Webinar:
Global Sovereign debt and the Dollar after COVID

Intro Remarks
Markus Brunnermeier

Ken Rogoff (Harvard)
PAST AND FUTURE SPEAKERS

- Last
  Lisa Cook
  “Racial disparities”

- Today
  Ken Rogoff
  “Sovereign debt and the Dollar”

- Next webinars
  Raj Chetty  WEDNESDAY
  “Tracking real time impact of COVID”

  Veronica Guerrieri
DEBT

- The 2 roles of (defaultable) debt
  - Lending/Borrowing: transfer resources over time
  - Default: transfer resources across states of nature
  - Multiplicity problem

- Dynamics: Runs

- Debt holdout problem
  - CAC, SRDM, Paris Club
DEBT THEORY

- Many risk-neutral investors, $r^f = 0$

Diagram:
- Payoff of debt claim in $t = 2$
- Face value
- Cash flow/tax revenue
DEBT THEORY

- Many risk-neutral investors, $r^f = 0$, bankruptcy cost $c\%$ of face value
Many risk-neutral investors, $r^f = 0$, bankruptcy cost $c\%$ of face value.
Many risk-neutral investors, $r^f = 0$, bankruptcy cost $c\%$ of face value
Come in with legacy debt that needs to be rolled at $t = 1$
Illiquid equilibrium = RUN
(don’t rollover if others don’t)

Reprofiling/debt moratorium
- Forced to roll-over
- Rules out “bad equilibrium”

... but investors might fear moratorium and run before others run
RISK-AVERSE INVESTORS

- Many risk-neutral investors, $r^f = 0$, bankruptcy cost $c\%$ of face value

- Risk premia = price of risk * (exogenous + endogenous risk)

- 2 risks
  - Exogenous: $x$ cash flow payoff
  - Endogenous: jump in bad illiquidity equilibrium
**STRAITJACKET COMMITMENT**

- **Straitjacket commitment** (repay debt no matter what $x$ will be)
  - Use banks as “hostage” (doom loop)

- **Advantage**
  - Removes illiquid equilibrium (multiplicity)
  - Reduces risk premia

- **Disadvantage**
  - Debt overhang
  - Austerity measures
STRAITJACKET COMMITMENT

- Straitjacket commitment (repay debt no matter what $x$)
  - Use banks as “hostage” (doom loop)

- Advantage
  - Removes illiquid equilibrium (multiplicity)
  - Reduces risk premia

- Disadvantage
  - Debt overhang
  - Austerity measures

![Graph showing payoff of debt claim in $t=2$]

- Shifts cash flow distribution $x$
HOLD-OUT PROBLEM

- Many risk-neutral investors, $r^f = 0$, bankruptcy cost $C$

- Large investors can overcome multiplicity problem

- Debt hold-out: refusal to restructure

- Collective Action Clauses (CAC)
  - CAC lead to lower yield: Colla et al (2020)

- Sovereign Debt Restructuring Mechanism
IS SOVEREIGN DEBT DIFFERENT FROM PRIVATE DEBT?
IS SOVEREIGN DEBT DIFFERENT FROM PRIVATE DEBT?

- Sovereign debt often serves as safe asset

- Asset Price = \( E[\text{PV(cash flows)}] + E[\text{PV(service flows)}] \)
  - Service flows/convenience yield
    1. Collateral
    2. Safe asset \[\text{[good friend analogy]}\]
      - When one needs funds, one can sell at stable price
        ... since others buy
      - Partial insurance through re-trading - market liquidity!
    3. Money (medium of exchange)

\[ r^f + \text{risk premium} < g \]
ROLE OF THE DOLLAR

- Global anchor currency
  - Invoicing currency
  - Reserve currency
  - medium of exchange
  - store of value

- Triffin dilemma
  - Large supply of reserve currency needed
  - Large US deficit makes debt less safe
EMDE safe asset status often wobbly

\[ r + \text{RISK PREMIUM} < g \]

- Tranching: to concentrate risk premium on junior bond, eliminate risk premium on senior bond
- Real bond: to remove inflation risk from senior bond
- Pooling: to overcome commitment problem, not to create a supersenior bond later
POLL

- Should private debt be defaultable since this provides ex-post insurance and avoids debt-overhang problems
  - Yes
  - No

