Lecture Ten International Debt Crisis

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Outline

- 1. Overview of International Debt Crisis
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 - 1.2 Interlink of Three Types of Crises
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Debt Crises of Advanced Countries in History



Source: Reinhart(2018), "Government Debt/GDP, 1900–2017". These debts stand at or near historic highs in a number of advanced economies. If contingent liabilities (private debts and pensions) are added (not an issue at the end of WWII) current levels far exceed prior peaks.

Debt Crises for Advanced and Emerging Countries



Source: Reinhart et al.(2012). Figure 1. "Gross Central Government Debt as Percent of GDP (unweighted averages)".

Financing for the War: the United Kingdom



the United Kingdom (from Barro, 1987; used with permission)

Source: Romer, D. 2012, Advanced Macroeconomics, McGraw Hill Higher Education. British military spending as a share of GNP (relative to the mean of this series for the full sample) and the long-term interest rate.

Note: Wikiwand provides more information of war involving U.K.

Financing for the War: 1800 – 1950



- France - Germany - United Kingdom - United States

Note: Debt Ratio to GDP. Data from Historical Public Debt Database(IMF). The dotted red line for the American Civil War, the dotted blue line for WWI and WWII.

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Financing for Economic Growth: 1945 - 2015



- France - Germany - United Kingdom - United States

Note: Debt Ratio to GDP. Data from HPDD. The red dotted line for the Nixion Shock(1971), the dotted blue line for the government of R. Reagan in U.S.(1981 to 1989), and the solid blue line for the government of M. Thatcher in U.K.(1975 to 1990).

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Currency and Debt Crisis



Source: Laeven and Valencia(2018).

Bank Lending and Public Debt in History



Source: Jordá et al.(2016).

Public Debt after Banking Crisis

Cumulative increase in public debt in the three years following the banking crisis



Source: Reinhart et al.(2018).

Cost of the Crises

TABLE 11-1

Costs of Sovereign Defaults, 1970–2000 Output losses can be very large after a default, as measured by deviation from trends. While a default-only crisis may be short and not costly, the more common twin and triple crises last much longer and have very high costs.

Type of Crisis	Number of Crises	Average Length (years)	Mean Cost per Year (% of GDP)				
Default only	4	3	-1.0				
Default and exchange rate crisis	13	5	10.3				
Default and banking crisis	7	8	13.2				
Triple crisis	21	10	21.7				
All crises	45	8	15.1				
Source: Bianca De Paoli, Glenn Hoggarth, and Victoria Saporta, 2006, "Costs of Sovereign Default," Bank of England Quarterly Bulletin, Fall.							

Government Debt to GDP: 2015



Source: Historical Public Debt Database, IMF.

Public Debt Ratio and Debt Risk: 2015

Figure 1.6. Indicators of Fiscal Space in Advanced Economies and Emerging Market and Middle-Income Economies¹



2. Emerging Market and Middle-Income Economies

Source: IMF(2016a).

1. Advanced Economies

Total Debt Ratio: Developed vs. Emerging Markets



Source: Buttiglione et al.(2014). Authors' calculation based on OECD, IMF and national accounts data.

Breakdown of Total Debt Ratio by Sector



Source: Buttiglione et al.(2014). Authors' calculation based on OECD, IMF and national accounts data.

Private Debt Deleveraging vs. Public Debt Accumulation



Source: IMF(2016b).

Private vs. Public Debt by Country



Table 1.1. Private Sector Deleveraging Episodes: Basic Facts

Country	Start	End	Initial Private Debt (percent of GDP)	Initial Public Debt (percent of GDP)	Duration	Size of Deleveraging (percentage points)	Sector
Finland	1992	1998	164	39	6	55	NFC
Japan	1995	2007	221	95	12	55	NFC
Korea	1997	2004	163	10	7	24	NFC
Thailand	1997	2007	182	40	10	91	NFC
Iceland	2007	2015	272	27	7	176	HH
United States	2008	2013	168	73	5	19	HH

Source: IMF staff estimates.

Note: Following Chen and others (2015), the start and end of the deleveraging episodes correspond, respectively, to peaks and troughs in the private-debt-to-GDP ratio, with the exception of that in Iceland, where deleveraging is still ongoing. HH = household sector; NFC = nonfinancial corporate sector.

Source: IMF(2016b).

A Tale of Two Crises



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 assetprice/financial sector link)
Stronger fiscal stimulus and financial sector support

Source: Abbas et al.(2011). "Debt-to-GDP ratios comparision of the Great Depression and the Great Recession" in slides, with countries sized by 2009 PPPGDP.

Debt Decline Episodes



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

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%)
- 2/3 of episodes recorded "slow" increases (less than 5%/year)

Sources of Changes in Debt Ratios

From the government budget constraint:

$$D_t = D_{t-1} (1 + i_t) + P_t + V_t$$

Where:

- *D_t* is the stock of public debt;
- $P_t = G_t T_t$ is the accumulation of debt from primary deficit;
- *V_t*: revaluation of the debt, capturing revaluation effects and "below-the-line" fiscal operations (financial sector recapitalization, privatization and so on), as well as errors and omissions.

