Sovereign debt

Lecture 8, ECON 4330

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(Adopted from Tord Krogh)

March 18, 2015

Today:

- Some concepts and empirics
- Sovereign risk in an endowment economy

Next time:

- Sovereign risk in a production economy

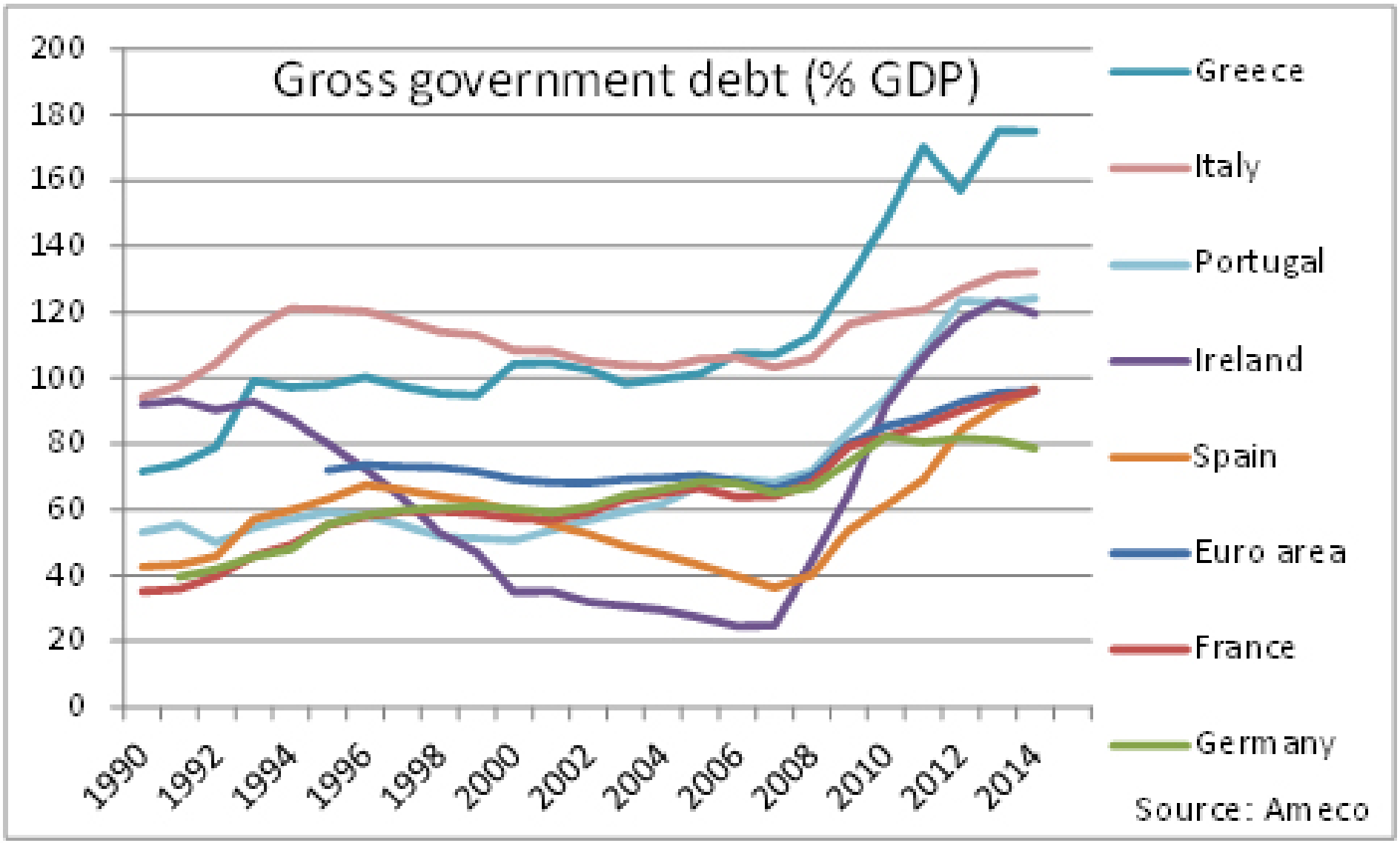
Outline

Causes of sovereign debt:

