

Recent Economic and Financial Crises

Lecture 6

The Euro Crisis

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- The Great Financial Crisis, 2007-09
- The Euro Crisis

"We very much think of the euro area as a beautiful ship that has been built, nurtured for the soft seas, but which is not yet completely finished for the rough ones. A lot has been done in relation to banking union. If I have a message today it is that that particular part of the ship needs to be finished, needs to be completed and speed is of the essence."

*Christine Lagarde Managing Director of the IMF,
September 10, 2013*

Manias, Panics and Crashes: international propagation

Historically both euphoria and panic have spread from one country to others, through several different channels:

- **GDP increases/decreases** in one country induces increases/decreases in demand for imports and hence increases/decreases exports (and GDP) in other countries
- **Capital flows** (followed by “sudden stops”), that lead to increases/decreases in the value of the currency and in prices of the assets in the receiving country
- **Increases/decreases in credit** in one country spill over in other countries, given the global interconnections in the banking and financial sectors (incl. financial innovation)

Global Pandemic of the GFC

Even though in late 2007 two large European banks - German IKB and British Northern Rock – had already collapsed, amongst the first victims of the GFC, in September 2008 the German Minister of Finance, Peer Steinbrueck, declared: **“This crisis is above all an American problem”**.

A few days later much of the **European banking system effectively collapsed** and Germany was forced to bail out the banking giant Hypo Real Estate. Ireland had to issue a very costly blanket guarantee for all liabilities (deposits and bonds) of its biggest financial institutions, other European countries followed suit and Britain effectively nationalized much of its banking system

Conventional wisdom – first promoted by Goldman Sachs analysts - that held that the rest of the world would **“decouple”** from the ailing US **was clearly proven wrong**

An old saying in financial markets states that **“when the US sneezes, the RoW catches a cold”**

The GFC spread globally through several channels:

- Money markets: the complex webs of borrowing and lending that binds together the international financial system broke down after the Lehman default
- Stock markets: investors' sentiment turned negative and the stock markets all over the world became the medium through which investors registered their growing aversion to risk, by dumping equities and piling into “riskless assets” (mainly T-Bills and T-Bonds and **“safe heavens”** currencies like US\$ and Yen)
- Trade: letters of credit [that guarantee that goods in transit between trading partners would be paid when they reach their final destination] and trade finance became much more expensive and often unavailable at any price. As a result, **global trade came to a standstill**. At the peak of the crisis, in early 2009, exports were down 30% yoy in China and Germany, 37% in Singapore and 45% in Japan. World trade was 50% lower in 2009 than it 2008
- Commodities: Collapse of international commodity prices, especially oil (that fell to US\$ 40 a barrel from over 110\$) and copper, throwing commodities-exporting countries into fiscal crises

“Contagion effect” or “home-grown problems”?

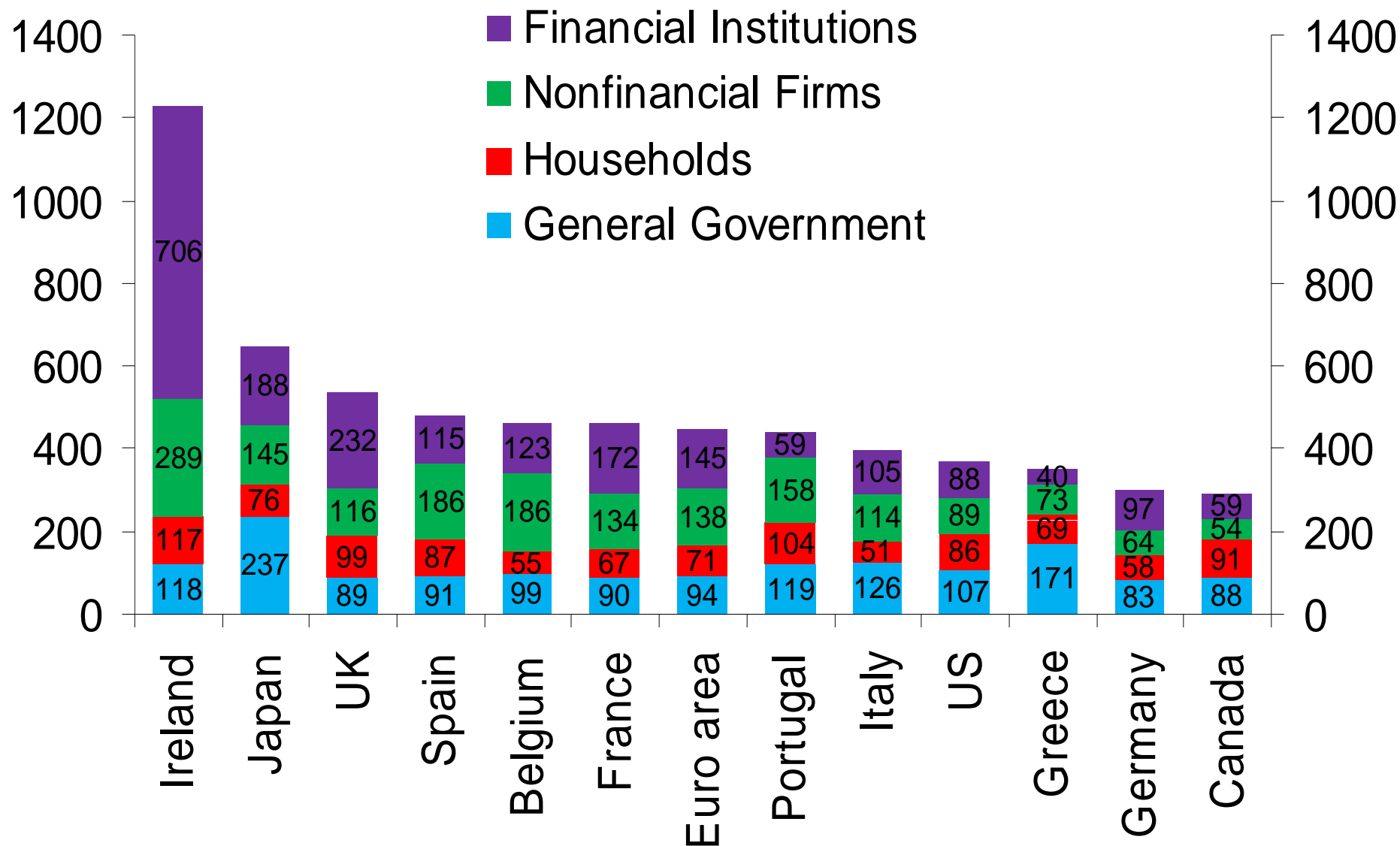
The crisis started in the US but the “**contagion**” would not have spread to other countries had they **also not been suffering from their own underlying vulnerabilities and weaknesses**, often similar to those of the US:

- **Housing prices in many countries around the world had appreciated at a relentless rate**, even higher than in the US: the Economist calculated that the total value of the residential properties in the world’s developed economies had doubled from 2000 to 2005. This gain, a stunning \$40 trillion, was equivalent to the combined gross GDP of all countries in question
- As house prices went up, households felt wealthier, **spending more and saving less**. The boom in residential property investments boosted these countries’ GDP
- Low savings and high consumption and investment rates implies a **negative current account balance**: the imbalances need to be funded by foreign capital, private or public
- Private capital flows are intermediated by the traditional or the shadow banking system: when both systems seized up, the imbalances could not any longer be financed by private capital flows. **Deficit countries were forced to rebalance their trade flows in a very short period of time** - no financing was any more available - or had to resort to official support
- **Public spending as % of GDP in most countries kept growing after 2000**, notwithstanding the favourable growth cycle, but Government budget deficits generally remained well behaved because revenues were boosted by tax receipts linked to the financial and real estate boom. When the economy slowed down, **budget deficit expanded dramatically**
- **Leverage and risk taking was also high in the European banking and financial sector**: leverage ratios at European banks were even higher than their US counterparts (Credit Suisse 33:1, ING 49:1, Deutsche Bank 53:1, Barclays 61:1) and European banks were heavily involved in the financing of many high risk ventures, leveraged buyouts and had even heavily invested in American subprime loans
- Finally European banks had vastly increased cross-border financing, exposing themselves to **sovereign risk**, towards Central and Eastern European countries and towards “peripheral” euro countries

Gross debt in selected advanced economies, 2012

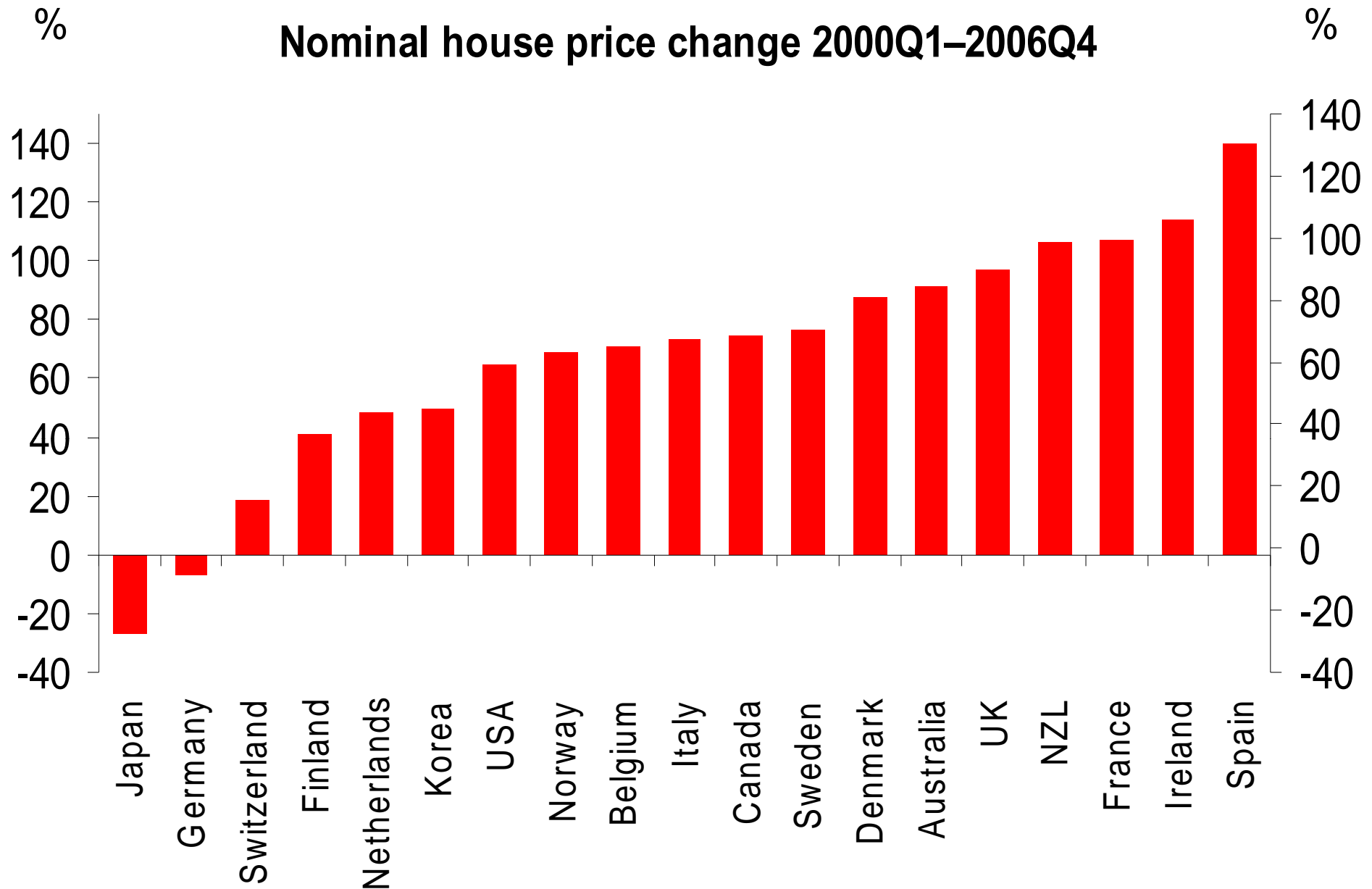
% of GDP

% of GDP



Source: IMF, DB Global Markets Research

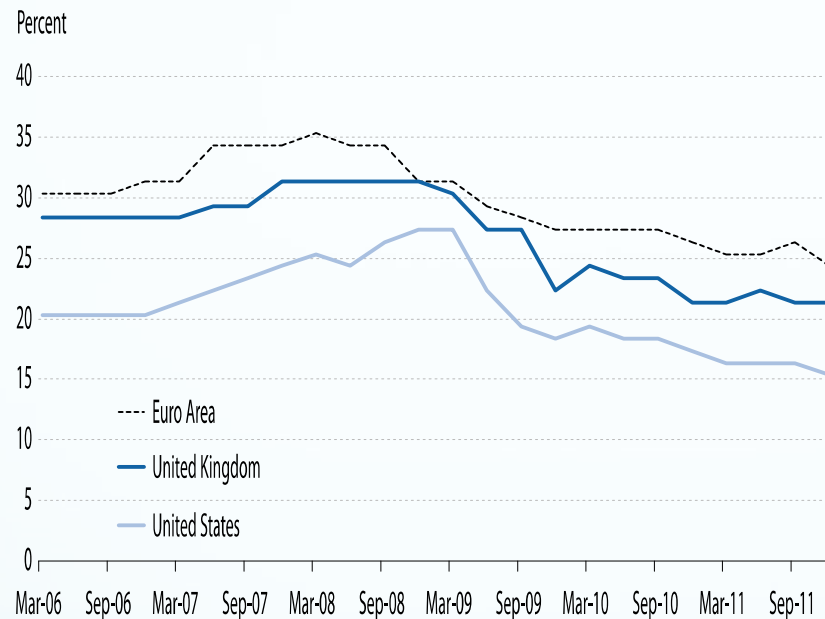
Significant house price bubble in most OECD countries



Source: OECD, DB Global Markets Research

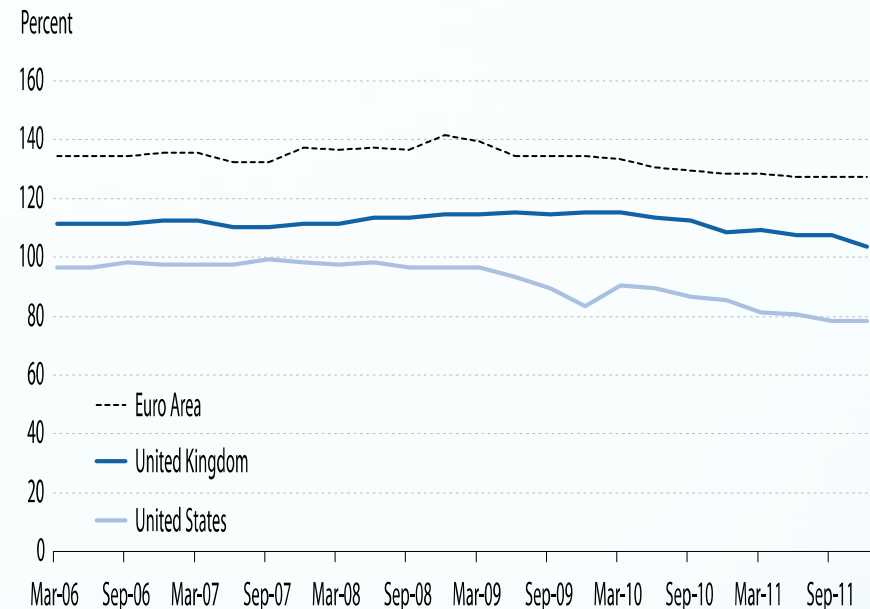
Bank Leverage and Loan-to-Deposit Ratio: Europe worse than US

Bank Leverage



SOURCE: IMF (2012).

