Historical Patterns and Dynamics of Public Debt – Evidence From a New Database

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Motivation and Objectives

- Renewed interest in historical episodes of large public debt changes since the financial crises:

    - Provide a public good

    - Examine—in a historical context—the drivers of large episodes of debt changes for 19 advanced economies

Preview of Key Findings

- Debt data very elusive, with different definitions and coverage

- Historical pattern of negative correlation between debt and growth

- Episodes of debt declines were mainly driven by the primary balance, while debt build-up episodes were associated with larger stock-flow adjustments

- Asymmetry in debt drivers over time

I. Historical Public Debt Database (HPDD)

Existing Datasets

- IFIs and regional bodies electronic databases: WEO, IFS, GDF, OECD, and ECLAC—*Most widely used, but limited coverage*

- Individual Researchers: Missale (2000), Flandreau and Zumer (2004), Christensen (2005), Cowan et al. (2006), Guscina and Jeanne (2006), Fouad et al. (2007), Jaimovich and Panizza (2010), Abbas and Christensen (2010)—*Limited coverage and not updated*

- Reinhart and Rogoff (2010)
  - Coverage is deep but not wide
  - Subject the data to manipulations

Data Overview

- **Unbalanced panel:** 1880-2009 with 174 countries

- **Data sources**: Statistical handbooks, official publication, and individual datasets
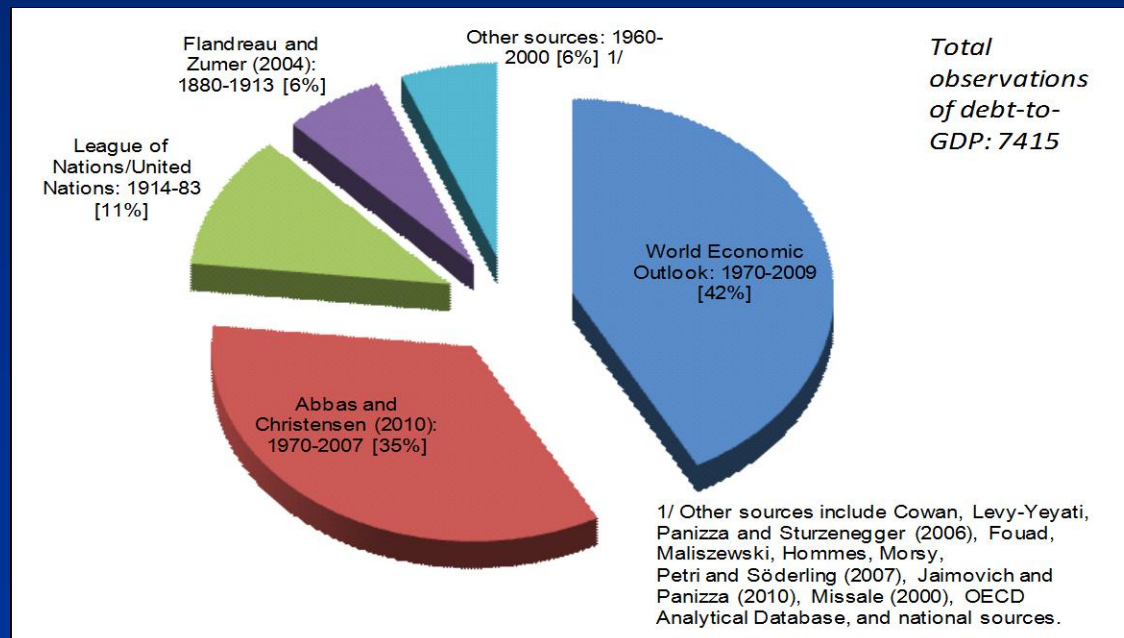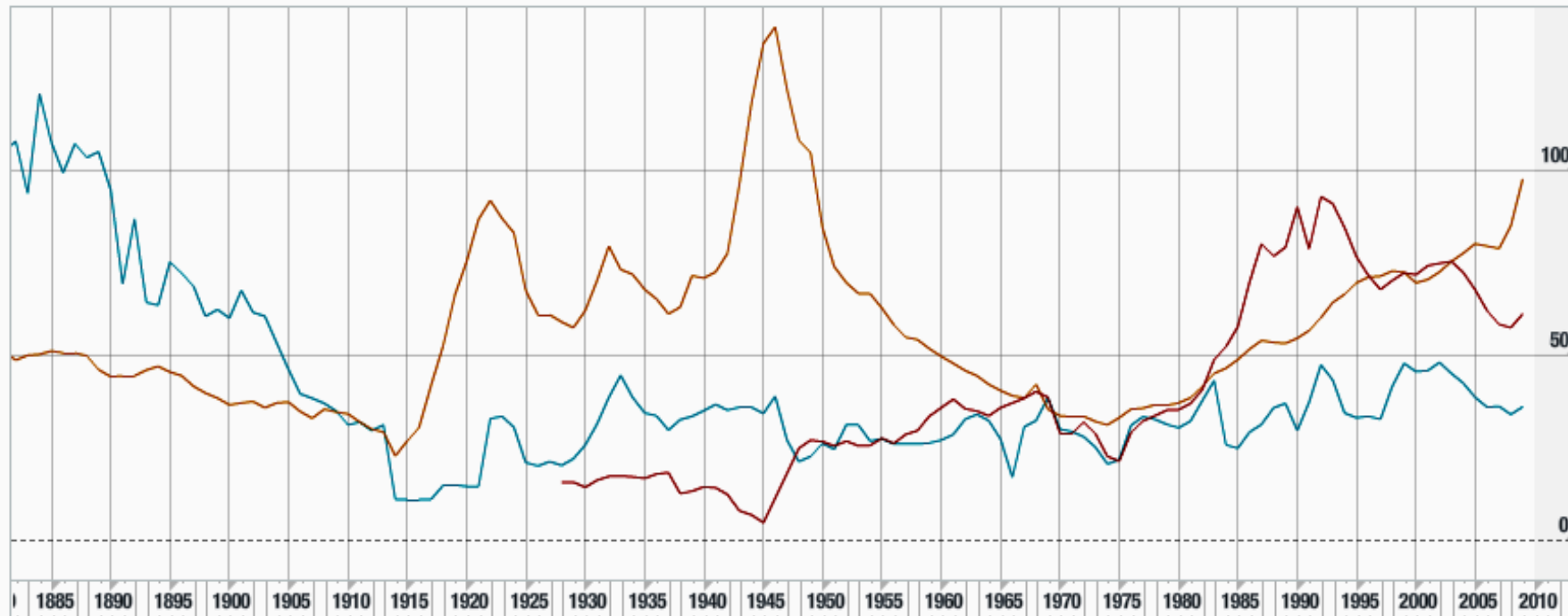
Evolution of Debt-to-GDP Across Countries
(1880-2009; group PPPGDP averages, percent)
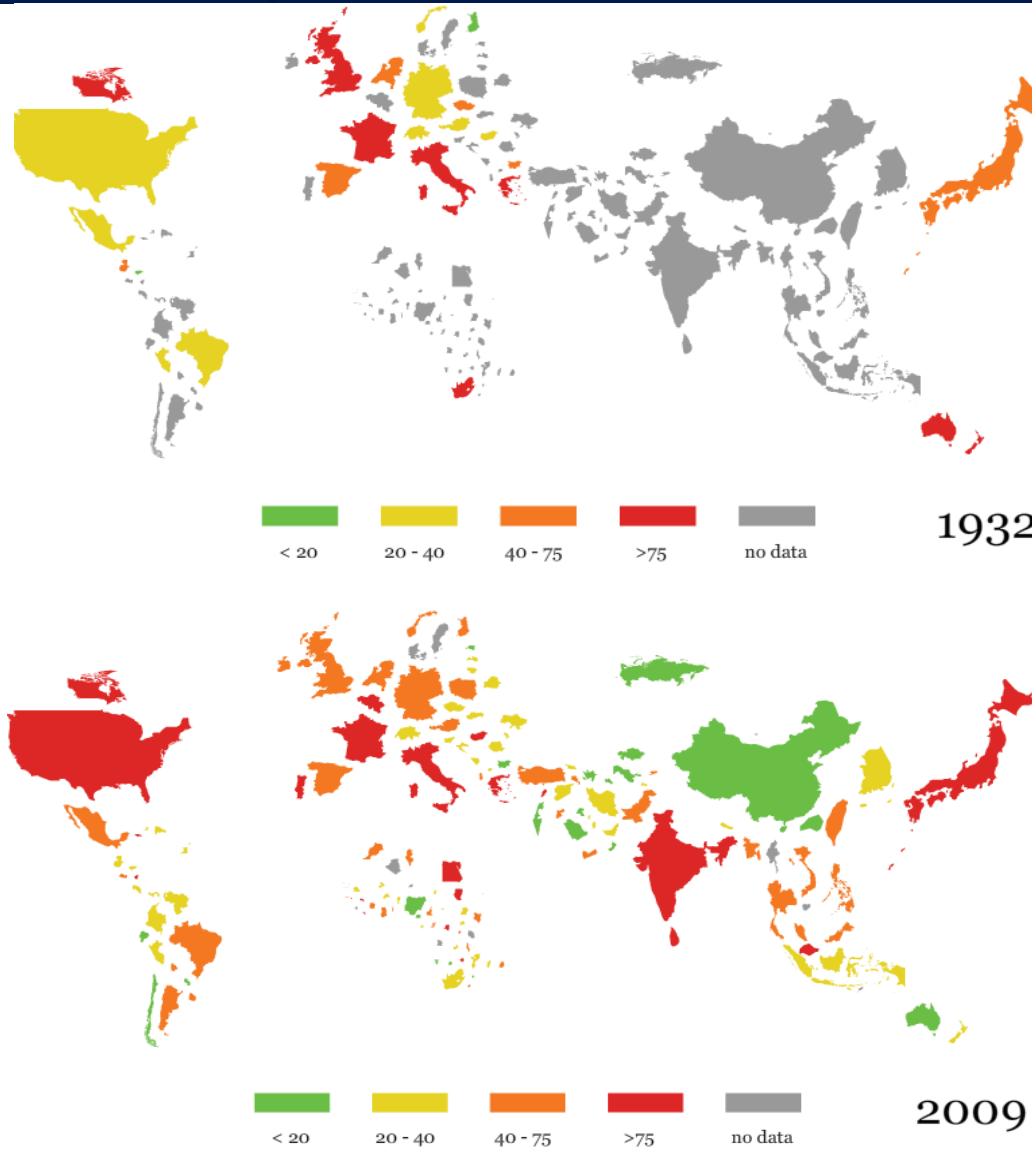