- Smoothing consumption
- Finance investment

Problems with sovereign debt:

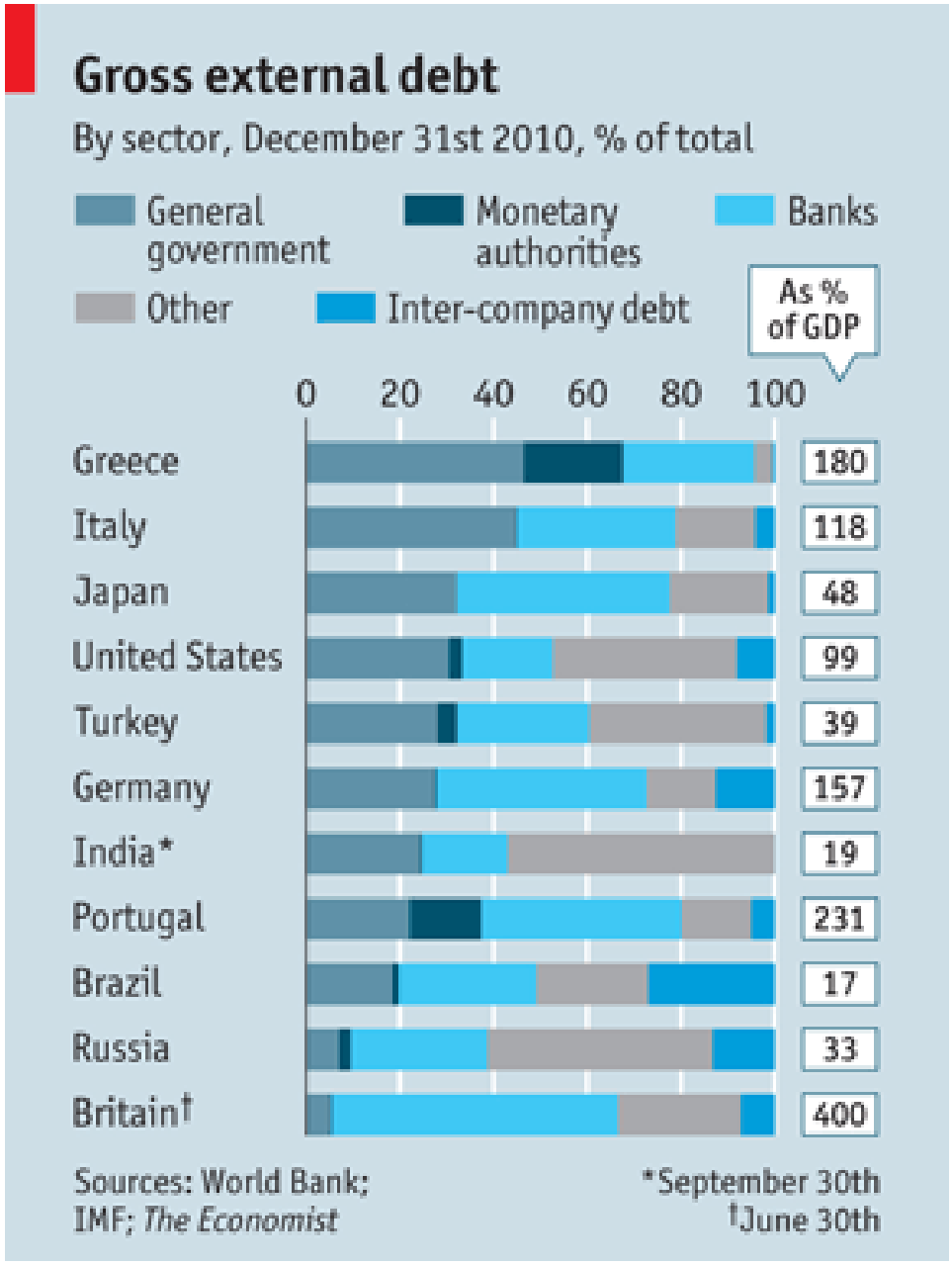
- Repayment
  - Commitment
  - Sanctions