Bank Loan-to-Deposit Ratios



SOURCE: IMF (2012).

- The **global European banks expanded their balance sheets and significantly increased leverage**: there are noticeable differences between the leverage ratios of European banks and their US counterparts. These differences have been attributed primarily to two factors: adoption of different accounting standards and differences in regulatory landscape for banks
- **European banks tend to gravitate towards assets that carry a low risk weight, allowing them to report strong capital ratios under the Basel II risk-weighted framework.** Conversely, in the United States, where the emphasis beyond Basel I has long been on the leverage ratio, banks tend to focus more on assets that carry attractive returns, since they have a more binding leverage constraint and cannot over-accumulate assets

Business Cycles & Financial Crisis: the three key elements

Business cycles leading to financial crisis are characterized by three elements:

1. **Changes in trade patterns**, due to:
 - New entrant(s) in the world markets (typically exploiting a “comparative advantage”) [in the past: end of wars]
 - Lowering of trade tariffs
 - Change in terms of trade
2. **Technological innovation(s)**
3. Credit growth/unsustainable **increase in leverage**, often accompanied by **financial liberalization/innovation**

The aftermath of severe financial crises

Severe financial crisis are protracted affairs, whose aftermath is characterized by:

1. **Deep and prolonged collapses in assets markets:**
 - Declines in real housing prices average 35% over 6 years
 - Declines in equity prices average 56% over about 3 ½ years
2. **Profound declines in output and employment:**
 - Unemployment rate rises on average 7 percentage points during the down phase of the cycle, which lasts on average more than 4 years
 - Output falls (from peak to trough) more than 9% on average, although the downturn, average ca. 2y, is considerably shorter than for unemployment*
3. **Value of government debt tends to explode: on average it rises by 86% (in real terms, relative to pre-crisis levels**)**

* Presumably this is partly because potential GDP growth is positive and we are measuring only absolute changes in income and not gaps relative to potential output. Even so, recessions surrounding financial crises are usually long compared to normal recessions, which typically last less than a year

** The main cause of debt explosions is not the widely cited costs of bailing out and recapitalizing the banking system: bailout cost are difficult to measure (the divergence among estimates from competing studies is considerable), but even upper-bound estimates pale next to actual measured increases in public debt. The biggest driver of debt increases is the inevitable collapse in tax revenues that governments suffer in the wake of deep and prolonged output contraction. Automatic stabilizers and countercyclical fiscal policy efforts contribute to the debt buildup. Finally, if interest rates soar following a financial crisis, a spike in interest burden on debt further raises the outstanding debt amount

The “EURO” crisis

- The Euro Crisis reflects primarily the reaction of financial markets to over-borrowing by private households, the financial sector and governments in periphery countries of the Euro Zone (GIPSI - Greece, Ireland, Portugal, Spain, Italy). Yet at the heart of the euro debt crisis is an **intra-area balance of payments crisis caused by seriously unbalanced intra-area competitiveness positions** and the - largely private - accompanying cross-border debt flows

The euro area faces **three interlocking crises** that together challenge the viability of the currency union:

1. **a banking crisis** – where banks are undercapitalized and have faced liquidity problems
2. **a sovereign debt crisis** – where a number of countries have faced rising bond yields and challenges funding themselves
3. **a growth crisis** – with both a low overall level of growth in the euro area and an unequal distribution across countries

Crucially, **these crises connect to one another**:

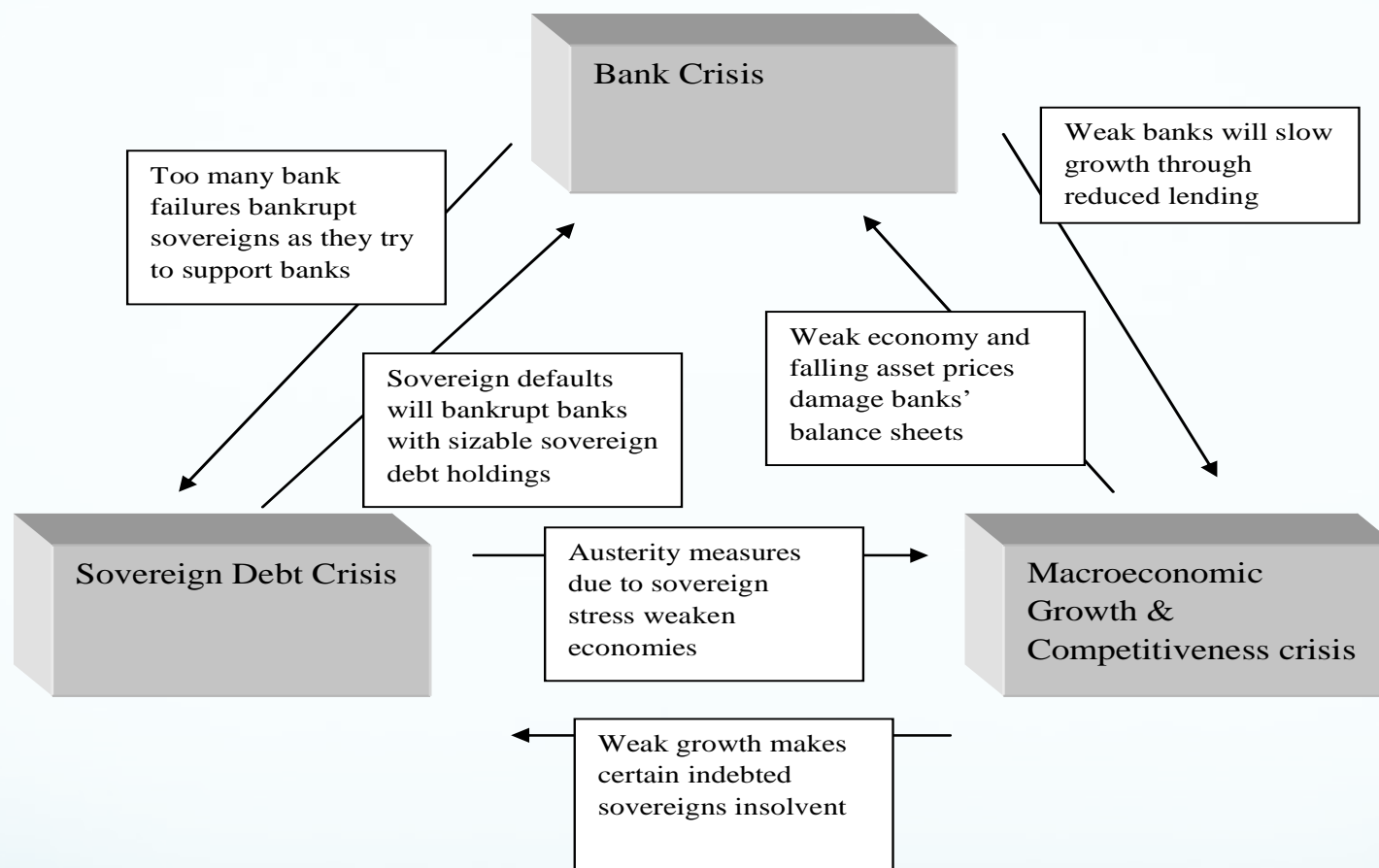
Bailouts of banks have contributed to the sovereign debt problems, but banks are also at risk due to their holdings of sovereign bonds that may face default. Weak growth contributes to the potential insolvency of the sovereigns, but also, the austerity inspired by the debt crisis is constraining growth. Finally, a weakened banking sector holds back growth while a weak economy undermines the banks

Unless policy responses take into account the interdependent nature of the problems, **partial solutions will likely be incomplete** or even counterproductive

The euro area lacks:

- an institutional framework to deal with banking problems at the supranational level (that is, at the level of the entire euro area instead of at the national level)
- a unified debt market and as such, investors who want to hold euro area debt to must pick and choose amongst various national debt issues, making a possible default of one of the nation states more consequential than a default by a state or province within a country
- **the ability to manage “asymmetrical” shocks** that hit different parts of the euro area economy differently

The euro's three crises



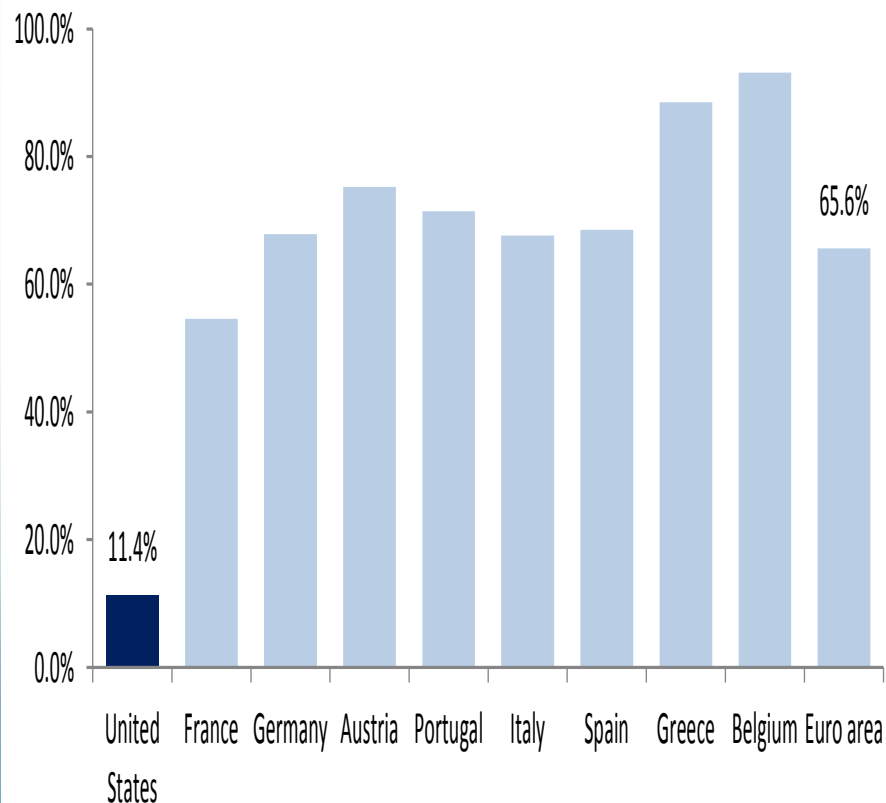
Many of the policy approaches have been limited to address a particular symptom of individual crises: nation states bailing out a banking system, austerity to balance budgets, massive liquidity allowing banks to buy more sovereign debt. Often though, these policies have the potential to make matters worse. In particular, the growth crisis has often received insufficient attention (especially the question of short run growth). Large liquidity provision by the ECB may be an important step towards a broader solution, but **a more comprehensive solution is needed**

1. The euro bank crisis

The **banking system in the euro area** – and in the EU more broadly – **is both large and global**

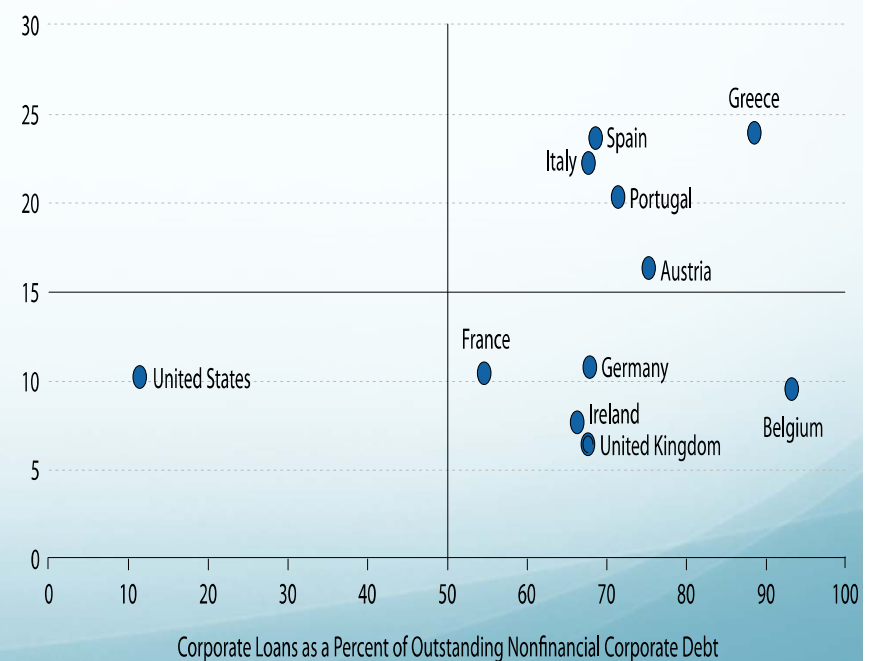
- Total assets of the banking system as a share of the overall economy were over 300% in the euro area in 2007 and under 100% in the United States. **Firms in the euro area rely more on the banking system for financing than American firms** (who are more likely to use capital markets directly), making the health of the banking system particularly important in Europe. Finally **the largest European banks are massive relative to the economy of the government that would be responsible to help them in times of distress**

Nonfinancial corporate loans (share of outstanding debt)



Reliance on Bank Funding by Non-Bank Institutions

Corporate Lending as a Percent of Bank Assets



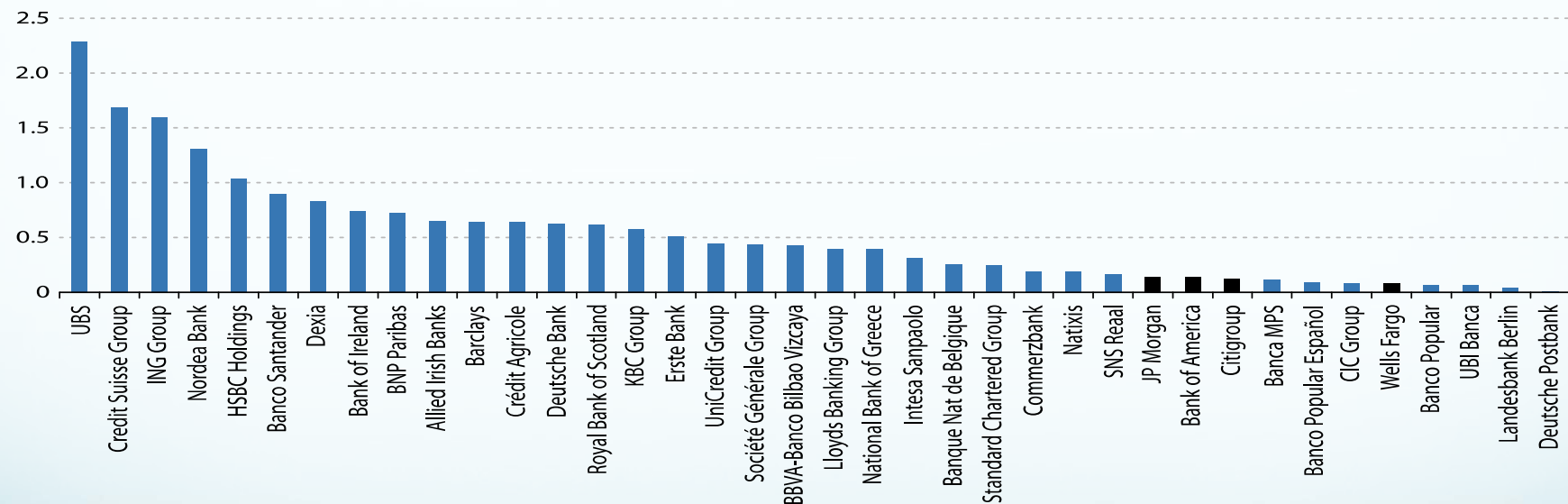
SOURCE: ECB, Eurostat, Federal Reserve from IMF report (2012).

