Financial Integration and Crisis

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Lecture 5

Introduction
European Imbalances
Sovereign Debt Crisis: a simple model

Lecture 5: Facts and Issues about Europe and the Greek Tragedy

Third wave of the crisis: sovereign crisis

Public debt sustainability became serious issue (Greece, Portugal, Spain, Ireland, Italy)

Lecture 5: Facts about Greece

Greece:

- The proximate trigger for the loss of market confidence in Greece's debt was the October 2009 announcement, by a newly elected government, that the overall budget deficit was much larger than stated by the outgoing one.
- Instead of 6 to 8 percent of GDP, the deficit was then projected to be between 12 and 13 percent. With the debt/GDP ratio at 115 percent, and mediocre growth prospects, the announcement led markets to question the long-run solvency of Greece.
- In December 2009, first of a long series of credit-rating downgrades.
- In a mechanism often seen during the crisis (and previously during the crisis in the financial sector in 2007-2009) market views on Greece changed rapidly, in self-reinforcing fashion.
- By the spring Greece, which only six months before could borrow at rates essentially identical to those paid by Germany, was effectively shut out of the financial market.

Lecture 5: Facts about Greece

Greece: policy response

- Greece: it announced and implemented a number of austerity measures, aiming to reduce the budget deficit: aggressive but insufficient given big funding gap.
- External bail out to avoid default, with conditionality.

Lecture 5: Facts about Greece

Greece: policy response

- The agreement that was struck by the European Council and the IMF in May 2010: Greece committed to a severe austerity program in exchange for a significant amount of official financial assistance.
  - Greece committed to bringing the deficit down to 3 percent of GDP by 2014, with detailed quarterly targets, the compliance with which was to be monitored by officials from the IMF, the European Commission, and the ECB.
  - All other Euro area states were to make bilateral loans to Greece, roughly in proportion to the size of their economies, for a total of approximately £80 billion over three years.
  - The IMF was to lend an additional £30 billion over the same period.
  - The role of the bailout funds was to fill the funding gap left by the austerity program, for the period deemed necessary before Greece could return to borrow on financial markets at acceptable terms.
  - See IMF May 2010, Country Report No. 10/110

Lecture 5: Facts about Greece

Greece: policy response

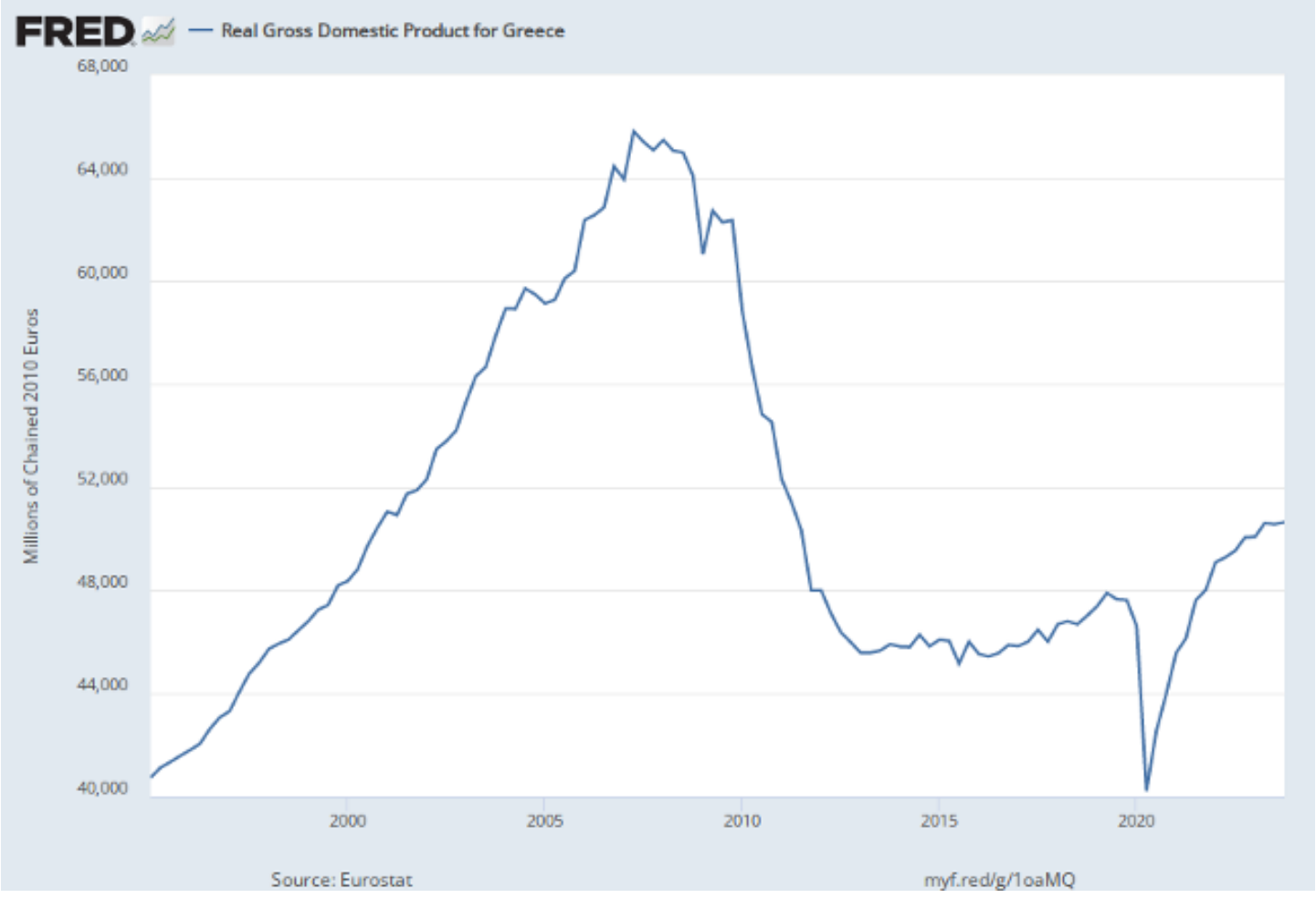
TABLE I-GREEK PACKAGE SIGNED **IN MAY** 2010

	Primary deficit/GDP	Total deficit/ GDP	Gov. debt/ GDP	Real GDP growth(%)	Spread over bunds	T-bill issuance (EurB)	Bonds issuance (EurB)
2009	-8.6	-13.6	115.1	-2.0		6.1	*55.6*
2010	-2.4	-8.1	133.2	-4.0	250	8.0	25.4
2011	-0.9	-7.6	145.2	-2.6	200	8.0	4.4
2012	I	-6.5	148.7	II	150	8.0	23.4
2013	3.1	-4.9	149.2	2.1	100	8.0	34.9
2014	5.9	-2.6	146.1	2.1	100	8.0	64.5
2015	6	-2	140.4	2.7	**100**	8.0	66.8

