



# DEBT OF NATIONS

Mr. Micawber's Vindication: Causes and Consequences of Excessive Debt

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\* In Charles Dickens's *David Copperfield*, Mr Micawber offers this financial advice: "Annual income twenty pounds, annual expenditure nineteen ninety six, result happiness. Annual income twenty pounds, annual expenditure twenty pounds ought and six, result misery."

## DEBT OF NATIONS

### Mr Micawber's\* Vindication: Causes & Consequences of Excessive Debt

After the leverage binge in advanced economies (AEs) over the three decades preceding 2008, debt growth is generally likely to be low in the years ahead. Deleveraging is likely to continue to weigh heavily on growth in highly indebted economies, and the deleveraging process will be costlier and take longer unless adequate policies are implemented to support it.

Debt in the non-financial sector of AEs has almost doubled as a share of GDP between 1980 and 2008 – a period during which GDP grew rather briskly. It initially grew more strongly in the private sector, but only for public debt shot up sharply after the 2007-09 North-Atlantic financial crisis.

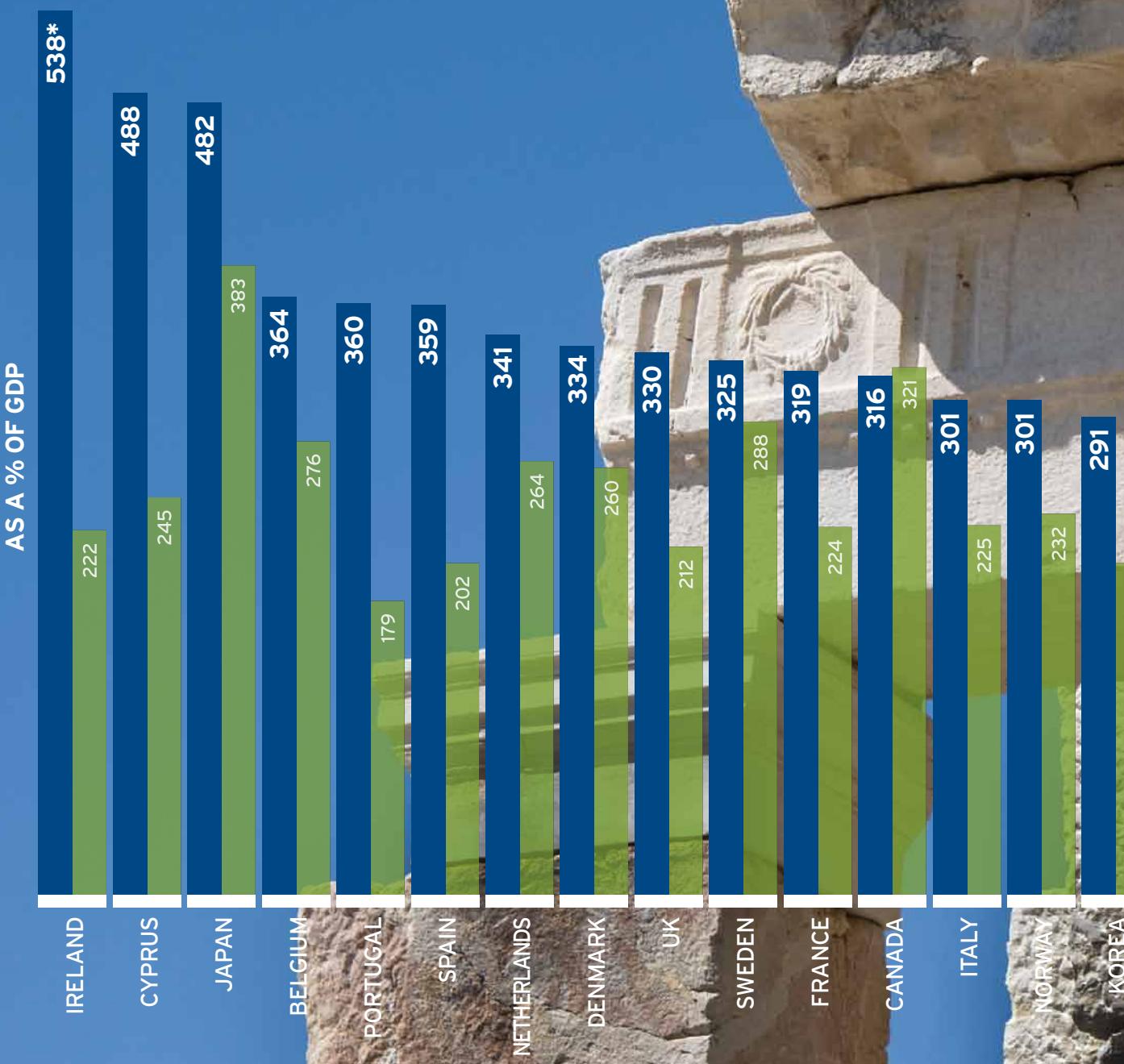
Since 2008, debt growth has slowed by a third in real, and by half in nominal, terms. It would have fallen even more sharply if public debt growth had not more than doubled. The speed of deleveraging varies widely in different countries and sectors. On average, household and non-financial corporate debt has fallen, while public debt is still rising. Private (and sometimes public) deleveraging has generally been faster where GDP and income growth have held up, and is impeded by weak income growth in countries where deleveraging pressures are intense, such as in Greece, Ireland, Portugal or Spain. Safe debt is rapidly becoming an oxymoron.

Hangovers from credit booms are serious. Increases in debt can cause systemic crises which generally tend to be both long-lived and costly. Large increases in debt also make such crises more painful – we find that the ‘GDP loss’ relative to trend in the aftermath of financial crises is almost twice as large in countries which had a large pre-crisis increase in debt than in countries that did not. Today, growth is weakest, on average, in countries with the largest pre-crisis debt increases. But even when debt does not cause a major crisis, debt reduction through higher saving rates tends to be contractionary because the poor coordination of deleveraging, saving and investment decisions give rise to Keynes’s ‘paradox of thrift’.

Deleveraging – shrinking balance sheets – occurs when households, businesses or the public sector either desire to save more or are forced to do so. Economic actors may want to save more, or may be forced to save more by restricted access to external funding or because their net worth is perceived to be inadequate. Both net worth and gross debt therefore matter for saving and deleveraging behaviour.

Some of the costs of deleveraging are likely unavoidable, but policies can help to reduce the avoidable costs of deleveraging. First among those is access to liquidity. A well-capitalised banking system would be a good start, but the private provision of liquidity – a public good – in crises is usually highly inefficient, so central banks will likely retain a key role in liquidity provision for the coming years. Mechanisms to allow the gross deleveraging, i.e. the ‘netting’ of assets, especially among banks and other financial intermediaries, should be encouraged. Where higher financial surpluses are required, policies should encourage higher saving rather than lower investment. Extensive debt restructuring for governments, banks, and in some countries also households, using yet-to-be-created orderly debt restructuring mechanisms, is both desirable and likely. In the medium-term, the lessons should be clear. First, to better coordinate saving and investment decisions, while supporting financial markets with more effective and sustainable fiscal and monetary policies. Second, on the liability side of any balance sheet: more equity, less debt.

# HOW MUCH DEBT IS THERE NOW?



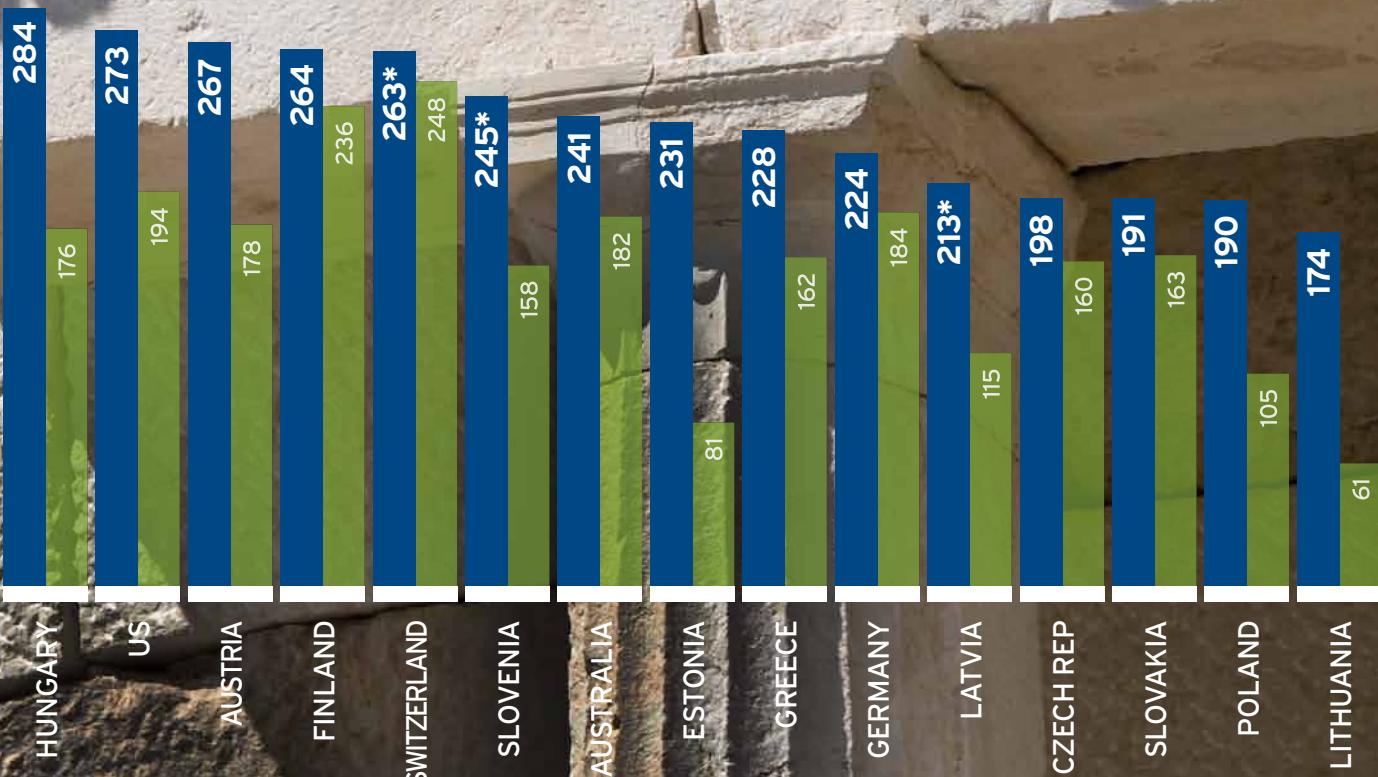


### NON-FINANCIAL SECTOR DEBT AS A % OF GDP

MOST RECENT DATA  
DATA FROM 1995

\* DATA FROM 2001

Sources: National sources, OECD, Eurostat  
and Citi Research

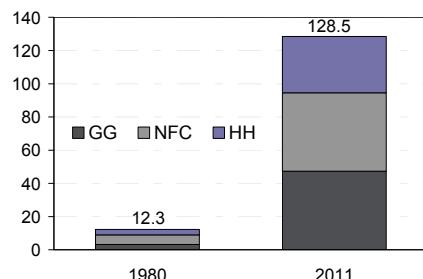


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## 1. Introduction

Figure 1. Advanced Economies – Non-Financial Sector Gross Debt (USD trn)



Note: HH = household, NFC = non-financial corporation, GG = general government. Non-financial sector gross debt equals the sum of HH, NFC and GG gross debt. Gross debt corresponds to financial liabilities for HHs and the GG, and financial liabilities excluding shares and other equity for NFCs. The countries covered are Japan, Italy, UK, Portugal, Spain, Belgium, Greece, France, Finland, Netherlands, US, Korea, Australia, Austria, Sweden, Germany and Canada.

Source: OECD, National Sources and Citi Research

Debt in advanced economies has grown strongly since 1980, first in the private, then in the public sector

Debt and credit growth from here on is likely to be low in most DMs for the foreseeable future...

There is a lot more private and public debt today in the advanced economies than has been the norm during peacetime periods. In 1980, the total non-financial sector (NFS) gross debt in 17 developed markets amounted to \$12.3 trillion or 168% of the GDP of these countries. In 2011, the debt total from these same markets stood at \$128.5 trillion, or just over ten times that value (see Figure 1) and amounting to 315% of GDP.

Debt is attractive to holders because it offers, or appears to offer, a predictable safe income stream. It is attractive to issuers because, among other advantages, it provides leverage, in the economic sense of the word: "...leverage exists whenever an entity is exposed to changes in the value of an asset over time without having first disbursed cash equal to the value of that asset at the beginning of the period."<sup>1</sup>

Debt has grown in most countries and in most sectors. Private debt, both household debt and debt of businesses, grew strongly from the 1980s until quite recently. Public debt grew more modestly until the North-Atlantic financial crisis that erupted in August 2007 confronted governments with large revenue losses, as well as the need for fiscal stimuli and banking sector bail-outs. Growth in public debt has now overtaken the growth in private debt. In 1980, 27% of the debt of advanced economies was household (HH) debt, 47% non-financial corporation (NFC) debt and 26% general government (GG) debt. By 2011, the share of general government debt had grown to 37% of the total (and is likely to continue rising in the coming years) with the share of NFC debt strongly down (to 37%) and the share of HH debt only slightly down (26%).

In every single one of the 26 countries that we surveyed, gross debt in the non-financial sector rose relative to GDP between 1995 and now. Only in two countries (Germany and Japan) did the HH gross debt-to-GDP ratio fall. The NFC debt ratio has risen less and fallen in more countries, but even there the last two decades saw a significant overall increase. Where private debt grew most strongly in the pre-crisis years, such as in Ireland, Portugal, Spain or Cyprus, public debt is now rising most sharply. In many countries this sequencing is causal. First bad or impaired non-financial private sector debt migrates to the banks and other financial institutions that issued it. Then bad or impaired bank and other financial institution debt migrates to the public sector when the financial institutions or their creditors are too systemically important or too politically well-connected to be allowed to fail.

Much of today's debt is considered less safe than debt issued by *prima facie* comparable issuers in the past. This is the case in particular for developed market (DM) sovereign debt and for unsecured bank debt. There is general agreement that this large and risky debt stock is excessive, both from the (retroactive) perspective of the individual debtors that issued the debt and the individual creditors that bought it as well as from a social perspective.

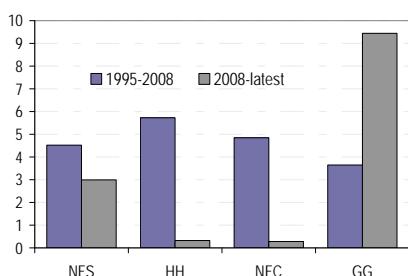
Now that debt levels are perceived to be excessive in many places, debt and credit growth from here on is likely to be low in most DMs for the foreseeable future. Real growth in gross debt in DMs since 2008 has been roughly one third lower than it was between 2001 and 2008. Nominal debt growth has roughly halved from the pre-

<sup>1</sup> See Counterparty Risk Management Group II (2005), P A1. Clearly debt can be used to leverage equity, but many other financial instruments other than debt can be used to create leverage. This includes initial margin in futures contracts, and embedded leverage through options. These broader forms of leverage played a role in the North-Atlantic financial crisis, but will not be part of our focus.

Deleveraging has mostly been limited to the private sector so far...

...Public debt is still rising in most countries

**Figure 2. Selected Countries – Average Annual Growth in Real Gross Debt (% pa)**



Note: Growth in the GDP weighted average of the debt of the non-financial sector, deflated by GDP deflator (2000=100), in 26 advanced economies.  
Source: OECD, National Sources and Citi Research

Deleveraging process in a number of countries is hampered by weak income growth

Debt reductions most likely have a lot further to run in many countries

Deleveraging pressures are particularly severe in Cyprus, Ireland, Portugal, and Spain

crisis average. Nominal and real debt growth would have fallen by more if government debt were not rising at almost twice its pre-crisis rate of growth. In many countries, nominal debt growth during the coming years will likely go from 'nominal GDP growth plus' – between 1995 and 2012 gross debt-to-GDP in advanced economies (AEs) on average grew by 4ppcts of GDP/year – to 'nominal GDP growth minus'. The exceptions will be countries where the public debt burden will continue on an unsustainable trajectory. Nominal GDP growth itself in most DMs is likely to be significantly lower than in the decade before 2008, partly because real growth was flattered by the debt boom and partly because inflation targeting central banks and excess capacity are unlikely to produce inflation rates above those seen during the Great Moderation when much of the debt was incurred.<sup>2</sup>

Even though credit growth has generally fallen, the years since the North-Atlantic financial crisis of 2007-2009 have on average only seen a modest degree of private sector deleveraging – from a peak of around 205% of GDP in 2009 to maybe 5ppcts of GDP less in Q2 2012. Total NFS gross debt continues to increase, as public debt has generally risen strongly in nominal and real terms – and as a share of GDP, it has gone up by 30ppcts in the space of less than four years since 2008.

The lack of more substantial deleveraging is in some countries due to the fact that the costs and risks of excessive debt have not yet been brought home clearly enough, so credit growth continues to outpace GDP growth. This is the case in the Scandinavian countries, and also in some 'soft core' countries in the euro area (EA) such as Belgium or France. In the US, private debt growth is picking up again after a few years in which private debt had fallen, while public debt has continued to grow fast.

In other countries, the failure of debt burdens to decline more quickly is due more to the fact that nominal and real GDP growth have been very weak, partly in response to excessively indebted governments, banks, households and non-financial corporations attempting to deleverage by cutting back their spending on goods and services, e.g. in Ireland, Portugal and Spain. In most countries, liquid assets (e.g. deposits) have been accumulated at the same time that debt levels were targeted for reductions. Such deposit accumulation has been particularly substantial for households in Portugal, Ireland, and the UK. The *prima facie* paradoxical juxtaposition of deposit accumulation when debt reduction has a lot further to go could potentially make sense if repaying debt early is either impossible or expensive (e.g. for long-maturity debt without early repayment clauses or with costly early repayment) or if those who are accumulating deposits are not the same households that are heavily indebted.

#### **Debt reductions most likely have a lot further to run in many countries.**

Deleveraging pressures are likely to be particularly severe in Cyprus, Ireland, Portugal, and Spain. In these four countries, all three sectors (HHs, NFCs and the government) have had large increases in gross debt. The total increase in gross (non-financial sector) debt has exceeded 150ppcts of GDP since 1995, almost twice the cross-country average, and banking sectors in these countries are weak. Private sector net worth has also fallen recently, sometimes sharply, even though prior increases had mostly been even larger during the boom years. In the absence of

<sup>2</sup> The 'Great Moderation' refers to the period of modest business cycle fluctuations and low inflation that started in the mid-1980s and ended in 2008, at the time often attributed to institutional and structural changes, including central bank independence and inflation targeting, greater effectiveness of the automatic fiscal stabilisers, liberalisation, privatisation and other reforms of product, labour and financial markets.

decisive (public and private sector) debt restructuring, deleveraging processes in these countries are likely to continue for most of the rest of this decade.

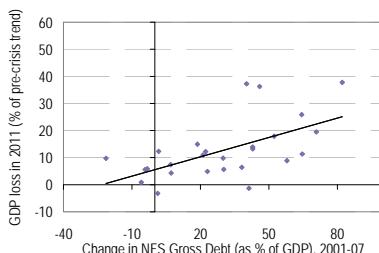
In most other countries, private sector credit growth is likely to remain sharply below the growth rates in previous years. Only in a few countries, including Germany and Japan, has the growth in private sector debt in recent decades been modest enough that we consider a further moderation unlikely.

Two thirds of the countries in our sample have gross general government debt levels that exceed the Maastricht-era reference point of 60% of GDP. Many of them have much higher levels of public debt which will in many countries require a long period of painful public deleveraging. Financial repression and a supportive central bank can ease and grease the path of fiscal pain, and fiscal consolidation will be easier where private sector savings are high, and international capital mobility is low – which is unfortunately not the case for the four countries in the euro area with the highest private sector deleveraging pressures highlighted above.

Higher real growth is not a realistic option for painless deleveraging

Growth is likely to be low during this period of deleveraging, due to an increase in desired net saving, and the paradox of thrift

Figure 3. Selected Countries – GDP Loss in 2011 (% vs. trend) and Prior Increase in Debt



Note: GDP loss is the deviation of real GDP from its pre-recession trend. The pre-recession trend is calculated as the average growth in real GDP between 1997 and 2004.

Source: OECD, World Bank, National Sources and Citi Research

High levels of gross debt can create pressure to deleverage even when net worth is not too low

Growth during this period of deleveraging is likely to be low in the AEs. Deleveraging following an asset price bust (typically land, real estate and equity, sometimes also commodities) and in the aftermath of financial crises tends to be a particularly painful and protracted process (see Reinhart and Rogoff (2009)). In contrast to periods in which debt burdens are reduced due to faster growth of nominal GDP, periods of active debt decumulation are associated with output, consumption and investment growth rates that are significantly below trend, as HHs, businesses and/or the public sector increase their (desired) saving. Large debts tend to make this process worse – we find that countries that had a large debt increase ahead of a financial crisis suffered output losses relative to trend that were almost twice as large as countries without a strong increase in debt.

The immediate adverse effects on economic activity of an asset price collapse or financial crisis tend to be enhanced and prolonged by the subsequent deleveraging process, which often weakens aggregate demand due to the paradox of thrift. When an economic agent finds itself with lower-than-desired (non-human) wealth (net financial and real assets), the attempt to correct this wealth shortfall by saving more can lead to weaker aggregate demand, unless it is matched, *ex-ante*, by other agents planning to save less or to invest more: consumption demand is reduced by more than investment demand is boosted. Financial markets that are meant to reconcile society's saving decisions and investment decisions often fail to do the job properly.

Empirically, gross debt seems to matter a lot, which highlights the role of liquidity. Even when agents' net non-human wealth is adequate, private and public agents may be forced to raise their saving rates to correct a situation in which there is excessive gross debt. If the real or financial assets held by the agent are illiquid and cannot be sold at short notice at prices close to 'fair value', the only way to get rid of excessive gross debt may be to save more, rather than selling assets and using the proceeds to reduce gross debt without any change in net debt. The presence of illiquid assets or the risk of liquidity shocks can therefore create a situation in which excessive gross (but not net) debt increases desired net saving, which can mean a close encounter with the paradox of thrift. This is very relevant today, when elevated levels of gross debt go along with still-respectable levels of net worth in many countries.

Policy responses should be focused on minimizing the avoidable costs of deleveraging

Efficient gross deleveraging requires access to liquidity:

- A well-capitalised banking system would be useful
- Central banks are likely to play a leading role

Timely deleveraging will likely require substantial debt restructuring – which require orderly and efficient debt restructuring mechanisms

Policy should encourage net deleveraging to take place through increased saving rather than reduced investment

Some of the adverse consequences that large-scale debt reduction brings with it are probably unavoidable. But policy responses should be focused on minimizing the avoidable costs of deleveraging. First among those should be measures to allow gross deleveraging (shrinking balance sheets through equal reductions in assets and liabilities, without the need to raise financial net worth by running financial surpluses/'saving') to take place in an orderly and coordinated fashion.

Efficient gross deleveraging likely requires ready access to sufficient liquidity. That calls in the first instance for a well-capitalised and well-regulated banking sector.

However, the private provision of liquidity during crises is likely to be costly and inefficient. Requiring banks to hold during normal, non-crisis times, levels of liquid assets appropriate to abnormal periods of market illiquidity and funding illiquidity, is privately and socially wasteful and prevents these institutions from engaging in the maturity transformation and liquidity transformation that is their core social function. The Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) of Basel III are therefore examples of socially inefficient regulation. Minimum capital requirements and leverage ratios are not subject to this criticism, as solvency is a good that can only be provided privately in an efficient manner even though the quantitative implementation of capital adequacy requirements remains a rather inexact science.