“Globalization” of the banking system

The growth in banking and financial globalization during the 2000s was a worldwide phenomenon, spurred by accommodative monetary policies and ample global liquidity, asset appreciation that eased collateral constraints on borrowers, progressive financial deregulation, and the generally stable macro environment of the “Great Moderation.” Within Europe, EMU provided a further impetus by creating a larger integrated financial market under a single currency and by promoting expectations of faster peripheral income convergence

The **dramatic increase over time in bank concentration has magnified the systemic importance of several individual institutions**

Bank Asset-to-GDP Ratio



Despite banking activity being increasingly global, **bank supervision and resolution of banking solvency problems is still primarily a national activity** – even in the euro area where funds can flow freely in the same currency across borders

The creation of the European Banking Authority centralized some functions, but supervision and especially fiscal support is still at the national level. **The role of liquidity provision to banks is left to the ECB** – but **the ECB has no statutory responsibility to serve as the lender of last resort**. It can and did act as LLR but is not formally charged with the responsibility

Banks assets to GDP in € area

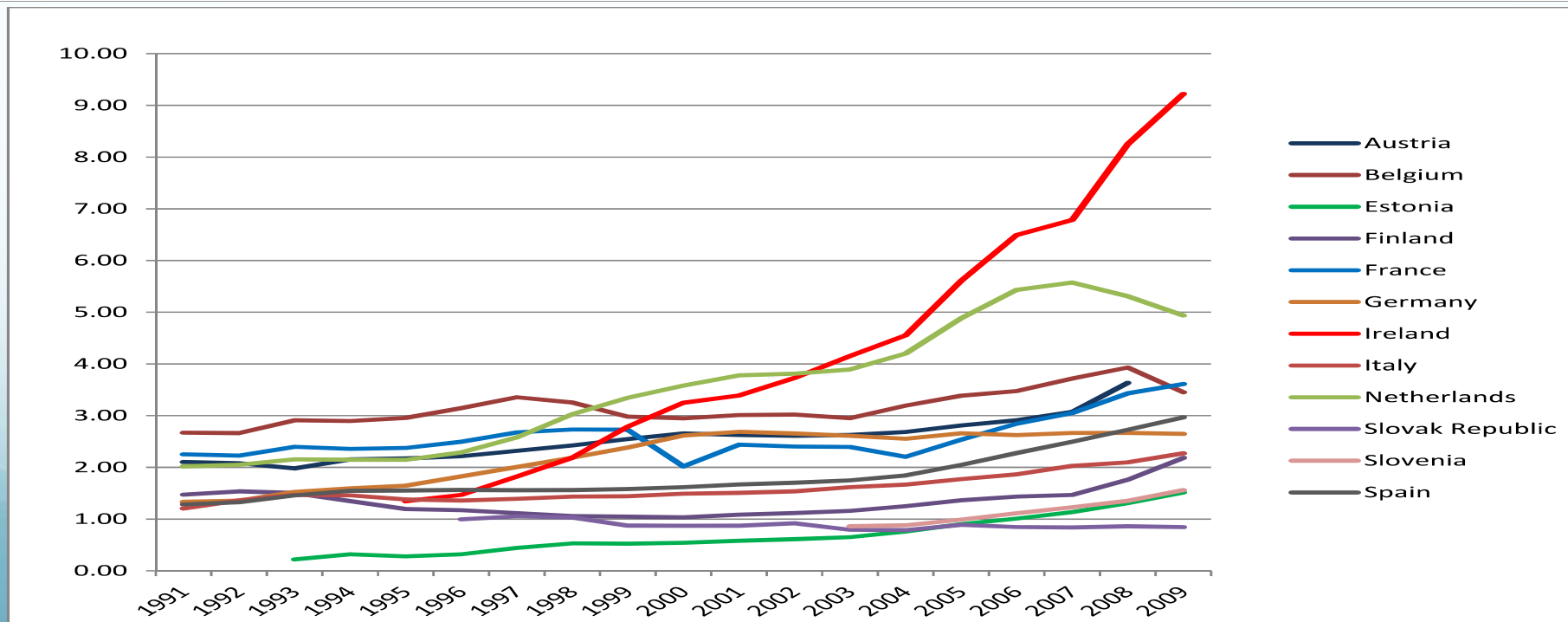
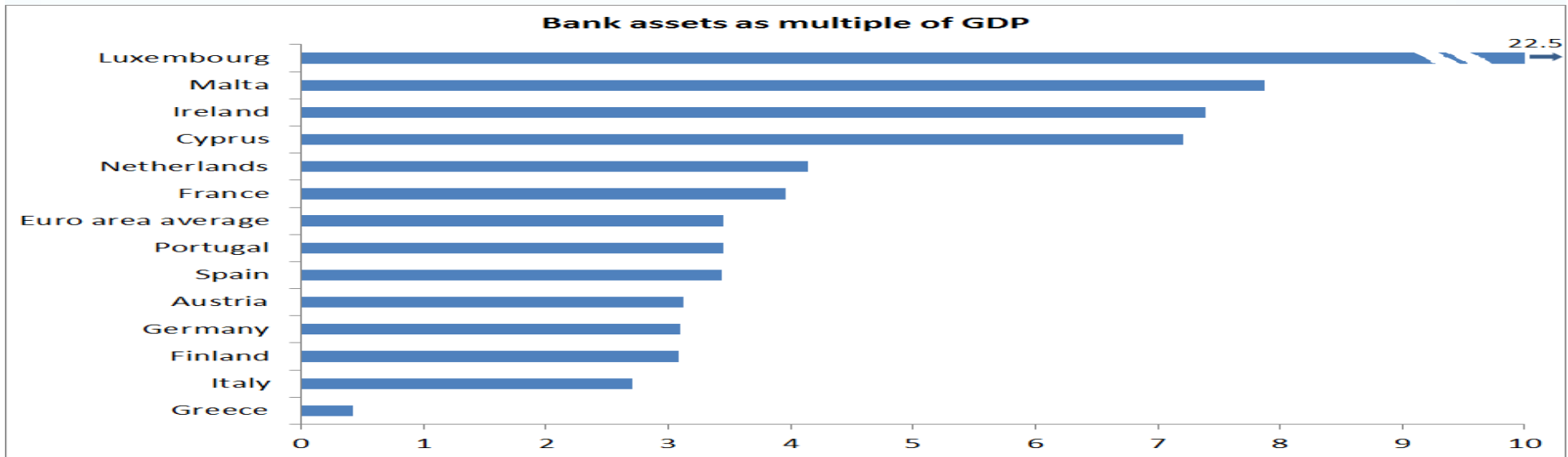


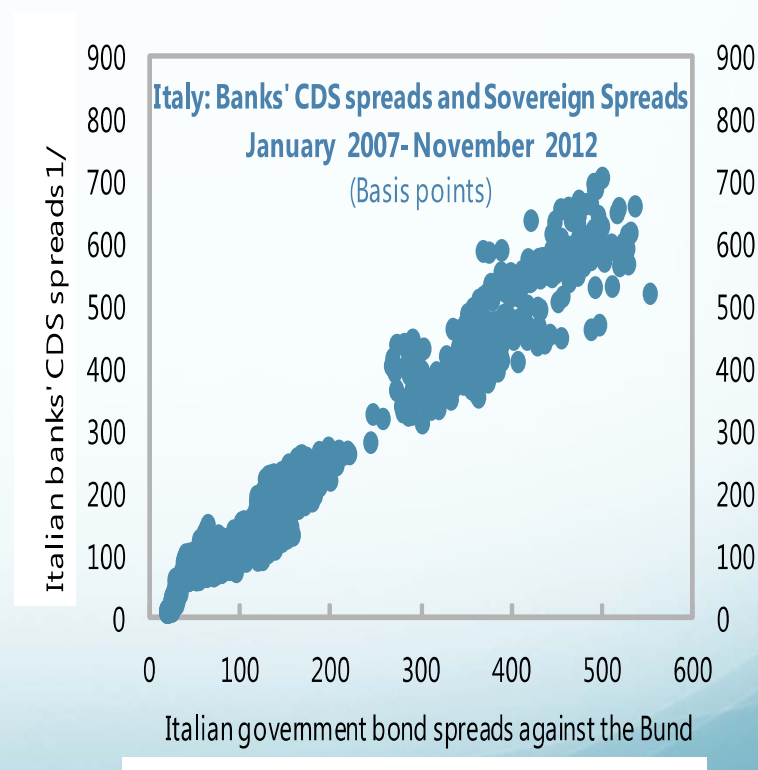
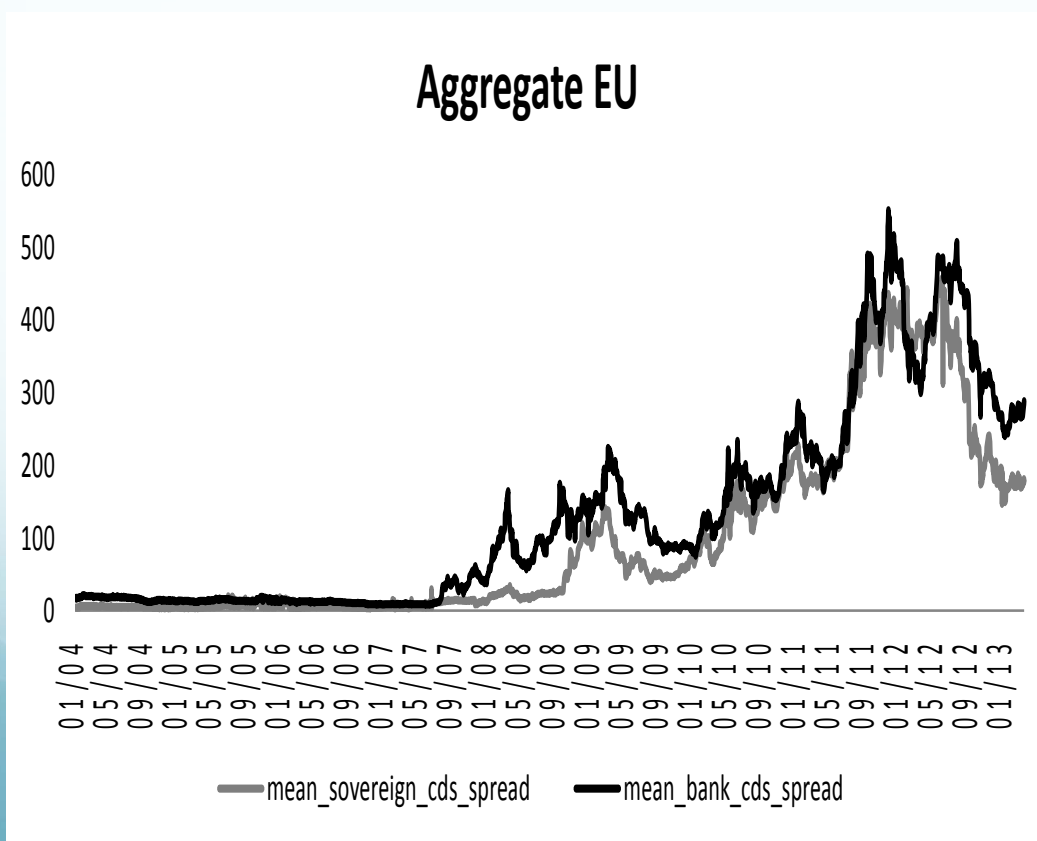
Figure 1 Bank assets relative to GDP, selected countries

1.1. The Euro Banks vs Sovereign linkage

European banks hold large amounts of euro area sovereign debt on their balance sheets.

Data from the stress tests of 91 significant banks show that Greek banks hold roughly 25% of GDP in the form of domestic govies, Spanish banks 20% of GDP while Italian and Portuguese banks hold closer to 10% of GDP. Banks in the €area also hold considerable volumes of bonds of other European sovereigns such that the total exposure to stressed sovereigns is even higher

The cost of insuring bank bonds varies with the cost of insuring the sovereign debt that those banks hold: **the risk of sovereign default is directly translated to the risk of bank default**



1.2. The euro bank crisis: capital/solvency issues

- Problems at European banks do not end with declines in the market value of sovereign bonds: **European banks were the dominant investors in US MBS and sponsored 70% of the asset-backed commercial paper (ABCP) originated prior to the subprime crisis.** Declines in real estate prices in Europe also created fears of **huge valuation losses on banks' residential and commercial real estate loan portfolios**
- Between May 2007 and the end of 2011, the market capitalization of European banks fell by 80%. The declines in market value far exceeded banks' write-downs, leading to a large gap between banks' accounting and market values. As of end 2011, the market cap of European banks was equal to just 57% of the tangible book value of equity, implying that banks were priced at a 43% discount to their accounting values. Many banks had been writing asset values up even as the market applied steeper discounts to those same assets: between 2007 and 2011, the book value of the 20 largest European banks increased by 35% even as these banks' market values declined by 53%
- **Since 2007 nearly every €area country took steps to stabilize their banking system which involved fiscal resources.** These included direct injection of capital into the banks (in 10 of 15 €area members) and state guarantee of bank liabilities (12 out of 15), as well as loans to the banking sector, acquisition of bad assets, nationalization, and individual rescues
- Based on IMF estimates, total direct support to the financial sector by mid-2011 (not including liability guarantees that may or may not cost money in the future) are roughly 6% of GDP in countries like Greece and Belgium, 13-14% in the Netherlands and Germany, and as high as 40% in Ireland. Some of this money will be repaid, but in some cases, the costs could go higher. In particular, the Irish state has been basically bankrupted by its support to Irish banks (whose default, incidentally, would not have represented a major domestic systemic problem, since the Irish banks had relatively little retail business and were mainly funded by foreigners, in particular British, German and French banks: therefore we can say that the Irish taxpayer "bailed-out" foreign financial institutions, at great cost to such a small country)

1.2.a Stress tests and Euro Banks recapitalization: EBA (failed) attempt

- Unlike the liquidity concerns which are normally dealt with at supranational level (by the ECB at times in coordination with the other global central banks) **bank solvency concerns in the €area have been treated until now as a local matter**. The European Commission and the ECB helped play a coordinating role as various EU nations grappled with banking solvency issues, but the plans – and most importantly their funding – came from the member states
- The **EBA** (European Banking Authority, the pan-European banking regulator) forced European banks to undergo “**Stress Test**”, following the example set by US authorities. **Rigorous “Stress Test” (as performed in the US) are the main way to resolve uncertainty over banks’ balance sheets solvency (that can lead to liquidity crises)**
- European authorities have performed a number of “stress test”, but **the most interesting scenario for the market to evaluate – a sovereign default – is just what that the authorities have promised to avoid!**
- **U.S. stress tests were successful because they were credible but also because there was a committed public capital backstop in case of capital shortfalls.** In the euro, any backstop is still at the national level: a bank that could go bankrupt due to a failure of its sovereign is relying on that same sovereign for a capital backstop
- In December 2011, the EBA required euro area banks to raise a total of €114.7 billion of capital to meet a 9% core tier one capital requirement by the middle of 2012. As of July 2012 banks were able to raise €94.4 billion in additional equity. Those banks that were unable to raise the required capital were either restructured or received public assistance. In the case of Spain, the EBA’s original €26 billion capital shortfall estimate was repeatedly revised upwards until July 2012 when the Eurogroup granted €100 billion to the bank recapitalization fund of the Spanish government to cover the estimated capital shortfall among Spanish banks

