicator of Debt Crises

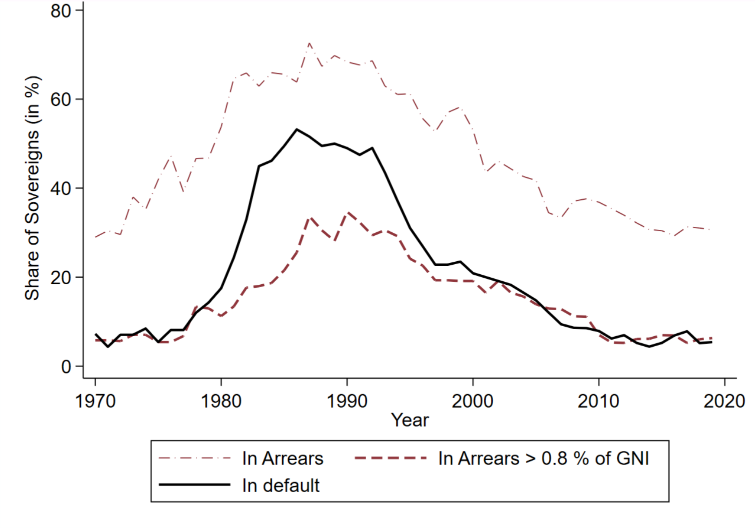


Figure: IDS Data, Authors' Calculations

# The composite indicator of debt crises

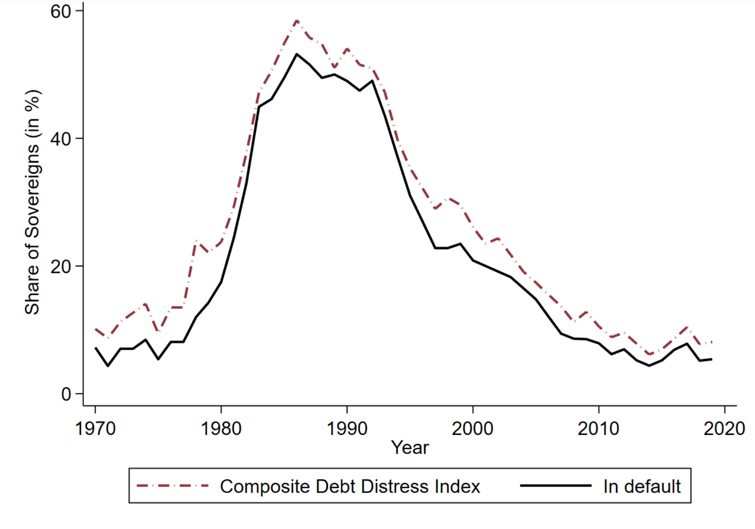


Figure: IDS Data, Authors' Calculations

# Filtering the noise: The composite indicator of debt crises

Table: Difference in mean values vs tranquil times

| | Real GDP p.c. Growth, percent | Primary Balance, share of GDP | Depreciation end of year, percent † | Inflation, percent † | CG Debt, share of GDP |
|---|---|---|---|---|---|
| Country-years in filtered arrears | -1.76*** | 0.69 | 12.09*** | 9.18*** | 26.81*** |
| In Default | -2.27*** | 0.88*** | 31.8*** | 22.23*** | 22.02*** |
| In arrears (any) | -0.49 *** | 0.7*** | 4.6*** | 4.28*** | 6.83 *** |

Note: † Winsorized below 1st and above 99th percentile; * $p<0.05$, ** $p<0.01$, *** $p<0.001$; Sources: DRS, IMF, Authors' Calculations

# References

Farah Yacoub, J., C. Graf von Luckner, and C. Reinhart (2022). Eternal external debt crises: A long view. *Forthcoming*.

Gelpern, A., S. Horn, S. Morris, B. Parks, and C. Trebesch (2021). How china lends: a rare look into 100 debt contracts with foreign governments.