Gross government debt (% GDP)
200
180
160
140
120
100
80
60
40
20
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
Greece
Italy
Portugal
Ireland
Spain
Euro area
France
Germany
Source: Ameco

This is what many think about when they hear international debt. :

European countries having higher and higher government debt. But this is not the full picture:

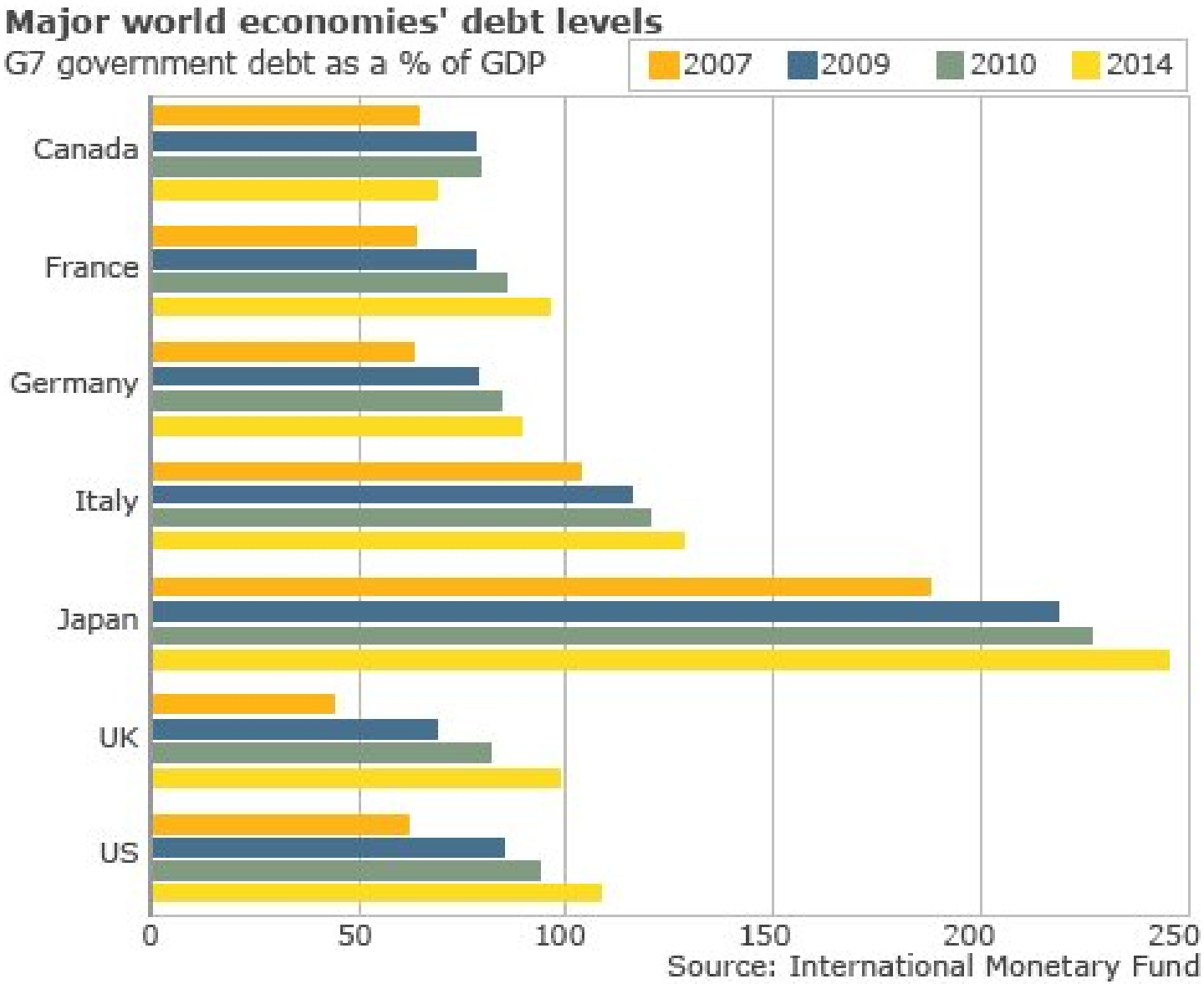
- Not all countries external debt can grow. Null sum!
- Government debt is (often) a large part of net external debt, but definitely not all.