Therefore central banks – entities capable of creating domestic-currency liquidity instantaneously and without cost in any quantity – naturally will continue to have a leading role providing deleveraging economies with adequate liquidity, as well as supporting growth and debt servicing capacity by keeping monetary conditions loose. Foreign currency liquidity can, of course, be provided most efficiently and cheaply by the relevant foreign central banks and by international organizations like the IMF.

Creating institutions or arrangements to help heterogeneous, decentralized and uncoordinated private and public entities coordinate the netting of gross financial assets and liabilities in complex networks of creditors and debtors should help, too. Clearing houses for a much wider range of financial claims should therefore be considered.

Additionally, debt restructuring will often be needed to bring about timely net deleveraging, something that probably requires establishing orderly and efficient debt restructuring mechanisms and procedures for banks and sovereigns where they don't exist and improving insolvency and bankruptcy procedures for households and non-financial corporates.

In addition to allowing deleveraging to happen in an orderly and coordinated fashion (either through netting or through restructuring), policy should attempt to ensure that, where greater financial surpluses are necessary, these are achieved primarily through higher saving rather than through lower investment. From the perspective of boosting the demand for goods and services, higher consumption demand (lower saving) is of course just as effective as higher investment demand. However, investment in countries with an ageing and undersized capital stock, is likely to pay greater dividends in the form of enhanced growth prospects also for the future – by boosting future potential output as well as current actual output. Unfortunately, to a large extent we have observed the opposite outcome: private investment has fallen sharply in many countries and where the public purse has tightened, public investment has usually been one of the main victims.

The entire process of deleveraging the EA sectors could take the rest of the decade and longer

Debt restructuring could accelerate the process. This would require a new EA-wide sovereign debt restructuring mechanism (SDRM) and a new EA-wide bank resolution mechanism

Unsustainable fiscal trajectory in Japan and the US is likely to eventually lead to painful and protracted sovereign deleveraging

The conditions today are very different from those in the post-WW II period when public debt levels were last extremely elevated

The periodic acute systemic conflagration episodes that have punctuated the euro area member states since the euro area sovereign and banking crisis – the euro area sequel to the North-Atlantic financial crisis of 2007-2009 – erupted at the beginning of 2010 are likely to recur for several more years.

The entire process in the euro area of deleveraging the sovereign, banking and (in many countries) household sectors and/or non-financial corporates could take the rest of the decade, unless debt restructuring plays a much larger role than the euro area political and central banking authorities are thus far willing to consider. We view a much enhanced role for both sovereign and bank debt restructuring, using a new EA-wide sovereign debt restructuring mechanism (SDRM) and a new EA-wide bank resolution mechanism, as desirable right now but likely only in the medium and longer run. Restructuring sovereigns without well-designed contractual and statutory mechanisms and restructuring banks without a bank resolution authority and fund, and a bank recapitalisation fund, invites financial dislocation and chaos. In Europe, both the sovereign and the bank resolution mechanisms should be established at the EA level and funded jointly.

Comprehensive government-initiated household debt restructuring, distinct from what would happen through the regular personal insolvency laws and procedures, including the partial equitisation of household mortgage debt, is, in our view, desirable but unlikely. Excessive non-financial corporate debt is likely to be reduced both through corporate financial surpluses and through the established judicial corporate insolvency processes, without the help of newly created special debt resolution mechanisms.

Japan and the US are the two G7 countries that appear to defy gravity by having sovereigns that continue to be able to borrow at very low interest rates at all maturities despite being manifestly fiscally unsustainable. We believe that the unique, country-specific buffers sheltering these two sovereigns from the market discipline that would normally be inflicted on them by bond market vigilantes are of finite thickness and are being eroded steadily. As Europe gradually exits the crisis phase of its sovereign and banking sector deleveraging process, the US and Japan are the likely next staging posts for painful and likely protracted sovereign deleveraging processes.

It is true that public debt has been much higher in many countries than it is today, including in the US and the UK at the end of major wars, especially World War I and World War II. This does not mean that the solutions that permitted major public sector deleveraging in, say, the period 1946-1973 will work today, for at least four reasons. First, in today's advanced economies the excessive indebtedness is not restricted to the public sector but extends to the banking sector and the household sector in many countries, and sometimes also the NFC sector. Second, the period 1946-1973 was the Golden Age of European (and to some extent also of US) growth, due to favourable demographics, rising labour force participation, urbanisation, migration, and trade liberalization. Third, financial repression was likely easier and the tolerance for inflation (accommodated by subservient central banks) greater in the post-WWII period. Fourth, the politics of fiscal burden sharing was very different in the post World War II years from what it is today. In Europe as in the US, growing inequality, polarization and a weakening of the political centre make it more difficult today to build and sustain a consensus for fiscal burden sharing.

## 2. The Great Leveraging

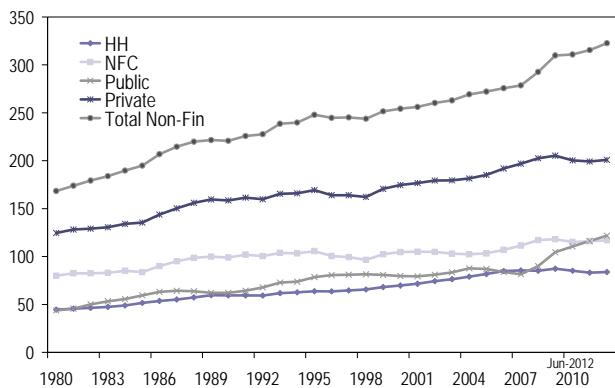
Non-financial sector gross debt in the advanced economies has almost doubled relative to GDP since 1980

Gross non-financial sector (NFS) debt has risen by 4-5ppts/year since 1980 in the industrial countries

Debt has risen over the past few decades, almost everywhere in the advanced economies and according to most measures (McKinsey Global Institute (2010, 2012), Cecchetti et al (2011), BIS 82<sup>nd</sup> Annual Report (2012), Tang and Uppen (2010)). Take gross non-financial sector (NFS) debt (the sum of the gross debt of households, non-financial corporations, and the general government) in advanced economies.

In a sample of 26 countries, gross NFS debt relative to GDP rose in every single one between 1995 and today.<sup>3</sup> For the 17 countries for which data are available since 1980, debt rose substantially in all.<sup>4</sup> For these 17 countries, the aggregate NFS gross debt-to-GDP ratios, weighted by GDP, almost doubled since 1980 (Figure 4), rising by just under 5ppts of GDP each year, on average. Since 1995, this aggregate debt-to-GDP ratio still rose by 75ppts of GDP (4.5ppts of GDP/year on average).<sup>5</sup> Over this period, real GDP (measured in constant USD at market exchange rates), grew by 37% (2.3% pa) in the 17 countries, and nominal GDP (measured in current USD) by 95% (5.9% pa), so the growth in real and nominal debt levels was even larger than the rise in debt-to-GDP ratios. In terms of the increase in the gross NFS debt to GDP ratio, the US was squarely in the middle of the pack, the UK was in the top quartile, while Germany is in the group of countries with the smallest increases.

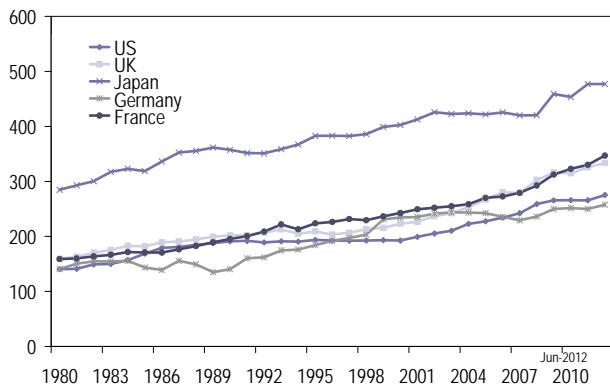
Figure 4. Advanced Economies – Gross Debt by Sector (% of GDP) – 1980-Q2 2012



Note: Advanced Economy gross debt by sector is constructed as gross debt weighted by the time-varying shares of nominal GDP in 17 countries (Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, Italy, Japan, Korea, the Netherlands, Portugal, Spain, Sweden, UK and US). NFS is the non-financial sector (sum of HHs, NFCs and the GG). Gross debt is equal to total financial liabilities for HH and the public sector, and to total financial liabilities less shares and other equities for NFC. Values are on a non-consolidated basis except for Portugal and Australia.

Source: IMF, OECD, National Sources and Citi Research

Figure 5. Selected Countries – Non-Financial Sector Gross Debt (% of GDP) – 1980-Q2 2012



<sup>3</sup> The countries are Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Lithuania, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, South Korea, Sweden, UK, and US. In addition to these countries, we often consider four countries for which data are only available for a shorter sample period: Ireland (from 2001), Latvia (from 1998), Slovenia (from 2001) and Switzerland (1999 to 2009).

<sup>4</sup> These countries are Japan, Italy, UK, Portugal, Spain, Belgium, Greece, France, Finland, Netherlands, US, Korea, Australia, Austria, Sweden, Germany and Canada.

<sup>5</sup> For the broader sample of 26 countries, the GDP-weighted increase in gross debt since 1995 was 89% of GDP.

Smaller countries had larger increases in (gross) debt and the private sector accounted for a larger share of it in many of them

Figure 6. Country Labels

Country	Abbreviation
Australia	AU
Austria	AT
Belgium	BE
Canada	CA
Cyprus	CY
Czech Republic	CZ
Denmark	DN
Estonia	ET
Finland	FI
France	FR
Germany	GE
Greece	GR
Hungary	HU
Ireland	IR
Italy	IT
Japan	JP
Korea	KO
Latvia	LV
Lithuania	LT
Netherlands	NL
Norway	NO
Poland	PL
Portugal	PT
Slovakia	SK
Slovenia	SN
Spain	SP
Sweden	SW
Switzerland	CH
UK	UK
US	US
Euro Area	EA

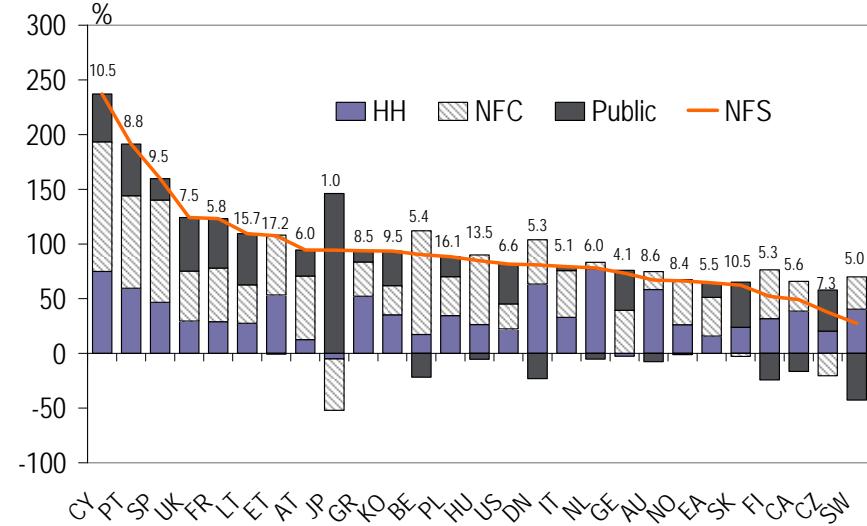
Source: Citi Research

Cyprus, Portugal, and Spain had the largest increases in NFS gross debt-/GDP in our sample – more than 150ppts of GDP

### The aggregate picture conceals much diversity.

There is a difference between smaller and larger countries: in our sample, larger countries on average had smaller increases in gross NFS debt and more of the total debt increase was accounted for by increases in public debt. Thus, the simple average (not GDP-weighted) increase in the gross NFS debt-to-GDP ratio across the sample of 26 countries between 1995 and H1 2012, was 94ppts of GDP (5.7ppts of GDP per year) compared to the GDP-weighted average increase of 5.3 percentage points and 89ppts for the 17 countries with longer data series which were on average still larger.<sup>6</sup> These data do not even include some of the small countries with the largest increases in debt, as data for the earlier period for these are not available. For example, for Ireland and Latvia, the data are only available from 2001 and 1998, respectively, but between these dates and today, their total non-financial debt increased by 307ppts of GDP (19ppts per year) and 93ppts (5.6ppts), respectively.

Figure 7. Selected Countries – Non-Financial Sector Debt/GDP ratio, Change 1995-Latest



Note: Public is the general government. For the EA change corresponds to 1999-2011. Latest values are for Jun-12, except for Italy, the Netherlands, Ireland (all Mar-12), and Cyprus (Dec-11). Numbers above the columns are average growth rates of the nominal stock of gross debt in local currency between 1995 and the latest observation. All values are expressed on a non-consolidated basis except for Australia and Portugal. See Figure 6 for a list of country labels. Source: National sources, Eurostat, OECD, and Citi Research

Cyprus, Portugal, and Spain were the countries in our sample that had the largest increases in NFS gross debt to GDP ratios, with NFS gross debt-to-GDP rising by at least 150ppts (or almost 10ppts/year). Ireland and Latvia would likely also have been in this category, if the data had been available for the entire period. The countries which saw the largest increase in debt often shared certain characteristics, including being an emerging European country (the Baltic countries, Hungary), being a financial centre (Cyprus, UK, Ireland) or having had a housing boom (Baltics, Ireland, Spain). Despite similarities in economic development and structure, some regional differences exist. For example, the Czech Republic and Slovakia had among the smallest increases in gross NFS debt (while Hungary did not), and gross NFS debt in Finland and Sweden grew only modestly, while the debt increase in Norway was larger.<sup>7</sup>

<sup>6</sup> The GDP weighted average increase in real GDP (measured in constant USD) was 39% (2.4% pa), and nominal GDP grew on average by 100.4% (6.3% pa) since 1995.

<sup>7</sup> In Norway public gross debt remained relatively stable over this period, while it fell sharply in Sweden, Finland and Denmark. The differential between the CEE countries was mostly driven by differential increases in NFC gross debt.

HH, NFC and public (gross) debt all increased in roughly half of the AEs

In Cyprus, Estonia, Portugal and Spain debt increased strongly in all three sectors, even though the private sector led

In contrast, in Belgium and Hungary, NFCs accounted for most of the increase in gross debt, in the Netherlands it was HHs

Gross debt increased, on average, in each one of the household (HH), non-financial corporate (NFC) and general government sectors (GG). Of the 89ppcts increase in GDP-weighted gross NFS debt between 1995 and today, fairly little (less than 25ppcts) was due to increases in NFC gross debt. Households added 23ppcts of GDP and general governments the rest – just over 43ppcts. However, again, small and large countries differed: in the simple cross-section of countries, the contribution of the HH and NFC sectors to the increase in total non-financial gross debt was much higher, on average, at 36ppcts of GDP and 40ppcts, respectively, while general government debt increased total non-financial debt by a mere 19ppcts of GDP.

The sectoral contribution was far from uniform across countries. In general, countries that saw a larger increase in HH debt, also tended to see an above-average increase in NFC debt (even though the correlation is only moderately positive at 0.35, see also Figure 8). Some countries, including Cyprus, Estonia, Portugal and Spain saw among the highest increases in both HH and NFC gross debt. Germany, Japan, and the Czech Republic had small increases or even decreases in both HH and NFC debt. In other countries, the evolution of debt was quite different for the HH and NFC sectors. In Belgium and Hungary, NFCs added more than twice as much to total gross debt as HHs, while the Netherlands had the highest increase in HH gross debt between 1995 and 2008 in our sample, but one of the smallest increases in NFC debt.

Figure 8. Selected Countries – HH vs. NFC Gross Debt (% of GDP) – 1995-2011 Change

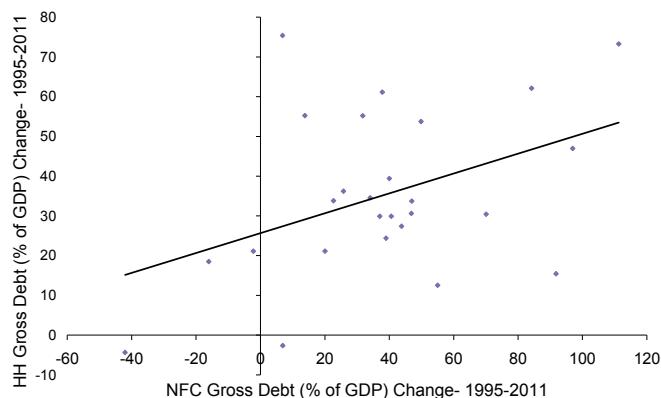
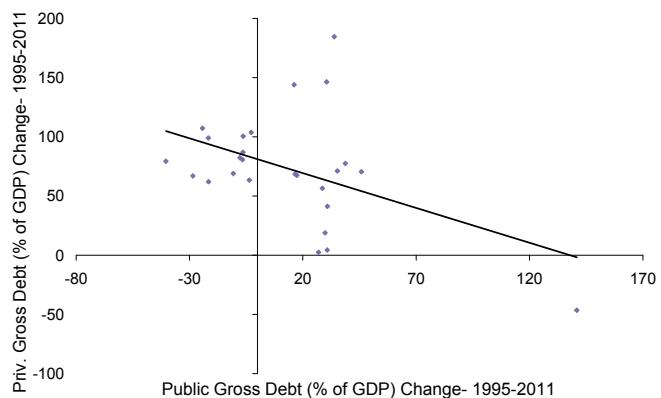


Figure 9. Selected Countries – Private NFS vs. GG Gross Debt (% of GDP) – 1995-2011 Change



Note: Private NFS (Priv.) is the sum of HH and NFC, while Public (GG) is the general government. The sample includes the following 26 countries: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Lithuania, the Netherlands, Norway, Poland, Portugal, Slovakia, Spain, South Korea, Sweden, United Kingdom, and United States

Source: National sources, OECD, and Citi Research

The correlation between increases in private gross debt (of the non-financial sector) and gross general government debt is *negative*, i.e. on average countries that saw above-average private gross debt increases had smaller-than-average increases in public debt (the correlation was 0.5, Figure 9). The most notable example is Japan, where private NFS (HH and NFC) gross debt as a share of GDP fell by 52ppcts between 1995 and H1 2012, but gross general government debt as a share of GDP increased by 146ppcts. Countries where public debt fell as a percentage of GDP while the private debt-to-GDP ratio increased include Australia, Belgium, Canada, Denmark, Finland, Hungary, the Netherlands, and Sweden.<sup>8</sup>

<sup>8</sup> In Estonia and Norway, GG gross debt as a percentage of GDP has also fallen relative to 1995, but only just.

Private debt generally rose before public debt – from 1995 to 2007, public debt was relatively stable

In Ireland, Cyprus and Japan, total NFS gross debt is close to or more than five times the level of GDP...

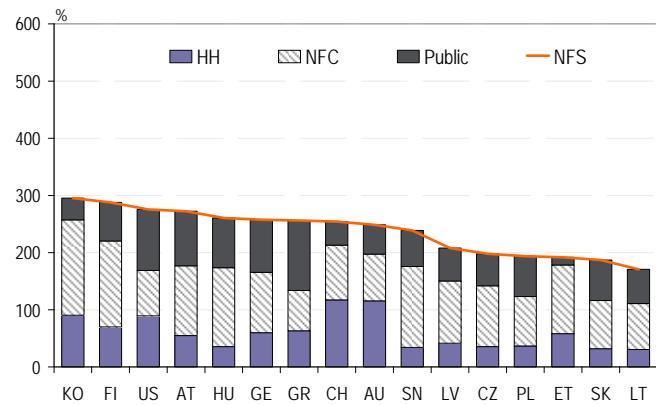
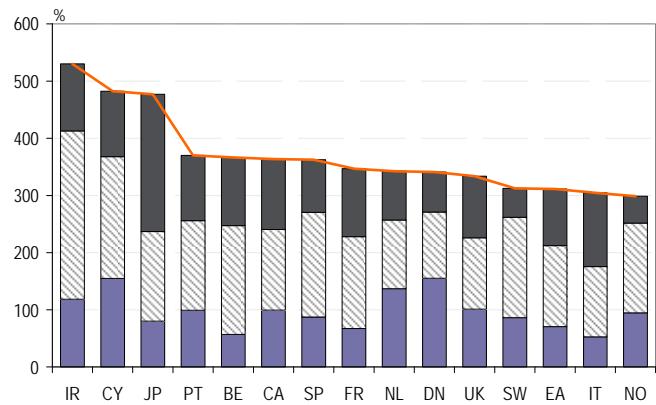
...in the US, it is around half that and in Germany and many CEE countries even less

The timing of increases in private and public debt has also been very different. Between 1995 and 2007, GG gross debt in our sample of 26 countries only increased 6.5ppcts of GDP (0.5ppcts pa) while private debt rose by 42ppcts of GDP (3.5ppcts of GDP/year). During the crisis years, between 2007 and Jun-2012 on the other hand, public debt rose by 36ppcts of GDP (a whopping 8.1ppcts of GDP/year), while private debt increased only by 3.6% (0.8ppcts/year). But overall, in more than half of our sample, GG, HH and NFC gross debt *all* increased over the 1995 to 2012 horizon.

Due to persistent country-specific effects, the increases in aggregate or sectoral debt levels during a common benchmark period are often more informative about the magnitude of potential desired future debt burden reductions than the levels of debt. But in terms of the *levels* of NFS gross debt, in our sample of 30 countries, Ireland, Cyprus and Japan are the mostly highly indebted countries, with NFS gross debt in each case amounting to close to or more than five times GDP (Figure 10). Portugal and Spain also have very high levels of gross NFS debt. The average level of gross NFS debt across the countries in our sample is three times the level of GDP (301% of GDP). The US (275% of GDP), but also Italy (304%), find themselves in the middle of the pack, and countries like Greece (256%), snf Germany (258%), but also the Baltics and most CEE countries, are at the lower end of the spectrum. Lithuania is the country with the lowest level of (NFS gross) debt in our sample at 171% of GDP.

The composition of debt levels across sectors also varies a lot between countries. In many countries, including Belgium, Ireland, Spain, but also Sweden, the Baltics and the Central & Eastern European countries, non-financial corporates account for most of the gross debt. Only in a few cases is public debt the major contributor to total NFS gross debt, the most notable case being Japan, but also in Greece, Italy and the US. In some countries, including Ireland, Cyprus, Portugal and Spain, all three non-financial sectors have relatively high levels of gross debt.

Figure 10. Non-Financial Sector Gross Debt/GDP Ratio, Latest



Note: NFS is the sum of HHs, NFCs & Public (GG). Latest values are for Jun-12, except for Italy, the Netherlands, Ireland (Mar-12), Cyprus, the EA (Dec-11) and Switzerland (Dec-09).

Source: National sources, OECD, Eurostat, and Citi Research

HH gross debt relative to disposable income has also increased strongly in most countries over the last decade

However, increases in debt service ratios were less dramatic, given the general reduction in interest rates

### Debt and debt service relative to debt servicing capacity

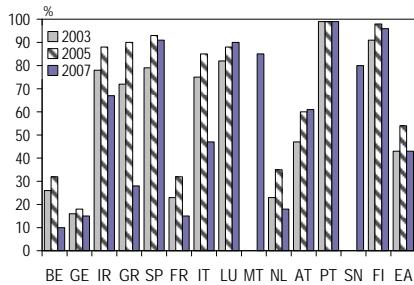
Relative to disposable income, HH gross debt also increased strongly in most countries, and the relative ranking of countries is also broadly similar. The level of HH gross debt currently exceeds annual disposable income in the majority of our sample, and is more than twice annual disposable income in Denmark, the Netherlands, Norway, Ireland, and Switzerland.<sup>9</sup>

For governments, the issue is slightly different as government revenues increased in many countries over this horizon (though in many cases by less than government expenditures did, so deficits often rose), so the pre-crisis trend in the ratio of general government gross debt to government revenues was actually declining in a number of countries. That development has since reversed in some – but not all – countries, as public debt has risen substantially, while the dynamics of public revenues have been rather mixed, as many countries experienced low growth or recession, which weakened government revenues.