1.2.b Stress tests and Euro Banks recapitalization: the ECB and the Single Supervisory Mechanism

- Following the failed attempts of the newly formed “European Banking Authority” (EBA) to produce adequate “stress tests” of the main European banks, the ECB took charge
- The European Central Bank (ECB) published on Oct. 26th 2014 the results of a thorough year-long examination of the resilience and positions of the 130 largest banks in the euro area, accounting for 82% of total banking assets: this rigorous exercise was a major milestone in the preparation for the **Single Supervisory Mechanism**, which became fully operational in November 2014
- The **Comprehensive Assessment** - which joined up the AQR and the stress test components - was aimed at strengthening banks’ balance sheets, enhancing transparency and building confidence.
- The **AQR** (Asset Quality Review) conducted by the ECB examined whether assets were properly valued on banks’ balance sheets as on 31 December 2013. It made banks comparable across national borders by applying common definitions for previously diverging concepts and a uniform methodology when assessing balance sheets. The ECB recognizes the **need to improve the consistency of the definition of capital and the related quality of capital**. ECB Banking Supervision will address this as a matter of priority.
- In the **Stress Test** banks were required to maintain a minimum CET1 ratio of 8% under the baseline scenario (as for the AQR) and a minimum CET1 (Core Equity Tier 1) ratio of 5.5% under the adverse scenario. **The stress test is a prudential exercise to test banks’ ability to withstand weakening economic conditions**
- **This unprecedented in-depth review of the largest banks’ positions was expected to boost public confidence in the European banking sector. By identifying problems and risks, it should help repair balance sheets and make the banks more resilient and robust. This should facilitate more lending in Europe, which will help economic growth**

1.2.c Euro Banks recapitalization: precautionary recapitalization

If a bank needs capital, it does not necessarily mean that it is failing or about to fail. There may be a number of options for banks to address their capital shortfall without triggering resolution and in line with EU state aid rules.

- a) A bank can raise capital on the market or from other private sources. (for example, in February 2017, shareholders of the Italian bank UniCredit approved a recapitalisation of €13 billion from private sources)
- b) A Member State can decide to intervene in line with market conditions. A state intervention is in line with market conditions if a private economic investor would carry it out on the same terms (for example, the Portuguese recapitalisation of the fully state-owned bank Caixa Geral de Depositos in March 2017 was carried out on market terms and therefore did not involve state aid in favour of the bank)
- c) The EU bank resolution framework [Bank Recovery and Resolution Directive (BRRD) and Single Resolution Mechanism Regulation (SRMR)] also foresees the exceptional possibility of a **precautionary recapitalisation**, which **allows the use of public funding subject to strict conditions and in compliance with state-aid rules** (for example, in 2015 the Commission approved Greece's precautionary recapitalisation of two Greek banks, Piraeus and National Bank of Greece, under EU rules. The Commission has also reached an agreement with Italian authorities to enable a precautionary recapitalisation of Monte dei Paschi in June 2017). The **main conditions for a precautionary recapitalisation** are:
 - the ECB, in its supervisory capacity, needs to declare that the bank is solvent;
 - the State support shall not be used to offset losses that the institution has incurred or is likely to incur in the future;
 - the State support is temporary and has received final approval under EU State aid rules
 - shareholders and junior creditors have contributed to limit the use of taxpayer money as required by EU state aid rules (“Burden Sharing”)

1.2.c Euro Banks recapitalization: Single Resolution Mechanism vs National insolvency Law

If the ECB declares a bank failing or likely to fail, the responsible resolution authority, i.e. the Single Resolution Board (SRB) in the Banking Union has to decide whether it is in the public interest to put the bank into resolution via the **Single Resolution Mechanism** (for example, the resolution of the Spanish Banco Popular in June 2017), or whether a bank could be wound down under **national insolvency law** (for example, the liquidation of Italian Banco Popolare di Vicenza and Banca Veneta in June 2017).

From 1 January 2016 the "**bail-in**" requirements for banks in resolution under **Single Resolution Mechanism** entered into force in all Member States. This means that, in resolution, **contributions from the SRF can only be made after a bail-in of at least 8% of the bank's total liabilities**. This may also require converting senior debt and uncovered deposits. Any contribution of the Fund is subject to a State Aid Decision by the Commission.

Also for Resolution under **National insolvency law**, burden-sharing requirements apply, i.e. shareholders and holders of subordinated instruments have to contribute in full to the cost of the measures. Depositors and senior creditors are not required to contribute.

1.2.c Euro Banks recapitalization: Single Resolution Mechanism vs National insolvency Law

Resolution under the **Single Resolution Mechanism**:

- In the Banking Union, if the SRB considers that it is in the public interest, based on the resolution objectives, the bank is put into resolution in line with the Single Resolution Mechanism Regulation (SRMR). **The SRMR requires that the bank's losses will have to be covered by the bail-in of shareholders and creditors (at least 8% of the bank's liabilities) before the Single Resolution Fund can be accessed. This may also require bailing-in senior debt and, where necessary, uncovered deposits.**

.Resolution under **National insolvency law**:

- If the SRB considers that resolution action is not warranted in the public interest, EU law stipulates that the bank is wound down in line with national insolvency law. It is the responsibility of the national authorities to apply national insolvency law.

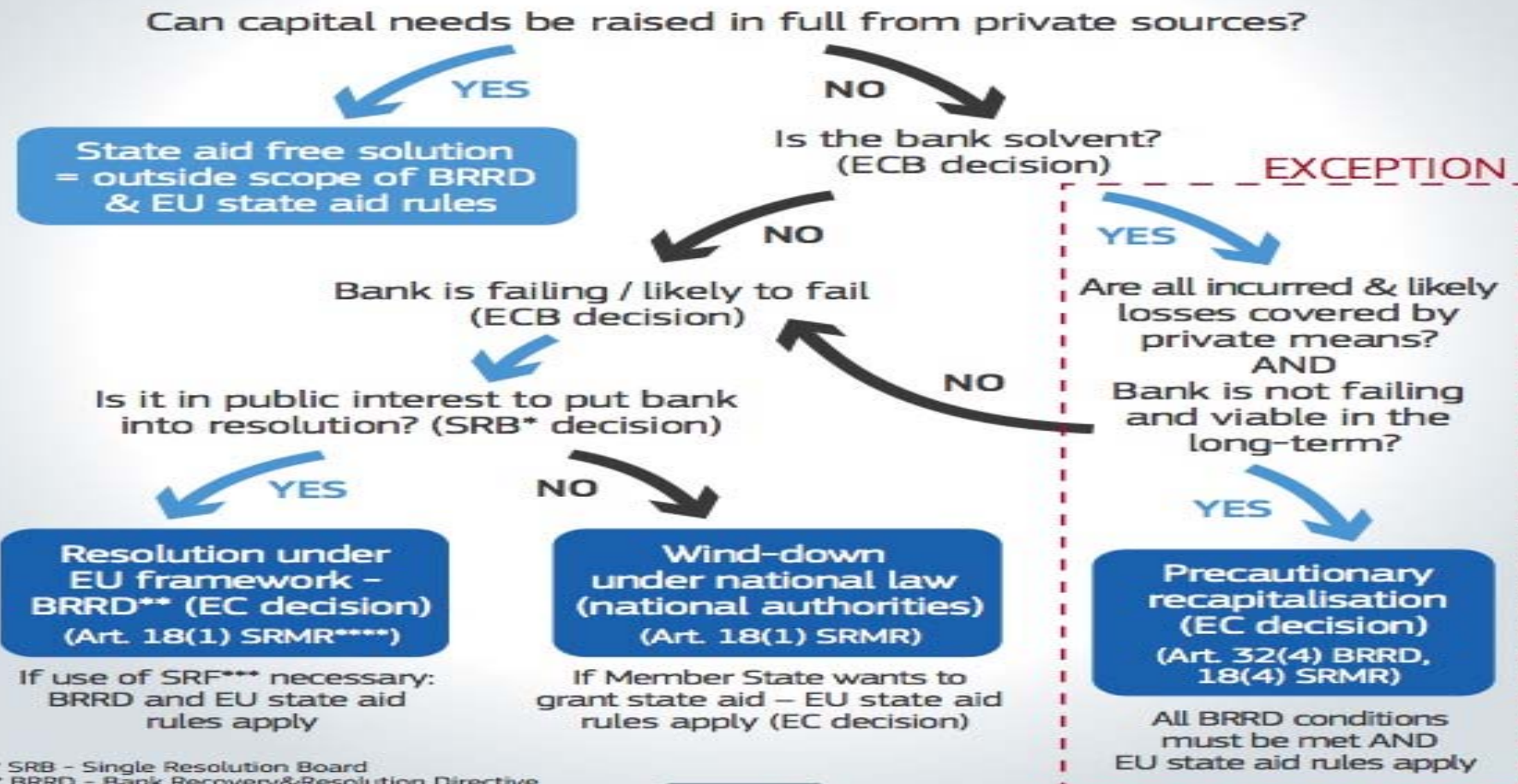
High degree of uncertainty and length of process damages the chances of a distressed bank to recover:

- All sources of funding dry up ("**bail-in risk**")
- All good borrowers look for alternative lenders ("**adverse selection risk**")

1.2.c Euro Banks recapitalization



If a bank has a capital shortfall in the Banking Union

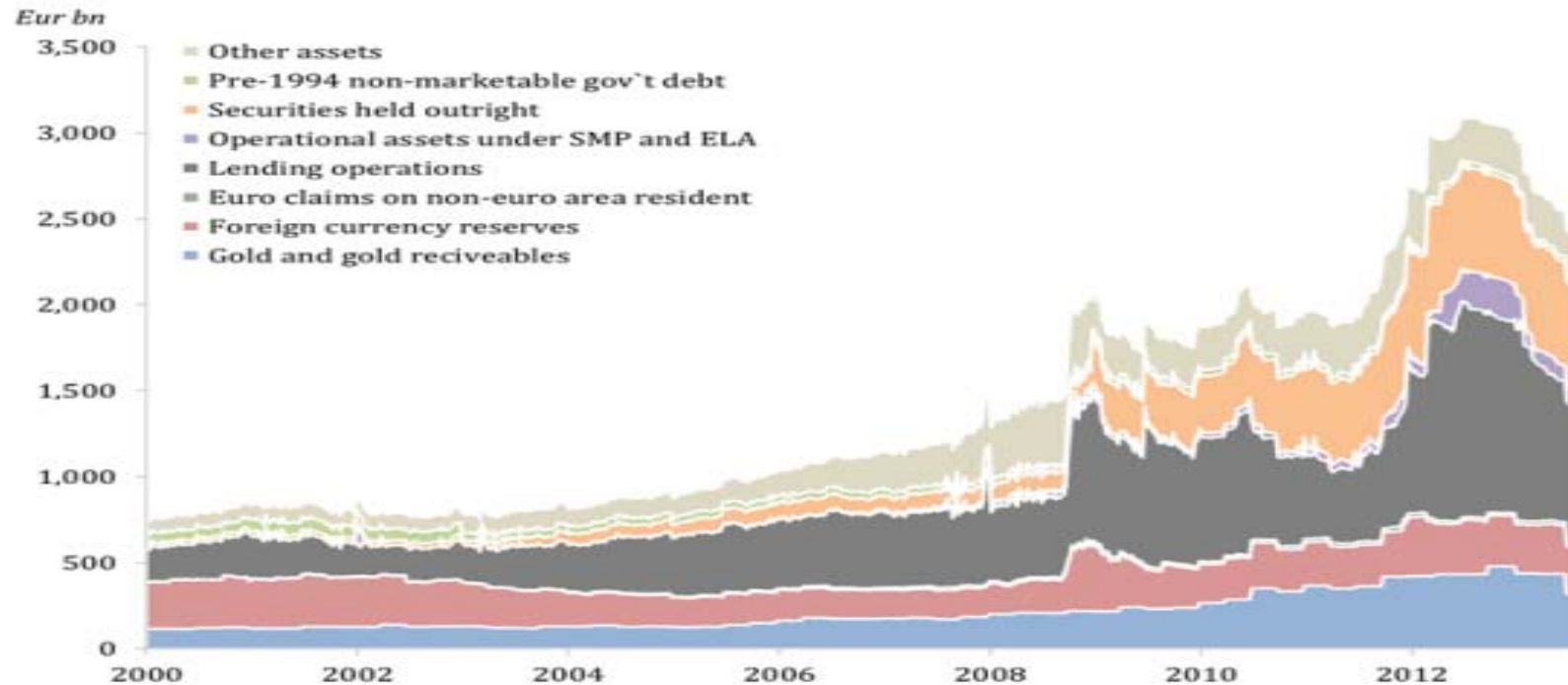


* SRB - Single Resolution Board
** BRRD - Bank Recovery & Resolution Directive
*** SRF - Single Resolution Fund
**** SRMR - Single Resolution Mechanism Regulation

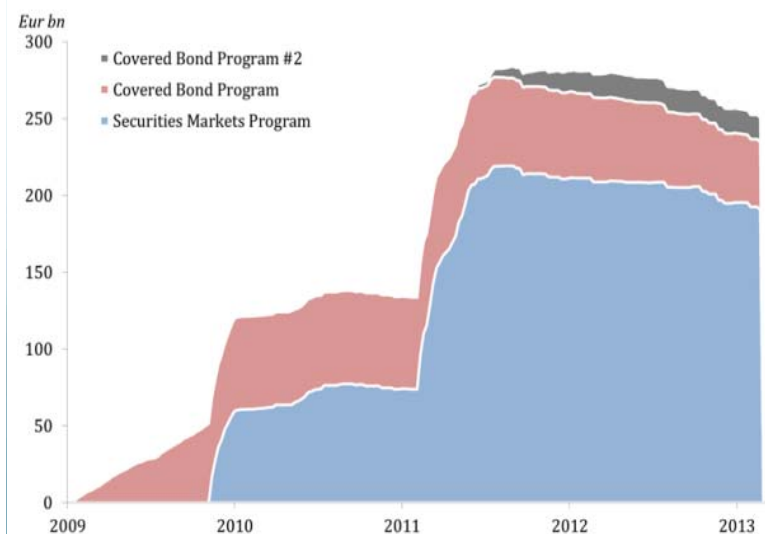
1.3. The euro bank crisis: liquidity issues