IMF Data Mapper ®

DEBT (% of GDP)

- G-20 Advanced
- G-20 Emerging
- Low Income

©IMF, 2010, Source: Fiscal Affairs Departmental Data

A Tale of Two Crises:
## *The Great Depression Vs. The Great Recession*

The current situation looks worse because of three factors:
- Weaker starting positions (debt in 2007 20 ppt. higher than in 1928)
- Sharper drop in revenues (due to stronger asset-price/financial sector link)
- Stronger fiscal stimulus and financial sector support

color-coded for debt-to-GDP ratios; countries sized by 2009 PPPGDP

Relationship Between Debt and Growth

DEBT (% of GDP)
Source: Fiscal Affairs Departmental Data
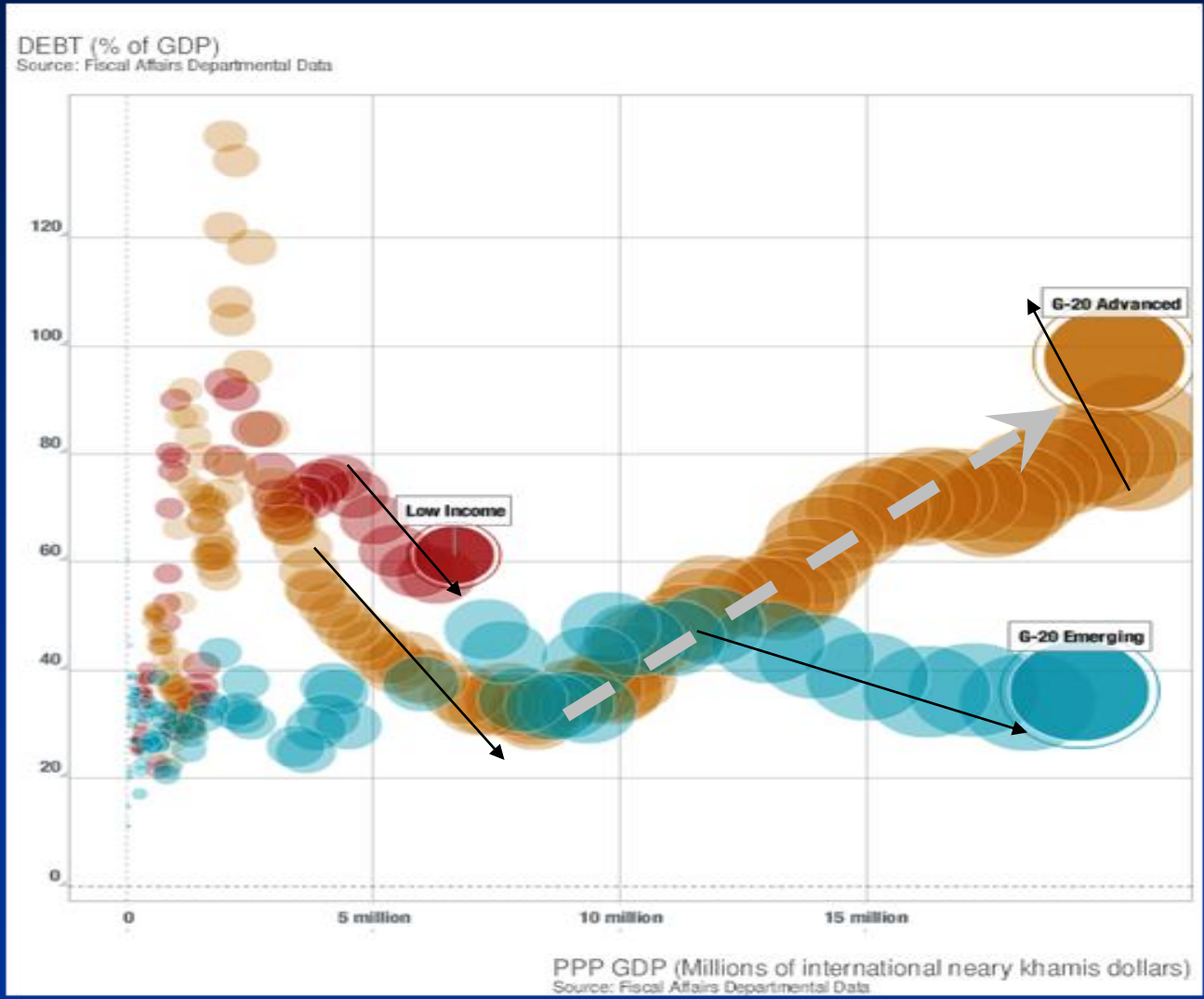
Was the contemporaneous increase in debt levels and incomes since 1970 in advanced economies anomalous?

G-20 Advanced

Low Income

G-20 Emerging

PPP GDP (Millions of international neary khamis dollars)
Source: Fiscal Affairs Departmental Data

II. Sources of Large Public Debt Changes in Advanced Economies

Literature on Key Sources of Debt Changes

- Easterly (2001): growth

- Campos et al. (2006): stock-flow adjustment term

- IMF (2010): primary surplus

- Reinhart and Sbrancia (2011): real interest rates and "debt liquidation"

# Methodology of Episode Identification

- Focus on sustained changes in sovereign indebtedness

- Major episodes: changes of more than 10 percentage points in the debt ratio, allowing temporary reversals

- Extracted 66 episodes of debt declines and 63 episodes of debt increases

Distribution of Debt Decline Episodes
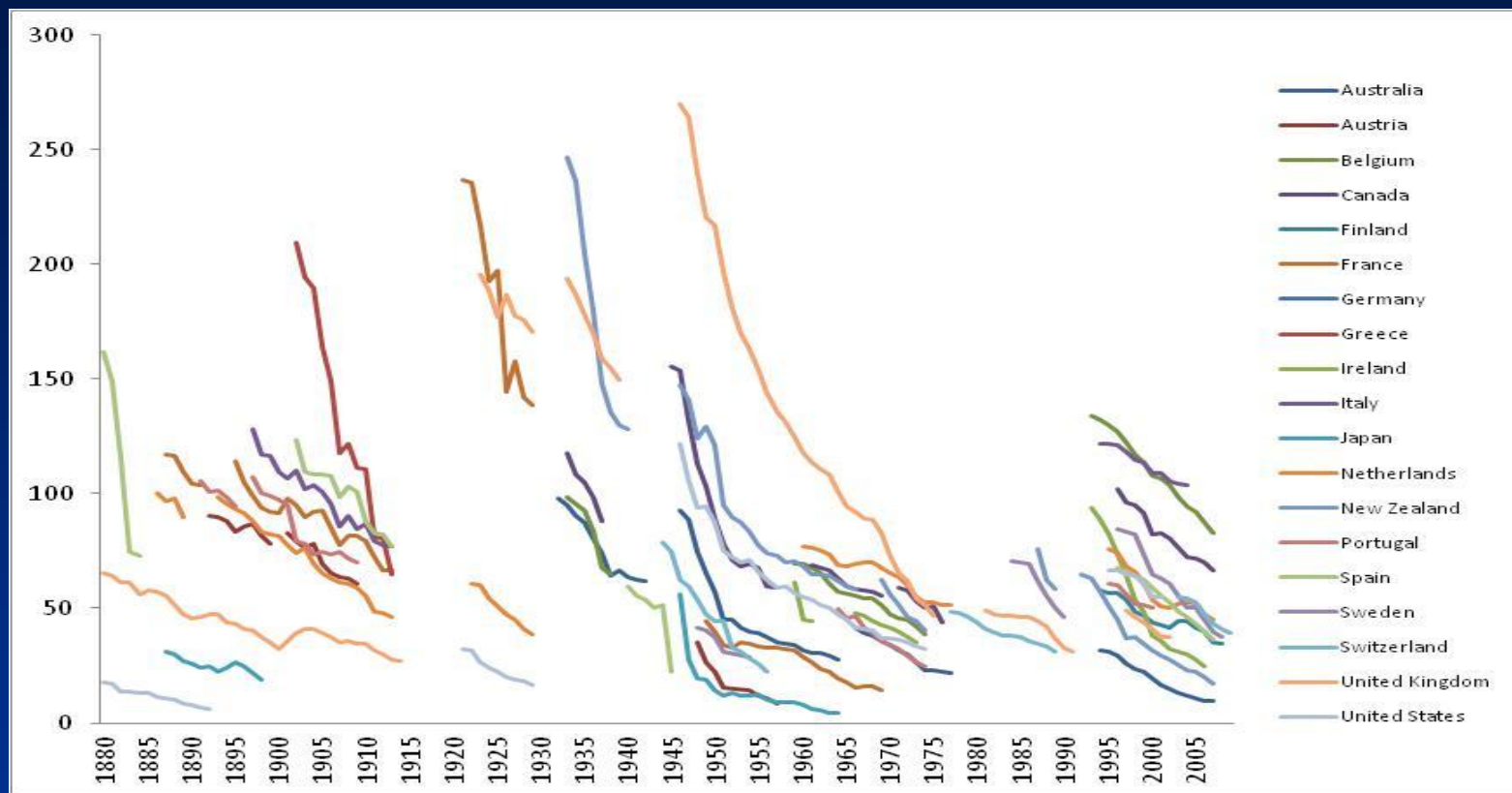
- Most episodes were long (more than 5 years)
- Half of episodes had a high start debt-to-GDP ratio (≧ 80%)
- 2/3 of episodes were large (decline of more than 20 ppt)
- 2/3 of episodes recorded "slow" declines (less than 5 ppt/year)