Increases in debt service ratios (interest and principal repayment) relative to disposable income for private sectors (household and non-financial businesses) were more muted, on average, as increases in indebtedness were at least partly (and in some cases fully or more than 100 percent) offset by reductions in interest rates. In Canada, where gross debt has fallen relative to GDP since 1995, private sector debt service ratios have fallen roughly by half since the peak in the early 1990s. In Germany and Switzerland private sector debt service ratios also fell, and in France ratios rose only modestly. In many countries, however, private sector debt service ratios also increased very substantially in the decade leading up to the financial crisis, including in Ireland, Spain, the UK, and the US, but also Denmark, Italy, Australia and Norway, despite falls in nominal and real interest rates over this period.

In countries with a high share of variable interest rate loans, and in particular mortgages, debt service ratios are very vulnerable to interest rate shocks, both positive or negative. The reduction in policy rates (and their pass-through to short-term money market rates which are often the basis for variable-rate lending rates) has provided debtors with a bit more breathing space. However, interest rates are now very low for most industrial countries and policy rates have only a very limited amount of space to fall further. Given extended economic weakness, we expect policy rates to remain low for an extended period of time. But a high level of variable rate mortgages and other loans creates the risk of a debt crisis, if interest rates rise sharply. The fraction of variable rate mortgages differs quite widely between countries. In Europe, it is particularly high in Spain, Portugal and Finland (at 90% or above, see Figure 11). In Belgium, France, Germany, or the Netherlands on the other hand, variable rate mortgages are less common.

Figure 11. Selected Countries – Share of Variable-Rate Lending in New Loans for House Purchase (%)



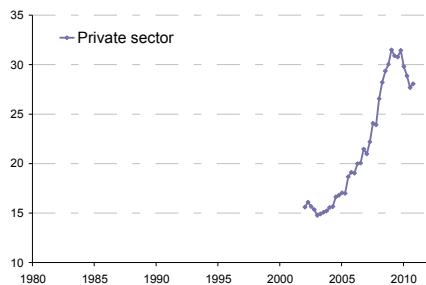
Note: LU is Luxembourg, and MT Malta.

Source: ECB and Citi Research

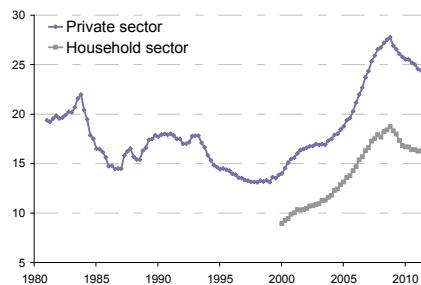
<sup>9</sup> For an overview of the levels and increases of HH gross debt relative to HH gross disposable income and GG gross debt relative to government revenues, see appendix.

Figure 12. Selected Countries – Private Sector and Household Debt Service Ratios (%), 1980-2011

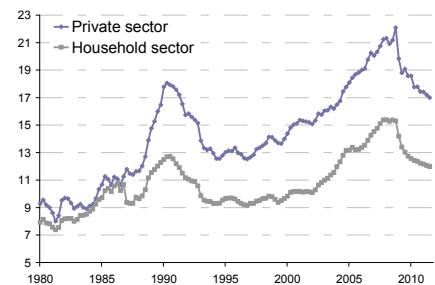
Ireland



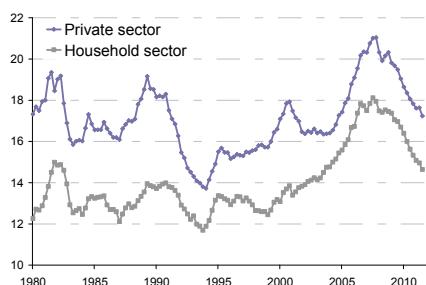
Spain



United Kingdom



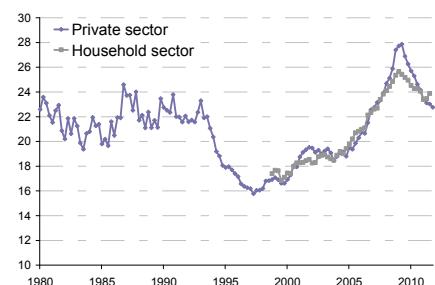
United States



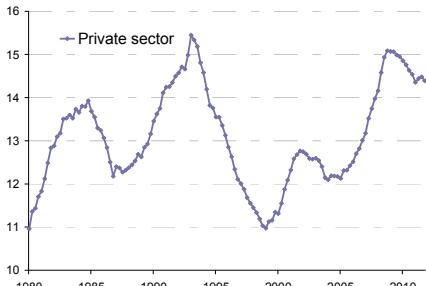
Canada



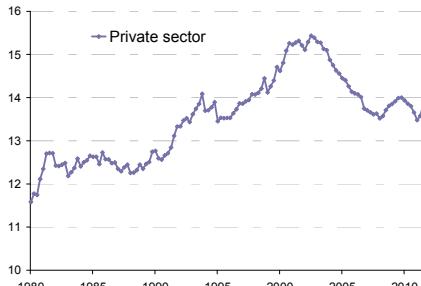
Denmark



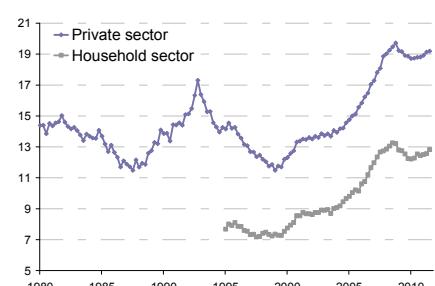
France



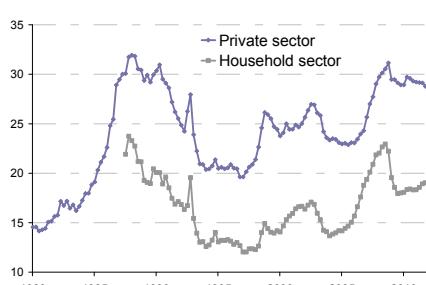
Germany



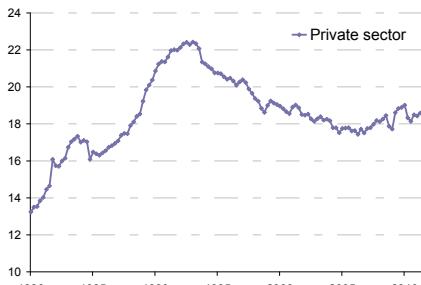
Italy



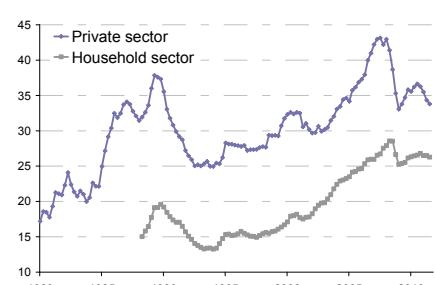
Norway



Switzerland



Australia

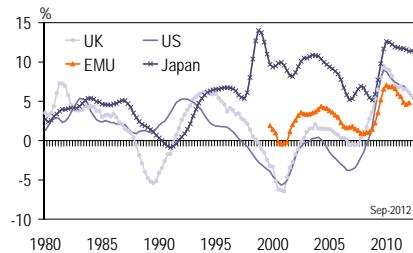


Note: The debt service ratio is the sum of interest payments and debt repayments, divided by disposable income.

Source: BIS 82<sup>nd</sup> Annual Report (2012), and Citi Research

Measures of *net debt* show a smaller rise or even decreases over the last decade, as holdings of financial assets have generally increased

Figure 13. Selected Countries – Private Sector Surplus (% of GDP), 1960 – 2012



Note: Private sector surpluses are computed as the difference between the current account balance and the general government balance.

Source: IMF WEO and Citi Research

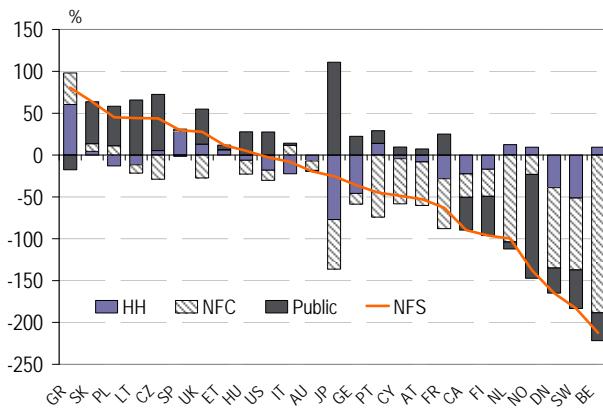
### The other side of the balance sheet – changes in net debt and net worth

HHs, NFCs and the public sector also have assets that could potentially be sold to reduce debt or generate income used to service debt. It therefore makes sense to consider these asset holdings when assessing debt sustainability, even though the potential liquidity, currency or maturity mismatch between assets and liabilities suggests that netting assets and liabilities may not generally be advisable.

For broad measures of *net debt* which only reflect liquid asset holdings, such as gross debt minus holdings of currency and deposits, the picture is often qualitatively and quantitatively quite similar to that for gross debt.<sup>10</sup> Such levels of net debt have generally increased across most countries across all three sectors, and the relative ranking of countries according to the net debt increase is similar to the case of gross debt. The size of the increase is smaller, as holdings of currency and deposits have generally increased – a simple average of narrow net debt increased by 62ppcts of GDP against 93ppcts of GDP for gross debt. In relative terms, the UK in particular looks somewhat better once we reflect currency and deposit accumulation.

Narrow measures of net debt did not increase to the same extent as gross debt, and often fell. For example, a narrow measure of net debt that accounts for all financial assets (i.e. including equity and fixed income claims and pension fund assets, but not ownership claims on land and real estate or pension entitlements) fell by 37% of GDP between 1995 and 2011 (or 23.1% in GDP-weighted terms). Most of this was due to the fact that the net debt of NFCs decreased on average (Figure 14), even though HH net debt also fell. However, the reduction or at least moderation in levels of net debt was not generally driven by an increase in private saving rates (Figure 13), but rather an increase in asset values, mainly on stocks, in the 1990s.

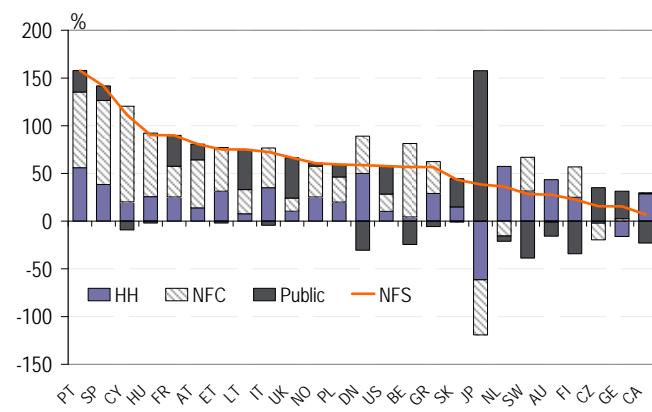
Figure 14. Selected Countries – Non-Financial Sector Narrow Financial Net Debt, 1995-2011 Change



Note: Narrow financial net debt is defined as gross debt minus total financial assets. All values are expressed on a non-consolidated basis except for Australia and Portugal. Countries missing include Ireland (data start only from 2001), Latvia (1998), Slovenia (2001) and Switzerland (1999)

Source: National sources, OECD, and Citi Research

Figure 15. Selected Countries – Non-Financial Sector Broad Financial Net Debt, 1995-2011 Change



Note: Broad financial net debt is defined as gross debt minus holdings of currency and deposits. All values are expressed on a non-consolidated basis except for Australia and Portugal. Countries missing include Ireland (data start only from 2001), Latvia (1998), Slovenia (2001) and Switzerland (1999)

Source: National sources, OECD, and Citi Research

<sup>10</sup> We call a measure of net debt that only deducts currency and deposits from gross debt 'broad' as only a narrow range of assets is deducted from gross debt. Narrow net debt therefore reflects a broader range of assets.

Asset price appreciation (rather than saving) for a long time seemed to do the wealth accumulation job for households, businesses and the public sector. Countries that saw the largest increases in gross debt generally tended to increase their accumulation of risky assets more heavily (notably equity and real estate, even though real estate holdings are generally not captured in our metrics of financial assets and financial net debt). Since many of the countries with large increases in gross debt have also seen the value of these assets plunge since 2007, increases in gross debt for these countries have also tended to imply large increases in net debt, including for Hungary, Portugal and Spain. On the other hand, for countries with large investments in risky assets but no major asset price bust so far, such as the Scandinavian countries (other than Denmark, which has experienced a house price bust since 2007), changes in net worth or broader measures of net debt bear little resemblance to the change in gross indebtedness. However, the high levels of gross debt and the sensitivity to asset price changes as well as the financing requirements that come with them highlight a source of vulnerability to us, despite rather healthy-looking ratios of net debt or net worth to GDP.<sup>11</sup>

### Non-financial assets are significant

Non-financial assets account for the biggest share of HH wealth

For Spanish households these holdings amount to 500% of GDP

Continuing falls in house prices in some countries (e.g. Spain, US) have resulted in large – and sometimes continuing – declines in HH net worth

Our discussion above misses some very substantial components of wealth and net worth, notably ownership claims to real estate or land. Unfortunately, the availability of data on holdings of real estate and other real assets is quite limited and measurement and definitional issues make cross-country comparisons tricky. But the available data indicate that these non-financial assets are sometimes of a similar order of magnitude for households alone as total financial assets for the entire non-financial sector. For example, in Spain HH non-financial assets were valued at almost 500% of GDP (Figure 16), and in France at just under 400% of GDP. In Germany or the US on the other hand, non-financial assets of HHs were valued just at around 150% of GDP.

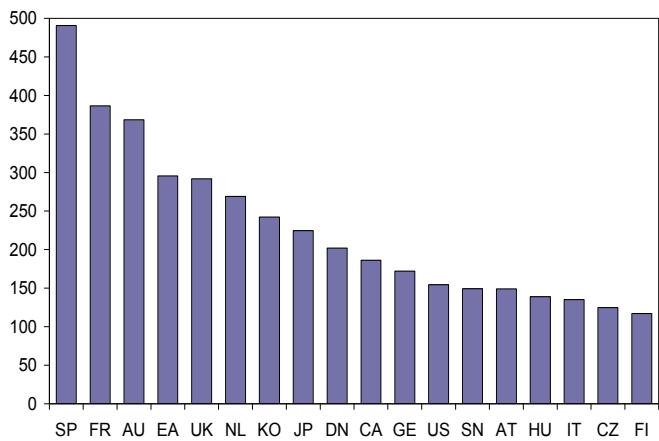
As real estate prices have risen, the value of non-financial assets has generally increased over the last few decades, often supported further by a boom in real estate construction. Changes in the value of these assets can easily overwhelm other changes on HH and business balance sheets. Many countries with long and large real estate booms have seen large falls in HH net worth in recent years. In the case of Spain, HH net worth has fallen by around 100% of GDP since 2007, mostly driven by a reduction in the value of non-financial assets. However, in those same countries, HH net worth is often still above the levels seen in the early 2000s. The fall in real estate valuations in Spain has brought HH net worth back to the levels of around 2004, with large increases in the years prior to 2004. Of course, continuing falls in house prices in Spain are likely to erode HH net worth in Spain substantially further in the years ahead.

In the US, HH net worth also fell along with house prices by about 100% of GDP in 2007 and 2008, but has recently stabilized. In countries that have not seen a major housing bust, HH net worth is generally close to previous peaks, with the exception of Japan, where HH net worth is still down substantially from the peak in the early 1990s and HH net worth has continued falling at a gradual and slowing pace since then (Figure 17).

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<sup>11</sup> See the appendix for an overview of changes for different definitions of net debt by country.

Figure 16. Selected Countries – Holdings of Non-financial Assets by Households (% of GDP), Latest

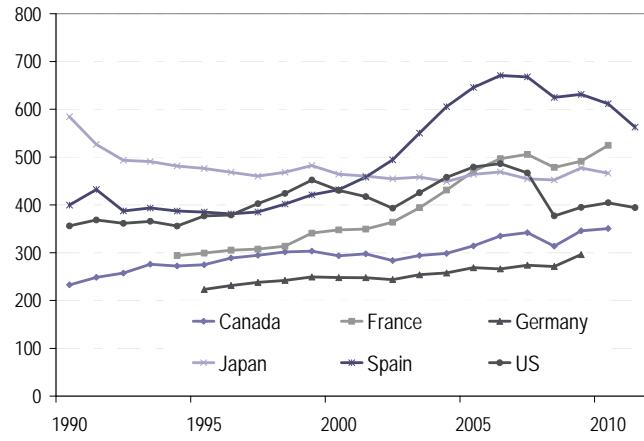


Note: Non-Financial Assets include fixed assets, inventories, fisheries, and land. For Italy, values correspond to total dwellings; for the UK and Hungary values exclude land, for the US, Germany, Slovenia, Austria, Denmark, Finland and Spain, values exclude land and inventories, due to data availability. Latest is end-2011 except for Japan, Canada, Australia, France, Czech Republic, Korea, Netherlands, and Slovenia (2010), and Germany, Italy and Hungary (2009).

Source: National Sources and Citi Research

Even with non-financial physical assets, data still miss intangibles and non-tradable assets, notably the value of human capital

Figure 17. Selected Countries – Household Net Worth (% of GDP), 1990-2011



Note: Net worth is defined as total assets (financial and non-financial) minus total financial liabilities.

Source: OECD, IMF, FED, Bank of Spain and Citi Research

Even once we include non-financial physical assets, the balance sheet analysis of the relevant agents is incomplete. Intangibles and non-tradable assets, notably the value of human capital, are not considered. As noted earlier, labour income is between 50 and 70 percent of GDP for the countries in our sample, and it is likely that (illiquid and non-collateralisable) human capital constitutes the bulk of wealth for most households. Likewise, the net present value (NPV) of unfunded state pensions, publicly funded health care and other social security benefits which can be very large, are not included in the gross debt of the government or the gross assets of the households. Countries with significant funded public or private pension systems, or with funded social security systems, public or private, such as the Netherlands (for private pensions) or Chile and New Zealand for public pensions, tend to have high levels of gross financial assets.

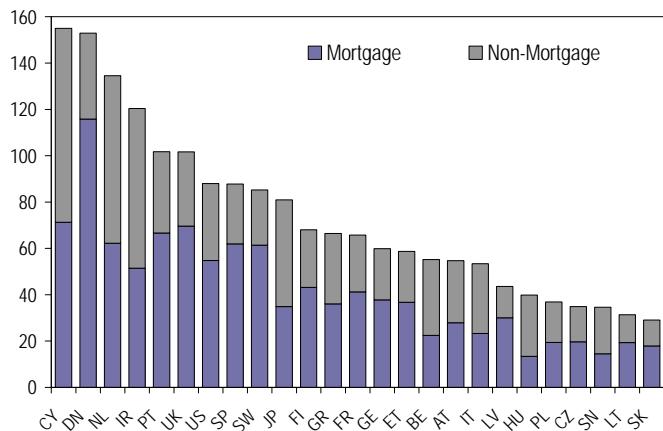
### Household gross debt and housing

Home ownership rates are 80% or above in Spain, Norway, and Poland...

...but around or below 50% in Switzerland, Germany and Austria.

Home ownership varies widely across countries and mortgages account for a substantial share of HH debt in many countries. Home ownership rates are 80% or above in Spain, Norway or Poland, but around or below 50% in Switzerland, Germany or Austria (Figure 19). The proportion of homeowners who have a mortgage varies even more. Thus, in Norway, Sweden, Denmark or the Netherlands, the vast majority of homeowners have a mortgage, while in Poland, Greece or Italy, the proportion is very small (see Figure 19).

Figure 18. Selected Countries – HH Gross Debt (% of GDP), 2011

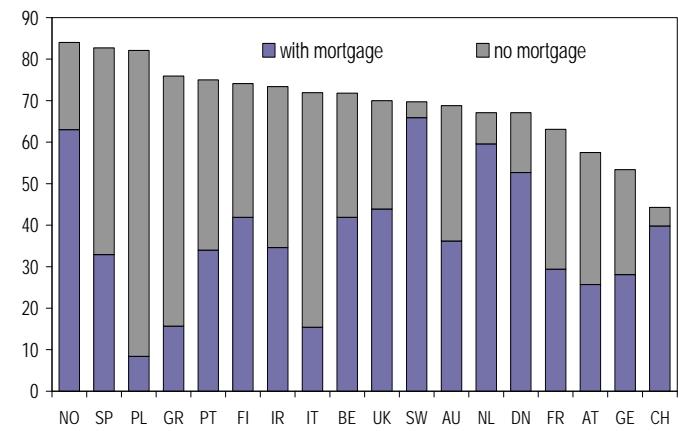


Note: Mortgage debt is mortgage loans outstanding provided by monetary financial institutions (MFIs) to HHs. For the US, mortgage debt is HH mortgage debt, while for Japan it is housing loans from private financial institutions. Non-mortgage HH gross debt is the difference between mortgage debt outstanding (from lenders' balance sheets) and HH gross debt (from HH balance sheet).

Source: OECD, Eurostat, National Sources, and Citi Research

Cyprus's HHs have the highest level of gross debt whether we include or exclude mortgages

Figure 19. Home Ownership (% of population), 2011



Note: Number of households owning a property divided by the total population. For Ireland, Italy, the UK and Switzerland, values correspond to 2010 due to data availability.

Source: Eurostat, Australian Bureau of Statistics and Citi Research

HH gross debt or measures of net debt that do not include real estate are potentially misleading, because homeowners could, ceteris paribus, be better able than tenants to service a given level of gross debt, as home-owners do not have to pay rent. One way to account for the cross-country heterogeneity in homeownership is to consider measures of net debt that also reflect real estate holdings, as we have done above. Another is to consider only non-mortgage debt. An illustration is provided in Figure 18.<sup>12</sup> Cyprus's households have the highest level of gross debt whether we include or exclude mortgages. In Denmark the difference between the value of HH gross debt ratios with and without mortgages, is largest. But excluding mortgages also makes a big difference in Spain, Portugal, Sweden, or the UK.

We do not advocate using measures of HH indebtedness that exclude mortgages. The reason is that such measures exclude HH exposure to changes in real estate valuations or to the often inflexible financing requirements that mortgages entail – and both of these are likely major factors in HH spending and saving decisions. But given that home-ownership is generally associated with a higher debt servicing capacity, measures of debt that control for cross-country variation in homeownership are of useful complementary value to, say, measures of HH gross debt.

<sup>12</sup> Figure 18 is only an illustration as mortgage debt is taken from MFI balance sheets, while total debt is taken from HH balance sheets. To the extent that HHs have mortgage debt from non-MFIs or foreign lenders, the figure underestimates the share of mortgage debt in total HH debt.

### 3. What Caused the Great Leveraging?

#### Debt, risky debt and equity: Why does debt exist in the first place?

Before discussing the drivers of the Great Deleveraging, it is worth reminding ourselves why debt exists in the first place and why taking on more debt seemed to be a good idea to so many and for so long.