- In response to additional funding problems at €banks in Dec 2011 the ECB provided nearly €500 bn through a **Long Term (up to 3y) Refinancing Operation (or LTRO)**. A second LTRO on Feb 29th, 2012 provided over €500 bn euros more.
- **The ECB loaned to banks for terms up to 3 years, filling a M/T liquidity need but it did not purchase assets from the market (contrary to the FED), thus leaving any credit risk on the balance sheets of banks**
- **The ECB maintains that the purpose of the LTRO program is simply to smooth troubled markets and ensure that the monetary policy transmission mechanism is functional**
- Prior to the crisis, LTROs were done with a variable rate tender, in which banks were required to bid on a fixed allotment of €. In response to the liquidity troubles that Europe faced, the **ECB decided to engage in a fixed-rate tender with full allotment**. As long as banks have the required collateral, they have access to as much liquidity as they need
- In addition to this non-standard implementation of monetary policy, the **ECB also expanded the set of eligible collateral for longer-term repo operations**
- These operations allowed European banks to profit from a “**carry trade**” by borrowing from the ECB at 1% to buy much-higher yielding government debt. The IMF estimates that of the €513 bn net increase in ECB bank credit provided through the LTROs, €115 bn was used to acquire additional government debt. With Italian and Spanish 10-year notes yielding above 7% and 5.6%, respectively, just prior to the allotments, it is conceivable that the net interest income from the LTROs alone increased bank capital levels by €5 billion in 2012
- Still, if banks use the LTRO to fund more sovereign debt purchases (to benefit from the carry trade), this means that while the LTRO may have been a crucial solution to a liquidity problem, it also implies that **the connection of banks and sovereigns has merely been strengthened as banks hold even more sovereign debt**.
- In that sense, the **LTRO is notably different from the quantitative easing (QE) policies followed by the Federal Reserve where the Fed purchased assets outright rather than help fund banks' ability to purchase them**

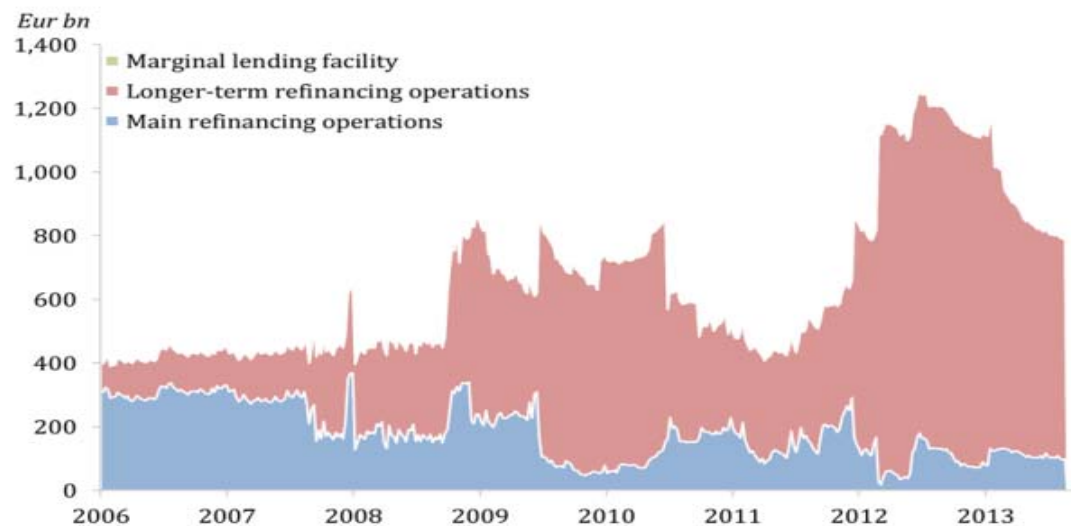
ECB balance sheet; assets



Securities held for monetary purposes



Refinancing operations (MRO & LTRO)



1.4. The euro bank crisis: long-run solutions

To break through the vicious circle between banks and sovereigns a more significant longer-run reform was required: in December 2012 an agreement among € area finance ministers was reached to establish the “**Single Supervisory Mechanism**” (SSM), or “**banking union**”

- **SSM grants ECB direct oversight of €area banks** (in cooperation with national regulators)

- **The SSM would create:**

- (i) a single set of rules
- (ii) a common and unique supervisory authority
- (iii) a single resolution mechanism
- (iv) a pan European deposit insurance scheme

for the entire euro area to reduce the uncertainty associated with cross-border operations and to eliminate the prospect of discriminatory treatment in any domestic bank resolution

- **The banking union thus consists of two elements:**

- i. joint banking regulation and supervision** for €banks, that would allow banks everywhere in Europe to be regulated and supervised according to the same high standards, also allowing to better take into account cross-border effects
- ii.** In case of bank failures (even under the best possible regulation and supervision there will always be cases of bank failures) measures like a **single resolution and restructuring mechanism and pan-European deposit insurance scheme** would ensure that financial institutions can fail without placing a strain on government finances

- Any safety net for a financial system requires offsetting regulation to combat moral hazard, and this regulation would logically need to sit at the same level as the bank insurance. Thus **the ECB, as euro area wide regulator, would need to take a key role in bank supervision**

1.5. The euro bank/credit crisis and growth

- **A weak banking sector is a continual drag on growth:** if banks do not lend, the euro area economy will not rebound
- The economics literature has long recognized the importance of the financial system for allocating capital towards productive uses and allowing firms and consumers to borrow. A rapid cut in the availability of credit will reduce both consumption and investment
- **A weak banking sector** can make any attempts at using monetary policy to stimulate the economy more difficult as it **compromises the credit channel of monetary policy transmission**
- In Europe, without well-developed market-based funding alternatives, any pullback in bank lending triggers an especially acute credit crunch that limits businesses' ability to expand and also requires businesses to operate with greater cash balances to self-insure against liquidity risks: bank credit to nonfinancial private sector borrowers contracted by 3.8% during 2012, causing the €area economy to contract by 0.5% over the course of the year
- **Using growth in the stock of credit when associating developments in credit with developments in domestic demand can be misleading, since developments in a flow variable (domestic demand) are being compared to developments in a stock variable (credit)**
- To the extent that spending is credit-financed, demand should be related to new borrowing, or the flow of credit. **Domestic demand in a particular period will depend on the new borrowing that takes places in that period, or the flow of credit.** Consequently, domestic demand growth must depend on changes in the flow of credit, rather than changes in the stock
- After a credit crisis all that is required for a recovery in demand growth is that new borrowing rises – it is not necessary that the level of new borrowing (and therefore credit growth) is positive. **If households are de-leveraging, then a slowdown in the pace of de-leveraging will be sufficient to boost demand growth. A credit-led rebound in domestic demand growth can occur even while credit growth is negative and as debt levels fall**

2. The euro sovereign debt crisis

The sovereign debt crisis in the euro area has gone through a number of acute phases where **the yields on some euro area government bonds jumped to very high levels**. In particular, market participants tend to focus **on the difference (or spread) between the various countries' bonds and those of Germany's as an indicator of the stress in the sovereign debt market**

Investors demand different interest rate on bonds from two different countries for two reasons:

1. if one currency is expected to strengthen against the other: the asset in the strengthening currency will be worth more over time and investors are willing to hold it even if it pays a lower interest rate
2. investors may worry that governments will default, that is, simply not repay its debt. If the chance of default differs between two countries, the country more likely to default will have to pay a higher interest rate to compensate investors for the risk

The basic equation for **debt sustainability** is:

$$\Delta D_t = (R_t - g_t) * D_{t-1} + \text{primary}$$

where D is the debt to GDP ratio, R is the nominal interest rate, g is the nominal growth rate, and primary represents the primary (non interest) budget deficit scaled to GDP

This year's debt scaled to GDP is the same as last year's (the debt outstanding) plus interest plus any new borrowing (or saving) beyond interest, minus the degree to which GDP (the denominator) grows to offset increases in the debt (the numerator)

If the interest rate paid on the outstanding debt is greater than the nominal growth rate of the economy, even if the primary (not including interest) portion of the budget is in balance, debt as a share of GDP will grow

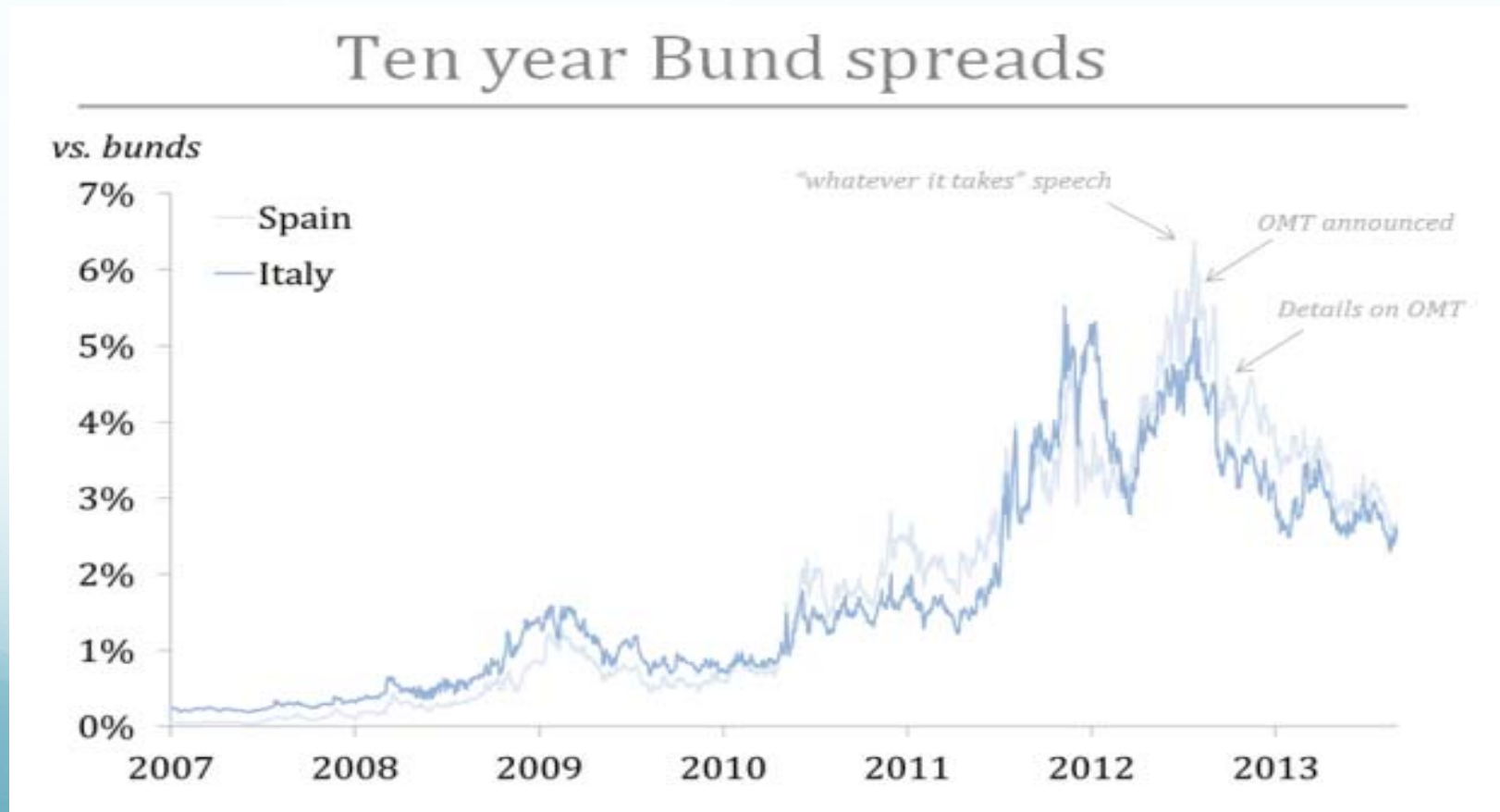
A sovereign debt crisis can act much like a bank crisis. A country that can fund itself with low interest rates is solvent, but the very same country forced to pay a higher interest rate is suddenly feared insolvent, even if its primary budget is in balance.

Furthermore, though, **low growth can doom an otherwise solvent country to insolvency**

2.1. The euro sovereign debt crisis: credit spread

Between the introduction of the euro currency in 1999 and the Lehman Brothers bankruptcy in 2008, market participants did not distinguish between the credit quality of EMU member states. Despite dramatically different fiscal profiles, the yields on 10-year notes issued by Germany and Greece were roughly the same as recently as 2007.

While the Maastricht Treaty that established the EMU expressly forbade bailouts, two institutional features made EMU sovereign bonds functionally equivalent: (1) the ECB applied an identical haircut to all euro area sovereign bonds pledged as collateral irrespective of fiscal position; and (2) all euro area sovereign debts carried a zero risk weight for banks under the EU Capital Requirements Directives



2.2. The euro sovereign debt crisis and the “power to print” money

The euro sovereign debt crisis also reflects a fundamental problem in the architecture of the common currency. Whilst the U.S. and U.K. governments borrow in a currency that their central bank can print (i.e. market participants know that a Treasury bill can always be redeemed at par in U.S. dollars upon maturity), **the Italian and Spanish governments are effectively borrowing in a foreign currency** and cannot provide similar assurances. If official support came, it would likely subordinate existing private lenders, exacerbating their ultimate losses, as happened in the case of Greece. Creditors demand a premium for bearing this risk, which creates a negative feedback loop, as the resulting increase in sovereign borrowing costs worsens the fiscal outlook, which further increases risk premia and yields

	(as a % of GDP)			
	Gross Public Debt	Structural Budget Balance	Required Fiscal Adjustment to Hit 60% Debt Ratio by 2030	10 Year Yield (7/31/2012)
France	86.01	-1.32	7.38	2.06
Germany	80.56	1.65	2.98	1.37
Greece	165.41	-1.52	13.92	25.46
Ireland	106.46	-4.59	12.88	NA
Italy	120.10	2.03	4.59	6.08
Japan	126.41	-7.72	21.08	0.79
Portugal	107.82	0.37	10.44	11.20
Spain	69.12	-5.10	12.74	6.75
United Kingdom	81.79	-3.73	13.15	1.54
United States	102.93	-5.31	19.58	1.47

3. The euro growth crisis

The euro area has **two aspects of a growth crisis**:

1. the **overall area is growing too slowly** to reduce unemployment and support debt levels
2. the **distribution of growth across the area is unbalanced** with those economies facing pressure in bond markets growing most slowly

This imbalance of growth is often described as a problem of current account imbalances within the euro area. **The chief problems in the GIPSI are:**

1. their **large current account deficits** prior to the crisis
2. **the buildup of overall debt** (not just government debt), in particular debt owed to foreigners (the external debt).