- Should sovereign debt be treated differently from private debt?
  - Yes
  - No

- Will the dollar maintain its global role
  - Yes
  - Other currencies will become more important
  - Digital currencies will become more important
Defaultable debt:
- Transfer resources over time and
- Insurance product across states
Self-fulfilling and (straitjacket) commitment not to default
Inflation default vs. outright default
  - Crossing the Rubicon
Reprofiling and dynamic incentives
  - Threat of reprofiling
  - Suspension of convertability
Sovereign debt versus corporate debt
SDRM
  - Hold-out problem and CAC: Pablo Colla and Elena Carletti
Paris Club and China
Dollar as international anchor currency
  - Reserve currency vs. invoicing currency
March 2020: record outflow

April 2020: stabilization

Flows during EME stress episodes

Source: National sources via Bloomberg.
Global Sovereign Debt and the Dollar Post-Covid

Kenneth Rogoff, Harvard University, June 12 2020
Princeton University Bendheim Center Series on
The Economic Implications of COVID-19
The Contracting Spiral of World Trade January 1929 to June 1933

Source: Reinhart and Rogoff, 2009 TTID ch 16
Reprinted from Monthly Reports of the Austrian Institute for Business Cycle Research 4 (1933); 63.
The Collapse of Exports, 1929-1932 Cumulative Change by Country
(1932 as percent of 1929)

Source: Reinhart and Rogoff (2009, ch 16)
Double Dip Example: US Banking Crisis of 1893

Source: Reinhart and Rogoff (AER 2014)
<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>% change Peak to trough</th>
<th>Number of years Peak to trough</th>
<th>Peak to recovery</th>
<th>Severity index</th>
<th>Double dip, yes=1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1926 Chile</td>
<td>-46.6</td>
<td>3</td>
<td>16</td>
<td>62.6</td>
<td>1</td>
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<tr>
<td>2</td>
<td>1931 Spain</td>
<td>-34.6</td>
<td>9</td>
<td>26</td>
<td>60.6</td>
<td>1</td>
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<tr>
<td>3</td>
<td>1983 Peru</td>
<td>-32.0</td>
<td>11</td>
<td>25</td>
<td>57.0</td>
<td>1</td>
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<tr>
<td>4</td>
<td>1931 Uruguay</td>
<td>-36.1</td>
<td>3</td>
<td>17</td>
<td>53.1</td>
<td>1</td>
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<tr>
<td>5</td>
<td>1893 Australia</td>
<td>-28.0</td>
<td>8</td>
<td>20</td>
<td>48.0</td>
<td>1</td>
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<tr>
<td>6</td>
<td>1929 Mexico</td>
<td>-31.1</td>
<td>6</td>
<td>16</td>
<td>47.1</td>
<td>1</td>
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<tr>
<td>7</td>
<td>1921 Italy</td>
<td>-25.5</td>
<td>3</td>
<td>21</td>
<td>46.5</td>
<td>1</td>
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<tr>
<td>8</td>
<td>1890 Brazil</td>
<td>-21.7</td>
<td>4</td>
<td>21</td>
<td>42.7</td>
<td>1</td>
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<tr>
<td>9</td>
<td>1923 Canada</td>
<td>-30.1</td>
<td>4</td>
<td>10</td>
<td>40.1</td>
<td>0</td>
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<tr>
<td>10</td>
<td>1890 Uruguay</td>
<td>-21.0</td>
<td>2</td>
<td>19</td>
<td>40.0</td>
<td>0</td>
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<tr>
<td>11</td>
<td>1981 Philippines</td>
<td>-18.8</td>
<td>3</td>
<td>21</td>
<td>39.8</td>
<td>1</td>
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<tr>
<td>12</td>
<td>1929 India</td>
<td>-8.2</td>
<td>9</td>
<td>31</td>
<td>39.2</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>1929/1933 US</td>
<td>-28.6</td>
<td>4</td>
<td>10</td>
<td>38.6</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>1939 Netherlands</td>
<td>-16.0</td>
<td>6</td>
<td>21</td>
<td>37.0</td>
<td>1</td>
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<tr>
<td>15</td>
<td>2008 Greece</td>
<td>-24.0</td>
<td>6</td>
<td>12</td>
<td>36.0</td>
<td>0</td>
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<tr>
<td>16</td>
<td>1980/1985 Argentina</td>
<td>-16.9</td>
<td>6</td>
<td>18</td>
<td>34.9</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>1920 UK</td>
<td>-18.7</td>
<td>3</td>
<td>16</td>
<td>34.7</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>1931/1934 Argentina</td>
<td>-19.4</td>
<td>3</td>
<td>15</td>
<td>34.4</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>1931 Poland</td>
<td>-24.9</td>
<td>4</td>
<td>9</td>
<td>33.9</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>1929/1931 Austria</td>
<td>-23.4</td>
<td>4</td>
<td>10</td>
<td>33.4</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Reinhart and Rogoff, AER 2014
Summary Statistics: Lessons from 100 Systemic Financial Crises over 150 years