Debt is an inflexible liability: in its purest, risk-free form, the future payments due cannot respond to unforeseeable or unforeseen changes in the ability of the debtor to pay. Indeed, in the case of risk-free debt, debt is not a contingent contract but a fixed contract. The inflexibility of the payments stream associated with debt is of course what makes it attractive as an asset class to many savers and investors, in particular because contractual inflexibility was sometimes confused with lack of risk or non-contingency. For contingent payoffs or *risky* assets, costly monitoring is generally necessary to establish whether the relevant contingency had occurred, or which contingency applies, as well as monitoring the *behaviour* of the debtor, as his behaviour can affect the likelihood of particular contingencies occurring – which can lead to moral hazard. A debt contract can in these circumstances still be an efficient tool to negotiate the trade-off between monitoring costs and the incentives of the borrower (see e.g. Townsend (1979)). However, that optimality is likely not the only – and probably not even the main reason – behind the massive build-up of debt in recent decades.<sup>13</sup>

The fact that fewer control rights are associated with debt instruments than with equity-type instruments (as long as the payments required under the debt contract are made on time), makes debt attractive to many entrepreneurs and corporate managers.

Even if the borrower has unlimited liability (typically the case for households, partnerships and other corporate structures without limited liability), debt will almost always be risky despite the inflexibility of the payment commitment under the debt contract. The total resources of the borrower are finite, uncertain and potentially manipulable by the borrower. The riskiness of debt is reinforced when the debt is incurred by an entity with limited liability. Limited liability for corporate equity holders means that the most they stand to lose financially is the value of their equity stakes and their other personal resources cannot be called upon to meet debt obligations of the corporation. Uncertainty about the resources which the debtor has available in the future to service the debt he has incurred can, in the presence of asymmetric information about the likelihood of default (or about the size of the future resources available to the debtor) give rise to adverse selection, even if the borrower cannot influence the size of the future resources available for debt service. It can cause moral hazard if the likelihood of default can be influenced by the borrower in ways that cannot be monitored by the creditors, or only at a cost.<sup>14</sup> The higher the leverage of an entity, the closer risky debt is to equity (of an unlevered company) but without the upside potential. Limited liability does a-fortiori encourage excessive

The inflexibility of the payments stream associated with debt makes it attractive to many savers and investors as an asset class

In addition, fewer control rights associated with debt instruments relative to equity-type instruments, makes debt attractive to many entrepreneurs and corporate managers

However, debt implies risk...

...the riskiness of debt is reinforced when the debt is incurred by an entity with limited liability.

<sup>13</sup> Even in the theoretical case, the debt contract is usually only optimal ex-ante, i.e. before the payoff-relevant event has happened. Ex-post, debt contracts are usually inefficient.

<sup>14</sup> Liability for debt is usually limited in some form, even if for example personal insolvency law does not allow for discharge of debt, as in many European countries (Gerhardt (2009)). The reason is that even then at least some share of the resources of the debtor is protected from the claims of the creditor.

Underestimations of the riskiness of debt instruments (by both debtors and creditors), could lead to unsustainable increases in debt

risk-taking through excessive borrowing by partly equity-financed and partly debt-financed corporates, if management (those making the investment and capital structure decisions) act in the interest of the shareholders only. If management is rewarded in part by stock options, which further leverage equity, excessive risk taking and excessive debt issuance are further incentivised.

The pathologies just described can occur even if everyone is fully rational and uses the (imperfect and often private) information at their disposal fully. A further obvious reason for debt to become excessive in a world where not everyone fits the 'economic man'<sup>15</sup> description, is that creditors may not appreciate the riskiness of the project(s) the borrowed resources are invested in, or be inadequately incentivized, unable or too lazy to monitor the risk appropriately, while the borrowing corporations are usually, but not always, aware of the limits to their liability. Of course, if *both* debtors and creditors underestimate the riskiness of the debt instrument, as may well have been the case during the pre-crisis lending and credit frenzy in many countries, unsustainable levels of debt may also be taken on.

However, the fact that debt and equity cater to different attitudes towards risk and to different capacities for management and active ownership and control is, in principle, a good thing when creditors and debtors are well-informed, reasonably rational and not subject to distorted price, tax or subsidy signals. Because debt leverages both profits and losses, familiar behavioural pathologies tend to create phases in the later stages of a long expansion when systematic underestimation of the risk of increased leverage prevail, as well as periods of acute panic and socially damaging debt aversion when the bubble bursts.

There were also distorted signals facing borrowers and lenders supporting external funding through debt over external funding through equity

With regards to distorted signals facing borrowers and lenders, many, indeed most countries in our sample give fiscal advantages to external funding through debt over external funding through equity. Corporate debt interest tends to be a deductible expense for the corporate income tax. Dividend payments, capital gains and retained profits don't benefit from this tax advantage. Many countries (the UK is an exception) also permit residential mortgage debt interest to be deducted to varying degrees from the personal income tax base. These tax distortions in favour of debt financing are increased when there is inflation, as most corporate and personal income tax codes that feature interest deductibility, permit *nominal* interest payments to be deducted. Only in Japan, with its persistent deflation, would this feature have reduced the bias towards excessive leverage.

### The drivers of the great leveraging

Drivers of the Great Leveraging include:

- 1) financial sector liberalization,
- 2) financial 'innovation',
- 3) a boom in real estate prices and construction,
- 4) a fall in lending standards,
- 5) a fall in real interest rates and
- 6) fast real growth
- 7) for the public sector, the crisis itself

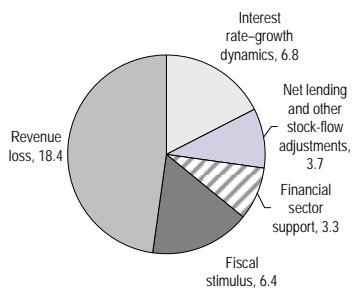
There were many drivers that can be related to the increase in debt in the last few decades (starting around 1980 in the UK and the US), including financial sector liberalisation, financial 'innovation', a boom in real estate prices and construction (themselves fed by the growing debt issuance), a fall in lending standards, a global fall in real interest rates (often associated with the ex-ante saving glut produced by China and other high-saving emerging markets and oil-producing countries), and the perception of a fall in macroeconomic volatility and of enduring faster growth.

Of course, profligacy of many governments in the run-up to the financial crisis, which was partly fed by a misidentification of highly cyclical, or at least unsustainable, revenue increases as permanent, played a role, too.

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<sup>15</sup> 'Economic man' refers to a hypothetical individual who acts rationally and with complete knowledge but entirely out of self-interest and the quest to maximise personal utility.

Figure 20. G-20 Advanced Economies – Increase in General Government Debt, 2008–2015



Source: IMF Fiscal Monitor, September 2011, page 26

Many of the drivers were also inter-related and often reinforced each other

Countries with the highest rates of nominal or real GDP growth between 1995 and 2008 generally tended to have *larger* increases in (NFS gross) debt

The demand for debt was fuelled by expectations about future growth and increases in living standards

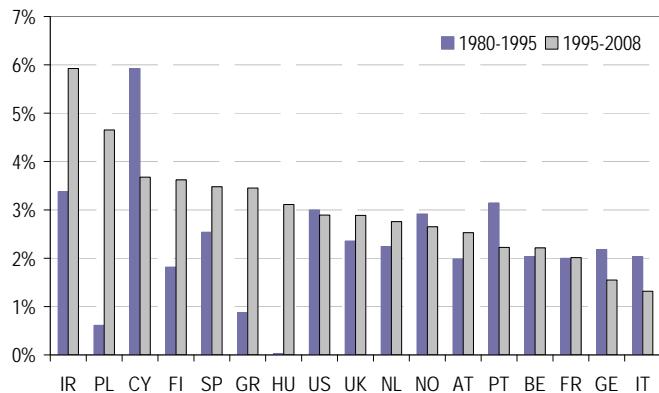
The recent global recession and financial crisis clearly played a major role through the collapse of certain sources of unsustainable tax revenues which the sovereigns had grown dependent on (especially taxes on real estate and on financial sector earnings). Other sources of debt growth include operation of the automatic fiscal stabilizers during the downturn caused by the crises, the discretionary measures to provide fiscal stimulus and the bail-outs of banks, and other financial institutions and sometimes non-financial companies deemed too systemically significant or too politically well-connected to be allowed to fail (Figure 20). In Europe, and especially the euro area, this migration of bad and impaired private sector assets to the public balance sheet continues. That there are limits to this migration because at some point ‘too big to fail’ gives way to ‘too big to bail’ should have been clear since Iceland in 2008, with recent reminders from Greece, Ireland, Spain, Portugal, Cyprus and Slovenia.

These factors implied that both the supply curve and the demand curve for credit shifted outwards in the two or three decades leading up to the financial crisis. Some of the factors, such as the reduction in global real interest rates and a perception of greater macroeconomic stability, likely affected both private and public debt. The rise in real estate prices and the fall in lending standards, likely had a stronger effect on private debt than on public debt. Many of the drivers were also interrelated and often reinforced each other. For much of this period, there was what seemed to be a virtuous circle where credit growth boosted demand, which in turn boosted economic growth and asset prices, which both improved superficial mark-to-market measures of balance sheet health and underpinned further increases in credit and demand.

One arithmetically obvious candidate as a source for the increase in debt-to-GDP ratios can plead ‘not guilty’: The rise in debt-to-GDP ratios was not generally due to a fall in or weak growth of the denominator, i.e. a lack of (real) GDP growth. Real (and also nominal) GDP growth was generally positive in most countries in recent decades, and was often higher in the ‘95–‘08 period than in the one or two decades prior to that (Figure 21) – although, not surprisingly, lower than real and nominal GDP growth in the ‘Golden Age’ for the advanced economies between 1946 and 1973. Indeed, the countries with the highest rates of nominal or real GDP growth between 1995 and 2008 generally tended to have *larger* increases in NFS gross debt and the relationship was pretty tight (Figure 22).

The fundamental relationships between economic growth and debt are, of course, much more nuanced than the obvious link in the algebraic decomposition of changes in debt-to-GDP ratios. Many of the drivers of debt also affect growth. Binding credit constraints or financial underdevelopment more broadly can limit economic growth and, in an environment of credit-constrained consumers or firms, a loosening of these constraints can increase growth prospects. But to the extent that current growth informs expectations about future growth and expectations of future improvements in living standards, it likely also increases the demand for debt for consumption smoothing purposes. Whether the influence of causal relationships between debt and growth is larger than the effect of common factors on both is almost impossible to tell.

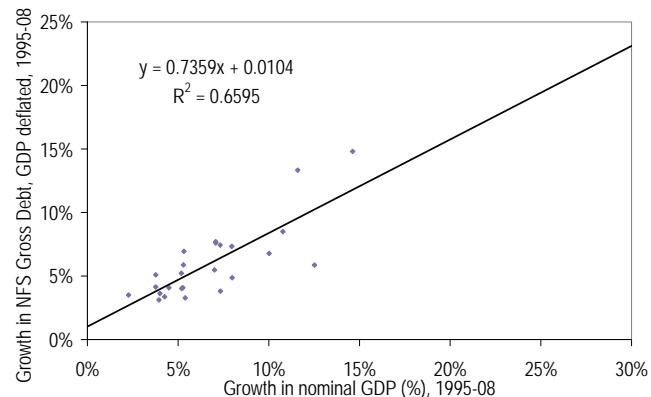
Figure 21. Selected Countries – Average Annual Growth in Real GDP (%), 1980 – 2008



Note: Measured in local currency at constant prices.

Sources: IMF WEO and Citi Research

Figure 22. Selected Countries – Annual Average Growth in Real GDP and Non-Financial Sector Gross Debt , 1995 – 2008



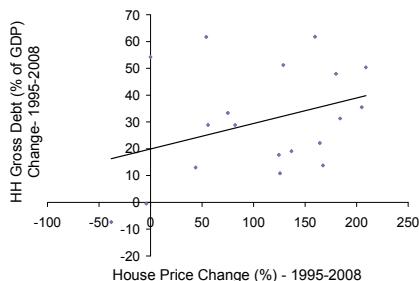
Note: GDP measured in local currency at constant prices. Sample of 26 countries: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Japan, Korea, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, UK, and US

Sources: IMF WEO, OECD, National Sources, and Citi Research

The increase in asset prices, real estate prices in particular, contributed to the credit boom

Rising asset prices in recent decades and the rising of real estate prices in particular, contributed to the credit boom. As asset prices continued to increase, many households and corporations interpreted these higher asset prices as sustainable. Even more extravagantly, particularly for housing, many extrapolated the growth in house prices into the indefinite future. Some of the debt was explicitly linked to asset price increases – mortgages got larger (in absolute terms or relative to income or GDP) as the price of houses increased. In other cases, the increase in asset values was leveraged by withdrawing equity from homes to finance consumption and other spending.

Figure 23. Selected Countries – HH Gross Debt (% of GDP) vs. House Prices (%), 1995–2008 Change



Note: HH gross debt equals HH total financial liabilities. House price indices are for existing single-family houses from Mack et al (2011) and the BIS (for Austria). For Sweden and Portugal house prices are for residential property prices for all dwellings. Countries included in the sample: U.S., Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Sweden, Canada, Finland, Portugal, Spain, Australia, Japan, UK, and Korea. Source: Federal Reserve Bank of Dallas, BIS and Citi Research

Financial liberalization, i.e. the deregulation of financial markets both domestically and for cross-border transactions, spurred what was at the time often referred to as 'financial innovation' and 'financial engineering', but today is more often called 'financial excesses' and sometimes worse, including regulatory and tax arbitrage. Deregulation affected a number of areas, including the reduction of credit and interest rate controls, the reduction of entry barriers into the financial sector and of restrictions on cross-border capital account transactions, a lowering of prudential regulations and an easing of supervision in the banking sector and securities markets. There were also many reductions of reserve requirements for financial institutions, and a reduction in effective capital requirements through disintermediation out of more tightly regulated financial intermediaries, products and activities into more loosely regulated ones, i.e., like the shadow banking sector.

Regulatory liberalisation, domestic and international, contributed to the increase in leverage

Most developed markets have had major episodes of financial deregulation in recent decades. In the US, these included the 1994 Riegle-Neal Interstate Banking and Branching Efficiency Act (eliminating previous restrictions on interstate banking and branching), the Financial Modernization Act in 1999 (also known as Gramm-Leach-Bliley Act in 1999, repealing all restrictions on combining banking, securities and insurance operations for financial institutions) and the Commodity Futures Modernization Act in 2000 (preventing the CFTC from regulating most OTC derivative contracts, including credit default swaps).<sup>16</sup> In the UK, the so-called 'Big Bang' of financial deregulation in 1986 (ending fixed commissions and removing restrictions that required companies to be narrowly specialized) followed on from seven years of prior reforms under Margaret Thatcher. But similar reforms opening up financial markets were enacted and implemented in many countries around the world, including those in the euro area. Along with financial liberalization came a fall in lending standards, with the advent of jumbo mortgages, Alt-A mortgages, interest-only mortgages, and a general increase in loan-to-value ratios for secured lending in many countries. Although these new instruments represent a useful addition to the financial asset menu under the right conditions, proper microprudential and macroprudential norms soon were not observed or enforced or even given any thought by those playing the game or those refereeing it.

The so-called 'Great Moderation' phase of low macroeconomic volatility may also have contributed

Macroeconomic factors also likely played a role in the Great Leveraging, beside the effect that adaptive or extrapolative expectations likely implied that robust current economic growth and rising asset prices fed into higher expectations of future growth and further increases in asset prices. Real interest rates were low in many countries, as nominal interest rates fell by more than inflation. And the so-called 'Great Moderation' phase of low macroeconomic volatility (see Stock and Watson (2002), Bernanke (2004)) may also have contributed to an increase in credit demand and supply, as both debtors and creditors, supervisors, regulators and those in charge of financial legislation underestimated the degree of riskiness of economic activity, as actual volatility fell. In Europe, the introduction of the euro gave an additional boost, through the reduction of interest rates in many countries, rapid financial integration and rapid (if with hindsight unsustainable) economic growth in some of the countries. The fact that from the launch of the euro in 1999 through 2008, spreads over ten year Bunds of Irish, Portuguese, Spanish and Italian sovereign debt rarely rose above 25bps, and that the same extraordinarily low spread prevailed for the Greek 10-Y sovereign bond from 2001 through 2008 bears testimony to the wholesale loss of common sense in the markets, and the resulting massive underpricing of differences in euro area sovereign risk (see Buiter and Sibert (2006)).

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<sup>16</sup> For a discussion, see Sherman (2009).

## 4. Why Does Debt Matter in General?

There is too much debt and too little equity in developed markets today

In the Modigliani-Miller world, capital structure does not matter

However, in the real world, distortionary taxes, asymmetric information, limited liability, and costs of default imply that debt and leverage do matter

There is general agreement that the large and risky debt burdens documented in the previous two sections are excessive, both from the perspective of the individual debtors and creditors (albeit with the benefit of hindsight only) and from a social perspective.

In the perfectly frictionless world of Modigliani and Miller (1958, 1963) and Wallace (1981), the capital structure of corporates (financial and non-financial), households and governments in general, and the levels of debt specifically, do not affect the value of the economic units and should otherwise matter little. In efficient financial markets, where home-made or personal arbitrage and leverage are possible to an unlimited extent, the very notion that relative amounts of 'inside' financial instruments outstanding have any impact on real (or indeed nominal) economic outcomes makes no sense.<sup>17</sup>

The reasons financial structure matters for economic outcomes and the reasons the Modigliani-Miller theory in its strict form fails are many, including distortionary taxes, asymmetric information, limited liability for some but not for all and costs of default. Not all of these imply that debt needs to be excessive in equilibrium, but there are many reasons why the social costs of debt, including debt default, can exceed the private costs and therefore have the potential to lead to excessive borrowing.<sup>18</sup>

In addition, and possibly empirically more important than the 'excessive leverage through distorted incentives' argument is the robust empirical observation that markets and economic actors – from households, through non-financial and financial corporates, professional investors and day traders, governments, supervisors, regulators and legislators – go through prolonged episodes of euphoria and despondency, irrational exuberance and unreasonable gloom, wild optimism and unfounded pessimism, mania and depression.

Given these bi-polar mood swings of markets and entire economies (well documented in e.g. Galbraith (1954), Garber (2000), Kindleberger (2000), Shleifer and Vishny (1997), Shiller (2000) and Reinhart and Rogoff (2009)), capitalist market economies go through extended periods of unwarranted (but at least temporarily self-validating) optimism, boundless confidence and trust (or the appearance of trust) in institutions and counterparties, followed by protracted periods of unjustified (but for protracted periods self-validating) pessimism, profound lack of confidence and mistrust of private and public institutions and counterparties. Since profits are leveraged by debt, too much debt is invariably taken on by households, non-financial and financial corporations and governments during the up-phase. Conversely, when moods and economic conditions shift to a minor key, since debt also leverages losses, the desire for deleveraging runs amok and private and public entities wish and/or are forced to reduce their indebtedness to an extent, and at speeds, that are socially damaging.

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<sup>17</sup> 'Inside financial instruments' are those that exist in zero net supply, e.g. debt – one person's debt is another person's claim. Equity (or the capital stock more generally) or land are 'outside assets', which exist in positive net supply.

<sup>18</sup> Distortionary taxation and tax credit systems, including the deductibility of interest from taxable corporate profits, while dividends and retained earnings often don't benefit from the same tax favours, are an obvious incentive for corporates to engage in privately rational but socially excessive leverage. The same applies to the deductibility of residential mortgage interest from the personal income tax base in many countries.

## What is deleveraging?

Language use is non-uniform when it comes to debt and deleveraging, something which can create confusion in a discussion of their significance. Before we discuss the effects of financial crises and deleveraging today, we therefore define the meaning of different forms of deleveraging precisely.

Note that the terms gross and net are not used to denote saving or investment inclusive of capital depreciation or excluding it. Gross debt is all liabilities. Net debt is liabilities minus assets.

**Financial Surplus** is derived through the flow-of-funds account and is defined as excess savings over capital formation (i.e. capital expenditure or investment in real reproducible capital). For a sector, it is the value of the sectors' net acquisitions of financial assets minus the value of the net financial liabilities it incurs over some period of time.

**Sector** refers to a sector of the economy — household (HH), non-financial corporate (NFC), financial corporate (FC) or government (GG).

**Change in sector net worth** (also referred to as financial wealth, capital, or equity in this example) is the sectors savings plus the capital gains (or minus the capital losses) on its existing assets and liabilities — real or financial.

**Gross balance sheet contraction** or **gross deleveraging** for short is a reduction in the size of the balance sheet (real and financial) without a change in net worth (i.e. net saving plus capital gains for the entity or sector in question is zero). Gross deleveraging can be both active and passive. The problems associated with the 'paradox of thrift' that we discuss below need not strike if all that is required is passive or active gross deleveraging by one, several or all sectors in the economy.

**Passive gross deleveraging** is the result of capital losses on real and financial asset and liabilities.

**Active gross deleveraging** is a reduction in the size of the balance sheet through equal value reduction in the stock of assets and liabilities at given prices. Active gross deleveraging does not require any change in either the flow of saving or the flow of investment spending by any individual or sector. However, it does require *coordination* of gross sales and purchases of asset or of gross lending and borrowing agents and sectors. Either asset markets or some other mechanism must coordinate the planned transactions in each of the assets and liabilities and translate them into actual sales and purchases.

**Active gross financial balance sheet contraction** or **active gross financial deleveraging** is a reduction in the size of the financial balance sheet alone, that is, excluding the physical capital assets, but with the value of financial assets and liabilities shrinking by the same amount (at current prices). Capital gains are excluded.

**Net wealth accumulation** or **net deleveraging** by a sector means an increase in the net worth of that sector, either through saving or through capital gains.

**Active net wealth accumulation** or **active net deleveraging** by a sector, which ignores capital gains or losses, is therefore just another name for positive saving by that sector. Although higher saving is good news from the point of view of the future growth of actual and potential output if a planned increase in saving is matched by an equal planned increase in investment, the paradox of thrift warns us about coordination failures between those who would raise their saving and those who would boost their investment. These coordination failures can result in short-run and medium term negative impacts on output and employment from a poorly coordinated saving boost by one or more sectors.

**Active net financial wealth accumulation** or active net financial deleveraging means running a financial surplus, i.e., savings exceeds investment.

**Paradox of thrift** is a Keynesian terms that describes a situation where a planned increase in saving by households (that is, a planned *ex-ante* reduction in household consumption demand at a given level of household disposable income) weakens output and employment to the point that actual, realized or *ex-post* saving instead of rising as planned, rises less, stays constant or even falls because lower consumption demand lowers production and thus household disposable income.

**Different forms of (net) deleveraging by a sector -- mostly for sovereigns, but with lessons for other sectors**

To guide our discussion of the various ways to bring down sovereign debt, we think going back to the textbooks and highlighting an accounting identity is useful:<sup>19</sup>

$$\begin{aligned}\Delta d &= (r - g)d - s \\ &= (i - \pi - g)d - s\end{aligned}\quad (1)$$

The change in the net debt-to-GDP ratio is given by the primary surplus (as % of GDP) and a 'snowball' factor

Here  $d$  is the net debt-to-GDP ratio,  $r$  is the ex-post (actual or realized) one-period real interest rate,  $g$  is the growth rate of real GDP,  $i$  is the one-period (strictly the instantaneous) nominal interest rate,  $\pi$  is the actual rate of inflation and  $s$  is the primary (non-interest) surplus as a share of GDP. To get from the first identity in equation (1) to the second, we use the fact that the ex-post real interest rate equals the nominal interest rate minus the actual rate of inflation ( $r = i - \pi$ ). Equation (1) says that the change in the net debt-to-GDP ratio is given by the primary surplus (as % of GDP) and a 'snowball' factor that depends on the difference between the real interest rate and the growth rate of real GDP.