Source: IMF May 2010, Country Report No. 10/110

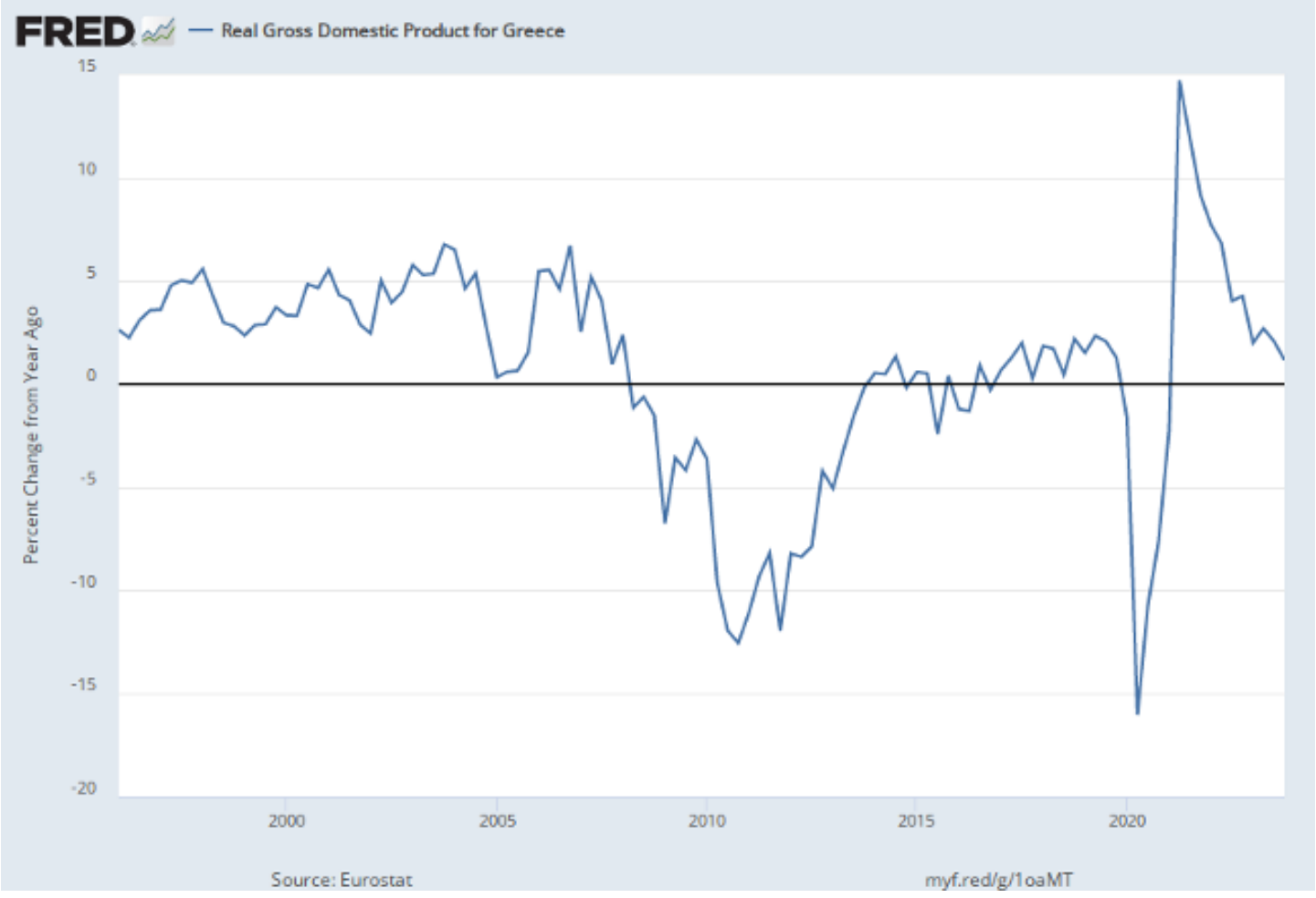
Lecture 5: Facts about Greece

Greece: ex-post reality



Lecture 5: Facts about Greece

Greece: ex-post reality



Lecture 5: Facts about Greece

Greece: ex-post reality

Lecture 5: Facts and Issues about Greece

Greece: market reaction

- Despite the early pessimism, things initially went as planned in the May 2010 agreement, and for the rest of 2010 it looked like Greece might succeed in eventually stabilizing its debt/GDP ratio without a default.
- A large number of fiscal provisions and other reforms were implemented by the Greek government, and the IMF and the European Commission issued a sequence of favorable reports on the implementation of the deal.
- In early 2011 Greece was still judged to be substantially on track to meet its deficit targets. Several bailout tranches were duly paid out. Greece was able to issue €5.7 billion of bonds with maturity up to three years in the period October 2010-March 2011.
- The more positive outlook lead to a steady decline in Greece's bond yields until mid-October.

Lecture 5: Facts and Issues about Greece

Greece: second bailout (background)

- Things changed in the first months of 2011.
  - Eurostat published a revised estimate of the 2009 deficit which placed it at 16 percent of GDP, or 2 percent higher than it had been thought to have been in May.
  - Yields across the Euro zone increased sharply on the infamous "Dauville announcement," by Chancellor Merkel and President Sarkozy, who said that crises after 2013, would involve "necessary arrangements for an adequate participation of private creditors."
  - The program for 2011-2013 was emphasizing structural reforms and privatization, which are politically harder to implement than fiscal contraction.
- These factors implied that Greece was no longer meeting its reform and stabilization targets and that it was not going to regain access to private funding by the time envisaged in May 2010.

Lecture 5: Facts and Issues about Greece

Greece: second bailout

- The agreement of July 2011 featured:
  - Greece agreed to an even tougher austerity and reform program, including the disposal of large numbers of state-owned assets;
  - countries in the Euro zone (through the recently created European Financial Stability Facility, or EFSF) committed to a new €109 billion in bailout funds,
  - Private sector involvment through restructuring of debt held by private was agreed.