<table>
<thead>
<tr>
<th>Descriptive statistic</th>
<th>% change Peak to trough</th>
<th>Number of years Peak to trough</th>
<th>Peak to recovery</th>
<th>Severity index</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Crises: Full sample</td>
<td></td>
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<td></td>
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<tr>
<td>Mean</td>
<td>-11.3</td>
<td>3.0</td>
<td>8.4</td>
<td>19.7</td>
</tr>
<tr>
<td>Median</td>
<td>-8.6</td>
<td>2.0</td>
<td>6.5</td>
<td>15.8</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>9.1</td>
<td>2.2</td>
<td>6.2</td>
<td>14.0</td>
</tr>
<tr>
<td>Share of episodes with double dip</td>
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</tbody>
</table>

| 63 Crises: Advanced economies |                         |                                 |                  |               |
| Mean                         | -9.6                    | 2.9                            | 7.4              | 17.0          |
| Median                       | -7.1                    | 2.0                            | 6.0              | 13.0          |
| Standard deviation           | 7.8                     | 1.9                            | 5.2              | 12.2          |
| Share of episodes with double dip |               |                                 |                  |               |

| 37 Crises: Emerging markets |                         |                                 |                  |               |
| Mean                        | -14.2                   | 3.2                            | 9.9              | 24.2          |
| Median                      | -13.3                   | 2.0                            | 8.0              | 22.1          |
| Standard deviation          | 10.4                    | 2.7                            | 7.4              | 15.9          |
| Share of episodes with double dip |               |                                 |                  |               |

Difference in means test (emerging minus advanced)

| Difference | 0.3 | 2.5 | 7.2 |
| p value    | 0.020** | 0.072 | 0.020** |

Source: Reinhart and Rogoff, AER 2014
Total debt has risen much more sharply than government debt
EMERGING MARKETS AND DEVELOPING ECONOMIES DEBT (% of GDP)

Source: Kose et al., *Global Waves of Debt*, World Bank, December 2019, IMF debt database
The run-up in domestic and external debt on the eve of external default: eighty-nine episodes, 1827-2003

Source: Reinhart and Rogoff, TTID 2009, ch 8
Debt intolerance: EM default occur at relatively low thresholds of external debt to GNP

<table>
<thead>
<tr>
<th>External debt-to-GNP range in first year of default or restructuring</th>
<th>Percent of total defaults or restructurings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 40 percent</td>
<td>13</td>
</tr>
<tr>
<td>41 to 60 percent</td>
<td>40</td>
</tr>
<tr>
<td>61 to 80 percent</td>
<td>13</td>
</tr>
<tr>
<td>81 to 100 percent</td>
<td>20</td>
</tr>
<tr>
<td>Above 100 percent</td>
<td>13</td>
</tr>
</tbody>
</table>

Reinhart, Rogoff and Savastano 2003, Reinhart and Rogoff, 2009, ch 2

Rogoff
Fiscal Multipliers in Emerging Markets and Developing Economies (cumulative over two years)

Source: Kose et al, Global Waves of Debt, World Bank, See also Ilzetski, Mendoza and Vegh (JME, 2013)
ADVANCED ECONOMY DEBT (% of GDP)

- Total
- Government
- Private

Kose et al., *Global Waves of Debt*, World Bank, December 2019, IMF debt database
EXPENDITURE ON INFRASTRUCTURE INVESTMENT HAS BEEN FALLING

Government investment as percentage of GDP, 2007, 2017 and 2018
Negative $r - g$ the norm over two centuries

<table>
<thead>
<tr>
<th>ADVANCED ECONOMY AVERAGE</th>
<th>61% of all country/years $r-g &lt; 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>62%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>55%</td>
</tr>
<tr>
<td>Japan</td>
<td>71%</td>
</tr>
<tr>
<td>Germany</td>
<td>50%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>EMERGING ECONOMY AVERAGE</th>
<th>75% of all country/years $r-g &lt; 0$</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>100%</td>
</tr>
<tr>
<td>India</td>
<td>62%</td>
</tr>
<tr>
<td>Brazil</td>
<td>56%</td>
</tr>
<tr>
<td>Mexico</td>
<td>57%</td>
</tr>
</tbody>
</table>

Data source: Paulo Mauro and Zhou, IMF (2020)
Clearly, $r - g < 0$ has not interfered with steady upward march in government debt