Now let  $\tilde{r}$  be the ex-ante or expected real interest rate. The nominal interest rate equals the ex-ante real interest rate plus the expected rate of inflation,  $\pi^e$ , that is,  $i = \tilde{r} + \pi^e$ . It follows that:

$$\Delta d \equiv (\tilde{r} + \pi^e - \pi - g)d - s \quad (2)$$

There are five distinct ways to deleverage, that is, to reduce  $d$ :

- 1) Fiscal Austerity
- 2) Reduce the effective nominal interest rates on the public debt
- 3) By inflation
- 4) Raise the growth rate of real GDP
- 5) Write down the debt or mutualise it

From equations (1) and (2) we can see that there are five distinct ways to deleverage, that is, to reduce  $d$ . When we list these five modalities, we are strictly keeping all else constant, even if this may make no sense in practice because there are other economic relationships linking the variables in equations (1) and (2). The five ways to deleverage are:

1. **Practice fiscal austerity** (increase  $s$  by increasing the numerator of  $s$ , tax revenues minus non-interest public spending).

This approach – fiscal pain through cuts in public spending or tax increases – is both painful and unpopular. This is partly because, even holding constant the level of economic activity (GDP and employment), public spending cuts deprive the beneficiaries of public spending of some of the benefits they receive, whether in cash or in kind, and because tax increases reduce disposable income or wealth. In addition, since the real world is Keynesian, at least in the short run, fiscal tightening almost always depresses economic activity. The expansionary contractionary fiscal policy paradigm of Giavazzi and Pagano (1996) and Alesina and Ardagna (2010) is a theoretical curiosum. The announcement effects, today, of a credible commitment to future fiscal austerity may be expansionary (because it lowers long-term interest rates), but when the pre-announced fiscal tightening occurs it will almost surely depress aggregate demand and economic activity. There is also no empirical evidence of a Keynesian 'Laffer curve' where tax increases or cuts in public spending reduce economic activity to such an extent that the tax base shrinks to the point that the deficit increases despite the fiscal

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<sup>19</sup> The identities hold only in continuous time. For discrete periods, slightly messier expressions exist.

tightening (see Cottarelli and Jaramillo(2012)), although excessive and misdirected fiscal zeal can do lasting damage to potential output.

Part of the debt held outside the general government sector may be held by the central bank. In addition, the sovereign's Treasury is the de-facto beneficial owner of the central bank and receives most of the distributed profits of the central bank, which are a budgetary receipt in the primary balance of the general government, and are represented by  $s$ . Increasing monetary issuance or extracting more profits from the central bank is often politically preferable to cutting public spending or raising taxes. However, the real resources that can be extracted by issuing base money when inflation is correctly anticipated are limited. Estimates in Buiter (2012), based on Buiter and Rahbari (2012), suggest that the maximum constant share of GDP that can be extracted through currency issuance ('printing money') when inflation is anticipated, lies between 0.8 percent and 2.0 percent for the euro and the US dollar – well below the cyclically adjusted or structural primary (non-interest) deficit of the US general government, which was 5 percent of GDP in 2011 (see also point 3. below).<sup>20</sup>

When inflation is low, as it is in most of the advanced economies today, seigniorage -- the difference between the value of money and the cost to produce it -- as a share of GDP, ranges between 0.25 and 0.50 percent of GDP. In the case of the US, the Fed sent \$75.4 billion worth of profits to the US Treasury for the year 2011, partly reflecting the massive expansion of the Fed's balance sheet since 2007 (mainly in the form of excess reserves on the liability side and US Treasuries on the asset side) and the profits it has made from its outright purchases of risky private debt and from its loans to risky counterparties, most of which have turned out well.<sup>21 22</sup>

## 2. Reduce the effective nominal interest rate on the public debt, $i$ .

This can be done (a) by influencing the market equilibrium interest rate (say through QE or other large-scale asset purchases of sovereign debt or private debt), (b) by ensuring the funding of the sovereign by the private sector (typically in the primary markets) at a cost below the market equilibrium interest rate, that is, through financial repression, or (c) by getting access to sovereign funding at below-market interest rates from external official entities, as Greece, Portugal and Ireland do through their access to the concessional and conditional funding of the IMF, the Greek Loan Facility and the EFSF. Holding constant the actual inflation rate,  $\pi$ , this is equivalent to lowering the ex-post real interest rate,  $r$ . In the post-World War II sovereign debt deleveraging period in the US and the UK, as well as in many other countries, this has been an important mechanism for deleveraging (see Sheets (2012, 2011)). Reinhart and Sbranica (2011) found that between 1945 and 1980 financial repression,

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<sup>20</sup> Source: IMF

<sup>21</sup> New York Times, January 10, 2012, "Fed Turns Over \$77 Billion in Profits to the Treasury", by Binyamin Appelbaum.

<sup>22</sup> Actual profits of the central bank are likely to be larger than their declared profits. This is because most central banks have supervisory and regulatory functions that are loss-making and funded from the central bank's profits. In the US and in the euro area, the true profits of the central bank are further understated by the historical legacy of an operationally over-decentralised monetary policy implementation mechanism (in the US this involves the Board and 12 Regional Federal Reserve Bank, in the EA, the ECB and the 17 NCBs), which could be streamlined and slimmed down substantially.

working through a reduction in the real rate of interest on public debt, was a major contributor to the reduction in public debt seen in many countries.

### 3. Pursue policies that raise the actual rate of inflation, $\pi$ .

Looking at equation (1), this will work provided these policies don't raise the nominal interest rate,  $i$ , don't lower the growth rate of real GDP,  $g$ , and don't raise the primary deficit,  $-s$  too much. The most obvious challenge is raising inflation without raising the nominal interest rate. Consider equation (2). If the equilibrium or ex-ante real interest rate  $\tilde{r}$  is not affected by the inflation-raising policy (this is sometimes referred to as the Fisher hypothesis), then higher actual inflation lowers the debt to GDP ratio only if and to the extent to which it is unanticipated (if  $\pi$  rises by more than  $\pi\epsilon$ ). If anticipated inflation rises as much as actual inflation, the nominal interest rate will rise one-for-one with the expected and actual inflation rate and there is no deleveraging. Financial repression can come to the rescue here too, of course. If the authorities stop the nominal interest rate on the public debt from rising with expected inflation, there is a de-facto reduction in the ex-ante real interest rate  $\tilde{r}$  and deleveraging will occur regardless of whether the inflation is anticipated or not.

Unanticipated inflation (or anticipated inflation combined with financial repression that keeps nominal yields from rising in line with anticipated inflation) can always be used to inflate away the real burden of servicing a given outstanding stock of (public) debt that is denominated in domestic currency (but not of course, inflation-linked debt or foreign-currency-denominated debt). As noted in point 1 above, there are rather strict limits on the ability of sovereigns to use the real value of the seigniorage that can be extracted through the issuance of base money *when inflation is anticipated*, in funding an ongoing real government deficit (or a given government deficit as a share of GDP).

Temporary inflation can solve fiscal unsustainability problems when the stock of debt is high and deficits are low

Temporary inflation can solve a fiscal unsustainability problem when the proximate cause of the fiscal unsustainability is a very large stock of debt and the real value of the flow (primary) deficit does not present a material problem. Italy fits this category. If the general government debt burden is more modest but the (primary) general government deficit is large – which was the situation in Ireland and Spain in early 2008 before bad private assets began their migration to the public sector balance sheet – a short sharp burst of inflation cannot solve the fiscal unsustainability problem by itself. If both the public debt burden and the public sector primary deficit are large in real terms and as a share of GDP, as is the case in the US and in Japan, inflation can only provide relief on the stock component of the fiscal unsustainability conundrum. The real flow primary deficit will have to be eliminated some other way.

### 4. Raise the growth rate of real GDP, $g$ .

Raising GDP growth would be very popular, but is hard to do in practice

This, of course, is everyone's favourite deleveraging policy, because it is effectively painless, especially if it means raising output by reducing economic slack and involuntary idleness of resources rather than by raising potential output along with actual output, which will in general require sacrificing valued leisure and/or private or public consumption to boost capital expenditure. Raising the level and/or growth rate of real GDP increases the real resources available for public debt service without the need for fiscal austerity, i.e., cuts in public spending or tax increases. Some of the writings of the 'growth instead of austerity' school make it look as though the governments of the euro area member states, the UK and other countries engaged in fiscal austerity either don't recognize that fiscal austerity hurts output and employment in the short or

medium run or somehow forgot to push the ‘growth button’. The problem with this view is that unlike fiscal austerity, which is a policy (or rather a set of two broad categories of policies: public spending cuts and tax increases), growth is not a policy. Growth is an outcome that a country enjoys if it has (1) the right policies, (2), the right institutions and culture, (3) the right initial conditions, (4) the right external environment, (5) a bit of luck and (6) affordable funding for the sovereign and other systemically important institutions.

The proponents of growth rather than austerity, which in practice amounts to less austerity, no austerity at all or fiscal expansion instead of austerity, argue as if the resulting larger government deficits can be funded on affordable terms. They extrapolate from the exceptional, indeed unique and non-replicable, cases of the US and Japan to the manifestly different cases of the UK, Spain, Italy and other euro area countries (see Section 10 for more discussion).

##### **5. Write down the debt or mutualise it.**

The final deleveraging option is default (restructuring) or mutualisation – effectively making the debt (or part of it) jointly and severally guaranteed by a wider community.

Debt default or debt restructuring takes two canonical forms from an economic perspective. The first is equitisation: part or all of the debt is turned into equity. This option is rarely applied, even in part, to sovereign debt. The second is a write-down. Repudiation is a 100% write down. From an economic perspective, what matters is the net present value write-down relative to the value of servicing the debt in full according to the letter of the debt contract. Whether the restructuring is voluntary or coercive and the details of the restructuring (maturity extension, lower interest payments, write down of face value or notional value of the debt) is of interest to lawyers, credit rating agencies and the ISDA Determinations Committees, but is of secondary economic significance.

##### **Can't we do what we did before?**

The conditions for rapid debt reduction were very different in the post-war period than they are today

It is true that public debt has been much higher in many countries, including the US and the UK at the end of major wars, such as World War I and World War II, than it is today. This does not mean the solutions that permitted major public sector deleveraging in, say, the period of 1946-1973 will work today. First, the excessive indebtedness today is not restricted to the public sector but extends to the banking sector and the household sector in many countries. Indeed, even the non-financial corporate balance sheets are weak in a number of the most afflicted countries today, including Spain, Portugal and Ireland.

Second, the period of 1946-1973 was the Golden Age of European growth (and to some extent also of US growth). Unlike today, the growth rate of potential output was boosted by favourable demographics, rising female labour force participation, large-scale rural-urban migration, trade liberalization after two World Wars and the Great Depression of the 1930s had severely restricted global trade, and, in the case of Europe, US FDI and the adoption of best-practice technology developed in the US. Financial repression and greater tolerance for inflation (accommodated by subservient central banks) further facilitated the erosion of the real burden of the public debt. Today, the US and Western Europe are at or near the technology frontier, which is moving out at a modest pace of perhaps 1-1.5% per capita per annum. Demographics are much less favourable. Central banks are more independent and focused on price stability. With an ageing population, the constituency in support of financial repression is likely less influential. Finally, the

economies of the US and Europe benefited from a significant positive labour supply shock in the immediate post-World War II period as large numbers of demobbed young men (and a few young women) rejoined the civilian labour force.

Equally important, the politics of fiscal burden sharing were very different in the post World War II years, both in the US and in Europe from what it is today. Once military expenditures returned to peace-time levels, public spending and taxation were much lower (relative to GDP) than they are today. In addition, immediately following World War II, the highest marginal tax rates in the US and the UK were over 80 percent. Today, political polarization in the US and Europe, mirroring growing inequality since the 1980s and the recent weakening of the political centre, have made it more difficult to build and sustain a consensus for fiscal burden sharing. In addition, popular willingness to shoulder the burden of increases public debt is likely greater when the debt has been incurred as the result of a conflict against a common external enemy than when the debt is the result of a gigantic domestic failure of governance, oversight, regulation, legislation and policy. Putting together an enduring coalition to support fiscal burden sharing after 2008 is a tall order indeed, as the increasingly vehement opposition to fiscal austerity in the euro area periphery makes abundantly clear.

For the reduction of private debt burdens there are analogous options to the five discussed above for sovereign debt. The main difference is that the financial repression and inflation options are not available to private debtors. For households and businesses, the analogue to the option of raising GDP or its growth rate, would be to raise income or revenues or to reduce costs or spending – which would be a jolly good idea during most times, but especially the first two of these are often hard to do in practice during recessions. In practice, the feasible set of private sector options for bringing about net deleveraging are therefore to increase saving (by reducing consumption for household and by cutting costs for firms), to restructure debt or to default.

## 5. Why Debt Matters Today

Excessive debt can cause systemic crises

The process of bringing down debt can be long-lasting and painful

High indebtedness can expose agents to economic shocks and create systematic fragility

High debt was at the heart of the 2008 financial crisis and the European sovereign debt and banking crisis

The relationship between the recent growth performance and the extent of the prior build-up in debt is strongly negative

There are at least two specific and concrete reasons why debt matters in advanced economies today. The first is that excessive debt can cause systemic crises, and such systemic crises can have very large and potentially long-lasting effects on actual and potential output, unemployment, and capacity use. The second reason is that if debt is considered excessive, the process of bringing down debt can be long-lasting and painful, even if it does not create a financial crisis or even after the crisis phase has passed. Coordination problems in the process of debt reduction often substantially increase the private and social cost of debt reduction, as agents attempt to raise their saving rates in response to the excessive level of their debt without a matching increase in planned investment (capital expenditure) by either the agents planning to raise their saving rates or by other agents at home or abroad. This can give rise to Keynes's so-called 'paradox of thrift'.

### Debt causes systemic crises

High debt held by some agents or institutions can make them vulnerable to shocks and unanticipated changes in their economic environments, enhancing the fragility of these agents and institutions. High indebtedness of many agents or institutions, especially if the economic-financial network is characterised by a high degree of complexity, can result in opacity of that network and in widespread ignorance (throughout the network and among supervisors and regulators) about the distribution of exposures and counterparty risk, risk chains and clusters across the network. This can create systemic fragility.

The high debt burdens in the developed markets brought with them vulnerabilities that recently triggered systemic financial crises. The first was a (mainly) private sector financial crisis – especially in the banking and shadow banking sectors of the North-Atlantic region – that started in August 2007 and lasted until the end of 2009. The second crisis is the sovereign debt and banking sector crisis that erupted in the euro area at the beginning of 2010, and is still ongoing. The euro area banking sector crisis is not confined to its periphery (Greece, Portugal, Ireland, Cyprus, Slovenia, Spain and Italy). Some of the worst affected banks since the crisis first erupted in 2010 have been in Germany, the Netherlands and Belgium. Continued weaknesses in the balance sheets of many banks in Germany, Austria, the Netherlands, Belgium and France have received less attention so far because these banks are ultimately backed by fiscally relatively strong core euro area sovereigns. Outside the euro area in much of the rest of the European Union (EU) too, excessive banking sector leverage (in the UK, but also Sweden and Denmark, for instance) and the fiscal austerity necessitated by unsustainable public sector debt and deficits (in the UK, notably) created crisis conditions or near-crisis conditions in 2007-2009 and weak economic growth or recession more recently (again, in the UK) as household and bank deleveraging and fiscal austerity prompted by the need for the sovereign to deleverage continue.

Both the North-Atlantic financial crisis and the euro area sovereign debt and banking crises have impacted severely on output and employment because in many developed market national economies (the main exceptions have been Germany, Italy and Japan), the household sector too has become highly indebted.

A few simple scatter plots can illustrate the role that debt has played in recent poor economic performance. Figure 24 plots the difference between what the level of real GDP in 2011 would have been had real GDP continued to grow at its pre-recession (1997-2004) trend growth rate and actual GDP in 2011 (the 'GDP loss') against the change in the ratio of NFS gross debt to GDP between 2001 and 2007. The

relationship between the recent growth performance and the extent of the prior buildup in NFS gross debt is strongly negative – for a 10pppts larger increase in the pre-crisis non-financial sector gross debt-to-GDP ratio, the GDP loss has been 2.2pppts higher, on average, in our sample of 30 industrial countries. The increase in debt alone can ‘explain’ – in a purely statistical sense – almost 40% of the variation in GDP performance relative to trend.

Figure 24. Selected Countries – GDP Loss in 2011 (% vs. Trend) and Prior Increase in Debt

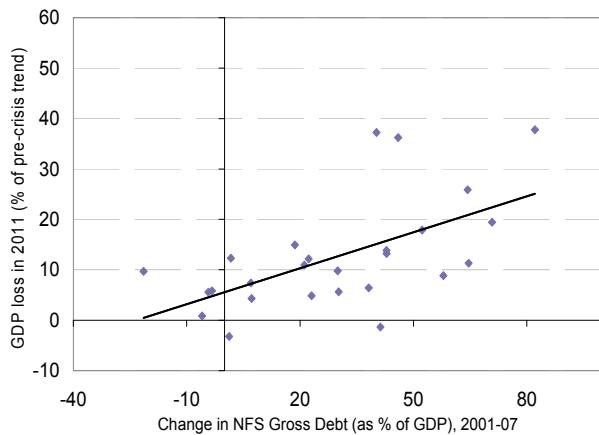
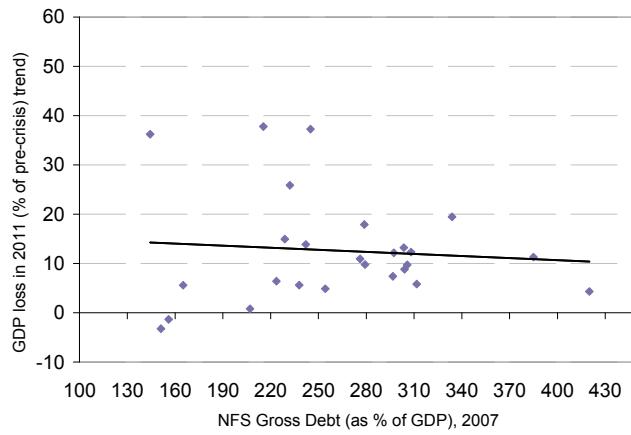


Figure 25. Selected Countries – GDP Loss in 2011 (% vs. Trend) and 2007 Debt Levels



Note: GDP loss is the deviation of real GDP from its pre-recession trend. The pre-recession trend is calculated as the average growth in real GDP between 1997 and 2004.

Source: OECD, World Bank, National Sources and Citi Research

In simple statistical terms, the level of debt and recent growth performance do not seem to be too closely related

Interestingly, there is very little evidence of a statistical relationship between the GDP loss and the *levels* of the gross debt to GDP ratio at the end of 2007 – the beginning of the North Atlantic financial crisis (Figure 25). Although we do not want to over-emphasise the significance of this simple (possibly simplistic) statistical exercise, to us the finding that changes in NFS gross debt ratios are significant in explaining the variation in cross-country experience suggests both that country-specific factors are very important (so cross-country comparisons of levels of debt cannot tell the whole story) and that some of the increase in the NFS gross debt ratios in the years of the Great Leveraging was excessive and is therefore likely to result in some mean reversion towards historical averages. The pre-crisis increase in debt ratios may also be a better guide to the extent of *desired* deleveraging than the realised debt reduction or the level of debt since the beginning of the crisis – as the process of deleveraging is nowhere complete and in many countries and sectors has not yet started. The reason is that, in an environment where there has been a widespread increase in the (precautionary) desire to save, the so-called ‘paradox of thrift’ can exert powerful effects and actual saving may well fall short of desired saving, a point we will discuss below in more detail.

‘Consumption and investment losses’ tend to be associated with larger prior increases in HH and NFC debt, respectively

Similar relationships hold at the sectoral level. As discussed in IMF (2012), countries with larger increases in household debt have seen larger ‘consumption losses’ (negative differences between the consumption levels implied for 2011 if real consumption had continued to grow along its pre-recession 1997-2004 trend, and actual private consumption in 2011). We can also observe a very similar relationship between increases in NFC gross debt and ‘investment losses’ (Figure 26 and Figure 27).<sup>23</sup> Similar to GDP, increases in HH and NFC gross debt alone can explain 40%

<sup>23</sup> For reasons of data availability, investment here comprises both public and private investment.

and 35% of the variation across countries in private consumption and investment losses, while there is no relationship between the levels of HH and NFC gross debt and consumption or investment losses.<sup>24</sup>

Figure 26. Selected Countries – Consumption Loss and Increase in HH Debt

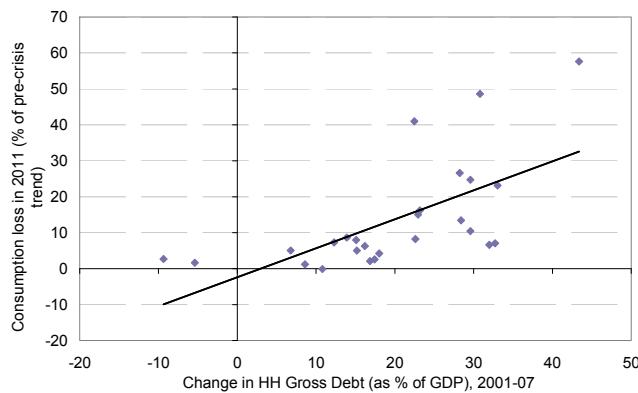
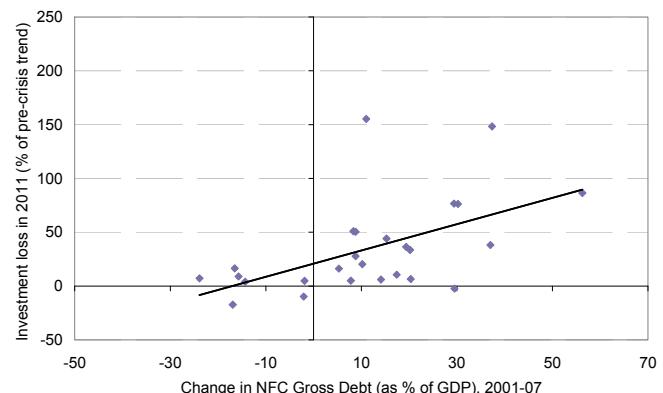


Figure 27. Selected Countries – Investment Loss and Increase in NFC Debt



Note: Consumption (investment) loss corresponds to real private consumption (real total investment) deviation from pre-recession (1997-2004) trend. The sample consists of 30 countries: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Latvia, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK, and US.

Source: OECD, World Bank, National Sources and Citi Research

That credit matters for growth (even outside periods dominated by financial crises) has been documented empirically in countless studies. For example, creditless recoveries have not been all that rare (Abiad et al (2011)), and especially so after financial crises or credit booms. But creditless recoveries have on average been much slower than recoveries with credit – Abiad et al (2011) find that output growth is on average a third lower in creditless recoveries than in recoveries with credit.

Episodes of deleveraging after financial crises have generally been associated with poorer economic performance

Previous episodes of deleveraging after financial crises have generally been associated with poorer economic performance.<sup>25</sup> Figure 28 to Figure 34 depict the behaviour of several macroeconomic variables (relative to their pre-crisis trend) in response to financial crises that were associated with deleveraging in 86 countries between 1960 and 2006.<sup>26</sup> There were 18 episodes of financial crisis associated

<sup>24</sup> The finding that changes in debt are related to output losses, while levels are not also holds for other measures of debt, including various measures of net debt (deducting assets from gross debt) or measures of debt relative to debt service capacity.

<sup>25</sup> See also Michael Saunders (2011), "What's the Damage? Debt and Growth in Deleveraging", [Global Economic Outlook and Strategy - Prospects For Economies And Financial Markets In 2012 And Beyond](#), "What's the Damage? Medium-Term Output Dynamics after Financial Crisis", IMF World Economic Outlook, September 2009. See also Cecchetti et al (2012).