Lecture 5: Facts and Issues about Greece

Greece: private sector involvement (PSI)

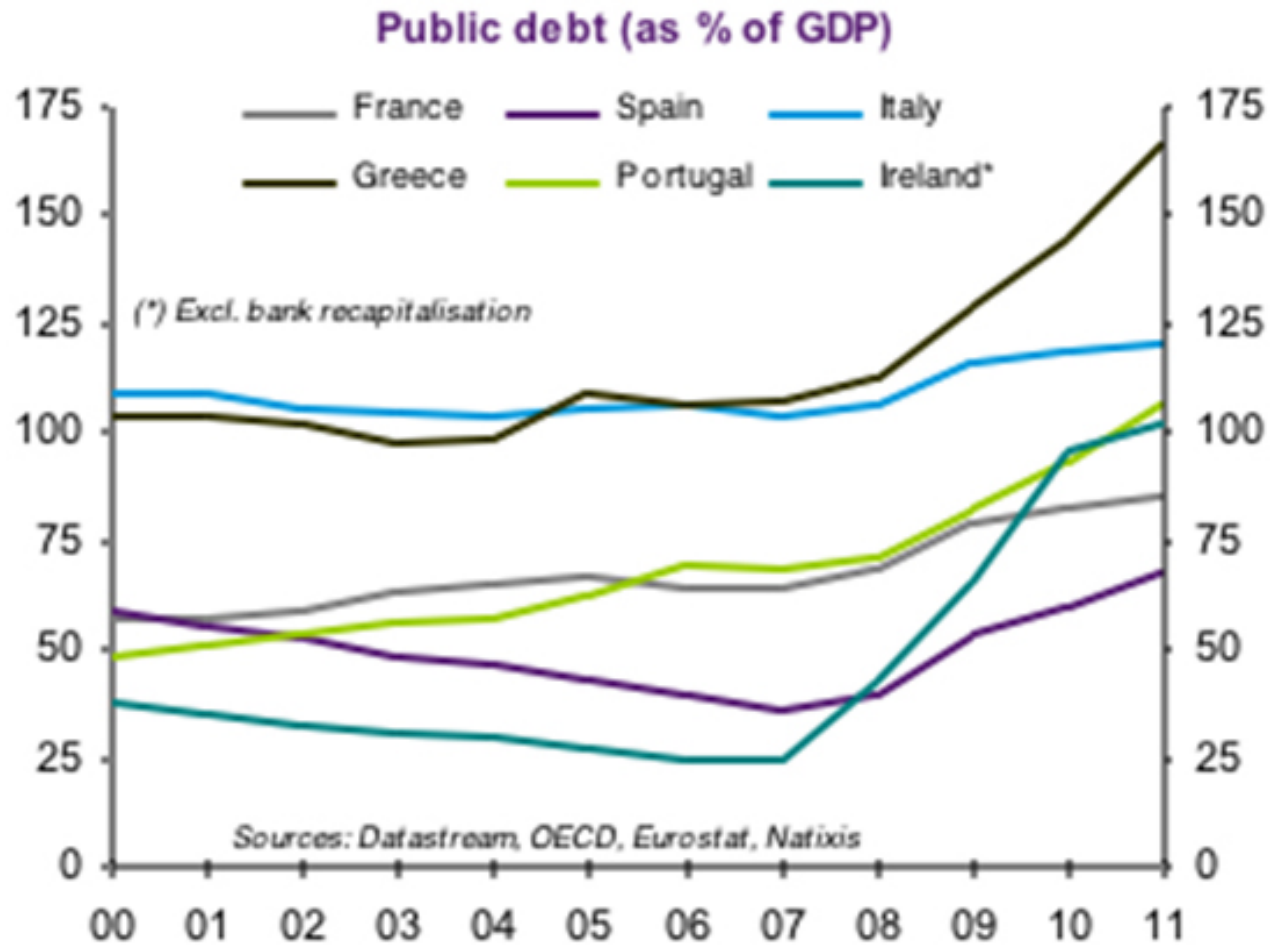
- The agreement committed Greece to open negotiations with representatives of private lenders to achieve a voluntary reduction in the value of the debt of approximately 20 percent.
- it was built into the bailout agreement that the haircut on private holders was to be between 0 and 20 percent. As private creditors (ECB excluded) held an estimated 58 percent of the overall stock of Greek debt outstanding, the absolute upper bound on the debt relief that might come from the deal was a 12 percent reduction of the debt/GDP ratio (20 percent x 58 percent).
- The PSI component of the deal was little more than symbolic, and provided no meaningful debt relief.
- The PSI component in the July agreement increased the costs and the complication of the broader European debt crisis. It seems likely, for example, to have been a significant factor in dragging Italy into the crisis in the late Spring and Summer of 2011.

Lecture 5: Facts and Issues about Greece

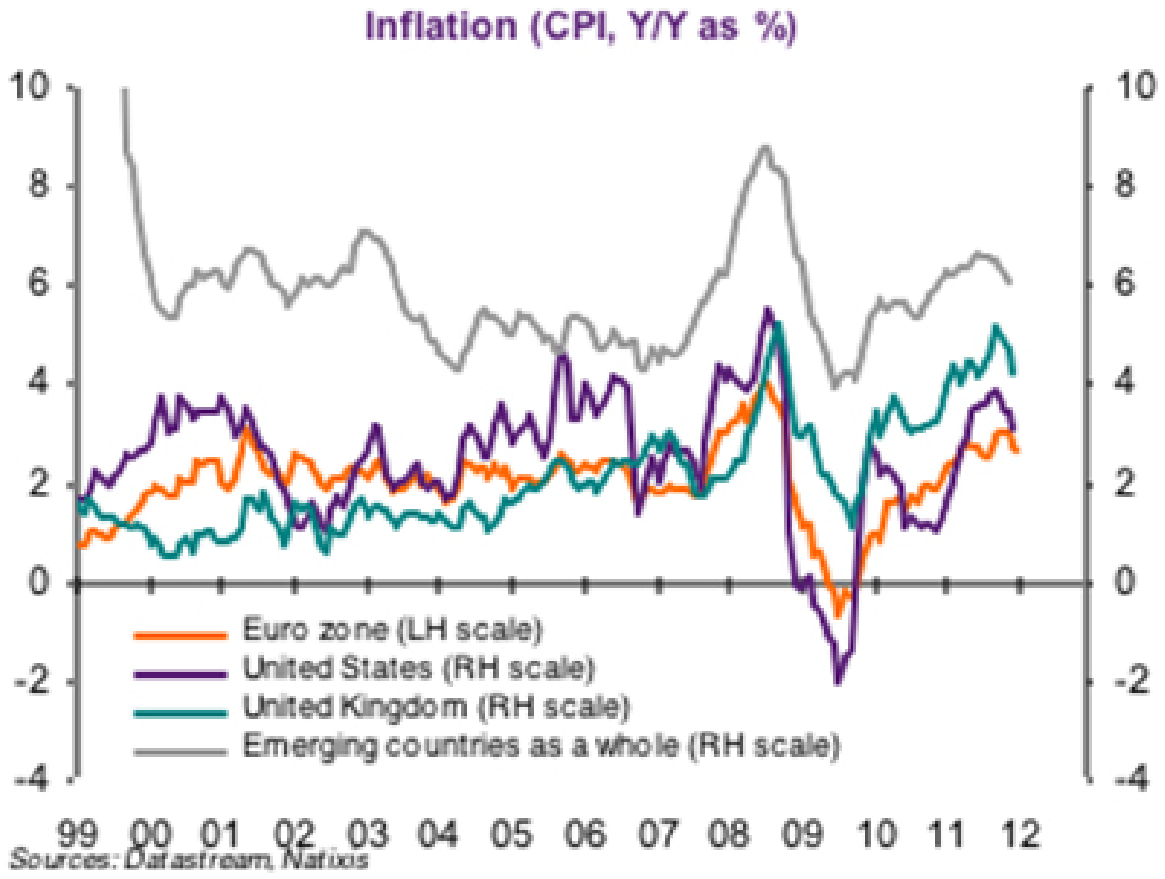
Greece

- Lack of transparency about primary deficits and public debt
- High level of public expenditure combined with high nominal wages in the public and service sectors.
- High domestic inflation;·
- Loss of competitiveness and current account deficit.