The current account deficit and growth crisis are clearly linked:

- the current account imbalances prior to the crisis signalled competitiveness problems in the periphery, and the present day current account deficits are a drag on demand. These gaps grew over a decade and will be very hard to reverse quickly with no changes in exchange rates across member states possible, holding back growth in the GIPSI
- the capital inflows helped increase domestic prices in GIPSI, reducing the competitiveness of the borrowing countries. The increase in prices reduced real interest rates relative to other euro countries, leading to more and cheaper borrowing and to the buildup of debt that now requires painful deleveraging
- For GIPSI to increase their growth based on exports (or shift consumption towards domestic goods and away from imports), they need their relative prices to fall compared to other goods and services on world and euro area markets

In 2002 Blanchard and Giavazzi argued the current account deficits (just growing at the time) may not be a problem within the euro area as they may simply represent poorer countries with higher expected growth rates increasing their consumption in a newly unified market. More recently, with ten more years of experience to monitor, Obstfeld (2012) has argued **policymakers should remain wary of current account deficits even within a currency union** (especially if national governments are responsible for national financial stabilization)

3.1.a. The GIPSI competitiveness crisis

The sharp rise in wages in GIPSI - primarily driven by increases in public sector wages - was one of the factors contributing to their **loss of competitiveness**

The industrial development of China and of other EM constitutes a massive global real shock affecting the demand for higher technology investment goods. Northern Europe is more vertically integrated into the EM through its high-technology investment goods focus than is southern Europe that is subject to greater competition in manufactured consumer goods

Percent increase in Unit Labour Costs (ULC), Q1 2001 – Q1 2011

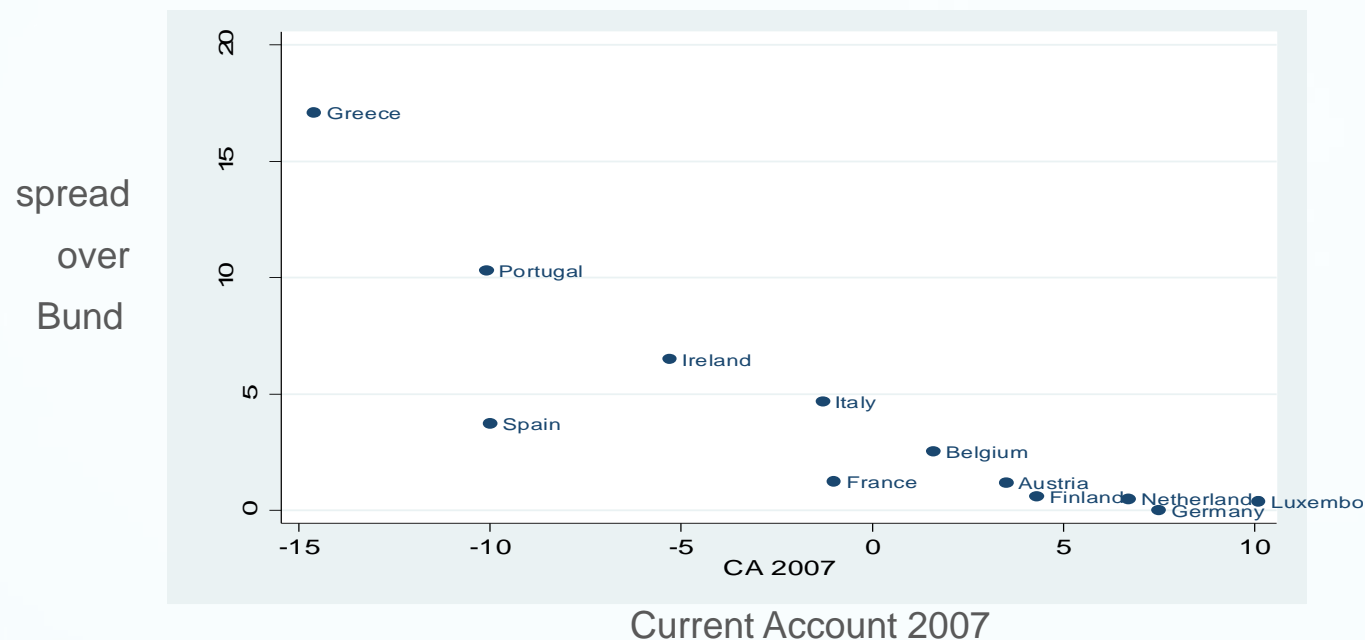
Greece	33.2%
Italy	30.7%
Spain	26.6%
Ireland	20.0%
United States	11.5%
Germany	0.9%
Source: OECD.Stat.	

Germany established its own new norm of zero nominal ULC inflation, resulting from a consensus between the trade unions and employers that wage restraint was pivotal to preserve Germany's competitiveness and reduce unemployment

To regain competitiveness GIPSI should engender an “internal devaluation” that is, have the price of their goods and services fall relative to other countries. This is a very difficult road, especially in a very low inflation global environment: it is often more difficult and costly to change prices down than it is up. In particular, wages are difficult to adjust downward. Thus, **unless prices rise quickly in GIPSI's trading partners' economies (that is in Germany), it may be slow and costly for an internal devaluation to occur and to restore GIPSI's competitiveness**

Internal devaluation comes with one further challenge. If wages and prices fall, this means even if there is real GDP growth, nominal GDP could fall. Thus, the denominator in the debt to GDP ratio does not grow. Therefore, **even if the GIPSI countries restart real growth via internal devaluation, it is not until they restart nominal growth that it will help their debt sustainability**

3.1.b. The link between CA and sovereign risk

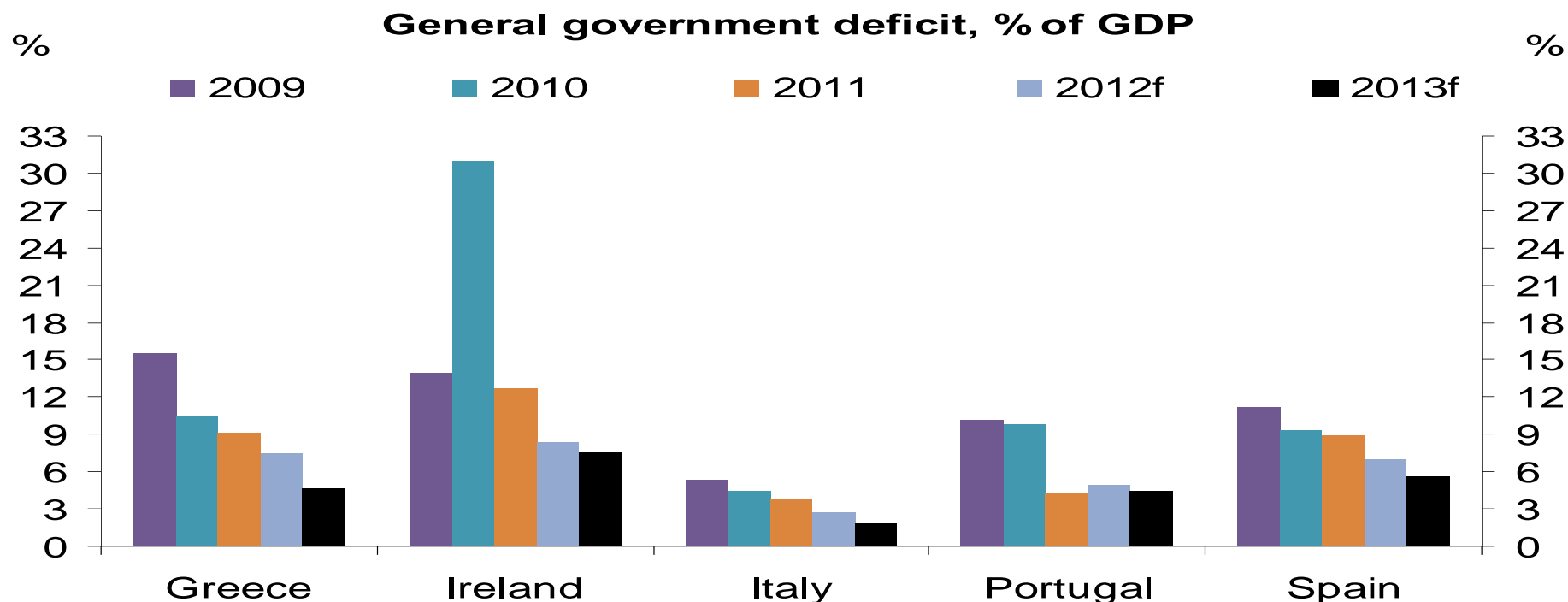


The picture above shows a **nearly perfect relationship between the current account in 2007 and the spread over German debt paid at the height of the sovereign crisis** (Spring 2012). Those countries that were borrowing (as opposed to just governments borrowing) came under attack (the picture is identical if one looks at the sum of current accounts over the period of 2001-7)

The current account deficit represents the net borrowing by all participants in the economy from the rest of the world (if a country buys more than it sells it must borrow the money from elsewhere.) If in a crisis many private sector debts wind up becoming public debts (due to bank bailouts or other aid to the economy), one would expect that large borrowing prior to the crisis anywhere in the economy will lead to problems with sovereign repayment at some future point because previous private borrowing may increase current fiscal risk

The problem is with total borrowing in the economy - and with borrowing from outside the economy in particular - not with government borrowing per se

3.2. Contractionary economic policies & fiscal adjustment of GIPSI



Source: IMF Fiscal Monitor, Oct 2012, DB Global Markets Research

Cutting deficits normally comes at the expense of growth: lower real growth in a low inflation environment leads to little improvement (sometimes even a worsening) in the debt/GDP ratio

A better option for GIPSI is to adopt a “**fiscal devaluation**” policy: rather than wait for internal devaluation (a recession) to reallocate demand, the same impact as a shift in relative prices can be accomplished via tax changes

Reducing taxes on labour and increasing taxes on consumption and on wealth (especially real estate) can mimic the outcomes of an exchange rate depreciation (or tariff and subsidy). Reducing payroll taxes on employers, governments directly reduce unit labour costs. Reducing payroll taxes on employees, they may help employees to accept a lower wage (or lower wage growth). At the same time, governments can increase taxes on consumption, both to balance the budget effect of the payroll tax cut and to discourage imports

3.3. Structural Reforms to Increase Growth

GIPSI must adopt a number of “**structural reforms**” to try to increase growth:

- **deregulating product or retail markets**
- **making labour markets more flexible, to help either increase productivity or lower wages leading to lower production costs**
- **streamlining rules for investment or starting businesses**
- **introducing policies aimed at improving innovation**
- **removing barriers to entry in various services and professions**

Any reform that increases growth can help achieve debt sustainability and lower unemployment

Such reforms are not typically rapid in their implementation. Moreover, if the economies are struggling from a lack of demand – with household balance sheets stressed and sovereigns that cannot spend – improving potential output will not lift the economies from their current recession. **It will help in the long run, but not in the present.** This does not mean such reforms should be ignored, they are likely good policy, but they may not be sufficient to relieve these economies from their current slumps

Over a long horizon, **countries with poor structural policies could raise potential GDP by adopting structural reforms but the impact in the near term is likely to be limited**

Many policies that remove labour market rigidities appear to have limited impact in the first few years

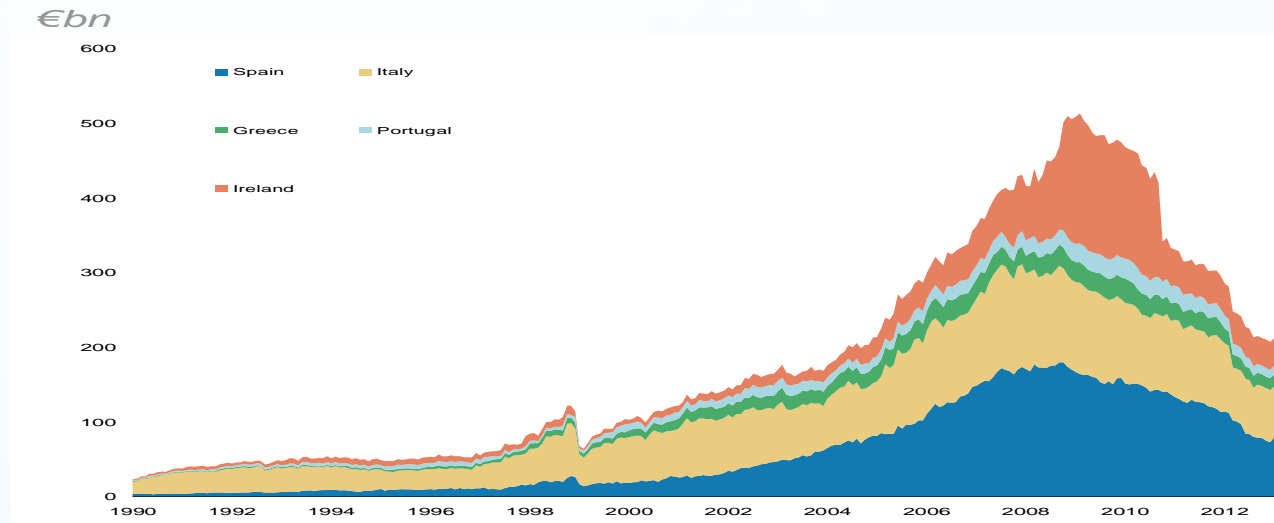
- Policies that limit unemployment insurance generosity may lower unemployment rates in some settings, but the impact appears to be negative when the economy is weak (likely due to negative impact on demand).
- Product market reforms may increase the labour force over time, and again increase potential GDP, but in the face of constrained demand and high unemployment, increasing the labour force participation rate is unlikely to be helpful in the short run

Structural reforms will certainly help over time and should be pursued as part of long run packages, but evidence is not encouraging that they can be a route to a near term resolution of the growth crisis

Financial fragmentation and risks of € break-up

- The financial fragmentation evident during the height of the banking crisis stemmed, in part, from banks efforts to hedge “**redenomination risk**,” or the potential that a current member state would elect to leave the euro area and reintroduce its own national currency. **To manage this risk, multinational banking groups sought to match assets and liabilities on a country-by-country basis.** For instance, a French bank with a Spanish subsidiary would ensure that each loan extended to Spanish borrowers would be funded, on a €-for-€ basis, with deposits or wholesale funding from Spain. **Corporate treasurers increasingly “swept” account balances in “peripheral” banks on a nightly basis** and re-deposited the funds in accounts open at German or Dutch banks. **Asset managers sought to reduce “peripheral” exposures** and sold Greek, Portuguese, Spanish, or Italian bonds, loans, and equity

German banks: GIIPS funding gap



Source: Morgan Stanley Research, Bundesbank. Data at July 2013.