Distribution of Debt Build-Up Episodes
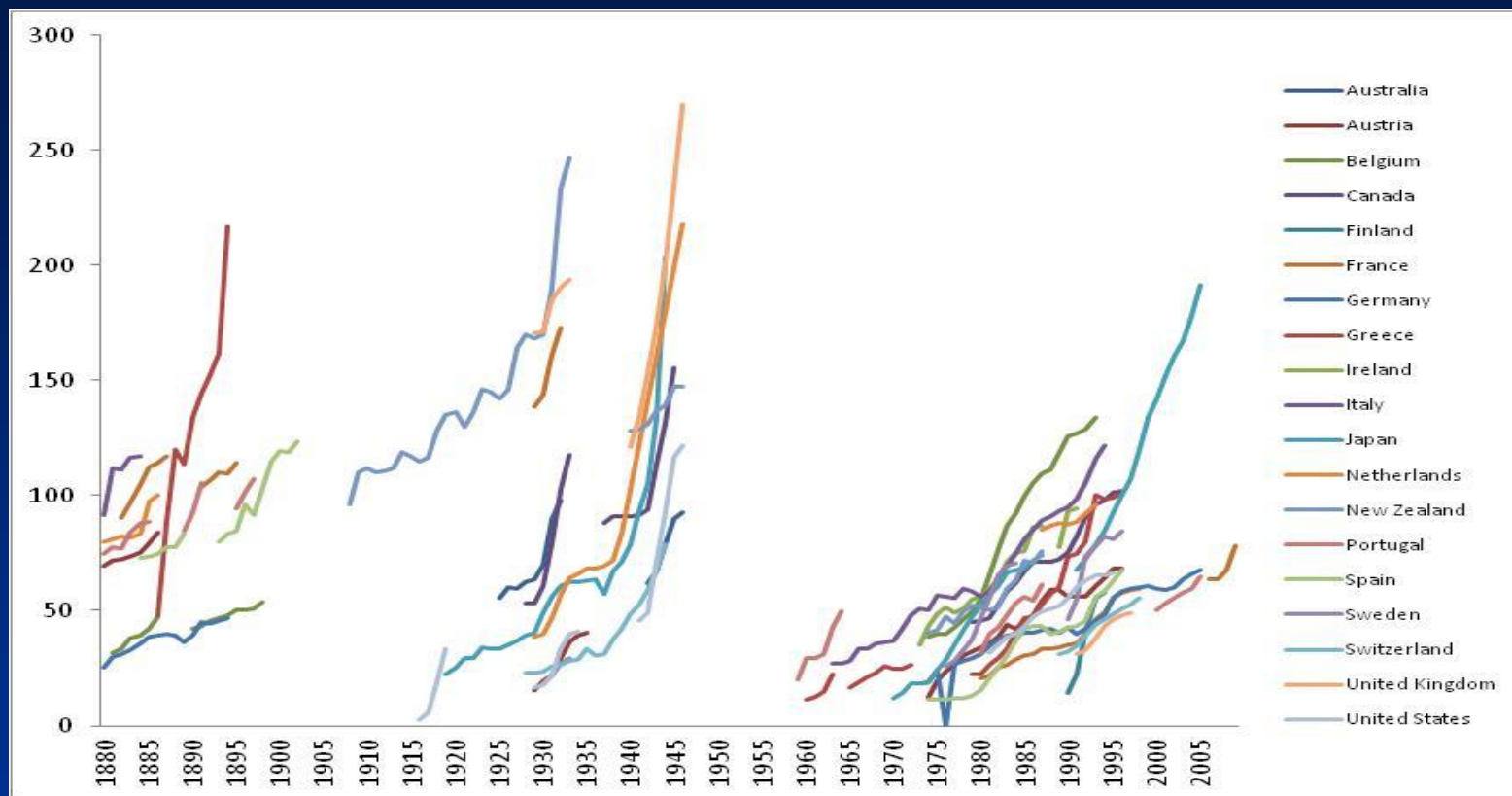
- Most episodes were long (more than 5 years)
- 2/3 of episodes had a low start debt-to-GDP ratio (<60%)
- 2/3 of episodes were large (increase of more than 20 ppt)
- 2/3 of episodes recorded "slow" increases (less than 5 ppt/year)

Methodology of Debt Decomposition and Fiscal Flow Data Collection

$$d_t - d_{t-1} = \frac{i_t - \gamma_t}{1 + \gamma_t} d_{t-1} - p_t + sfa_t$$

- Debt decomposition: standard equation with an sfa term—Limitation

- Data on primary balances and interest payments from 1880-2010 for 19 advanced economies (14 EU)

- Data sources: Official Sources, UN, LoN, Flandreau and Zumer (2004), OECD, and WEO

Illustration: Decomposition of Large Debt Decline Episodes for the U.S.