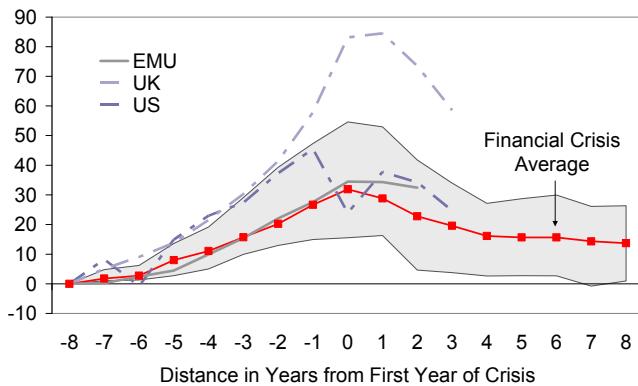
<sup>26</sup> Episodes of deleveraging are identified, following McKinsey (2010), as episodes where the ratio of gross NFS debt to GDP has fallen for at least three years and by at least 10ppcts of GDP, or where the stock of nominal debt declined by 10ppcts or more. Unlike in other parts of this study, NFS debt is defined as the sum of private sector credit and public sector debt (both provided by the IMF), due to data availability for this longer sample period. Private sector credit represents the total amount of credit given (loans, bonds, shares, etc.) to resident non-banks by domestic banks (deposit-issuing financial institutions operating within the country). Financial crises are taken from Laeven and Valencia (2008) and episodes of financial crises-cum-deleveraging are the interface of the two lists. The exercise provided a total of 31 deleveraging episodes, of which 18 were preceded by a financial crisis. These 18 episodes were: Argentina (2001), Bolivia

On average, GDP fell by around 10ppcts relative to the pre-crisis trend in the 18 episodes of financial crisis associated with deleveraging in our sample

with deleveraging in our sample, starting with Chile in 1981 and ending with the Dominican Republic in 2003.<sup>27</sup>

On average in this sample of episodes, the stock of private sector credit as a share of GDP grew by 30ppcts in the eight years preceding the financial crisis and fell by around 15-20ppcts over the following eight years (Figure 28). The effect of financial crises on real GDP was fairly dramatic: GDP fell by around 10ppcts relative to the pre-crisis trend, on average, in the first two years and made up very little ground in subsequent years. Compared to this historical average of financial crises, the GDP performance of the US, the UK and the euro area to date have actually been broadly similar, with the UK underperforming the historical average of our 18 episodes moderately. The increase in private sector credit in the UK prior to the financial crisis much exceeded that in the US or euro area, and also that of the average in the 18 countries in our past financial crises sample, which may partly account for the UK's sub-par economic performance since 2007.

Figure 28. Selected Countries – Change in Domestic Credit to the Private Sector (% of GDP), 2007-11

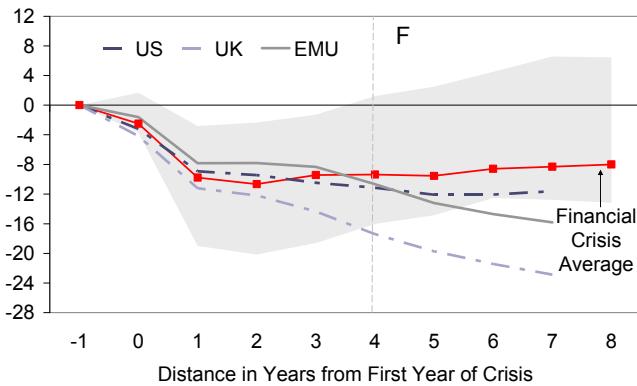


Note: Accumulated change in domestic credit to the private sector from T-8 to T+8, where T is the beginning of the banking crisis. For the US, the crisis is dated (T=0) in 2007, for the UK in 2008 and for the EA in 2009. The shaded area covers the interquartile range of previous episodes, which indicates the middle 50 percent of all crises.

Source: IMF and Citi Research

While net exports and government consumption usually cushion the fall in output, private consumption and investment fall sharply

Figure 29. Selected Countries – Real GDP Versus Pre-Crisis Trend, 2007-16F



Note: The shaded area corresponds to the interquartile range of previous episodes, which indicates the middle 50 percent of all crises. From T+4 (2012), real GDP corresponds to Citi Research forecasts.

Source: IMF, World Bank, BEA, Eurostat and Citi Research

As Figure 30 and Figure 31 show, both private consumption and investment fall sharply in the aftermath of financial crises with deleveraging. The fall in consumption is similar to the fall in GDP, but the fall in investment is more than three times as large – examples of the investment accelerator at work. Net exports on the other hand add substantially to GDP growth, but the contribution is almost entirely due to import compression, while exports were on average flat in these episodes. This suggests that the gains in external competitiveness and real exchange rate depreciations experienced by many of the countries in the sample

(1994), Chile (1981), Dominican Rep (2003), Ecuador (1998), Finland (1991), Indonesia (1997), Japan (1997), Korea (1997), Malaysia (1997), Mexico (1994), Nicaragua (2000), Norway (1991), Paraguay (1995), Philippines (1997), Sweden (1991), Thailand (1997), and Uruguay (2002). Please see the appendix for further details.

<sup>27</sup> Our filter rules out ongoing and very recent deleveraging episodes by construction. Our filter also excludes transition economies during the period of the transition (e.g. Russia and Ukraine) because the output developments in these economies were strongly related to the shift away from central planning rather than to financial crises per se.

(those that had a floating exchange rate, devalued a currency peg or abandoned a currency board) following their financial crises, boosted the trade balance in much the same way as fiscal austerity would at a constant real exchange rate: by depressing demand and lowering living standards. The improvement in external competitiveness was often associated with a worsening in the terms of trade that acted like a tax by lowering household real income (measured in terms of the consumption bundle).

Figure 30. Selected Countries – Real Private Consumption vs. Pre-Crisis Trend, 2007-11

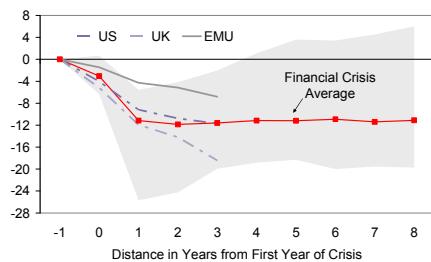


Figure 31. Selected Countries – Real Investment vs. Pre-Crisis Trend, 2007-11

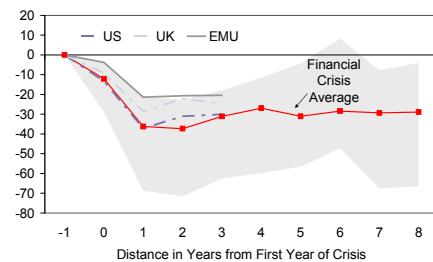
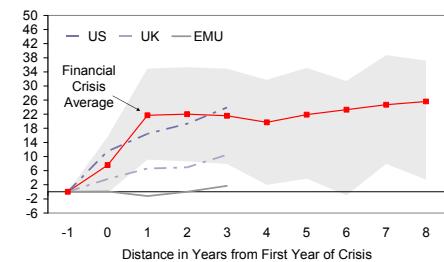


Figure 32. Selected Countries – Real Net Exports vs. Pre-Crisis Trend, 2007-11



Note: The shaded area corresponds to the interquartile range of previous episodes, which indicates the middle 50 percent of all crises.

Source: IMF, World Bank, BEA, Eurostat and Citi Research

Private savings tend to increase in the aftermath of financial crises

### Financial crises are particularly damaging, as both credit demand and credit supply are generally impaired.

The desire to raise savings can be rooted in a desire to rebuild net worth after a fall in asset prices or can reflect precautionary motives, as an increase in uncertainty (as is common in recessions) and an increased cost of and reduced access to credit or an increase in the risk of future restrictions in credit supply increases the motive to self-insure.

Sometimes, the precautionary saving motive reflects a desire to reduce gross leverage, i.e. to reduce assets and liabilities equally, e.g. when an increase in perceived liquidity risk causes households or non-financial corporates to wish to hold less illiquid financial assets and less gross debt, but not to wish to increase their financial net worth. In these circumstances, a coordinated solution to the desired reduction of gross leverage by several agents (and the provision of the financing required to facilitate this multi-agent netting of gross positions) could reduce the economic damage of the debt reduction process, as would some form of 'liquidity insurance'.

Increase in (desired) saving occurs as a result of a combination of (greater fear of) illiquid asset markets, (greater fear of) future borrowing constraints, and reductions in net worth

If some assets cannot be disposed of easily, say because of their illiquidity, gross deleveraging will become net deleveraging, as liabilities are reduced without reducing assets by the same amount. In this case net saving is the only way to get rid of excessive (gross) debt. An increase in perceived liquidity risk can therefore create a precautionary demand for net saving, even though fear of future inability to borrow would not create an incentive for net saving if assets could be sold in liquid markets. It is therefore the combination of (greater fear of) illiquid asset markets and (greater fear of) future borrowing constraints that creates a precautionary net saving motive.

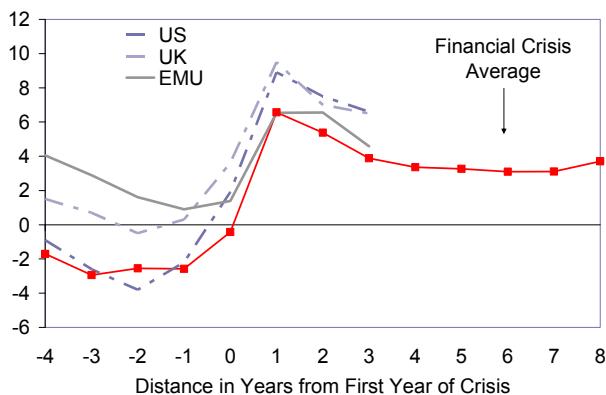
The second rationale for increased saving rates is to increase wealth or net worth, for life cycle reasons, say, or for precautionary reasons driven by types of uncertainty other than liquidity risk. An increase in desired saving based on a deficient level of wealth (say one created by a sharp fall in equity prices and, for homeowners, real estate prices) is also subject to potentially severe coordination

Private sector financial surpluses rose by more than 6ppcts of GDP in the year of the crisis in the 18 financial crisis episodes of our sample

issues. Indeed when all agents in an economy attempt to increase their saving rates, such desires are likely to be disappointed, even with optimal and well-informed coordination among the savers. Those in charge of capital expenditure decisions must be brought on board.

Private sector financial surpluses rose by more than 6% of GDP around the time of the crisis in our sample of previous financial crises, then fell back by half over the next two or three years, but stayed persistently higher than before the crisis. The increase in private sector financial surpluses occurred despite a strong response by monetary policy through sharply lower interest rates. Again, the euro area, the UK and the US are close to the historical experience following financial crises. The fiscally vulnerable euro area countries show a similarly strong pattern – private sector financial surpluses rose by 10.4ppcts of GDP between 2007 and 2009 and are expected to fall by only 2.1ppcts of GDP between 2009 and 2012.

Figure 33. Selected Countries – Private Sector Surplus (% of GDP) After Financial Crises

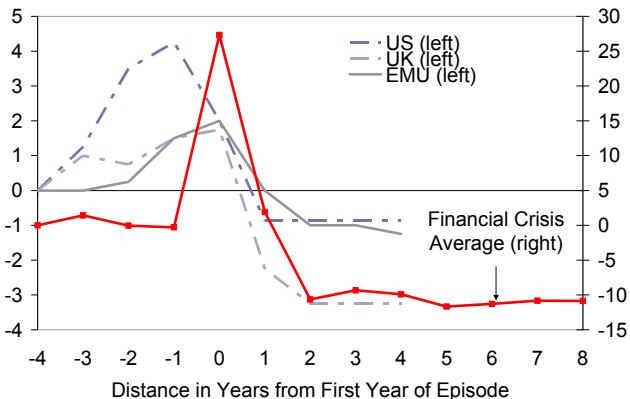


Note: Private sector financial surpluses (% of GDP) for US, UK and EMU between T-4 and T+8, where T=0 is 2008. Private sector financial surplus is defined as the difference between the current account balance and the general government balance. The financial crisis average is computed for 11 financial crisis episodes (Argentina (T = 2001), Bolivia (1994), Dominican Republic (2003), Ecuador (1998), Finland (1991), Japan (1997), Korea (1997), Philippines (1997), Norway (1991), Paraguay (1995), and Sweden (1991)), due to data availability.

Source: IMF, World Bank and Citi Research

GDP losses tend to be almost twice as larger in financial crises with large increases in debt

Figure 34. Selected Countries – Change in Policy Interest Rate After Financial Crises (ppcts)



Note: Accumulated change in the policy rate between T-4 and T+8, where T corresponds to 2008 (for T+4 we use the policy rate as of August 2012). Average for 10 financial crisis episodes (Ecuador (1998), Finland (1991), Indonesia (1997), Japan (1997), Korea (1997), Philippines (1997), Norway (1991), Paraguay (1995), Sweden (1991), and Uruguay (2002)), due to data availability.

Source: IMF and Citi Research

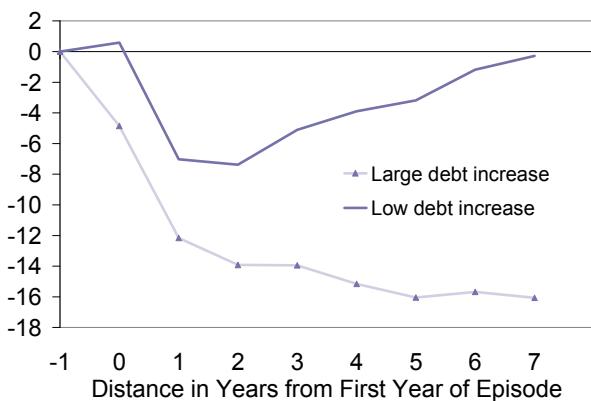
Excessive debt not only creates the vulnerabilities that lead to financial crises, it also increases the cost of financial crises, as Figure 35 and Figure 36 show. In these figures we divide the sample into two groups, depending on the increase in debt prior to the financial crisis during the four years before the crisis.<sup>28</sup> The average increase in the debt-to-GDP ratio was 18ppcts of GDP for the group with the larger debt increases, while this debt ratio actually fell by 3.5ppcts in the other group, on average, in the 4 years before the financial crisis.<sup>29</sup> As we can see in Figure 35, the fall in GDP for the larger-debt increase group was almost twice what it was in the other group two years after the crisis. Even worse, it continued to fall relative to the trend, while the ‘smaller debt increase’ group crept back to trend. The fall in private sector debt post-crisis on the other hand was much steeper for the large debt increase group, while private sector credit fell modestly. The falls in investment and consumption were larger and more persistent, and so were the increases in saving rates for the countries where debt had risen more ahead of the financial crisis.

<sup>28</sup> We define a ‘large’ increase in debt as an increase above the median of all episodes over the three years leading up to the crisis (between T-4 to T-1), as in IMF (2012).

<sup>29</sup> The cut-off increase in NFS debt was 8.8ppcts of GDP.

For the many countries that had large increases in private debt up until the North Atlantic financial crisis, the outlook may therefore be even gloomier than the average experience depicted in Figure 36 would suggest. Out of the 30 countries in our sample, all but 6 (Germany, Netherlands, Canada, Japan, Slovakia and Czech Republic) had increases in NFS gross debt in the three years leading up to the crisis that would have put them into the 'larger debt increase' group of the financial crisis sample.

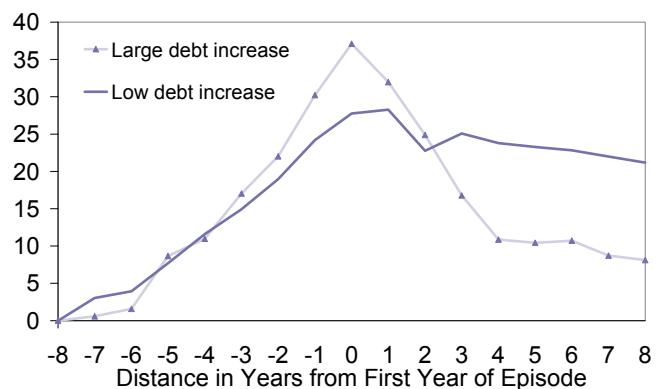
Figure 35. Real GDP Versus Pre-Crisis Trend After Banking Crises, 1980-2011



Note: "Large debt increase" group includes countries with above-median increases in gross debt in the three years leading up to the crisis.

Source: IMF, World Bank, and Citi Research

Figure 36. Change in Domestic Credit to the Private Sector (% of GDP) After Banking Crises, 1980-2011



Note: "Large debt increase" group includes countries with above-median increases in gross debt in the three years leading up to the crisis.

Source: IMF, and Citi Research

### Even 'orderly' deleveraging is likely to be costly - coordination failures and the 'paradox of thrift'

Even outside of financial crises, deleveraging may be costly...

...as an uncoordinated increase in desired savings may lead to lower output rather than higher saving – the 'paradox of thrift'

The physical, institutional and legal separation of the saving and investment decisions places a big coordination burden on financial markets

Systemic crises are particularly painful, as they often combine impairments to credit availability with an additional desire to increase saving. But debt reduction can impose heavy costs even outside crisis episodes that feature a weak banking system and widespread restrictions on credit availability.

Increased planned net saving implies lower net spending on goods and services, and lower net income from the production of these goods and services for somebody unless that shortfall in demand is somehow replaced by increased spending elsewhere. However, the main reason that heavy economic, social and human costs are often associated with deleveraging by the public and private sectors is the fundamental coordination problem faced by decentralised capitalist market economies with large financial sectors and significant financial intermediation. This coordination problem can arise from an increased desire to save, no matter whether this was driven by liquidity or solvency concerns. This coordination problem has preoccupied macroeconomists since Keynes, and probably before Keynes as well.

In a closed system (like the world economy) it has to be the case that system-wide aggregate saving has to equal system-wide aggregate investment. Even though this relationship holds identically *ex-post*, that is, for realized saving and investment flows and for purchases and sales of financial instruments, it need not hold *ex-ante*, for planned investment and saving and for planned financial asset accumulation and decumulation. It can therefore be viewed, *ex-ante*, as a coordination constraint. Failure for it to hold *ex-ante* can result in the revenge of the 'paradox of thrift'.

Unlike in a subsistence peasant economy, where a decision to save (that is, a decision to abstain from consumption of current goods and services), constitutes *ipso facto* an identical decision to invest (to add to the stock of real reproducible capital – by adding the grain that is not consumed to the stock of grain to be used for sowing for the next harvest), in a decentralised financially developed economy, households save (abstain from consumption) but invest very little in the form of capital expenditure. Instead household saving flows into a range of financial instruments. Likewise, firms do most of the capital expenditure, but when they cut their investment, they don't raise corporate consumption demand by the same amount. Instead they either retain profits or distribute their disposable income to households and other beneficial owners. This physical, institutional and legal separation of the saving and investment decisions places a big coordination burden on the financial markets linking households and NFCs, and, in a more complex world, households, NFCs, financial institutions, the government and the rest of the world. Much of the time, financial markets do a reasonable job of performing the task of balancing saving and investment at levels of employment close to full employment. But as the years since 2007 remind us, there can be spectacular market failures (financial markets), sometimes aided and abetted by policy failures.

The *paradox of thrift* described a situation where planned increases in saving by HH weaken real growth to the point that they reduce HH income (and therefore savings)

In the Keynesian textbook model, the *paradox of thrift* described a situation where a planned increase in saving by households (that is, a planned or *ex-ante* reduction in household consumption demand at a given level of household disposable income) weakens output and employment to the point that actual, realized or *ex-post* saving instead of rising as planned, rises less, stays constant or even falls because lower consumption demand lowers production and thus household disposable income. We can see variants of these destructive feedback loops at work throughout the periphery of the euro area, in the UK and in core euro area countries like the Netherlands, where the realization in 2011 by households that they were excessively indebted contributed to a major slowdown in private consumption demand and a recession.

It is key to recognise that the 'paradox of thrift' is not restricted to the consequences of fiscal austerity implemented by governments that are trying to reduce their debt burdens or deficits. It applies to the adverse feedback loops created by any economic agent, or sector, whose individually rational defensive actions when faced with an unsustainable debt and deficit configuration (or with any other reason for boosting his individual saving) creates negative income or demand externalities for other agents in the economy by cutting his consumption and thus the effective demand for output and actual output – externalities that are not effectively captured by the price signals, quantity signals or other information conveyed by these actions. Indeed, the original paradox of thrift does not involve fiscal austerity at all. Instead, it analysed the consequences of a 'spontaneous' decision by the private sector to raise the household saving rate.

The incompleteness of markets is a major obstacle to the efficient allocation of resources over time and across states of nature

Financial markets and financial asset prices and yields are supposed to coordinate the spending and saving plans of producers, consumers and other economic agents. Unfortunately, they do so least effectively when it is most needed. Allocation over time and the pooling, sharing, pricing and trading of risk are the areas of economics where both markets and governments are weakest. The incompleteness of markets -- due to private and asymmetric information and costly contract enforcement, poor governance of private and public enterprises, the inability of governments to commit their successors and indeed often even to themselves for any length of time, a pervasive lack of trust in people and institutions and a scarcity of all key ingredients of social capital -- is a major obstacle to the efficient allocation of resources over time and across states of nature.

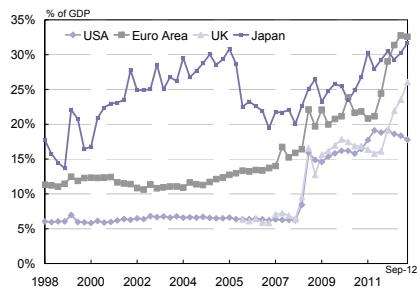
## 6. Which Debt Matters Most?

**Debt matters no matter which sector it resides in – and it can migrate from one sector to another**

Debt can migrate from one sector to another

We noted that deleveraging can, through the effective demand externalities created by the decision to boost financial surpluses, depress economy-wide activity regardless of the sector in which it occurs. Clearly, the details of the adverse effective demand feedback loops will depend on whether it is the government that tries to deleverage through cuts in public spending or tax increases, households by reducing spending on consumer goods and services, including consumer durables and residential housing, banks by lending less than they take in through new borrowing, or non-financial corporates by cutting capital expenditure, production or employment. And, as we argue below, not all debt is created equal. A financially impaired sovereign may present both a uniquely difficult challenge for the whole economy and be uniquely capable of addressing that challenge because it has instruments at its disposal that are not shared by the private sector, especially if it can depend on the sensible support of the other key state entity in the management of macroeconomic and financial stability – the central bank.

Figure 37. Selected Countries – National Central Bank Balance Sheet Size (% of GDP), 1998-2012



Note: values for total assets of national central banks (Sep-12) expressed as % of annual GDP in 2012:Q2, due to data availability.

Source: National Central Banks and Citi Research

Public debt has increased continuously since the start of the 2007 crisis, through (banking and in some cases NFC) bailouts and fiscal packages

It therefore makes sense, when analyzing the consequences of excessive indebtedness, to consider the debt situation of all four domestic sectors – households, non-financial corporates, financial corporates and banks, and the government – separately as well as jointly. This has motivated our analysis and presentation throughout this study. Indeed, it will be desirable to apply a finer disaggregation at times. The banking sector often has different debt dynamics from the rest of the financial sector. Even more important, the central bank – an agency of the state often classified for accounting purposes with the banking sector – has very different objectives and capabilities from the rest of the banking sector (and indeed from the rest of the public sector). The leading central banks in the developed markets have been increasing the size of their balance sheets since the beginning of the North Atlantic financial crisis, consciously leveraging up when all those around them, private or public, have been deleveraging or attempting to do so. Figure 37 illustrates this for the four leading central banks in the advanced economies, and we will return to the issue below.