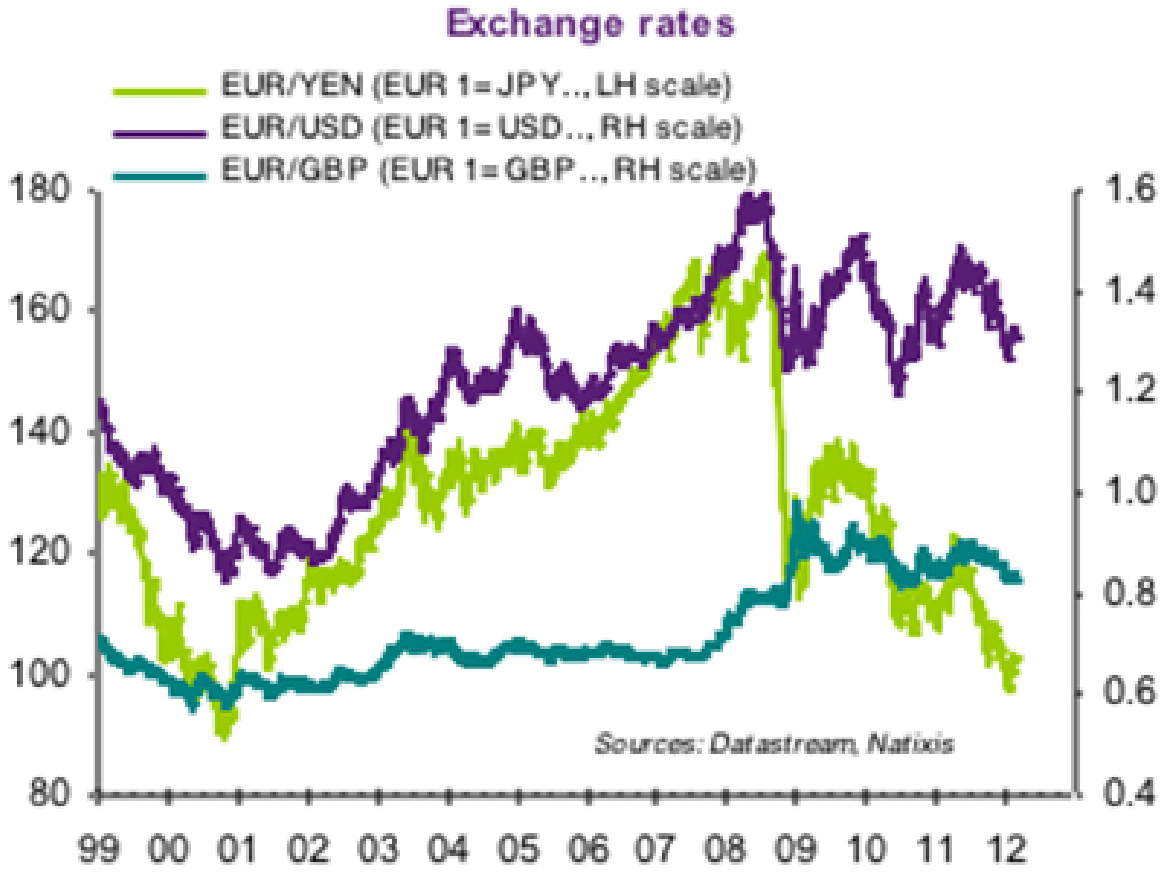
Lecture 5: European Facts: public debt



Lecture 5: European Facts: inflation

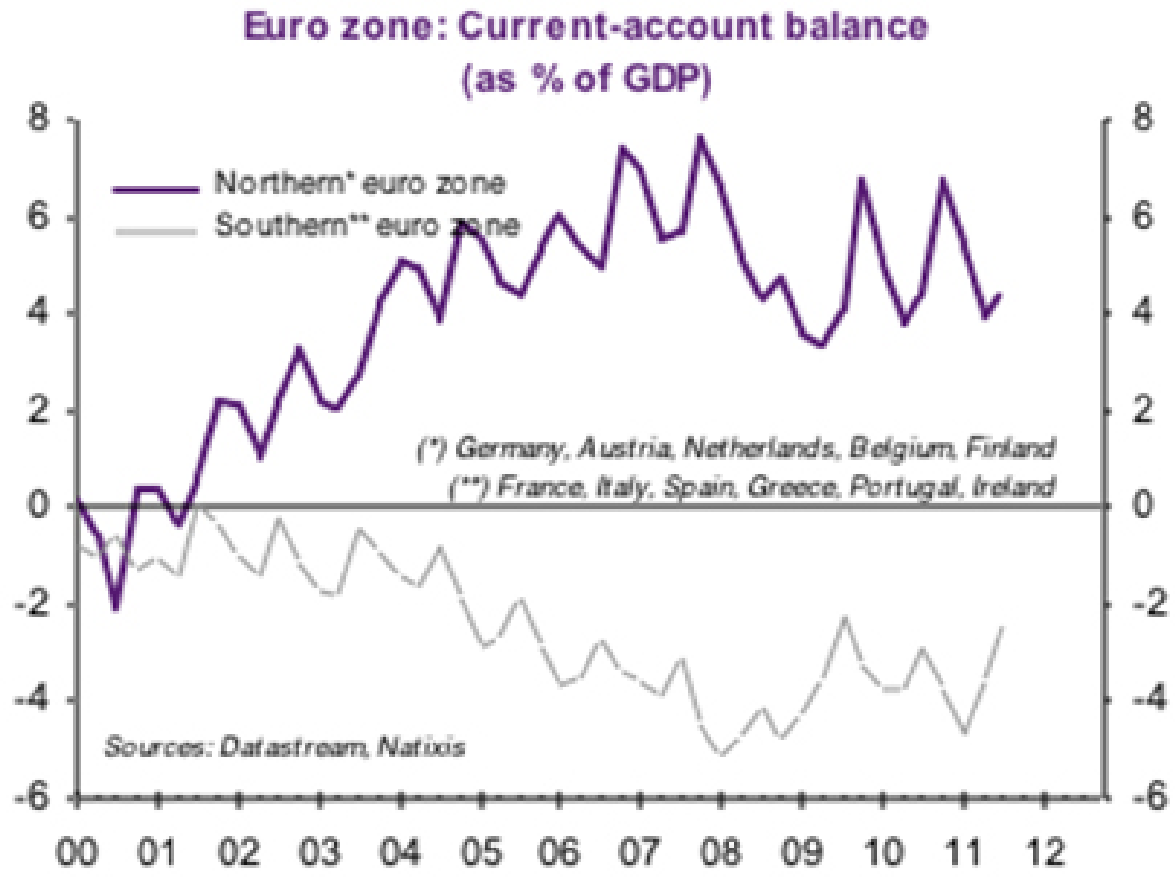


Lecture 5: European Facts: the Euro

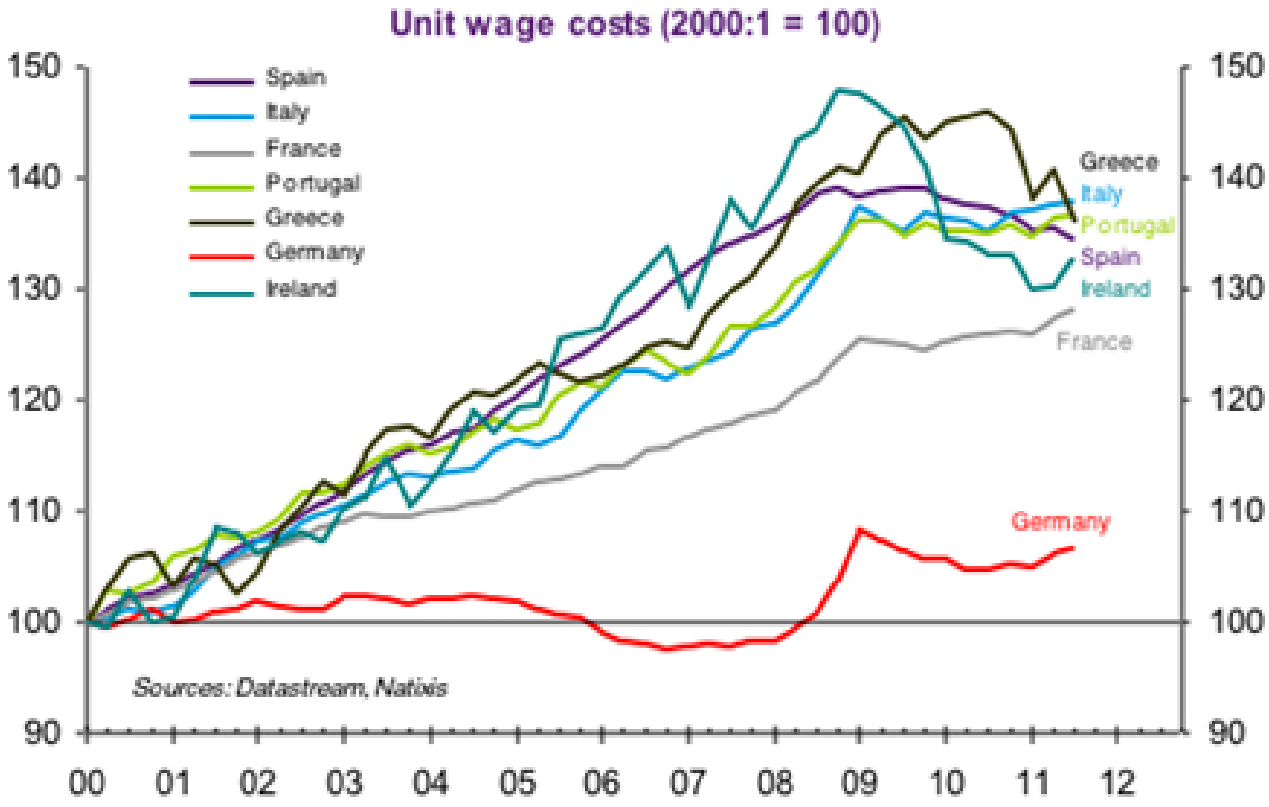


Lecture 5: European Facts: GDP

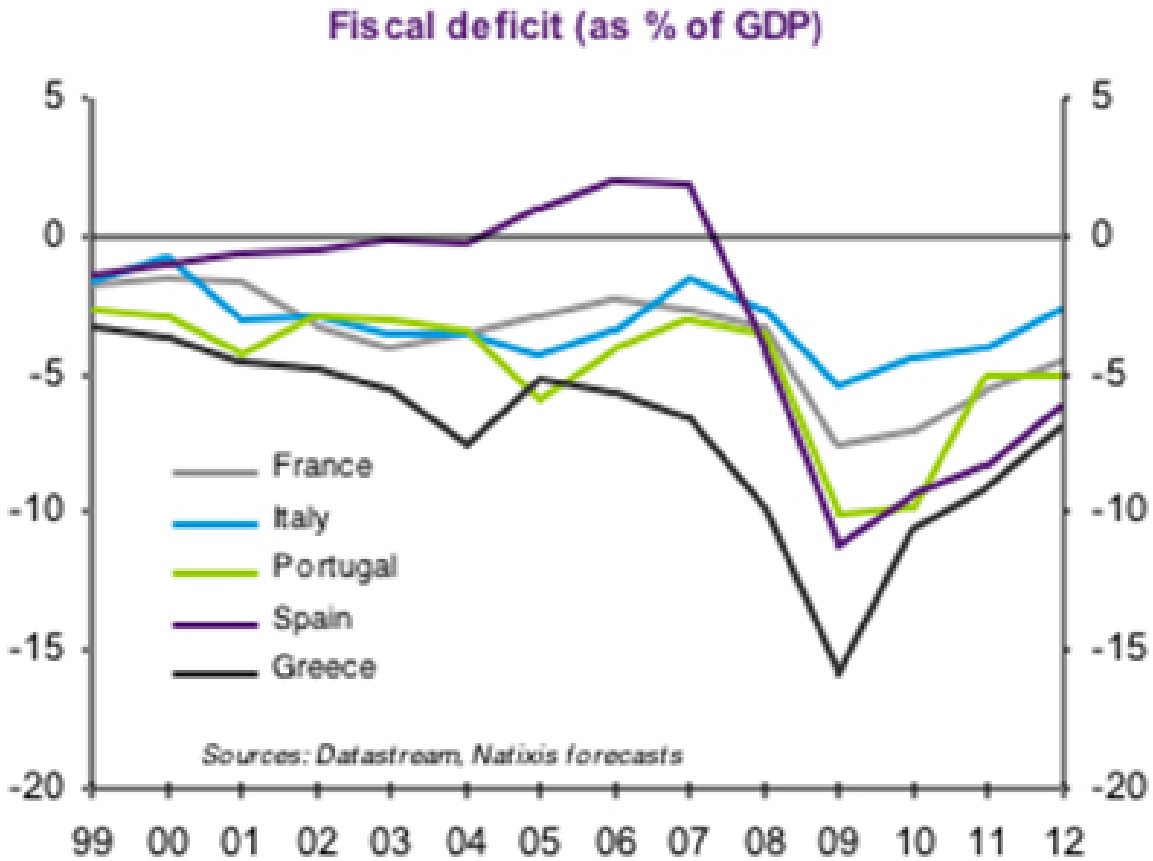
Lecture 5: European Facts: internal disparities



Lecture 5: European Facts: internal disparities



Lecture 5: European Facts: internal disparities



Lecture 5: Facts and Issues about Europe

General issue in the Eurozone stem from:

1. Loss of competitiveness;
2. High wage growth and labor costs;
3. Fiscal indiscipline;
4. Euro appreciation.

OECD estimated that public debts to GDP ratios in advanced economies would have risen to about 100% of GDP.
With PIIGS, problems is beyond public deficits and debt ratios.