Decomposition of Large Debt Reduction Episodes in the US, 1880--2009
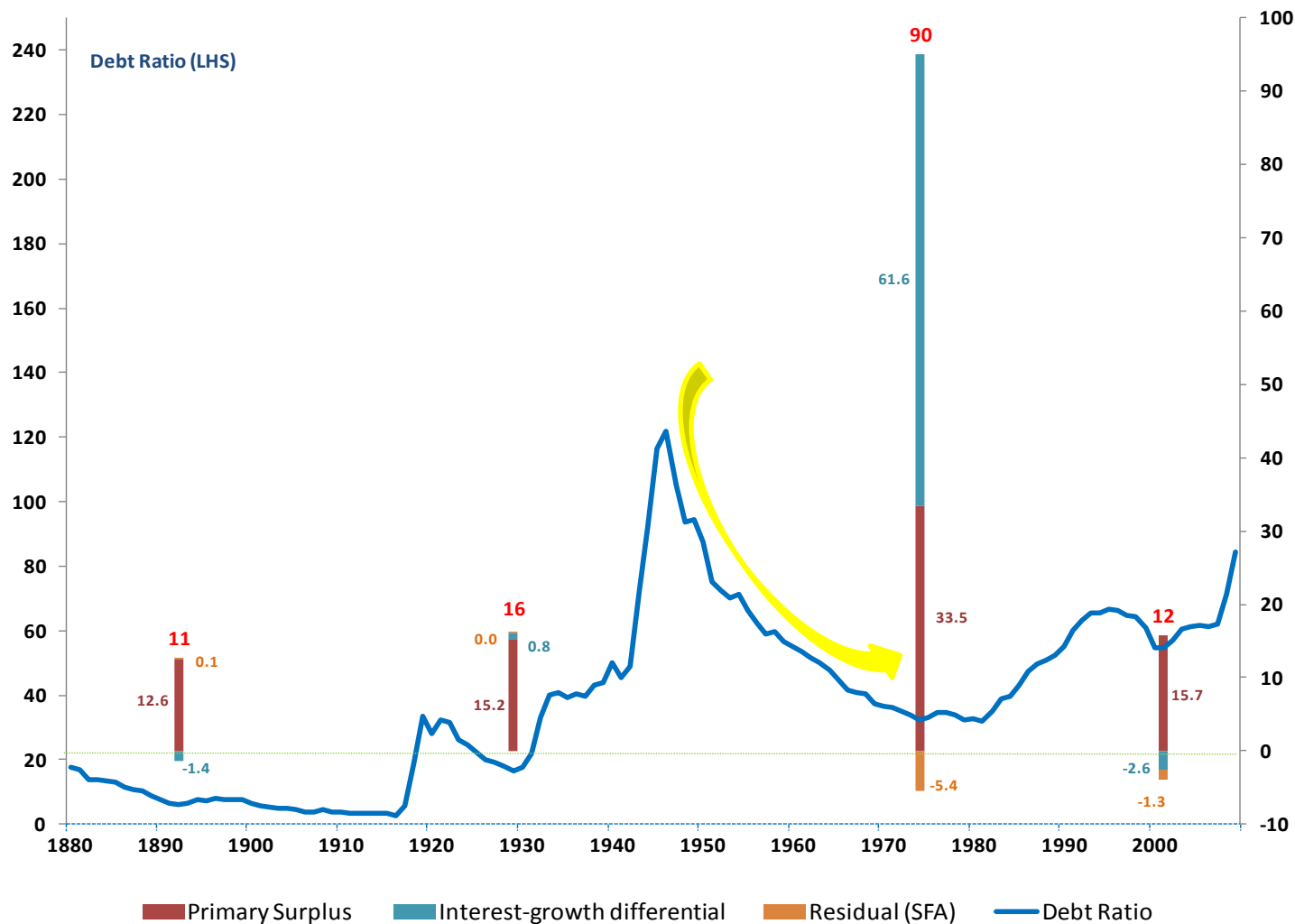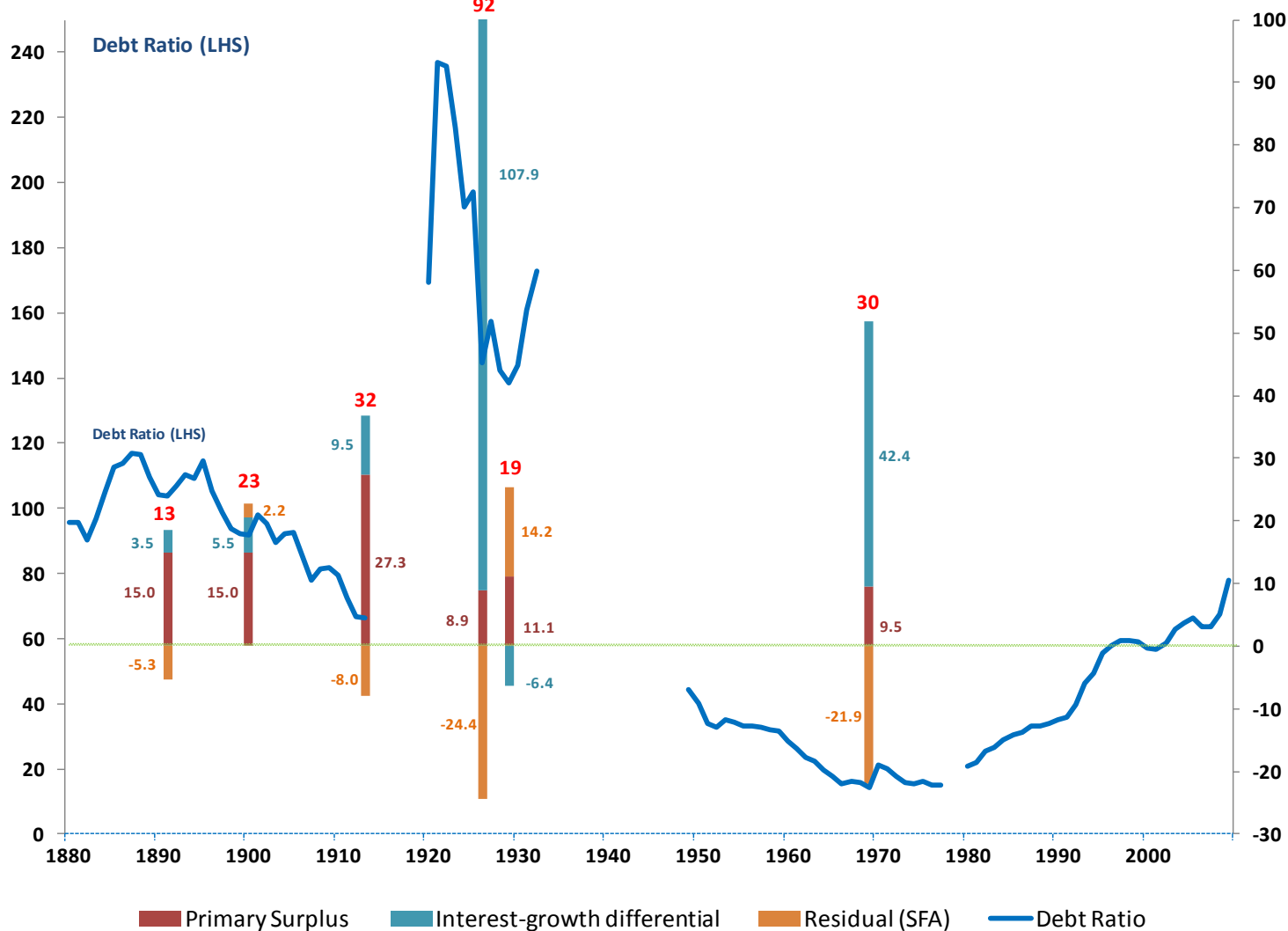(In percent of GDP)