- These simultaneous fund flows from the “periphery” to the “core” generated a full-blown balance of payments crisis similar to that experienced in many emerging market crises. Fortunately **in the Eurosystem the role of foreign currency reserves is replaced with a system of inter-central bank debits and credits called TARGET2.** If the Spanish banking system lacks the liquidity to meet deposit outflows, it can borrow from the Bank of Spain, which, in turn, borrows (via the ECB) from the central bank of the banking system in receipt of the deposits (the German Bundesbank, for instance). Spain never needs to worry about running out of Eurosystem debits because the Bank of Spain’s credit line has no limit. The only constraint on the infinite provision of cross-border liquidity is the ECB collateral rules, which require the Spanish banks to post eligible collateral to the Bank of Spain as a condition of any loan

The Target 2 imbalances

TARGET2 is an interbank payment system for the real-time processing of cross-border transfers throughout the European Union

The Eurosystem has the statutory task of promoting the smooth operation of payment systems. This is crucial for a sound currency, for the conduct of monetary policy, for the functioning of financial markets and for financial stability. The Eurosystem's main instrument for this task is **the provision of payment settlement facilities through the TARGET2 system**, the 2nd-generation Trans-European Automated Real-time Gross Settlement Express Transfer system for the euro

- Since the beginning of the financial crisis in August 2007, claims of the Deutsche Bundesbank on the Eurosystem through the TARGET2 system have gone from basically zero to more than €700 bn. This has led to a debate over what this accumulation means and what, if anything, should be done about it

TARGET2 balances can arise from:

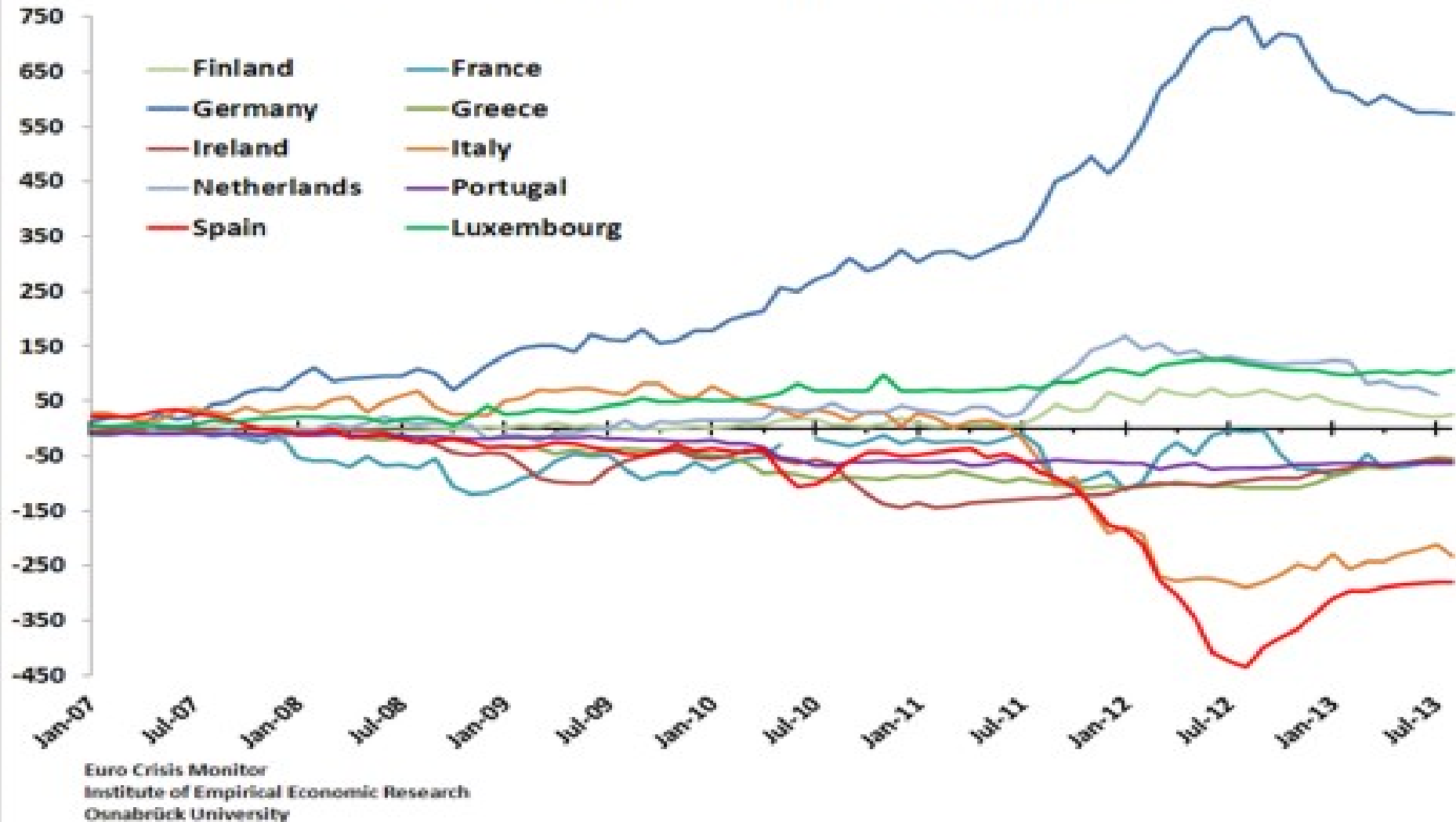
1. **current account**
2. **capital account transactions**

Such balances are associated with ongoing current account balances but they may also reflect a capital account reversal that is motivated by credit concerns (including “redenomination risks”)

With the onset of the global financial crisis, as euro area interbank markets became less and less liquid, euro area banks became partially dependent on the recycling of CA surpluses (financing of CA deficits) through the Eurosystem. In addition, commercial banks, among other private creditors, were shifting stocks of financing, mainly for fears of a default amongst the GIPSI that might lead even to the re-emergence of national currencies (“redenomination risk”)

Deposit outflows and increased recourse to central bank borrowing as a substitute for the lack of alternative funding were reflected in intra-euro area payment imbalances. Target balances, an indicator of euro area fragmentation and capital market malfunction, reached an all-time high at levels above €1,000 billion in the summer of 2012, even though current account imbalances were already being reduced

Net Balance with the Eurosystem / Target [bn €]



The € banking system cannot be permanently reliant on central bank funds for its main source of funding; in the medium term “peripheral” countries cannot continue to substitute inflows of foreign private sector liquidity with TARGET2 liabilities. Countries under stress need to return to private markets and attract funds from the rest of the area; this requires that confidence be restored both in the banking sector and in the sustainability of public finance

The Outright Monetary Purchases (OMT)

“There are risks and costs to action. But they are far less than the long-range risks of comfortable inaction.” JF Kennedy

ECB President Draghi in his now-famous July 2012 speech argued that **rising yields on Spanish and Italian debt “have to do more and more with the risk of convertibility”** (i.e. the risk that a Spanish € may one day be worth less than a German €) **than with credit risk.**

- When OMTs were announced in August 2012, **financial fragmentation had created widely divergent borrowing costs for firms and households across euro area countries.** As a result, **the transmission of monetary policy was severely impaired:** monetary policy impulses were not evenly transmitted across countries or adequately along the yield curve
- Furthermore, a **tail-risk** in the euro area emerged, triggering self-perpetuating dynamics in the economy: in an adverse scenario a “bad equilibrium” was possible, **triggered by self-fulfilling and reinforcing expectations.** Investors required an interest rate premium to compensate for the risk that the euro might not remain the irreversible currency of the euro area – at least in its current composition. In this adverse scenario, **the expectation of one or more countries exiting the euro would have driven public and private financing costs in these countries to such a high level that they would have had no other option than to actually exit**

If some portion of the yield differential reflects “redenomination risk”, then elevated borrowing costs are not just the fault of the profligate peripheral governments but also an issue properly in the jurisdiction of the central bank. **To the extent that yields reflect redenomination risk rather than borrower-specific factors, they come into ECB mandate and “the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough”**[Mario Draghi]

- The goal of OMT is to eliminate the unwarranted and self-reinforcing fears of a euro area break-up that have undermined ECB ability to effectively conduct monetary policy in the pursuit of price stability, complementing – but not substituting itself - to the market, which in the current crisis has been abrupt and unreliable

The Outright Monetary Purchases (OMT)

6 September 2012 - Technical features of Outright Monetary Transactions

The Governing Council (GC) of the ECB has taken decisions on a number of technical features regarding the Eurosystem's outright transactions in secondary sovereign bond markets that aim at safeguarding an appropriate monetary policy transmission and the singleness of the monetary policy. These will be known as OMT and will be conducted within the following framework:

➤ Conditionality

- A necessary condition for OMT is **strict and effective conditionality attached to an appropriate European Financial Stability Facility/European Stability Mechanism (EFSF/ESM) programme**
- The GC will consider OMT to the extent that they are warranted from a monetary policy perspective as long as programme conditionality is fully respected, and terminate them once their objectives are achieved or when there is non-compliance with the macroeconomic adjustment or precautionary programme
- Following a thorough assessment, the GC will decide on the start, continuation and suspension of OMT in full discretion and acting in accordance with its monetary policy mandate

➤ Coverage

- Transactions will be focused on the shorter part of the yield curve, and in particular on **sovereign bonds with a maturity of between one and three years**
- No ex ante quantitative limits are set on the size of OMT

➤ Creditor treatment

- The Eurosystem intends to clarify in the legal act concerning OMT that it accepts the **same (pari passu) treatment as private or other creditors** with respect to bonds issued by euro area countries and purchased by the Eurosystem through OMT

➤ Sterilisation

- The liquidity created through Outright Monetary Transactions will be fully sterilised

➤ Transparency

- Aggregate OMT holdings and their market values will be published on a weekly basis. Publication of the average duration of OMT holdings and the breakdown by country will take place on a monthly basis

The ECB rescue of € OMT

Since 2012 **actions taken by the ECB and the EMU member governments dramatically reduced the risk of currency fragmentation, sovereign restructuring, or a banking system collapse**

From 2010 to 2012, the EU and ECB attempted to deal with the € problems through piecemeal policies aimed at temporarily calming markets. It was not until the ECB formally announced **OMT** on September 6, 2012 that the architectural question was finally addressed. The OMT program permits the ECB to purchase “unlimited quantities” of the sovereign debt of member states that submit to a fiscal adjustment program. Through conditionality OMT foster incentives for sound economic and fiscal policies and the ECB effectively announced that the debt of compliant euro member states is fully convertible into euro currency at par upon maturity



Source: Bloomberg.

The Effectiveness of OMT

OMT have been able to address the impairments to the transmission mechanism of monetary policy by reducing fragmentation and restoring the distributional neutrality of monetary policy

OMT has eliminated fears of disasters and removed denomination risk from the market

OMT has been successful since it not only has eliminated (tail) risk in the market, but it has done it in a controlled and incentive-compatible way

How was this possible without spending a single euro? **OMTs are an insurance device against redenomination risk**, in the sense of reducing the probability attached to worst-case scenarios. The existence of OMT contains the risk of such catastrophic scenarios materialising, since:

- by their very existence OMT eliminate the undue spread components and hence self-fulfilling default trajectories
- through conditionality OMT foster incentives for sound economic and fiscal policies
- by focusing on bonds with shorter maturity, they limit the duration of the risk exposure to a given creditor

As for any insurance mechanism, OMTs face a trade-off between insurance and incentives, but their specific design was effective in aligning *ex ante* incentives with *ex post* efficiency

Policy conditionality aligns incentives in the countries already subject to an ESM programme as well as in countries that are at risk of requiring support. This is because, in the programme context, national authorities face a substantial loss of sovereignty with regard to economic policy. The political cost related to this loss of sovereignty constitutes a forceful deterrent: experience with EU/IMF programmes shows that governments request assistance only if it is strictly unavoidable

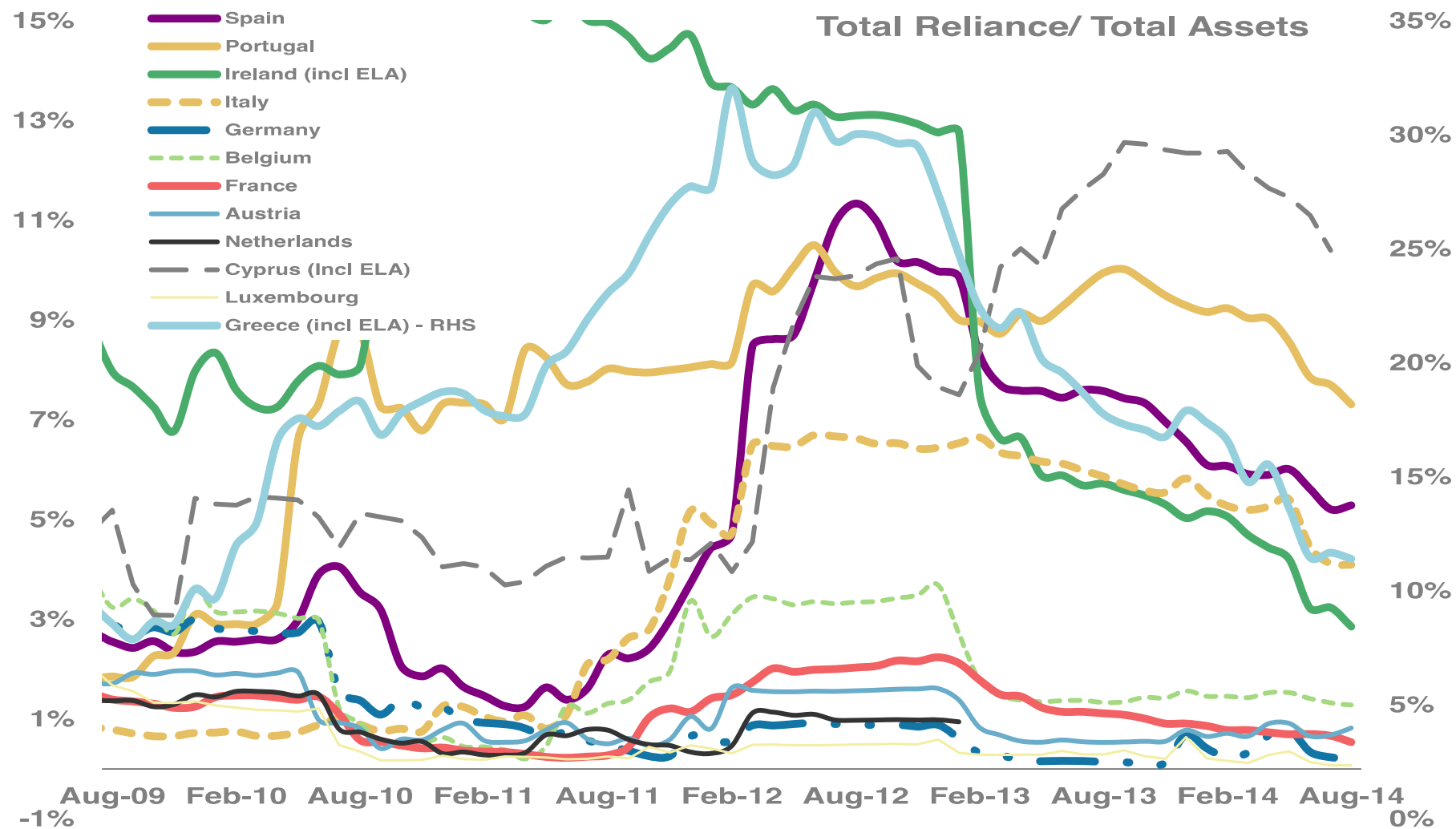
One year after the announcement, **the positive effects of OMTs are visible in several key indicators:**

1. distortions on the sovereign debt markets have receded
2. bank and firm borrowing conditions have eased
3. banks have been able to re-access the market, for both funding and raising capital. The strong divergence in funding costs across countries has fallen. Deposits outflows have been reversed: deposits by €area residents at banks in GIPSI have increased by about €210 bn since Aug 2012

These improvements in the form of reduced fragmentation can be summarised by the **downward trend in Target2 balances**. These have been reduced by about €300 bn or some 30% from their peak one year before. **They have returned to levels observed before the two three-year LTROs at the end of 2011**