Lecture 5: Facts and Issues about Europe

- Fiscal consolidation in Greece and in the Euro made the current recession worse:

  Higher taxes and lower spending reduce aggregate demand. Stabilizing debt/GDP ratio could be problematic as GDP falls

- Solution could be a real depreciation through:

1. Deflation that reduces prices and wages by 20-30%. But deflation are associated with persistent recession.
2. German model: accelerate structural reform and corporate restructuring to increase productivity growth while keeping wage growth moderate. But this process might take time.
3. Nominal euro depreciation.

Lecture 5: Facts and Issues about Europe

- Other problem: The effective stocks of public debt may be larger than the official estimates for several reasons:

1. If deflation is needed to achieve a real depreciation, the fall in prices would increase the real value of public debt as a share of GDP.
2. If a fiscal adjustment leads to lower output the public debt to GDP ratio will rise.
3. Most of these economies have aging populations, reducing potential growth and increasing their debt to GDP ratios. Aging populations also increases unfunded implicit public liabilities:
4. Pay as you go social security systems Long term health care cost of care for the elderly
5. Potential for further distress in the financial system deriving from deflation and persistent recession Fiscal costs of bailing out insolvent financial institutions may grow over time.
6. If the need to restore competitiveness eventually were to require an exit from the European monetary union, the ensuing nominal and real depreciation of the new national currency would sharply increase the real value of public debt given the balance sheet effects of foreign currency liability. Even more problematic than what the high public debt ratios already suggest.

Lecture 5: European Imbalances

- Competitiveness and Current Account Imbalances in the Euro Area
- Do current account imbalances matter in a currency union?
  - Theory: why do we care?
  - Facts: what are the origins of the imbalances?
  - Policy: what should we do about them?

Lecture 5: European Imbalances

- External payment situation of member states has always been disregarded. (no place in Maastricht criteria or Commission assessment)
- Rationale: Ingram (1973) suggests that with monetary integration "the traditional concept of a deficit or a surplus in a nation's balance of payment becomes blurred"
- Growth theory in open economy also provides rationalization of current account imbalances: capital flows to the catching up countries (attracted by expectation of faster productivity)

Lecture 5: European Imbalances

- Convergence hypothesis: higher growth consistent with the excess of their potential growth over that of the euro area.
- Pattern of Labor productivity is inconsistent with growth pattern: unhealthy imbalances.
- Standard accounting exercise: (contribution to per capita GDP):

$$\left(\frac{dY}{Y} - \frac{dN}{N}\right) = \frac{dA}{A} + a\frac{dK}{K} + (b-1)\frac{dN}{N} + b\frac{dHours}{Hours}$$

Lecture 5: European Imbalances

	GDP per capita		Labour productivity per person employed		Labour productivity per hour worked	
	(a)	(b)	(a)	(b)	(a)	(b)
Ireland						
1998	106,1	99,2	108,1	111,4		
2000					94,9	89,0
2008	123,8	116,4	118,7	121,7	104,2	94,7
Greece						
1998	72,8	68,0	78,4	80,7		
2000					64,2	60,2
2008	86,2	81	93,2	95,5	71	64,5
Spain						
1998	83,3	77,9	92,9	95,7		
2000					87,2	81,7
2008	94,5	88,8	94,5	96,9	92,4	84
Portugal						
1998	69,3	64,8	60,4	62,3		
2000					52,9	49,6
2008	71,6	67,2	67,1	68,8	56,2	51,1
Italy						
1998	105,3	98,4	112,2	115,6		
2000					98,5	92,3
2008	93,6	87,9	99,8	102,3	88,8	80,8

(a) Euro-area =100
(b) Germany = 100

Source: Eurostat

Lecture 5: European Imbalances

Table 4 - Potential growth and its components

	Euroarea	Ireland	Greece	Spain	Portugal
Potential growth rate					
1989-1998	2,3	6,5	2,1	2,9	3,1
1999-2008	2,2	6,5	3,9	3,7	1,9
% contributions to potential growth rate					
- *Labour*					
1989-1998	*8,7*	*20,0*	*19,0*	*34,5*	*9,7*
1999-2008	*22,7*	*29,2*	*15,4*	*54,1*	*36,8*
- *Capital*					
1989-1998	*34,8*	*16,9*	*38,1*	*44,8*	*41,9*
1999-2008	*36,4*	*27,7*	*33,3*	*43,2*	*52,6*
- *TFP*					
1989-1998	*56,5*	*58,5*	*38,1*	*20,7*	*45,2*
1999-2008	*36,4*	*40,0*	*48,7*	*2,7*	*10,5*

Source: European Commission (2008)

Lecture 5: European Imbalances

Table 5 - Determinants of growth 1995-2005

	Euro area	Germany	Italy	Ireland	Greece	Spain	Portugal
Real GDP growth							
1995-1998	2,3	1,7	1,7	10,0	2,9	3,4	4,2
1999-2005	1,9	1,2	1,2	6,8	4,3	3,7	1,6
% contributions to GDP growth							
- Labour utilisation and population							
1995-1998	34,8	-23,5	29,4	40,0	34,5	94,1	14,3
1999-2005	36,8	-25,0	66,7	44,1	14,0	86,5	37,5
- Hourly labour productivity							
1995-1998	65,2	123,5	70,6	60,0	65,5	5,9	85,7
1999-2005	63,2	125,0	33,3	55,9	86,0	13,5	62,5
of which:							
TFP							
1995-1998	*47,8*	*82,4*	*41,2*	*60,0*	*48,3*	*5,9*	*57,1*
1999-2005	*36,8*	*83,3*	*-8,3*	*39,7*	*58,1*	*0,0*	*-6,3*
Capital deepening							
1995-1998	*17,4*	*41,2*	*29,4*	*0,0*	*17,2*	*0,0*	*28,6*
1999-2005	*26,3*	*41,7*	*41,7*	*16,2*	*27,9*	*13,5*	*68,8*

Source: European Central Bank (2007)

Lecture 5: European Imbalances

- Irrelevance of current account in a monetary union holds as long as the proceeds of external borrowing are used for productive purposes.
- Important distinction between productive or unproductive purposes of external financing.
- Issue of satisfying intertemporal solvency condition: excess of foreign borrowing with the purpose of financing non-traded goods might be incompatible with solvency conditions. (Giavazzi-Spaventa, 2010)