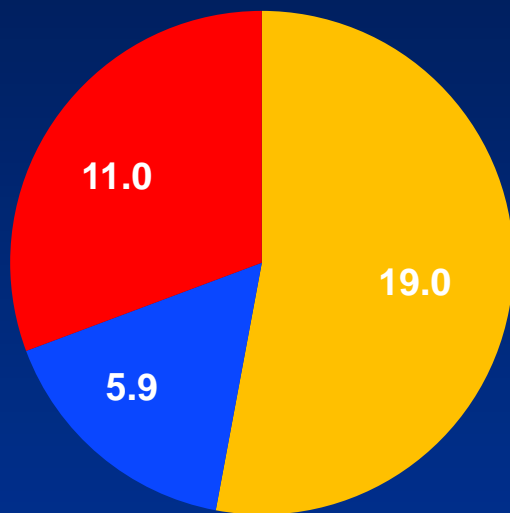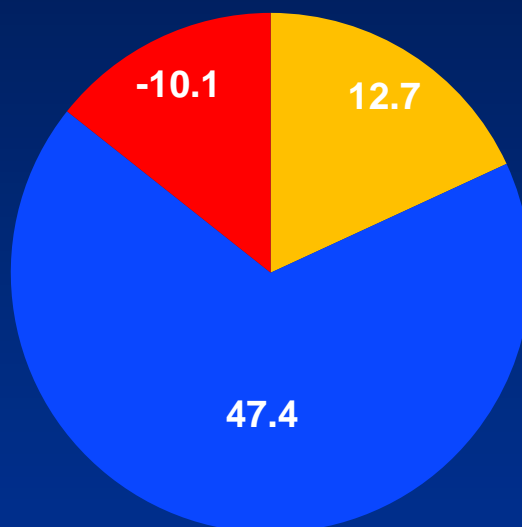Legend: Primary Surplus — Interest-growth differential — Residual (SFA) — Debt Ratio

Decomposition of Large Debt Reduction Episodes in France, 1880--2007
(In percent of GDP)

Sources of Debt Decreases Over Time

Before 1914
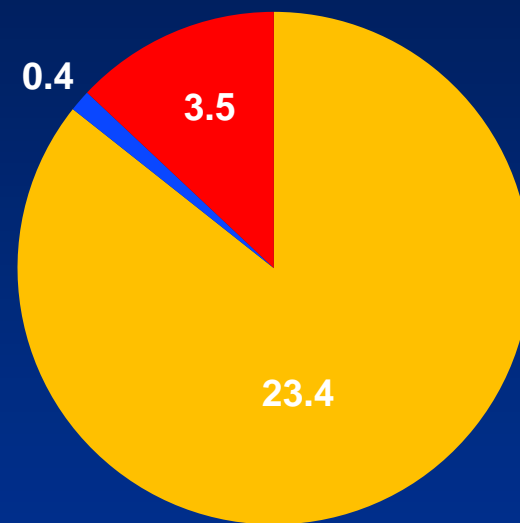**(av. reduction of 36 percentage points)**

1945-1970
(av. reduction of 50 percentage points)

After 1970
(av. reduction of 27 percentage points)

11.0   19.0   5.9

-10.1   12.7   47.4

0.4   3.5   23.4

■ **Primary surplus**

■ **Interest-growth differential**

■ **SFA residual**

Full sample median: decrease of 26 percentage points originating from primary balance (15%) and debt dynamics (12%)

Interest-Growth Differential was a Main Driver of Debt Declines Post World War II
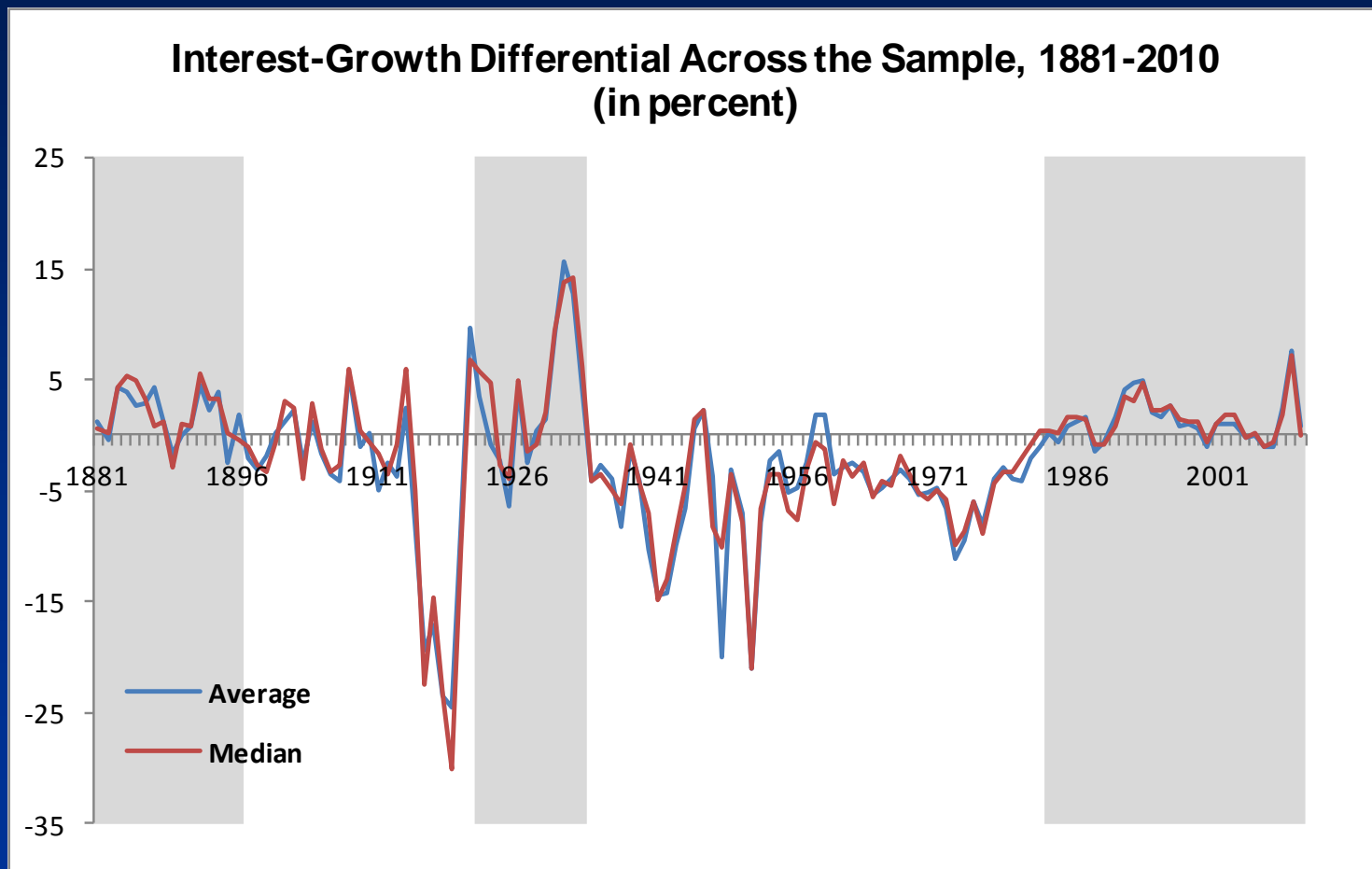