Gross external debt
By sector, December 31st 2010, % of total
General government
Monetary authorities
Banks
Other
Inter-company debt
As % of GDP
0
20
40
60
80
100
Greece
180
Italy
118
Japan
48
United States
99
Turkey
39
Germany
157
India*
19
Portugal
231
Brazil
17
Russia
33
Britain†
400
Sources: World Bank; IMF; The Economist
*September 30th
†June 30th

As we see external debt consists of money borrowed by several different types of people and institutions:

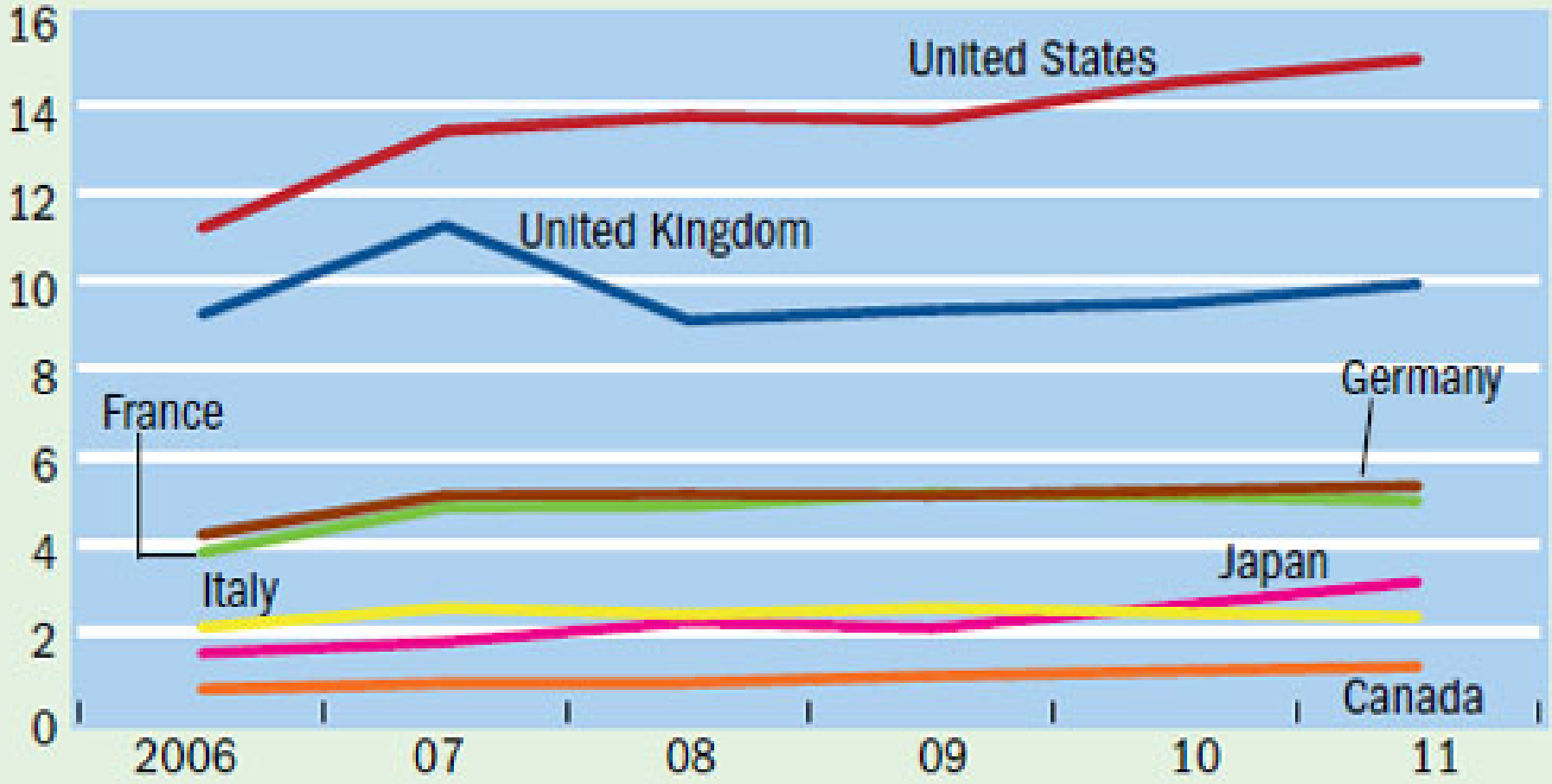
- Government
- Central banks
- Private banks
- Other financial institutions
- Residents and private companies

So does large government debt cause large external debt? Let's look at Japan.