The crises since 2007 have reminded us of the old truth that the ownership of assets and liabilities across sectors (and within sectors) is not a given and can be changed not just through sales and purchases, but through non-market transactions and mechanisms.

Indeed, in the sequence of developed market crises that started in late 2007, a constant feature has been the steady migration of bad or impaired banking sector assets to the sovereign balance sheet, often funded through increased issuance of sovereign debt. Massive capital injections into the banking sector were undertaken in Ireland, the US, the UK, the Netherlands, Belgium, Germany and Greece, with Spain, Cyprus and Slovenia next in line. More sovereigns will no doubt inject more capital into their domestic banking systems, and if banking union becomes a reality in the euro area, the European Stability Mechanism (ESM) will be able to take equity stakes directly in banks, without a guarantee from the sovereign in whose jurisdiction that bank is domiciled. And not only impaired banking sector assets have found their way onto the public sector balance sheet. Non-bank financial entities, including insurance companies like AIG, and manufacturing corporations like General Motors have had injections of public funds when threatened with insolvency.

In the end, as long as the sovereign is solvent, private sector bad or impaired assets owned by entities that are either too systemically important to fail from an economic perspective or too politically well-connected to fail, often end up migrating to the public sector balance sheet, thus increasing the gross and net debt burden of the public sector.

The movement of impaired or bad private assets to the public sector, often at inflated valuations, is not the only form of inter-sectoral asset migration. Historically, in many emerging markets with populist political systems, profitable private assets have been expropriated by the rulers, typically at prices well below fair value. We see this today in Argentina (with the private pension fund assets and with Repsol's local subsidiary) and, in the form of retroactive taxation, for example in India. Retroactive taxation is, of course, not unique to emerging markets. A reasonably recent practitioner of the art in the UK was Gordon Brown who, as Chancellor of the Exchequer in 2006 imposed the controversial "pension stealth tax" on UK pension funds, reducing the value of their assets by least £100 billion.<sup>30</sup>

#### **Not all debt is created equal: public vs. private debt**

The state's capacity to carry debt is fundamentally different from other sectors, given its capacity to tax and regulate resources owned by other actors in the economy

Certain sectors are unique in their capacity to carry debt. The state is the most obvious example, because of its capacity to tax (impose unrequited transfers on the other sectors in the national economy) and to regulate. Both these powers are manifestations of the fundamental source of state power: its monopoly of the legitimate use of force, compulsion and coercion. This gives it contingent power over resources ostensibly owned and controlled by other actors in the economy.

The state is unusual in that enforcement of sovereign debt contracts effectively relies exclusively on self-enforcement rather than on external enforcement through third parties (courts and law enforcement agencies or informal (and often illegal) private analogues of courts and law enforcement). Gunboat diplomacy to enforce sovereign debt contracts has gone out of fashion. Occasionally, as in the case of Cuba, economic and financial sanctions or embargoes are imposed on sovereigns that wilfully default on their debt or expropriate foreign-owned assets. But these tend to be rather ineffective, as the case of Cuba illustrates. There are no courts that can attach more than a very small fraction of the assets of a non-performing sovereign. This is really feasible only when these assets happen to be located in a foreign court's jurisdiction. Sovereign debt issued under domestic law relies exclusively on self-enforcement. The motives for the sovereign living up to debt commitment are (1) the sense that it is morally/ethically right to do so; (2) fear of negative "rule of law externalities" for the enforcement of other contracts in its jurisdiction, if the state -- the ultimate upholder and enforcer of contracts in that jurisdiction -- were to flout, when it comes to its own financial obligations, the principles it is supposed to uphold for citizens and legal entities in its jurisdiction; (3) the fear of being locked out of the capital markets for some time (foreign, domestic, or both) and/or the fear of facing higher borrowing costs even after financial market access has been restored.

The central bank typically serves as the 'leverager of last resort'

The central bank, often separate from the government but always part of the state in modern societies, traditionally has the monopoly of the issuance of legal tender. The monetary liabilities of the central bank therefore almost always are the most liquid domestic-currency-denominated instrument in a national jurisdiction. With fiat

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<sup>30</sup>"Brown's raid on pensions costs Britain £100 billion", Liam Halligan, *The Telegraph*, 15 October 2006,  
<http://www.telegraph.co.uk/news/uknews/1531448/Browns-raid-on-pensions-costs-Britain-100-billion.html>

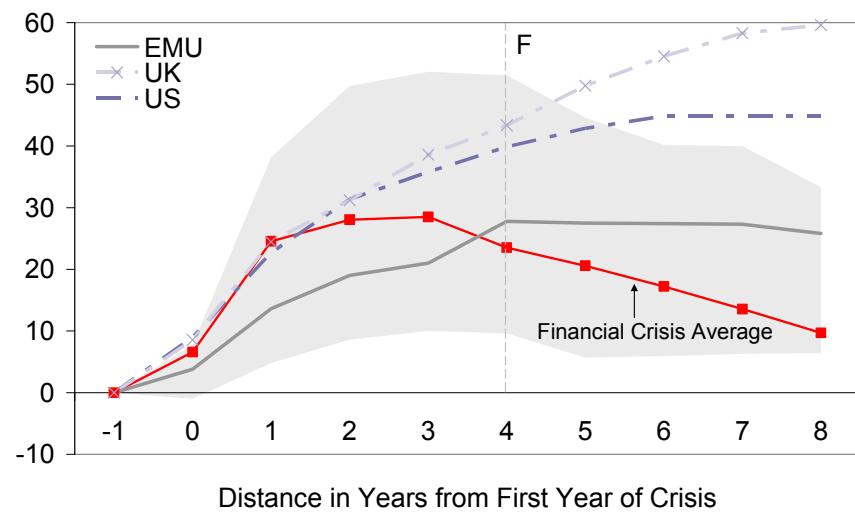
currencies the norm (i.e., money that derives its value from government regulation or law) this means that the central bank can, in principle create any nominal amount of domestic currency purchasing power at will and instantaneously. The *real* resources that can be commanded through the issuance of fiat base money is of course much more limited, even though, under the right circumstances, it can be considerable (see [Global Economics View - Looking into the Deep Pockets of the ECB\\*](#)).

In the current crisis, the central bank, is typically the leverager of last resort, increasing the size of its financial balance sheet even when all other sectors, including the general government sector, are deleveraging (see Figure 37), or at least attempting to do so.

Policy action (monetary and fiscal) should serve as stabilizers in the event of private deleveraging

If the private real economy (households and non-financial enterprises) are forced to deleverage (generally because banks or other creditors are raising the cost and restricting the availability of funding), the state, through expansionary monetary and policy actions, is supposed to act as the countervailing power, stabilizing the economy through automatic fiscal stabilisers, through discretionary tax cuts or public spending increases and through interest rate cuts. Currently, monetary policy throughout the developed markets is severely impaired – some would say all but ineffective – because of the proximity of short and medium-term risk-free nominal interest rates to the zero lower bound or the effective lower bound. This is the moment fiscal policy ought to shine, according to the intermediate Keynesian textbooks that ignore the issue of public debt sustainability and default risk. And Figure 38 shows that indeed public gross debt has tended to increase substantially in the aftermath of financial crises – by around 25-30ppts of GDP.

Figure 38. Selected Countries – Change in Public Gross Debt (% of GDP), 2007-2016F



Note: Accumulated average change in the general government gross debt-GDP ratio from T-1 to T+8, where T is the beginning of the banking crisis. For the US, UK, and EMU T corresponds to 2008, while T+4 (2012) corresponds to Citi forecast. The shaded area corresponds to the inter-quartile range of previous episodes, which indicates the middle 50 percent of all crises. From T+4 (2012), real GDP corresponds to Citi Research forecasts. The 18 financial crises covered are: Argentina (2001), Bolivia (1994), Chile (1981), Dominican Rep (2003), Ecuador (1998), Finland (1991), Indonesia (1997), Japan (1997), Korea (1997), Malaysia (1997), Mexico (1994), Nicaragua (2000), Norway (1991), Paraguay (1995), Philippines (1997), Sweden (1991), Thailand (1997), and Uruguay (2002).

Source: IMF, Eurostat and Citi Research

The excessive indebtedness of the state is restricting its ability to use conventional fiscal stabilisation policy in many countries

Unfortunately, the excessive indebtedness of the state is restricting the ability to use conventional fiscal stabilisation policy to an ever-smaller number of countries. In most of the euro area, the ability of the state to engage in expansionary fiscal policy through public spending increases or tax cuts and funding the resulting increase in the deficit through sovereign debt issuance is severely impaired by low and declining sovereign creditworthiness, due to the large outstanding stocks of debt and in many cases also by continuing large deficits. Among the larger euro area economies, only Germany has scope for debt-financed fiscal expansion, although, with its general government gross debt at more than 80 percent of GDP and the German economy slowing down markedly, even Germany's scope to add to its sovereign debt stock is limited.

To make matters worse, the state is also the ultimate source of financial support for insolvent but systemically important non-government (mainly private) entities. So if the state itself is excessively leveraged and is keen to or under pressure by the markets to reduce the size of its debt, not only will the deleveraging of the state inflict damage on the real economy through the fiscal austerity that is the standard method for sovereign deleveraging, the state will also not be able to act effectively as the bailer-out of last resort of systemically important domestic institutions like large banks. We have seen this in Greece, Portugal and Ireland. We are seeing it now in Spain, and we may see it in the not too distant future in Italy and in countries in the soft-core of the euro area with weak banks, like Austria, the Netherlands, France and Belgium.

A sovereign that is forced by the markets to deleverage quickly will do the most damage if at the same time banks and other systemically important financial institutions find themselves looking for financial support from the sovereign, and if households and non-financial corporations are trying to deleverage as well. This is the situation we are in throughout the euro area and in a number of other DMs.

#### **Not all debt is created equal: private non-financial sector debt**

Human capital cannot be collateralised nor, when a household declared insolvent, can its human capital be attached in full

Most developed economies have reasonably well-developed and more or less adequately functioning procedures for dealing with household insolvency and with non-financial corporate insolvency. But the main source of wealth of most households is human capital or the net present value of future after-tax labour income. Since the abolition of slavery, debt slavery and indentured labour, human capital cannot be collateralized. Nor, when a household defaults on a debt and is declared insolvent, can its human capital be attached in full, following a personal insolvency procedure. Even the Victorian debtors' prisons familiar to Mr Micawber (and to Charles Dickens, whose father spent some time in one of these establishments) are a thing of the past.

The ability of a court to attach part of a person's future wage income to meet outstanding debt obligations exists to varying degrees in most countries. Household non-human wealth (or the income from it) also cannot always be attached (and never in full) to meet an unsecured debt obligation. Of course, secured lending, including mortgage lending does relax household borrowing constraints.

Secured lending when the value of the security is less than the amount of the loan only provides the creditor with partial comfort. Many countries and many states in the US have non-recourse mortgages. This limits the creditor's ability to cover the negative equity using other income sources and assets of the borrower to the amount the borrower is *willing* to pay for reputational and similar reasons. In addition, the repossession of a residential home by a creditor bank following a mortgage default can run into political obstacles even when the law appears to

Excessive banking sector indebtedness and rapid banking sector deleveraging can be more damaging to economic activity than the deleveraging of HHs and NFCs

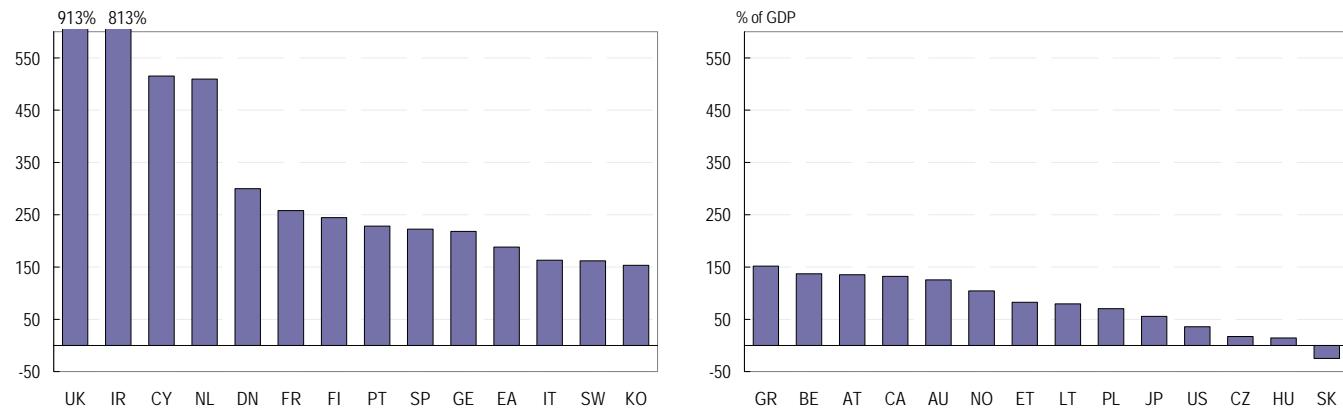
assign unambiguous repossession rights to the creditor. Non-financial corporations facing insolvency can use legal constructions like "Chapter 11" in the US to keep an insolvent corporation functioning, using the capital and labour resources at its disposal, if these activities at least cover variable cost.

#### Not all debt is created equal: bank and financial sector debt

Banks are probably the most debt-intensive institution created by man, especially if the size of the balance sheet at a point of time is related to the value added created by the institution during a quarter or a year rather than to its equity. A bank gets destroyed as a functioning, economically useful entity when it is subjected to the insolvency procedures applicable to (and appropriate to) non-financial corporates. This is because these insolvency procedures often involve much of the financial assets and liabilities of the insolvent entity being effectively frozen for months or longer. However, a standstill defending a bank against its creditors makes no economic sense when access by the creditors to the bank is the *raison d'être* of the bank. The economic value of a bank comes from its financial assets and liabilities and the maturity, liquidity and credit risk transformations they permit, as well as from the foot-loose highly-skilled part of its labour force and management.

Because banks provide so much of the external funding of non-financial corporates and households (especially in the euro area), excessive banking sector indebtedness and rapid banking sector deleveraging, either through the banks trying to run large financial surpluses (active net financial deleveraging) or through aggressive sales of assets (often into declining asset markets) to redeem debt becoming due (say because of active gross deleveraging), is more damaging and serious to economic activity than the deleveraging of households and non-financial corporates. The damage caused by the deleveraging is more a function of the size of the balance sheet reduction that is attempted (which can be multiples of GDP) than of the value added of the banking sector (which is generally less than 10 percent of GDP).

Figure 39. Selected Countries - Financial Corporation Debt/GDP Ratio (%), 1995-2011 Change



Note: Financial Corporations include NCBs. Gross debt is equal to total financial liabilities less shares and other equities from national balance sheet statistics. For the US, financial corporations' debt is "credit market instruments". For the EA, the change is between 1999 and 2011 and between 2001 and 2011 for Ireland. All values are expressed on a non-consolidated basis except for Australia and Portugal.

Source: OECD, Eurostat, National sources, and Citi Research

Financial sector leverage has increased substantially over the past few decades

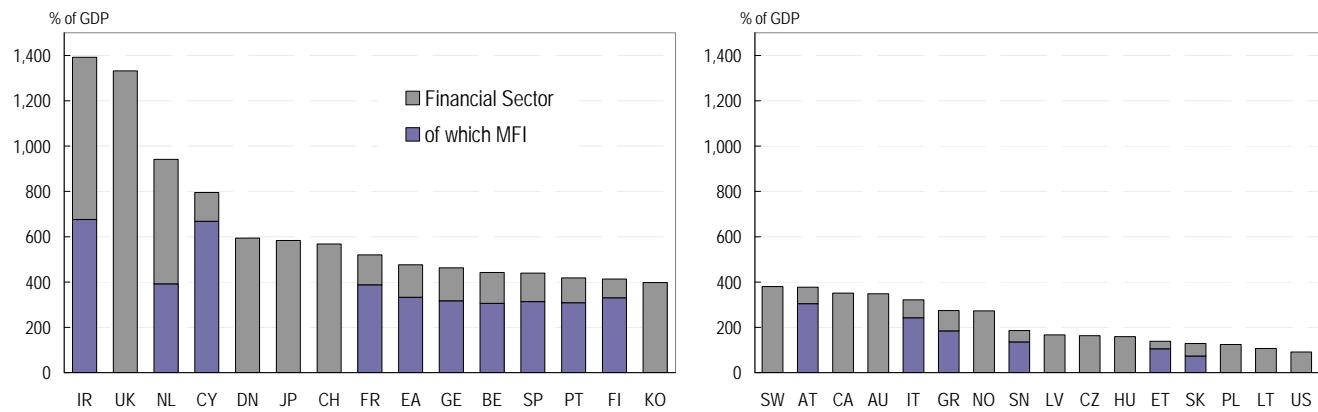
Debt in the banking sector, and in the financial sector generally, has increased enormously over the past few decades. In fact, in some financial centres, including Ireland and the UK, increases in debt in the financial sector dwarfed increases

elsewhere, and increases in simple, unweighted, measures of gross debt and total balance sheet size generally suggest much higher increases in debt than more complex (or esoteric) measures such as risk-weighted asset ratios, net debt/net worth, or different definitions of leverage based on (non-independently verifiable) risk weights or on net debt ratios.

Increases in financial sector debt were particularly high in the UK, Ireland and Cyprus

The ranking of national financial sectors by size of gross debt (measured by balance sheet size minus equity as a share of annual GDP) is very close to a ranking by the magnitude of the increase in size over the past couple of decades. Most of these increases took place over the last 1-2 decades, and are sometimes enormous. Perhaps somewhat surprisingly, the US financial sector had the fourth lowest increase in the debt-to-GDP ratio (behind Slovakia, Hungary, and the Czech Republic and just ahead of Japan) and the lowest level of financial sector debt relative to GDP in our sample of countries. On the other hand, increases in financial sector gross debt-to-GDP in Cyprus, Ireland, the UK and the Netherlands were immense.

Figure 40. Selected countries – Financial Corporation Debt (% of GDP), Latest



Note: Financial Corporations include National Central Banks. MFI corresponds to Monetary Financial Institutions. Gross debt is equal to total financial liabilities less shares and other equities from national balance sheets statistics. For US financial corporations values correspond to the item "credit market instruments" on the liability side of the corresponding balance sheet. All values are expressed on a non-consolidated basis except for Australia and Portugal. Latest values are for Jun-12, except for Italy, the Netherlands, Ireland (Mar-12), the EA, and Cyprus (Dec-11).

Source: OECD, Eurostat, National sources, and Citi Research

As noted above, financial crises and banking sector collapses have historically been associated with very severe and sometimes catastrophic outcomes for the real economy. Does this mean that any large-scale banking sector deleveraging will be catastrophic if it has to occur in a short period of time under the threat of imminent insolvency? If this is the case, things would be dire for Europe, where the balance sheet of the banking sector stands at around 350 percent of annual GDP. In the US, the corresponding ratio is about 85 percent of GDP, and was around 100% of GDP at the end of 2007. Recognising the significantly more important role played by the banking sector in financial intermediation in Europe outside the UK, it is still likely that the European Union banking sector will have to contract its balance sheet significantly, and possibly by as much as one quarter or one third.

Financial sector deleveraging took place in many countries (e.g. the UK, Ireland, Austria and Belgium)

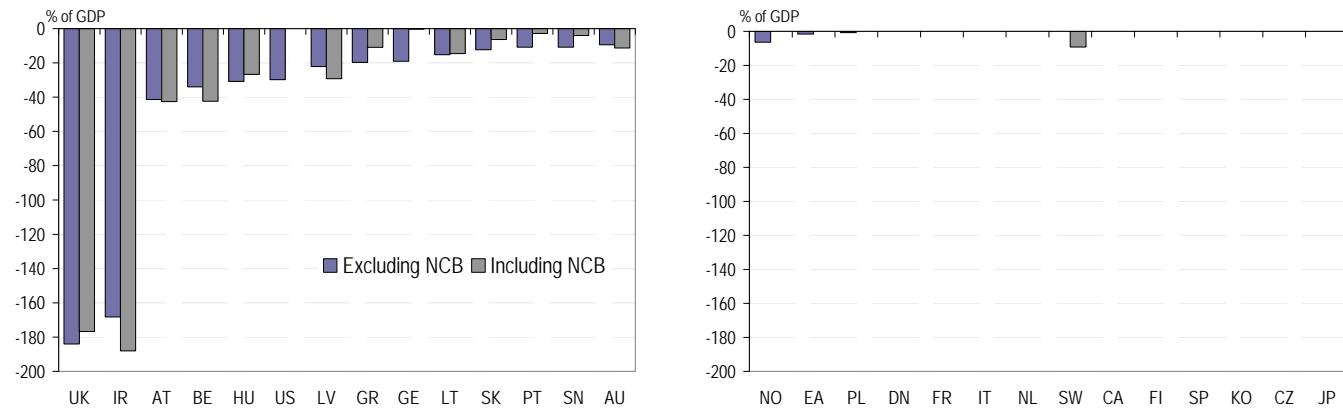
Some substantial deleveraging has taken place in the financial sector in many countries, notably in the UK, Ireland, Austria, and Belgium. For banking sectors, the relative reduction in balance sheet size has been even more marked. Thus, in nominal terms, total assets of monetary financial institutions (MFIs) in Ireland have fallen by almost a third from the peak in 2008, by a quarter in Luxembourg, and by close to 20% in Cyprus and Greece, even though in some of these countries the debt reduction was likely boosted by reclassifications of institutions as a result of

Central bank balance sheets have increased substantially in recent years and are included in financial sector balance sheets – but cannot nearly explain the rise in debt or the slow pace of subsequent deleveraging

nationalisations. The deleveraging would likely appear even larger once we move away from simple measures such as assets/GDP or the level of assets and consider more esoteric ones (generally based on information that is not independently verifiable by third parties), such as risk-weighted assets or risk-weighted leverage.

However, in our view it is striking just how little deleveraging there has been in some countries with vulnerable banking sectors, including in France (MFI assets peaked in May 2012 and have fallen by 3% since), Spain (March 2012 and 3%), Italy (July 2012 and 0%), the UK (certainly when the admittedly large decline in the ratio is related to the gargantuan initial value of that ratio) or the Netherlands (May 2012 and 1%). For the financial sector statistics (but not the MFI statistics cited here), one reason for this limited deleveraging could be that central banks are included in the financial sector in official statistics, and central bank balance sheets have grown substantially in recent years, especially in financially troubled countries. Thus, in the euro area, there is no evidence at all of deleveraging in the financial sector as long as we include the central bank in the sector. Excluding the central bank, total financial sector gross debt has decreased by 2% of GDP – not massive, but at least somewhat significant. Overall, it is clear that financial sectors in many countries, and banks in particular, have plenty more deleveraging to come.

Figure 41. Financial Corporation Debt/GDP Ratio, Peak-Latest Change



Note: NCB stands for National Central Bank. Peak corresponds to maximum since 2006, and its timing can potentially be different for the measures of financial sector debt excluding or including the NCB. Gross debt is equal to total financial liabilities less shares and other equities. For the US financial corporations, values correspond to the item "credit market instruments". All values are expressed on a non-consolidated basis except for Australia and Portugal. Latest values are for Jun-12, except for Italy, the Netherlands, Ireland (Mar-12), the EA, and Cyprus (Dec-11).