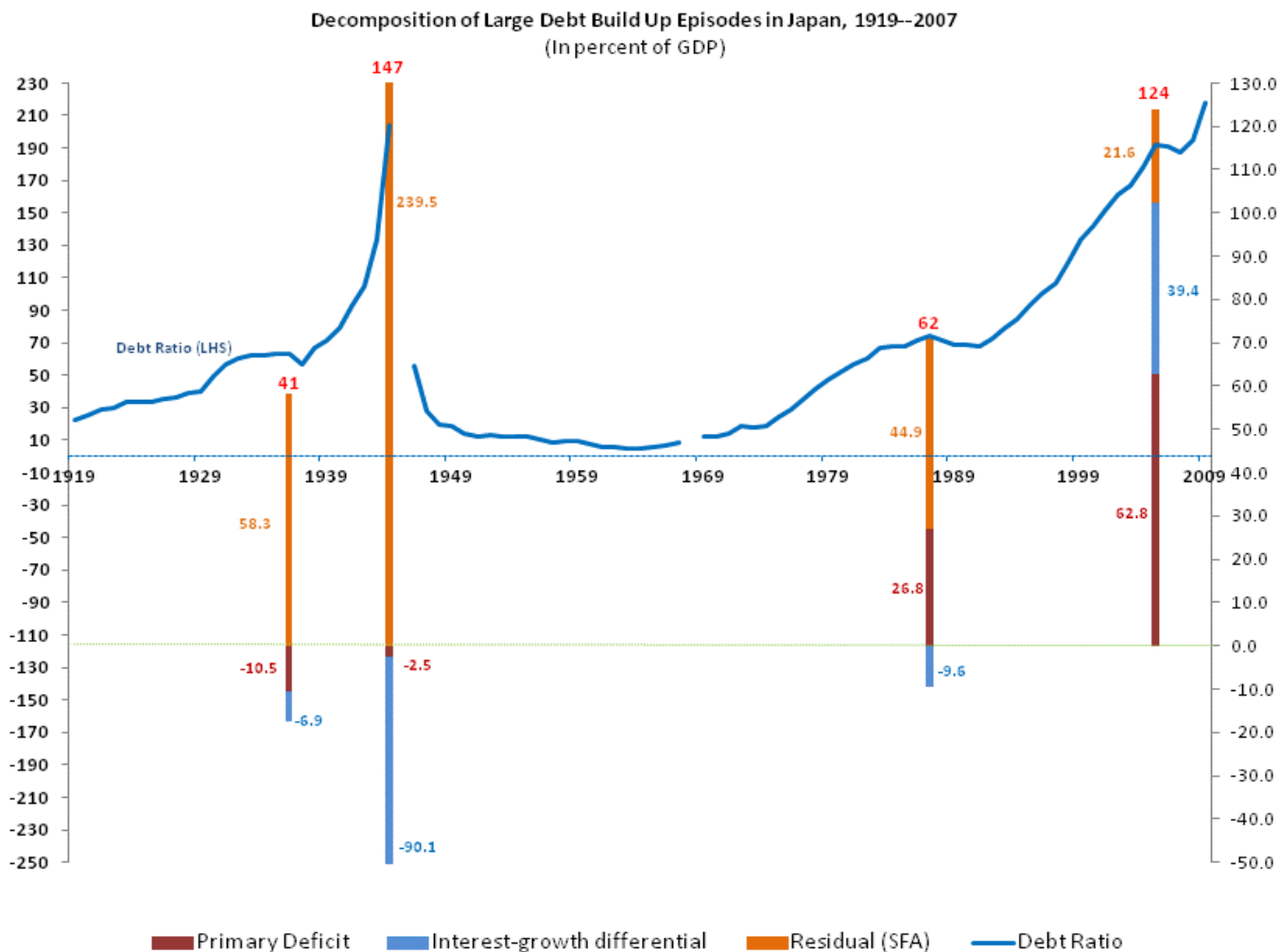Interest-Growth Differential Across the Sample, 1881-2010 (in percent)