Major world economies' debt levels
G7 government debt as a % of GDP
2007
2009
2010
2014
Canada
France
Germany
Italy
Japan
UK
US
0
50
100
150
200
250
Source: International Monetary Fund

The United States has the most external debt among the G7.

(gross external debt, trillion dollars, end of period)



In the models we use later we often do not separate between foreign and government debt. Remember our two-period economy, there was no government.

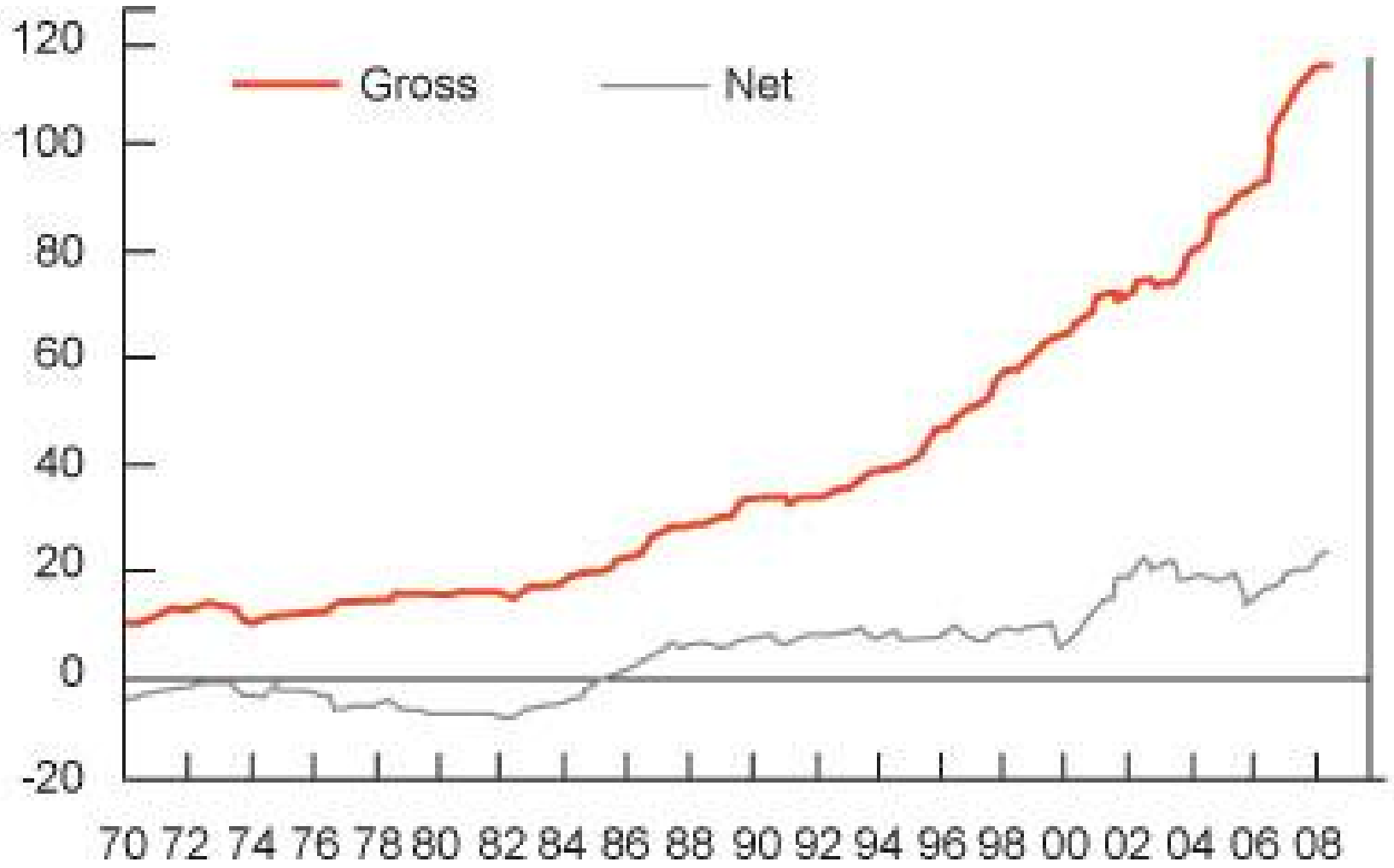
One justification for treating them the same in our simple models is that it might not make much difference. A private borrower in Greece is under Greek law and it is thus the Greek government which decides whether or not to enforce the borrowers debt just as they would decide whether or not to repay their own debt.