Chart from Pierre Yared, *JEP*, 2019

Government debt to GDP is gross central government debt as a percentage of GDP from Reinhart and Rogoff (2011). GDP is from from Feenstra, Inklaar, and Timmer (2015). The sample of advanced economies is a balanced panel which includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States. The line for advanced economies (excluding the U.S.) represents the GDP-weighted average for each observation year.
Contingent liabilities have risen even faster than conventionally measured public debt

• After the Great Depression and World War II, state and local debt, as well as corporate debt, had shrunk drastically after years of defaults, Depression and War (Reinhart and Rogoff, 2010b, Reinhart, Reinhart and Rogoff, 2012)

• The modern welfare state, featuring especially old-age pension and health guarantees did not exist, but today these are far larger than conventional debt by any measure (Auerbach, Gokhale and Kotlikoff, 1991)
Public Expenditures on Pensions as a percent of GDP, 2017

% GDP

Source: Rogoff, 2020, based on OECD, 2019
Social expenditures as a percent of GDP, 1960, 2000 and 2018

Source: Rogoff, 2020, based on OECD 2019
One major factor making “safe debt” so safe:
Measures of Debt in the Modern Welfare State

Public debt reduction has not always been orthodox -- even in advanced economies

*Reinhart, Reinhart and Rogoff (JIE 2015)*

Factors Behind Debt Reversals:
Fiscal Adjustment, Restructuring, Inflation, Growth, and Real Interest Rates

<table>
<thead>
<tr>
<th></th>
<th>Growth &gt; median</th>
<th>Growth &lt; median</th>
<th>Primary balance &gt; median</th>
<th>Primary balance &lt; median</th>
<th>Real rates &gt; median</th>
<th>Real rates &lt; median</th>
<th>Inflation &gt; median</th>
<th>Inflation &lt; median</th>
<th>Default or restructuring &gt; median</th>
<th>Default or restructuring &lt; median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sample, 70 episodes</td>
<td>38</td>
<td>41</td>
<td>41</td>
<td>41</td>
<td>16</td>
<td></td>
<td></td>
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<tr>
<td>Number of episodes</td>
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<tr>
<td>Share</td>
<td>0.54</td>
<td>0.61</td>
<td>0.59</td>
<td>0.59</td>
<td>0.23</td>
<td></td>
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<tr>
<td>Post-war cases, 36 episodes</td>
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<tr>
<td>Number of episodes</td>
<td>21</td>
<td>16</td>
<td>30</td>
<td>30</td>
<td>9</td>
<td></td>
<td></td>
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<tr>
<td>Share</td>
<td>0.58</td>
<td>0.48</td>
<td>0.86</td>
<td>0.83</td>
<td>0.25</td>
<td></td>
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<td>Peacetime, 34 episodes</td>
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<tr>
<td>Number of episodes</td>
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<td>25</td>
<td>11</td>
<td>11</td>
<td>7</td>
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<tr>
<td>Share</td>
<td>0.50</td>
<td>0.74</td>
<td>0.32</td>
<td>0.32</td>
<td>0.21</td>
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</tbody>
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Memorandum items:
Share of debt reduction episodes associated with deflation

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Total</td>
<td>0.07</td>
<td></td>
<td></td>
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<tr>
<td>War</td>
<td>0.11</td>
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<tr>
<td>Peace</td>
<td>0.03</td>
<td></td>
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</tbody>
</table>

*Source: Reinhart, Reinhart and Rogoff (JIE 2015)*
The Geography of Anchor Currencies, 2015

Iltzetski, Reinhart and Rogoff, 2017
Role of the Dollar and US Economy 1950-2015:

- **US GDP as a share of world GDP** (percent, right scale)
- **Share of countries where the US dollar is the principal anchor currency** (percent, left scale)

Source: Iltzetski, Reinhart and Rogoff, 2017

Rogoff
Marketable Debt Outstanding, 2018

Note: The left panel shows the marketable central government outstanding in billions of US dollars in 2018 for France and Germany, all Eurozone countries (including France and Germany) and the US. The right-hand panel shows corporate bonds outstanding and total corporate bank lending as a percent of GDP in the Eurozone and the US.

Ilzetski, Reinhart and Rogoff (Economic Policy 2020).
Foreign Holdings as Share Marketable Government Debt

<table>
<thead>
<tr>
<th>Year</th>
<th>US</th>
<th>Germany</th>
<th>France</th>
</tr>
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<tbody>
<tr>
<td>1999</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
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<td></td>
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<td>2009</td>
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<tr>
<td>2014</td>
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Note: Percent share of marketable government that is held by foreign investors (private and official sectors).
Thank you