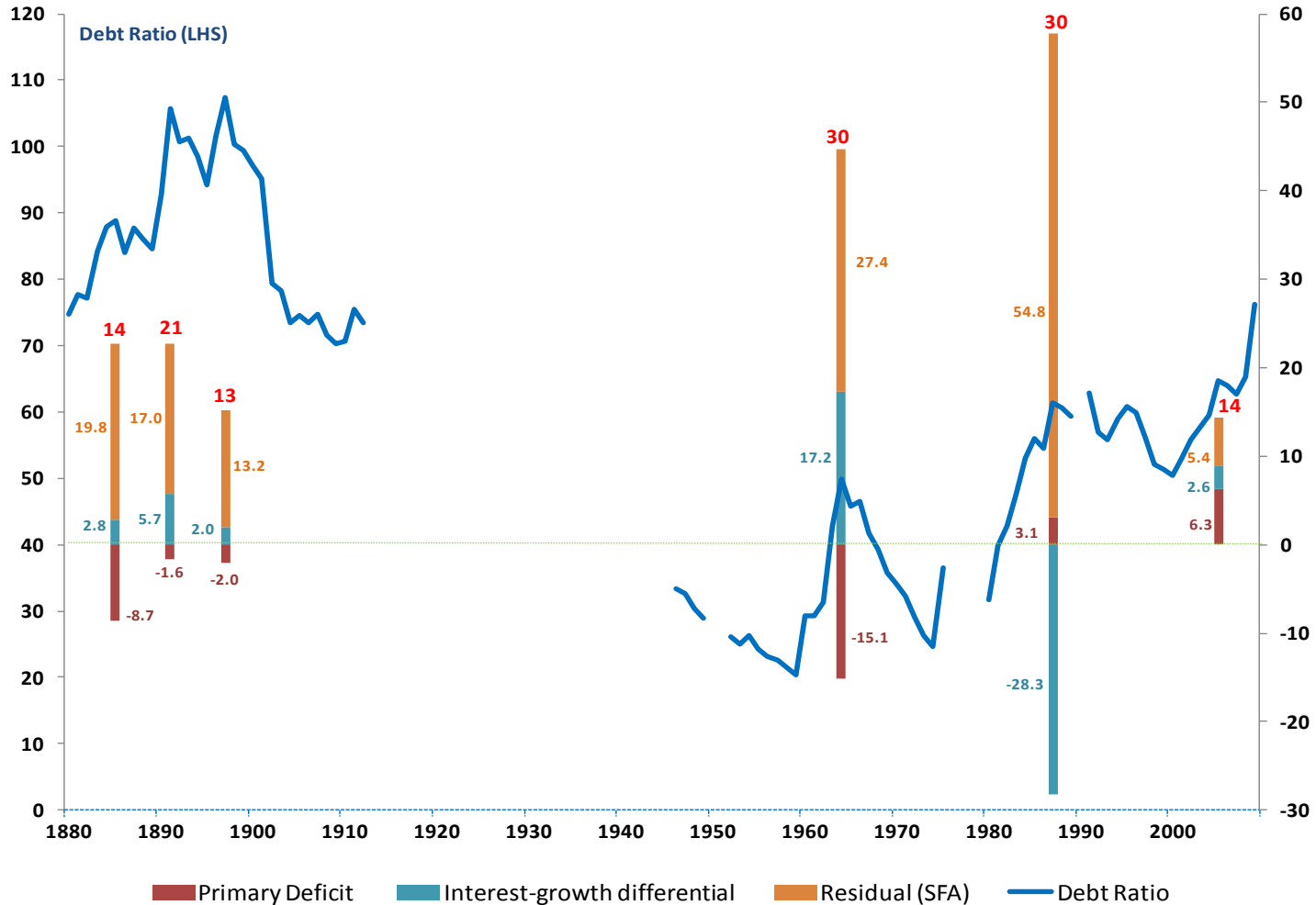# Illustration: Decomposition of Large Debt Build-Up Episodes for Japan

Decomposition of Large Debt Build Up Episodes in Japan, 1919--2007
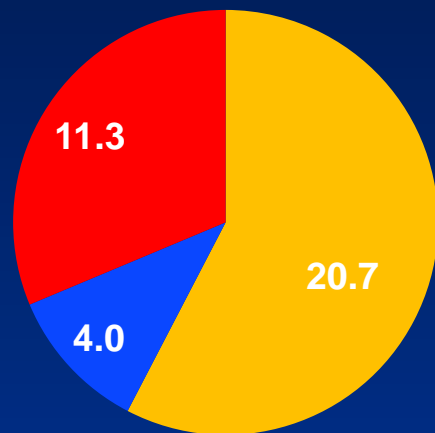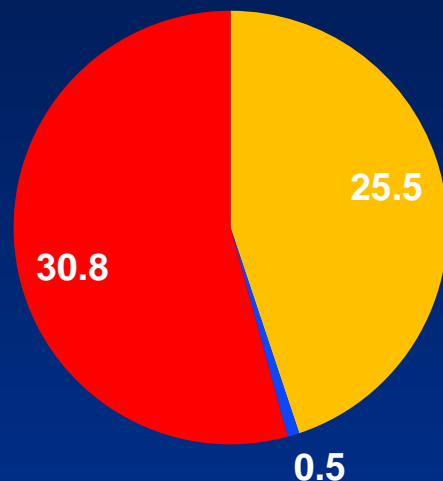(In percent of GDP)

Decomposition of Large Debt Build Up Episodes in Portugal, 1880--2007
(In percent of GDP)

Sources of Debt Increases Over Time

Before 1914
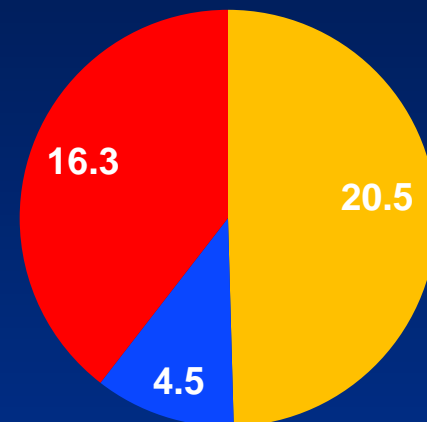**(av. increase of 36 percentage points)**

1945-1980
(av. Increase of 60 percentage points)

1980-2007
(av. Increase of 41 percentage points)

Before 1914: 11.3, 4.0, 20.7

1945-1980: 30.8, 25.5, 0.5

1980-2007: 16.3, 4.5, 20.5

■ **Primary deficit**

■ **Interest growth differential**

■ **SFA residual**

- Full sample median: increase of 31 percentage points from primary balance (6%), debt dynamics (7%) and sfa term (17%)

- <u>Current financial crisis (2007-2010)</u>: on average 23 percentage points rise from primary balance (10%), debt dynamics (8%) and sfa term (5%)

Behavior of The Unexplained Part of Debt

Stock-Flow Adjustment (SFA) Residual		
	For debt increase episodes (63)	For debt decrease episodes (66)
Number of occurences of positive SFAs	55	30
"Absolute SFA" ÷ "Δ debt" (median ratio over episodes)	45 %	29 %

- Positive SFAs observed in almost all episodes of debt increases, but only in about half of debt decline episodes
- "Absolute SFAs" contributed half of the increases in debt. However, during 2007-10, |SFA| contributed about a quarter of the debt increases
- SFAs could reflect poor data quality, currency valuation effects, and/or "below-the-line" nature of fiscal costs during crises
- They could also reflect "fiscal transparency under pressure": an attempt to hide deficits/spending in bad times

Summing up and Future Work

- The primary balance has been a major source of debt declines. But (i-g) quite favorable right after WW II

- Debt build-ups were associated with notably larger SFAs. Primary deficits relatively less prominent (esp. over 1914-1980)

- Periods of free capital movement appear to afford less scope for delivering favorable (i-g) to liquidate debt

- **Ideas for further work:**

  - Unpack SFAs: debt assumptions/restructuring? valuation effects? other?
  - Revenue-expenditure mix
  - Quantify "cyc.adj" primary deficit component
  - Sustainability tests (fiscal policy reaction function)

Thank you!