In reality this is too simple though.

Another distinction we should be careful about is gross debt vs net debt.


NORWAY GOVERNMENT DEBT TO GDP
Percentage of the GDP
55
50
45
40
35
30
25
42.5
53.8
50.7
48.2
43
43
28.4
29.4
29.52
2006
2008
2010
2012
2014
SOURCE: WWW.TRADINGECONOMICS.COM | STATISTICS NORWAY

United States: External debt (as % of GDP)



Sources: FoF, Natixis

Another distinction we should be careful about is gross debt vs net debt.

- The world is highly integrated
- Many financial transactions taking place across borders
- Global imbalances arise when net assets or debt levels grows over time.

Outline

International borrowing

So far in the course individuals and countries have borrowed as much as they want from international markets. In the closed economy model this is less of a problem, because we have a legal system that enforce contracts. In the international market this is not as straight forward.

Sovereign risk

Sovereign risk refers to the possibility of government default and seizure of foreign assets (in the country). It is a natural part of an inter-connected world economy since there is no institutional framework that exist to legally enforce countries to stand by their obligations.

- Within a country: Legal system
- Between countries: Loose agreements and limited sanctions

Sovereign risk II

Still some ways to enforce payments:

- Reject defaulting countries access to credit markets in the future
- Threatening with higher interest rates in the future
- Trade sanctions or other direct penalties

But the amount of borrowing will be limited by the creditors ability to enforce or the debtors ability to commit or the lenders ability to sanction.

Outline

Direct sanctions

First, we look at how direct penalties to a defaulting government may discipline borrowing in a simple two period model.

Two-period model

Remember the two period model from the first lectures, here with log utility. Utility of the home consumer is given by:

$$\begin{aligned} \max_{c_1, c_2} \quad & log(c_1) + \beta log(c_2) \\ s.t. \quad & c_1 + \frac{c_2}{1+r} = Y_1 + \frac{Y_2}{1+r} \end{aligned} \tag{1}$$

From this we can find the optimal asset-/debt-level as:

$$B_2^* = \frac{1}{1+\beta}(\beta Y_1 - \frac{Y_2}{1+r}) \tag{2}$$

Assume the home country borrow money in the first period, $B_2^* < 0$.

Two-period model II

What happens in the second period?
The home country has two options:

- Repay and consume $Y_2 - B_2$ or..
- Default and consume Y_2

Without any further sanctions the home country default for sure.

This implies that no creditor would have made the deal in the first place.

Direct sanctions

Sanctions available to the creditors are for simplicity assumed to involve a possibility to confiscate an η share of output. Hence if the country defaults in period 2, the creditors will manage to get

$$\eta Y_2$$

back through different sanctions.
So what the creditors will receive in the second period is the minimum of this share of GDP and the debt level.

$$Repayment = \min[-(1+r)B_2, \eta Y_2] \tag{3}$$

Direct sanctions II

As this is the only way creditors can punish debtors, no one will be willing to lend more than ηY_2.

If this amount is smaller than the country's optimal amount of borrowing, $B_2^* > \eta Y_2$, then the commitment problem will yield a welfare loss for the home country.

$$u'(c_1) < \beta(1+r)u'(c_2) \tag{4}$$

This is the main result in the deterministic model. Let's see what happens when we introduce uncertainty. What do you think?