Reliance on ECB Funding – since 2009

Total Liquidity Provisions/ Total Assets



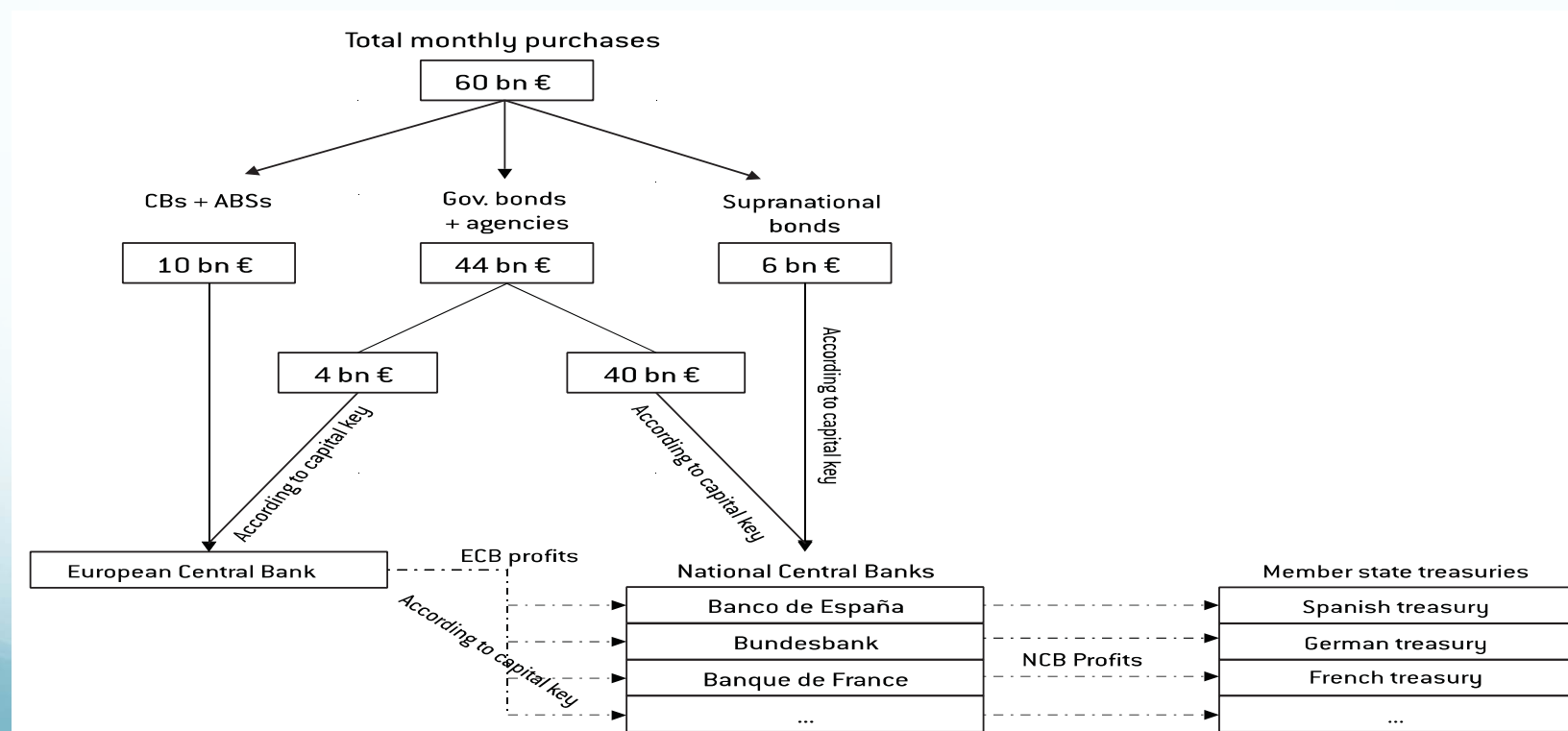
European Central Bank Quantitative Easing

- On **January 22nd 2015**, the European Central Bank (ECB) announced an expansion to the existing asset purchasing program to encompass Eurozone government, agency and European institution issued securities at rate of 60Bn EUR a month. This will begin in March 2015, continuing until September 2016 and left open ended.
- In combination with the ECB's existing stimulus, this move to begin Quantitative Easing (QE) aims to reverse persistent weakness in growth and inflation.
- **The primary objective of the ECB's monetary policy is to maintain price stability.** Eurozone inflation has remained below the ECB's target of "close to, but below 2%" for over two years and in recent months has fallen below 0.5%.
- The ECB has several tools to implement monetary easing, notably using key interest rates (including the main refinancing and deposit facility rate), liquidity injection measures, and quantitative easing through asset purchases.
- The Quantitative Easing program's goal is to help investor sentiment on the euro area in particular strengthen demand, increase capacity utilisation and support money and credit growth, and thereby contribute to a return of inflation rates towards 2%.

ECB QE - details

- To supplement the ECB's Asset-Backed Securities and Covered Bonds Purchase Programmes (ABSPP and CBPP3) originally launched in September 2014, the ECB introduced a new Public Sector Purchase Programme (PSPP). Under the PSPP, the Eurosystem will buy sovereign bonds from euro-area governments and securities from European institutions and national agencies. The purchases started on 9 March 2015 and will last at least until September 2016. The ECB Governing Council also made it clear that the programme is open-ended and that purchases will be conducted until the ECB sees “a sustained adjustment in the path of inflation which is consistent with the aim of achieving inflation rates below, but close to, 2 percent over the medium term”.

Figure 1: Allocation of monthly asset purchases by the Eurosystem



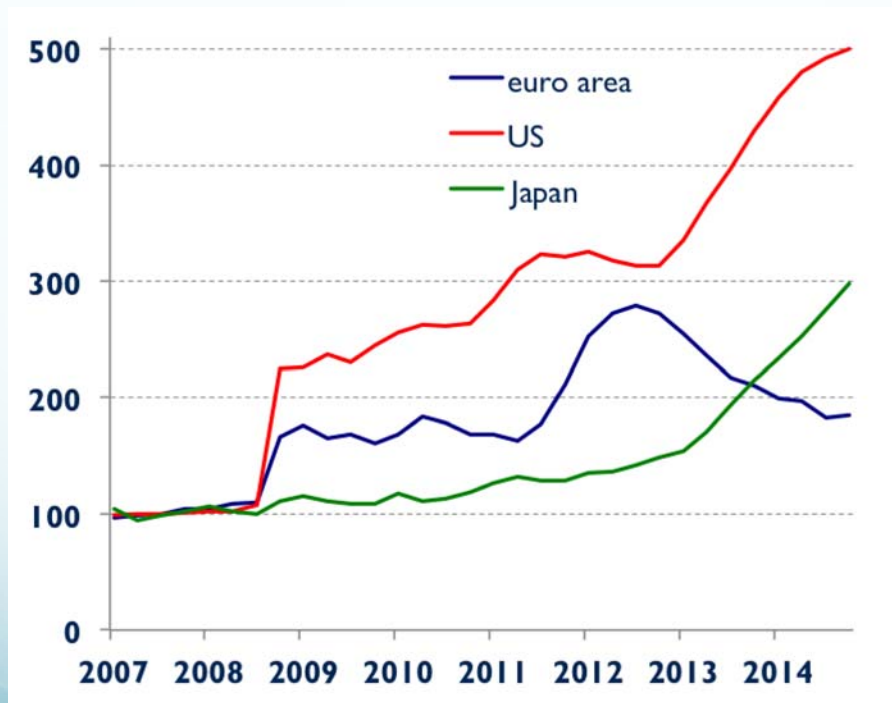
Source: Bruegel, ECB.

ECB Q E – International Comparison

The ECB is a relative latecomer to the crisis-era trend of targeted balance sheet expansion that started in the US, UK and Japan

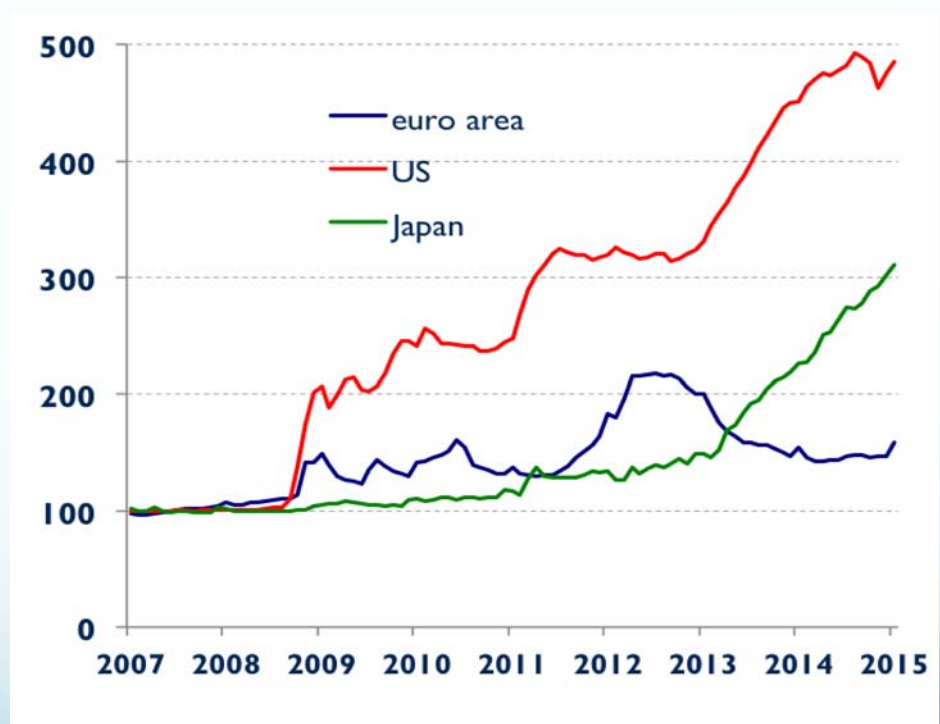
Central banks' balance sheets

(index 2007=100; quarterly data)



Monetary base

(index 2007=100; monthly data)



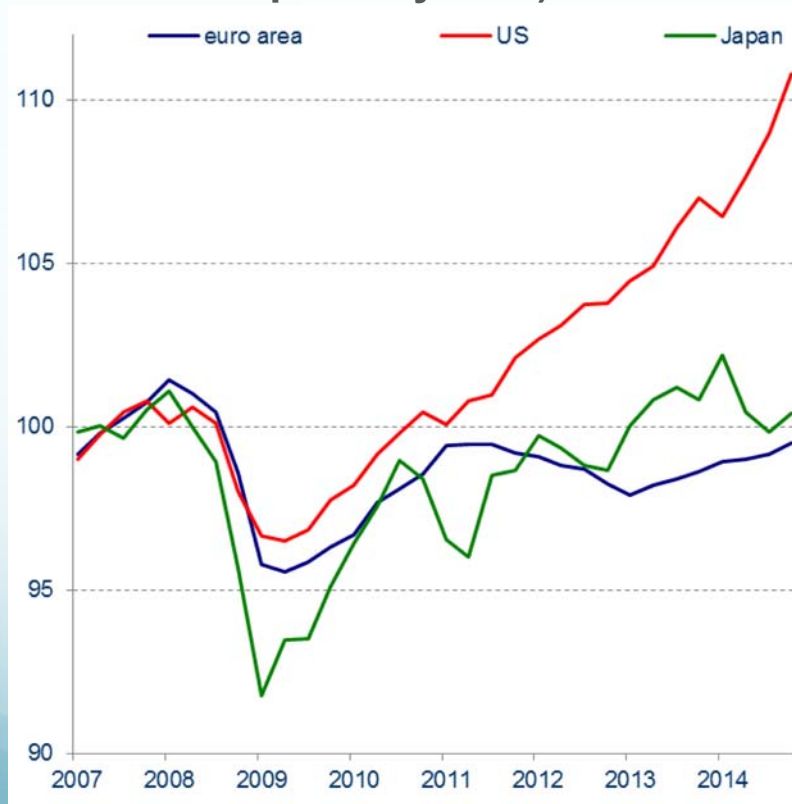
Sources: ECB, Federal Reserve Board, Bank of Japan and ECB staff calculations.

QE – Impact on Growth and Inflation

The ECB is expecting QE to revive growth in Europe and bring back inflation to its long-run 2% target

Real GDP

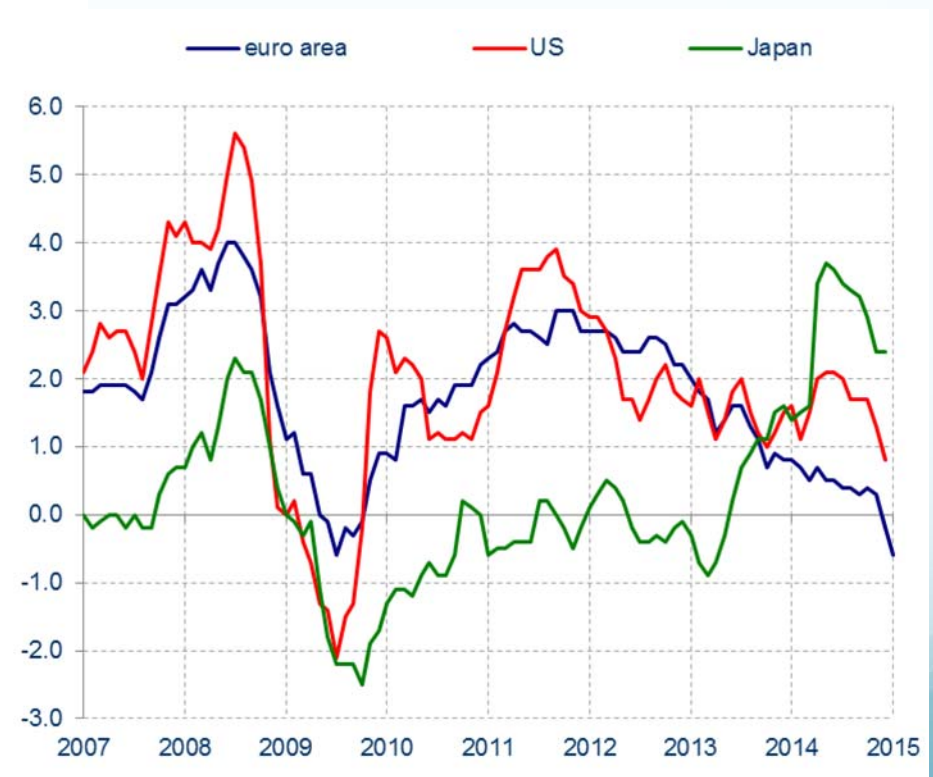
(index 2007=100; seasonally adjusted; quarterly data)



Sources: National sources and Haver Analytics.

CPI headline inflation

(annual percentage change; monthly data)



Sources: National sources and Haver Analytics.

Risks and Potential Costs of Quantitative Easing

- **Medium-term inflation risks:** unlikely, and central banks have enough instruments to deal with them.
- **Exit strategy and the possibility of losses incurred by the central bank:** as Bernanke said, this is a possibility but measured against the gains from a stronger economy and the previous budget contributions, such a risk is “not a true social economic risk” (in David Wessel (ed), 2014.)
- **Financial stability risks, stemming from search for yield and higher leverage:** these risks are real but monetary policy cannot be inhibited in line with its priority goals. These risks must be addressed by macro-prudential policies of a regulatory and administrative nature. The corresponding toolkit given to central banks has to be enlarged.
- **Potential laxity of credit risk management by financial institutions in a climate of low rates:** supervision, proper risk management governance and regulation of provisions, should deal with this problem.
- **Wealth effects and increased inequality:** a stronger economy and lower unemployment can mitigate but not eliminate this possible side effect.
- **In normal times, interest rates should remain the basic instruments used by central banks but advanced economies are more prone to face the zero lower bound (ZLB) problem: in this case “helicopter money” drops should be used to boost demand**

Suggested Readings

- Jay C. Shambaugh: **The Euro's Three Crises**, Brookings Papers on Economic Activity Spring 2012, http://www.brookings.edu/~media/Projects/BPEA/Spring%202012/2012a_Shambaugh.pdf
- Benoît Cœuré, Member of the Executive Board of the ECB: **Outright Monetary Transactions, one year on**, Speech at the conference “The ECB and its OMT programme”, organised by Centre for Economic Policy Research, German Institute for Economic Research and KfW Bankengruppe, Berlin, 2 September 2013, <http://www.ecb.europa.eu/press/key/date/2013/html/sp130902.en.html>
- Martina Cecioni, Giuseppe Ferrero: **Determinants of Target 2 Imbalances**, Banca d'Italia, Questioni di Economia e Finanza (Occasional Papers), number 136, Sept. 2012, http://www.bancaditalia.it/pubblicazioni/econo/quest_ecofin_2/qef136/QEF_136.pdf