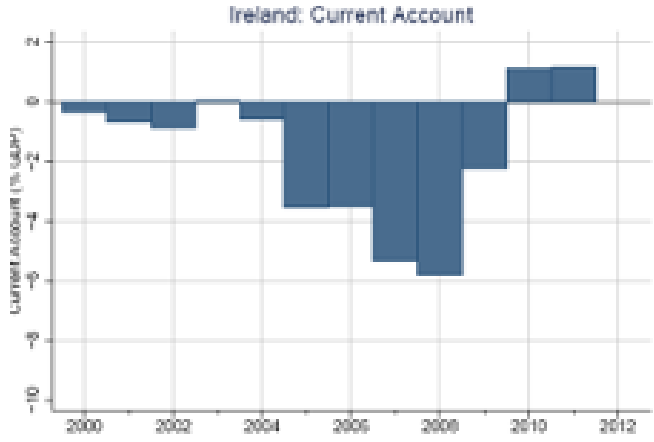
Resource Misallocation

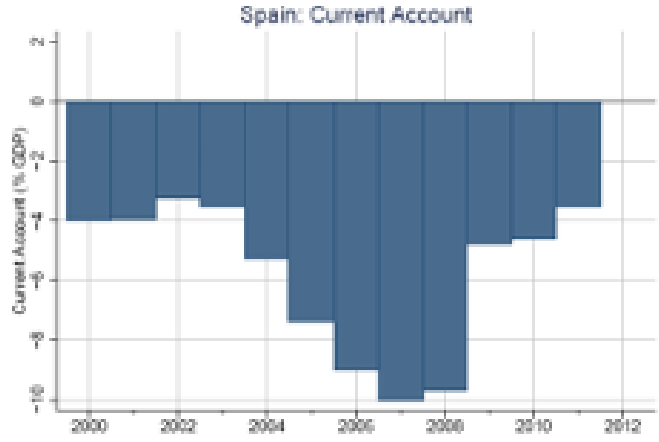
Allocation of resources: an example

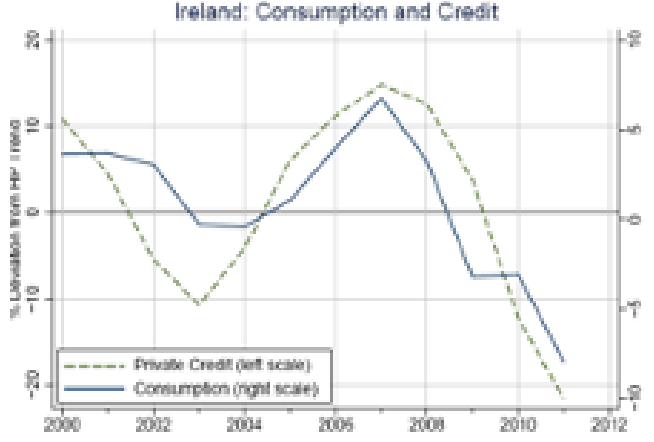
- Descriptive evidence for Spain and Ireland
- Financial Resource Curse: link between cheap and abundant access to foreign capital and weak productivity growth
- Following Euro-entry boom phase until 2008: low interest rate, capital inflows (increasing current account deficit), increase in real exchange rate, stagnant productivity and shift in employment towards construction industry ($\sim$ nontradable sector)

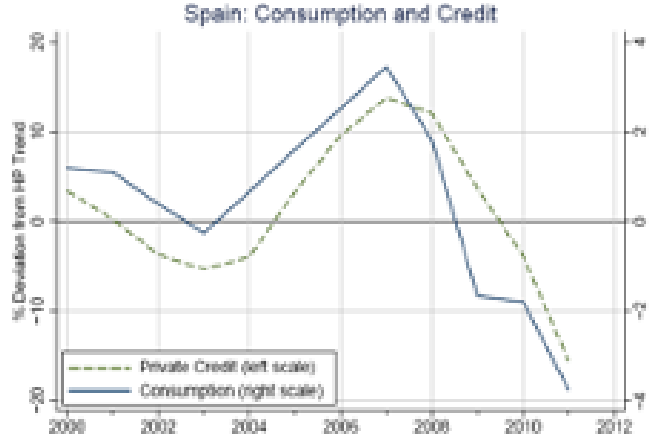
Resource Misallocation

Capital flows and booms (Spain, Ireland)



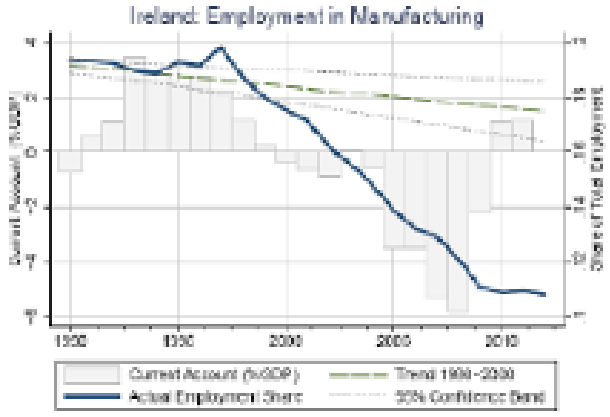


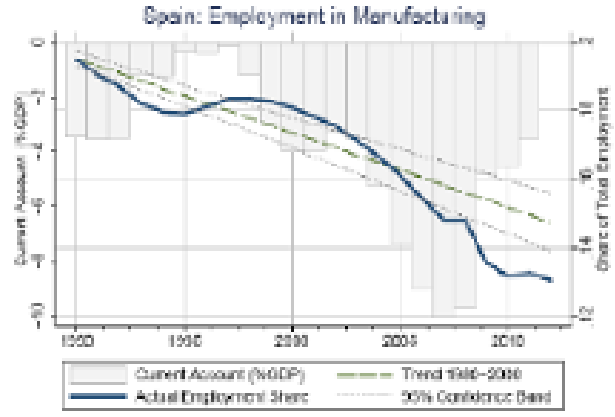


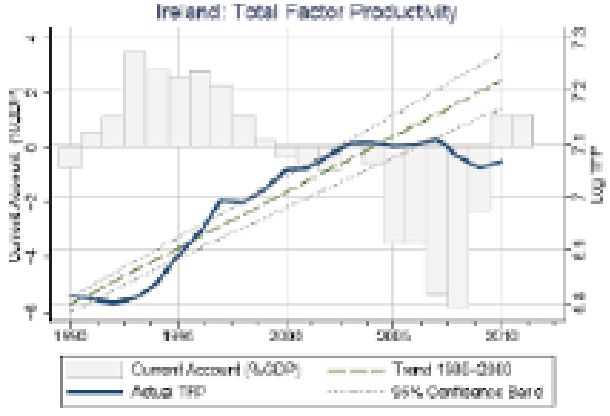


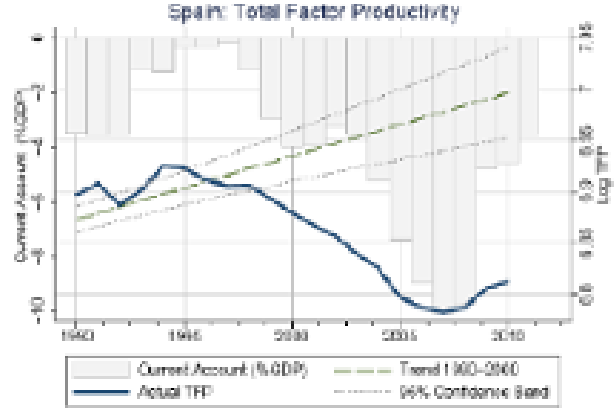
Resource Misallocation

Productivity and employment (Spain, Ireland)