With the notation $X_t/Y_t = x_t$ and $Y_t = Y_{t-1}(1 + g_t)$, there is:

$$d_t = d_{t-1}\frac{1+i_t}{1+g_t} + p_t + v_t$$

Three Components of Debt Change

Since $d_t = d_{t-1}\frac{1+i_t}{1+g_t} + p_t \Rightarrow d_t - d_{t-1} = d_{t-1}\frac{i_t - g_t}{1+g_t} + p_t$, it's easy to verify that:

$$d_t - d_0 = \sum_{s=1}^t d_{s-1} \frac{i_s - g_s}{1 + g_s} + \sum_{s=1}^t p_s + \sum_{s=1}^t v_t$$

The total episode change in the debt-to-GDP ratio is the sum of three components:

- the product of the lagged debt ratio and the differential between the interest rate on debt and the nominal GDP growth rate, cumulated over the episode years;
- the cumulative primary deficit;
- the cumulative revaluation term.

Decompose of Contributions



Note: Figure 8. Scatterplot of Interest-Growth Differential and Primary Deficit Contributions (cumulative contribution over episode; in percentage points). Full (empty) circles indicate episodes of debt increases (decreases); circle size is proportional to the magnitude of debt ratio change. Debt ratio increases and decreases larger than 100 percent of GDP not shown.

The Probability of Default and Debt Demand

The government's decision of default or not depends on the comparison of consumptions under repayment and default:



The repayment condition implies a threshold of Y_T . When $Y > Y_T$, the government will repay the debt, otherwise, default occurs with $Y < Y_T$:

$$Y_T = \frac{(1+r_L)\,L}{c}$$

In addition, when the output level $Y \in [\bar{Y} - V, \bar{Y}]$, the probability of debt repayment can be defined as:

$$p = \frac{\bar{Y} - Y_T}{V} = p\left(\underbrace{r_L; c, V}_{-}\right)$$

Repayment vs. Default



An Increase in the Debt Burden: $r_L \uparrow$



An Increase in Volatility: $V \uparrow$



Break-even of Bankers and Loan Supply

On the supply side, the bankers will set the loan interest rate r_L according to the risk-free interest rate r and repayment probability p with the following break-even condition.



Returns on Emerging Market Debt, 19703–2000s The cp post annual nailized neturns on emerging market debt huse been 13% on area(pass, as high as 39%). In tarth america and Asia, but as low as 7% elsewhere (columms 1-4). Given their riskines, these returns compare unthroadby with returns on safe U.S. government debt and U.S. corporate debt (columns 5-1). Whatwev er. ent risk premiums were charged to emerging market, deducts at set han all up and Interface only just trabes even.

Source: Ex post returns from Christoph Klingen, Jeromin Zettelmeyer, and Beatrice Weder, 2004, "How Private Creditors Fared in Emerging Debt Markets, 1970–2000," IMF Working Paper No. 04/13.



Loan Market Equilibrium When Volatility Is Low



Note: A higher level of debt means the probability of repayment falls(and the probability of default increases) between points 1 and 2 in panel (a), starting at the debt level L_V . As the probability of repayment falls, lenders increase the lending rate as the quantity of debt increases, so the loan supply curve LS slopes up in panel (b). As the lending rate falls, more debt is demanded by the country as insurance against consumption risk, so the loan demand curve LD slopes down. The equilibrium is at point 3 where demand and supply intersect.

Loan Market Equilibrium When Volatility Is High



(a) Repayment Probability

Note: More debt means a higher probability of default between points 3 and 4 in panel (a), so repayment probabilities now decline more rapidly starting at the debt level L'_{11} . In panel (b), therefore, to the right of point 4, default is now possible, and the loan supply curve LSshifts up and to the left in that zone. At the same time, at any given lending rate. higher volatility causes demand for debt to expand so as to give the country better insurance, so the loan demand curve LD shifts right. The new equilibrium is now at point 5 where demand and supply intersect. The lending rate rises; defaults are more likely; debt levels may rise or fall.

International Bond Issuance by Emerging Countries



Source: Allen et al.(2015). Emerging market includes Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Israel, Korea, Malaysia, Mexico, Philippines, South Africa, Thailand, and Turkey. Financial corporations include banks and other financial corporations. Original data from BIS.

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Currency Composition of Outstanding EM Bonds



Source: Allen et al.(2015). Billions of U.S. dollars on vertical axis. Original data from World Bank database.

From Commodity Price Shock to Currency and Debt Crises





Oil producers include: Norway, Bolivia, Ecuador, Mexico, Venezuela, Trinidad and Tobago, Bahrain, Iran, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen, Brunei Dar-us-Salaam, Indonesia, Vietnam, Algeria, Angola, Cameroon, Chad, Republic of Congo, Equatorial Guinea, Gabon, Nigeria, Sudan, Azerbaijan, Kazakhstan, and the Russian Federation. Source: HPDD; and crude oil price data is from www.inflationdata.com/inflation/ inflation_rate/historical_oil_prices_table.asp.

Source: Abbas et al.(2011).

Liquidity Trap of Japan's Economy



Source: Koo(2014).

Long Slump and Secular Stagnation



Source: Buttiglione et al.(2014).

Contagion of Risk and Debt Crises



Rabbit and Turtle in the Debt Race





Source: Dobbs et al.(2015), MGI report.

Turner(2016): Between Debt and the Devil

As a result we seem condemned to continued weak growth and fiscal austerity in the eurozone, to a mediocre recovery in the United States, and to an unbalanced recovery in the United Kingdom. Japan meanwhile, faces an ever-growing level of public debt that will never be repaid in the normal sense of the word. And as 2015 progresses, it looks increasingly likely that China's credit boom is ending in a potentially dangerous downturn. It seems that we are out of ammunition – the policy magazine is empty.