Direct sanctions III

Let's use a simple form of uncertainty and introduce a 10 % chance of recession in the home country in the second period.

$$Y_2 = \begin{cases} Y_H & \text{with probability } p \\ Y_L & \text{with probability } 1-p \end{cases} \tag{5}$$

And assume that ηY_L is smaller than the optimal amount of borrowing. Since the lender has no guarantee of getting his money back, he will not lend the previously optimal amount. He will only lend ηY_L

Now we have seen that the countrymight not be allowed to borrow what it needs on the world market. But let's take a detour and see if there is still a chance.

Let's introduce lenders explicitly and allow them to charge a risk premium.

Detour on interest rates

- Assume there is a different market with risk neutral lenders that can borrow from the world market and lend out to risky debtors.
- There is free entry into this business, so the lenders will earn zero profits in expectation.
- Assume for simplicity that the lenders don't have access to the same sanctions that we discussed earlier, but they just know that they will get paid unless there is a recession.
- Let our home country visit this market to lend $D = -B_2$ at interest rate i.

Detour on interest rates II

- Lenders earn $(1+i)D-(1+r)D$ in case of no default
- and $-(1+r)D$ in case of default.

Detour on interest rates III

The zero expected profit condition will then be:

$$E(\pi) = p(1+i)D + (1-p)0 - (1+r)D = 0 \tag{6}$$

And they will be willing to lend D at the interest rate:

$$i = \frac{1+r}{p} - 1 \tag{7}$$

So the lower the probability of repayment, p, the higher interest rate will be claimed.

Remember that D was the optimal amount of debt at the interest rate r. In general optimal borrowing will change when the interest rate changes and we might have multiple equilibria.

Market exclusion

Let's drop interest rates for now and return to our second way of disciplining a debtor; Market exclusion.

- If debtors default they loose access to financial markets
- Can lead to liquidity constraints
- Less access to insurance

Market exclusion II

Default in this case can bring a short term gain, but a long run cost of not being allowed access to the world market. This means we need a long-run model to analyze it.

Let's use a simple version of our infinite horizon model with the uncertainty we used before.

$$U_t = E_t \left[\sum_{s=t}^{\infty} \beta^{s-t} u(c_s) \right] \tag{8}$$

with the budget constraint:

$$\begin{aligned} B_{s+1} &= (1+r)B_t + Y_s - c_s \\ Y_s &\sim i.i.d. \end{aligned} \tag{9}$$

Market exclusion III

Say that the country has access to a a credit market that allows for perfect insurance so that they can sustain constant consumption, $\overline{Y}$, forever. In a period t, they can choose to default on their current debt, but that means exclusion from all markets for the rest of time. The gain of defaulting would be:

$$\text{Gain: } u(\overline{Y} + rB_t) - u(\overline{Y}) \tag{10}$$

and the cost of doing so would be:

$$\text{Cost : } \sum_{s=t+1}^{\infty} \beta^{s-t} u(\overline{Y}) - E_t \sum_{s=t+1}^{\infty} \beta^{s-t} u(Y_s) \tag{11}$$

The debt limit in this case would be the level of B that ensured equality of these costs and gains.

Market exclusion IV

How important is market exclusion in reality?

- Studies have found that the frequency of default does not affect access to credit markets.
- It takes relatively short time from default until you are back in the game.

Period		Years until resumption
1980	Mean	5.2
	Median	4.0
1990s	Mean	2.9
	Median	2.0
1980-2000	Mean	4.7
	Median	4.0

Table: Gelos, Sahay and Sandleris 2011

Renegotiations

- Countries that default on their loans often end up repaying parts of it.
- Renegotiations happen regularly between investors and debtors
- The outcome is determined by the debt level, ability to repay and the bargaining power of each party.

Outline

Today

- External Debt = Government debt + Private debt
- Sovereign risk arise because of lack of commitment and sanction possibilities
- These problems can be solved partly by introducing penalties for default
- But, a country might not be able to borrow as much as they want

Next time

Sovereign risk and investment

Read OR chapter 6.2