Sources: IMF BoPS, WDI, PWT, UNIDO, ILO

Lecture 5: Sovereign Debt Crisis Literature

- Obstfeld and Rogoff chapter 6 (contract approach)
- Arellano (2008), Aguiar and Gopinath (2009) model of default within real business cycle.

Lecture 5: A simple model of Sovereign debt Crisis

Calvo (1988)

- Two periods (period 0 and 1) model in which the relevant decisions are taken in the second period
- Two agents: government and consumers.

Lecture 5: A simple model of Sovereign Debt Crisis

Calvo (1988): Government problem

- In period 0, government borrows b per capita units of output at the gross interest rate R^b.
- In period 1, the government decides if it defaults or not.
- The budget constraint for the government is given by

$$T - G = (1 - \theta)R^b b + \alpha\theta b R^b$$

with $\alpha, \theta \in (0.1)$.

- θ denotes the ex-post country's default;
- α cost of default per unit of repudiated debt
- T and G denotes taxes and government expenditure respectively.

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Consumer problem

- All consumption occurs in the period 1:

$$C = [Y - z(T, Y)] - T + KR + (1 - \theta)bR^b$$

- $z(T, Y)$ is the deadweight loss for adopting taxation in terms of output.
- Y denotes output
- K denotes consumers' holding of foreign asset that pay a fixed return R.
- We make the assumption that entire public debt is held only domestically.

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Consumer problem

- Government choice of maximizing consumption subject to government budget constraint and choosing default.

$$\underset{\theta}{Max}\ C = [Y - z(T, Y)] - T + KR + (1 - \theta)bR^b$$

subject to

$$T - G = (1 - \theta)R^b b + \alpha\theta bR^b$$

- The first order condition is

$$-z'(T, Y)\frac{\partial T}{\partial \theta} - \frac{\partial T}{\partial \theta} - bR^b = 0$$

where

$$\frac{\partial T}{\partial \theta} = -(1 - \alpha)bR^b$$

- Substituting we get

$$z'(T, Y)(1 - \alpha)bR^b + (1 - \alpha)bR^b - bR^b = 0$$

with

$$z'(T, Y) = \frac{\alpha}{1 - \alpha}$$

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Solution

- Under policy discretion, taking R^b as given, there is an upper bound on the country's willingness to raise taxes independent of spending and interest rate:

$$z'(\bar{T}) = \frac{\alpha}{1-\alpha}$$

  $\bar{T}$ denotes the "tax capacity of the government".
- Tax capacity determines the maximum primary surplus.

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Solution

- We consider a stochastic environment in which output can be in two states H and L with probability π and $1-\pi$.
- We assume that the following holds:

$$\bar{T}^H - G = z'^{-1}\left(\frac{\alpha}{1-\alpha}, Y^H\right) - G > R^b b$$

The previous condition guarantees that there is enough spare capacity when taxes are the max level.

$$\bar{T}^L - G < R^b b$$

- Then we have the international arbitrage condition (foreigners are risk neutral)

$$R = R^b \left[\pi(1-\theta^H) + (1-\pi)(1-\theta^L)\right]$$

- Government budget constraints in the two states:

$$\bar{T}^L - G = R^b b + (1-\alpha)\theta^L b R^b$$

$$T^H - G = R^b b + (1-\alpha)\theta^H b R^b$$

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Expectations and Crisis

- We first consider the fundamental equilibrium in which the sovereign debt crisis occurs because of fundamental reasons.
- We have (conditional on having enough spare capacity)

$$T^H - G = R^b b = \frac{Rb}{1-(1-\pi)\theta^L} \text{ with probability } \pi$$

as no default occurs in the good state ($\theta^H = 0$).

- While partial repudiation occurs in the bad state

$$\bar{T}^L - G = Rb\frac{1-(1-\alpha)\theta^L}{1-(1-\pi)\theta^L} \text{ with probability } 1-\pi$$

The previous two equations determine θ^{L} and T^H.

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Expectations and Crisis

- We now consider the non-fundamental equilibrium in which the sovereign debt crisis occurs because of confidence crisis.
- We have

$$\bar{T}^H - G = \frac{1-\theta^H(1-\alpha)}{1-\theta^L+\pi(\theta^L-\theta^H)}Rb \text{ with probability } \pi$$

- While partial repudiation occurs in the bad state

$$\bar{T}^L - G = \frac{1-\theta^L(1-\alpha)}{1-\theta^L+\pi(\theta^L-\theta^H)}Rb \text{ with probability } 1-\pi$$

The previous two equations determine θ^L and θ^H.

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Policy Options

- In this model welfare losses are related to the use of taxation.
- Note that in the non-fundamental outcome, taxes are raised up to capacity in both states (good and bad), while in the fundamental outcome only in the bad states taxes are raised up to capacity.
- There is no welfare cost of crisis in bad state but there is in good state.
- One way to achieve the fundamental equilibrium in the good state, would be to impose an interest rate ceiling such that

$$R^N > \bar{R} \geq R^F = \frac{R}{1-(1-\pi)\theta^L}$$

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Policy Discussion (Corsetti, Dedola, 2012)

- Ceiling needs to be credible; (while fiscal authority lacks credibility so that our equilibrium is time-consistent)
- Intervention here should not be interpreted as a bailout. (bailout could be proxied by interest rate cap below fundamental rate)

Lecture 5: Sovereign Debt Crisis

Calvo (1988): Policy Discussion (Corsetti, Dedola, 2012)

- Do interventions reduce incentive to do reforms?
  Standard argument: any kind of intervention make things worse since reduces pressure on the country that is facing the crisis
- Suppose reforms, implemented in time 0, reduces the probability of being in the bad state outcome but entails a cost as well.
- Reforms will be undertaken when expected economic benefits are bigger than the initial cost. In this model reforms produces higher benefits in the fundamental equilibrium. In the non-fundamental equilibrium, taxation is at full capacity and the country faces the prospect of default so benefit of reforms is reduced. This points out to the importance of having a mechanism that would prevent a confidence crisis.