Source: OECD, Eurostat, National sources, and Citi Research

We believe that such de-leveraging can be achieved to a substantial extent through gross financial deleveraging, that is, by reducing intra-bank exposures, exposures between banks and shadow banks and between banks and other highly leveraged financial intermediaries, without these institutions needing to generate financial surpluses as part of the process. For example, for MFIs in the euro area, roughly one quarter of total balance sheet size reflects direct exposure to other euro area MFIs. There is no reason why this bank deleveraging should be at the expense of bank funding of households and non-financial corporates. In the language of our definitions earlier, banks in many developed markets need a lot of gross financial deleveraging, and a still substantial but much more modest dosage of net financial deleveraging.

In Europe, we believe that a significant amount of bank deleveraging will have to occur

Some of this bank deleveraging may occur through the yet to be created European Resolution Authority (ERA), together with a European Resolution Fund for banks

However, only Germany, the UK, Denmark, Ireland, Greece, and now also Spain currently have somewhat adequate bank resolution regimes

Making depositors senior to other unsecured creditors should be an EA-wide priority

Progress on the European bank resolution side of banking union will be crucial during the coming months and years

It is unlikely that all of the required bank balance sheet shrinkage -- if it is to occur swiftly, as we believe it should -- can occur through normal mechanisms – through the market-mediated netting of intra-financial sector exposures, and through banks and other systemically important financial intermediaries running sustained financial surpluses to build up their equity to safe levels. We believe that a significant amount of both gross and net bank deleveraging/balance sheet contraction will have to occur through the offices of a yet to be created European Resolution Authority (ERA) as part of the forthcoming euro area banking union. This ERA will be able to restructure the balance sheets, ownership and management of banks at high speed, overriding conventional insolvency and corporate restructuring processes and procedures and at times riding roughshod over conventionally established notions of property rights. Together with a European Resolution Fund and a European Recapitalisation Fund for banks, which could be spun off by the ESM, once it gets the authority to recapitalise banks directly, without going first through the national sovereign, the ERA can achieve bank deleveraging with minimal damage to new net bank funding of the real economy.

The key point is that this economic calamity-avoiding rapid banking sector deleveraging requires a systematic overriding of 'normal' non-financial corporate insolvency law and procedures, and a comprehensive rewriting of the laws, regulations and rules governing the resolution of banks and bank-like institutions in most countries of the EU and the euro area. Only Germany, the UK, Denmark, Ireland and Greece currently have somewhat adequate bank resolution regimes, and even these will have to be modified to achieve a common euro area –wide (or even EU-wide) bank resolution regime as part of euro area or EU banking union. More bank debt will have ex-ante coco (contingent convertible bond) features. But beyond that, all bank unsecured debt, starting from preference shares and hybrids, through subordinate unsecured debt to senior unsecured debt, and possibly including non-insured deposits as well, with or without special allowances for short-maturity debt, will be ex-post subject to bail in, should the bank make sufficiently large losses. Most unsecured debt (other than insured deposits), will have to be convertible into equity or subject to haircuts at the speed of crises, which is not much slower than the speed of light.

It seems self-evident to us that reversals of seniority among existing creditors should be avoided in moving to the new bank resolution regime, so as to minimize the (unavoidable) damage to the rule of law involved in the exercise. Existing equity holders should always be extinguished before any more senior debt instrument is either converted into equity or subjected to a haircut. Also, at the moment, depositors in the EU are *pari passu* with other senior unsecured creditors, like senior unsecured bond holders. Clearly, few would favour turning (insured) depositors into shareholders, so making (insured) depositors senior to other unsecured creditors should be a euro area-wide priority before serious bank debt restructuring gets underway.

In Europe, the legal, regulatory and institutional framework for minimal-cost accelerated bank debt restructuring is not yet in place. As time is running out and, increasingly, the alternative to bank resolution and bank debt restructuring is not a sovereign or multi-lateral bail-out but disorderly, 1930s style sequential bank defaults, progress on the bank resolution side of banking union will be crucial during the coming months and year.

### Heterogeneity within sectors

The heterogeneity of HHs within sectors matters hugely for the effects of debt and deleveraging...

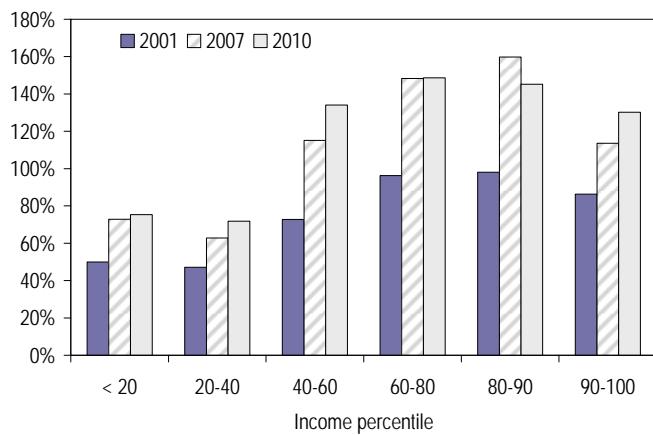
In the US, debt-to-income ratios have gone up more for the medium- and high-income HHs than the low income HHs

Lower income HHs in Spain are particularly vulnerable

The heterogeneity of households within sectors matters hugely for the effects of debt and deleveraging. As we have emphasized before, aggregation removes a lot of the information on the effects of debt – at the level of the world, we owe debt wholly to ourselves. Considering country and sectoral differences provides some information, but the within-sector distribution of debt is also very significant. A careful examination of the distribution of debt and assets across the world is beyond the scope of this study, but Figure 42 and Figure 43 highlight some elements of the heterogeneity of levels of indebtedness for various income levels in the US. Debt-to-income ratios have gone up across all income levels in the US, but they actually went up more for the medium- and high-income households rather than the low income households and levels of debt-to-income are much higher for higher income households on average, likely reflecting the availability of credit and of collateral to these households.

Figure 43 highlights, however, that lower income households nevertheless appear to be struggling much more with their debt levels, as suggested by a larger increase in the ratio of debt service to income, a higher level of the debt service ratio (DSR) and a much higher proportion of households with DSRs above 40% of income.

Figure 42. United States – Household Debt-to-Income Ratios by Income Percentile

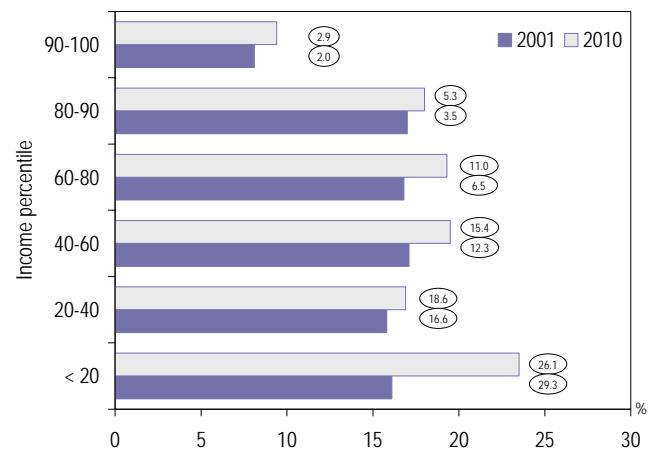


Note: Debt-to-Income Ratio is calculated using median total debt divided by median before tax income by income percentile.

Source: Survey of Consumer Finances, Federal Reserve Board, and Citi Research

In the UK lower income HHs are more 'leveraged' compared to higher income HHs

Figure 43. United States – Household Debt Service Ratios



Note: Numbers in circles show the proportion of households whose Debt Service Ratio is more than 40%

Source: Survey of Consumer Finances, Federal Reserve Board, and Citi Research

In other countries, the heterogeneity of debt burdens is also a significant part of the aggregate picture of debt-related vulnerability and fragility. Thus, the European Commission's in depth review for Spain in 2012 (European Commission (2012)) noted that lower income households in Spain were particularly vulnerable.<sup>31</sup> And in the UK, the Financial Inclusion Centre's Report on Debt and Household Incomes (Financial Inclusion Centre (2011) noted that :

<sup>31</sup> "According to the Household Financial Survey (HFS) 2008 7, households with low incomes (below the 20th percentile) were indebted to the tune of 140% of their income. This group of households is particularly exposed to increases in interest rates. Estimates based on the HFS for 2005 8 suggest that if interest rates were to rise by 300 basis points, the share of households in the lowest percentile, whose financial burden is above 40% of their income, would increase from 31% to 37%." Please European Commission (2012), "In-Depth Review for SPAIN", May 30, 2012, [http://ec.europa.eu/europe2020/pdf/nd/ir2012\\_spain\\_en.pdf](http://ec.europa.eu/europe2020/pdf/nd/ir2012_spain_en.pdf)

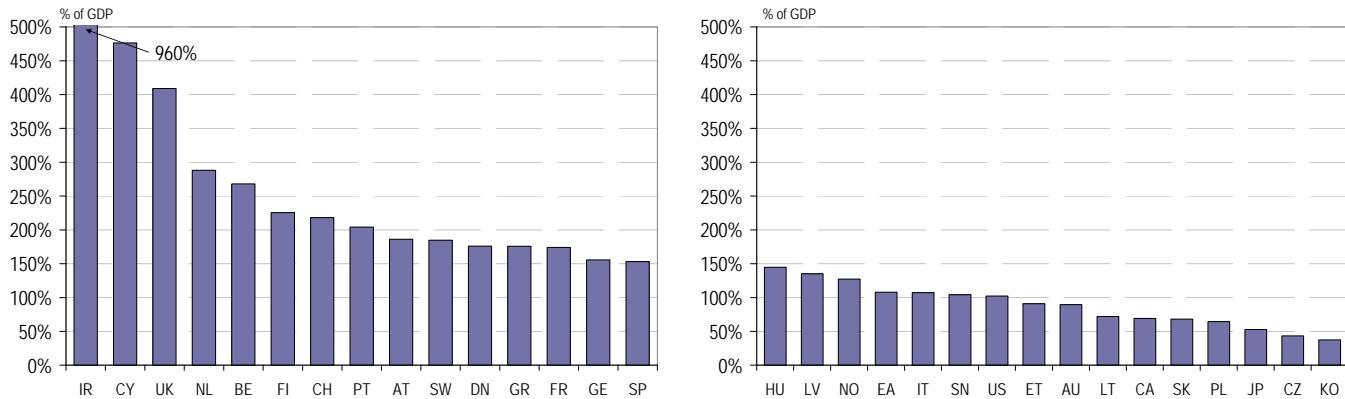
"while higher income households, not surprisingly, have more debt outstanding, lower income households are significantly more 'leveraged' – that is, their debts are much greater as a proportion of their incomes. Indeed, some of the levels of debt are quite astonishing. For example, households on incomes of £13,500 or less had total debts worth 6.4 times income (as at end 2009). In comparison, households with incomes between £30,000-£50,000 had total debts worth just under two times income".

### The external sector – debt and trade

Gross external (including of the financial sector) is particularly high in Ireland, Cyprus, the UK and the Netherlands

Figure 44 presents the latest available data on gross external debt (relative to GDP) for our sample of countries. Unlike many of the figures and charts in our study, these charts include the contribution of the financial sectors to external indebtedness – which is often significant. The level of gross external debt in Ireland is a staggering ten times of annual GDP, though this enormous level is driven to a substantial degree by multinational financial and non-financial corporations with headquarters in Ireland. Cyprus, the UK and the Netherlands have high levels of gross external debt, too, while the level of gross external debt in most CEE countries (except Hungary), Korea, Japan, and Canada is rather low. In the US and Italy, gross external debt is around 100% of GDP. It is around 150% of GDP in Greece, Germany and Spain.

Figure 44. Selected Countries – Gross External Debt (% of GDP), 2012 Q2



Source: Central Bank of Cyprus (Cyprus), BIS and IMF WEO for others, and Citi Research

The servicing of externally held official debt involves both internal and external transfers – but the first one is usually the difficult one

For any domestic agent or sector, the distinction between externally held debt and domestically held debt, although of considerable interest for some questions, seldom has the implications attributed to it by the 'if we owe it to ourselves, why worry' school. The servicing of externally held official debt involves both an internal transfer (from the tax payers and the beneficiaries of public spending to the government through the government's primary surplus) and an external transfer (from the nation to the foreign creditor through the nation's external primary surplus). The servicing of domestically held government debt only involves two internal transfers: through the government's primary surplus, from the tax payers and the beneficiaries of public spending to the government; and from the government to the domestic creditors, typically domestic pension funds, insurance companies and other institutional investors. The first internal transfer is common to both, and it is the hard one: someone's ox is getting gored. The proximate or ultimate beneficiaries of the second internal transfer are never the same as the losers in the first internal transfer.

Reinhart and Rogoff (2009) find that domestically held sovereign debt is less likely to be defaulted on than foreign-owned debt

Reinhart and Rogoff (2009), find that domestically held sovereign debt is less likely to be defaulted on than foreign-owned debt. In representative democracies this should not come as a surprise, since foreigners by and large don't vote in domestic elections. There are some exceptions to the Reinhart and Rogoff findings. Debt to the IMF is seldom defaulted on. We have limited experience of a world in which DM sovereigns owe significant sums to domestic residents, to foreign private investors, to foreign sovereign creditors (Greek Loan Facility, EFSF, ESM) and to the IMF.

In Europe, recent data suggest that Germany and other core EA member states have been reducing their exposures to the EA periphery for both public and private debt

Whether the repatriation of euro area periphery sovereign debt ownership back to domestic investors (especially domestic banks) reduces the incentives for sovereign default in the euro area periphery is a question of considerable interest. The likely answer is a qualified 'yes', but even the remaining sovereign default risk is non-negligible for any of the periphery sovereigns, given the risk of populist political parties gaining control of the levers of power in the euro area periphery.

Net exports usually cushion the effects of simultaneous sectoral deleveraging...

Whether the same 'home preference' (preferential treatment of domestic creditors) that we observe for sovereign debt applies to foreign ownership of private debt has not been the subject of much systematic investigation. Recent reports indicate that Germany and other core euro area member states have been reducing their exposures to the periphery for both public and private debt. As the euro area core has not been running large current account deficits vis-à-vis the periphery (in fact, continuing albeit shrinking current account surpluses have been the norm), the counterpart of these net sales of periphery assets by private German and other core euro area investors must have been either increased ownership of these assets by periphery residents, or the direct or indirect acquisition of these assets by the core euro area central banks and sovereigns, through larger Target2 credit balances and larger net core euro area sovereign exposures to the periphery through the Greek Loan Facility, the EFSF and similar vehicles.

...but this time these effects have been capped by the large number of countries in need of deleveraging, particularly in Europe

The flow side of the external sector is also of considerable interest. In open economies going through deleveraging by one or more domestic sectors, net exports usually cushion the effects. But currently, this effect is constrained by the large number of countries that are in need of debt reduction. Although the euro area is an open system as regards its trade and trade balance with the rest of the world, an increase in a euro area member state's net trade balance will not benefit euro area-wide demand unless the euro area's trade balance itself improves. If it does not, the net export changes of the euro area member states are zero-sum from the point of view of the euro area as a whole.

Of course, if the entire world were to be excessively indebted (and in terms of gross debt this is certainly possible in principle), relief through a stimulus to net exports is not possible. At the moment countries in need of deleveraging (most of the EU, the US and the Japan) account for over 50 percent of global GDP. Clearly, stronger domestic demand in the rest of the world (mainly in emerging markets) would help the developed market deleveraging process. Unfortunately, emerging markets since 2011 are slowing down (partly in response to weaker developed market demand) and are thus far unable or unwilling to boost domestic demand sufficiently to offset the weaker external demand they face. Of course, a domestic demand stimulus must be appropriate to the conditions of the emerging markets themselves. It would not make sense to ask them to boost domestic demand (some of which is bound to fall on domestic output) when these economies are overheating. Many critics of Germany's unwillingness to boost its domestic demand to help the euro area periphery forget that, until 2012, Germany was overheating, with record low unemployment and, in the past few years, evidence of rising unit labour costs and other manifestations of excess demand.

Depending on the size, growth and state of excess demand or supply in the rest of the world, the option of boosting net exports by increasing exports rather than through import compression driven by domestic austerity need not require a nation to have its own currency. Nor does it necessarily require a depreciation of the nominal or real effective exchange rate or an improvement in some other measure of real international competitiveness. Sometimes all that is required is for firms to look out of the window and realise that there is a world to sell to that does not end at their domestic borders. That action, however, is unlikely to result in an early increase in the production of exportable or import-competing goods and services if the allocation of resources in the economy in question has been biased for years, or even decades, towards the production of non-traded goods and services, often heavily subsidized by the state, like residential investment in the US.

#### **Gross and net debt/net worth: Liquidity and aggregation matter**

In well-functioning, liquid financial markets, net debt would be the concept of interest for most aspects of economic behaviour

However, in the real world where liquidity is rarely absolute, gross debt matters a lot

Some assets are always illiquid, and sometimes impossible to trade because of legal restrictions (e.g. human capital)

In this study we consider several measures of debt, including gross debt, several measures of net debt (gross debt minus various subsets of gross assets), financial net worth (gross financial assets minus gross financial liabilities), net worth (gross assets minus gross financial liabilities) and gross debt relative to income or gross financial assets.

In well-functioning, liquid financial markets, net debt (comprehensive gross liabilities minus comprehensive gross assets) would be the concept of interest for most aspects of economic behaviour. High gross debt but low net debt relative to debt servicing capacity would mean a low risk of insolvency as the prices at which gross assets could be realized would be close to fair value and would not decline materially as the size and speed of the asset sales increased.<sup>32</sup> This is not the world we live in. Some assets are always illiquid and sometimes impossible to trade because of legal restrictions. Human capital – probably between 50% and 70 % of total wealth if the share of labour income in GDP provides any guidance – is the obvious example. Other real assets, especially idiosyncratic ones characterised by serious asymmetric information between current owners and managers and potential buyers, are always relatively illiquid. The most dangerous financial instruments are those that sometimes are completely liquid and at other times cannot be sold at any positive price.

Liquidity – the ability to realize an asset at a price close to fair value regardless of the speed and size of the transaction – is always a matter of confidence, optimism and trust. With confidence, optimism and trust almost any store of value (barring those that cannot be bought and sold for legal or regulatory reasons) is highly liquid. Without these psychological or social-psychological attributes, no asset is liquid. There is a fundamental ‘network externality’ involved in liquidity. My willingness to buy a given quantity of an asset within a given time horizon at a price close to fair value, depends on my perception of the likelihood that, should I want or need to do so, I would be able to sell it again at a price close to fair value. So if I believe that markets are likely to be liquid in the future, they are more likely to be liquid today. And the more people share these beliefs, the more liquid markets will be.

This is a world that can produce multiple equilibria – sometimes a continuum of equilibria with varying degrees of liquidity, sometimes just two equilibria – the good one where most markets function and are reasonably liquid, and the bad one where many asset markets are frozen and rushed asset sales drive down prices precipitously, causing adverse feedback loops between market liquidity and funding liquidity.

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<sup>32</sup> Fair value is defined here as the NPV of anticipated future earnings, using the discount rates appropriate to well-functioning inter-temporal risk markets.

Even government liabilities can become illiquid when the capacity of the government to generate sufficient future resources (i.e. to serve debt) is questioned by the market

Even government liabilities can become illiquid when the willingness or capacity of the government to generate future primary surpluses sufficient to service the outstanding debt is questioned by enough market participants. We have seen this historically for all governments up to the re-invention of the broad-based income tax by the UK during the Napoleonic wars. We have seen it since World War II for many governments in developing countries and emerging markets. We are seeing it now in the periphery of the euro area, and may well see it spread further to other DMs.

Central banks have a unique capacity to support the liquidity of the debt of their sovereign (or sovereigns, in the case of the ECB), as long as that debt is denominated in domestic currency and not index-linked to the domestic general price level or some similar index. Even the central bank's monetary liabilities can become illiquid if either their convertibility into other currencies that matter or their real value become suspect.

Hyperinflations, of which 56 instances are documented by Hanke and Krus (2012), tend to destroy the liquidity of even the most liquid domestic currency asset, including base money. Although the EU, the US and Japan are today as far away from hyperinflation as it is possible to get while remaining within our solar system, the great European hyperinflations of 1923-35 and of the immediate post-World War II period are the Defining Moment of central banking history for continental European central banks, just as the Great Depression of the 1930s is the defining moment for the Fed and the Bank of England. Both the hyperinflation and the Great Depression filters are profoundly unhelpful for looking at the real issues faced by the developed markets today, but they are part of the political-economic reality within which today's financial crises are played out.

So liquidity matters and therefore measures of gross debt, the maturities of debt and the liquidities of assets matter for default risk. These measures therefore also matter for the dysfunctional behaviour caused by attempts to avoid default or cope with the consequences of (actual or anticipated) default when, belatedly, these risks are recognised as excessive, following a long period of increasingly misplaced confidence, optimism and trust.

In addition, there are some practical factors that make it a good idea to consider measures of gross debt. First, those who hold financial assets may not be the same agents that owe the debt. Focusing on data that net out asset holdings may therefore conceal that a portion of the sector may be both indebted and without liquid assets, or without substantial assets holdings at all. Second, data on gross debt are often more comparable across countries, and available for longer time periods. As we have argued before, persistent country-specific differences (not just of definitions, but of a fundamental nature too) often suggest focusing on *changes* in, say, gross debt, rather than the levels themselves.

### Debt and debt-servicing capacity

Debt servicing capacity clearly matters but is hardly well assessed by simplistic measures of debt service and income

Clearly, any debt, gross or net, has to be scaled by the debt servicing capacity of the entity that owes the debt. Ultimately, debt servicing capacity is determined by the capacity to generate future primary surpluses. Unfortunately, that is not an observable quantity. Because GDP bears some relationship to a sovereign's ability to tax, looking at the sovereign debt-to-GDP ratio may be a reasonable first approximation to the ratio of debt obligation to debt servicing capacity. But ultimately it is the stream of future primary (non-interest) government surpluses that services the government's debt. Using the ratio of debt to actual taxes makes no sense, unless (1) actual taxes are the maximum value of taxes (or of taxes as a share of GDP) that can be extracted and (2) government spending cannot be cut from

current levels. What the stock of outstanding debt should be related to is the maximum politically sustainable tax revenue (as a share of GDP) and the minimum politically sustainable level of non-interest public spending (as a share of GDP). Regrettably, both of these are unobservable.

For other sectors too, debt servicing capacity reduces to their ability to generate primary surpluses. For household net debt, the relevant primary surplus is effectively the maximum sustainable value of after-tax wage income minus household consumption minus household investment expenditure. For the nation as a whole, it is the maximum sustainable non-interest current account surplus if we consider gross external debt; it is the maximum sustainable current account surplus minus net foreign investment income if we consider net external debt – the maximum sustainable trade surplus plus net transfer payments from abroad. Of course, the data to construct such measures are not readily available.

## 7. When is Deleveraging Most Harmful?

Deleveraging is most harmful whenever there is little coordination of investment and saving decisions via markets and/or governments

These circumstances generally become more likely if:

- (1) the state is among the sectors that need to deleverage
- (2) the banking sector is in poor shape
- (3) more/larger sectors and countries are attempting to deleverage at the same time
- (4) the objective is to increase net wealth/reduce net debt rather than to bring down gross balance sheet size or levels of debt

The discussion in the previous section makes clear that the most damaging forms of deleveraging, from the point of view of their short-to-medium run impact on aggregate demand, output and employment, as well as possible long-run or even permanent effects on potential output, occur when the *ex-ante* desire to increase saving rises sharply and when the coordination of decisions on saving, investment and on sales and purchases of financial instruments are poorly coordinated by markets and governments. These circumstances are generally more likely,

- **if the state is among the sectors that need to deleverage.** As discussed previously, the government is often tasked with stabilizing the economy when the private sector deleverages. If, however, the government is preoccupied with its own debt burden, it is often constrained in its ability to support the private economy. It is also less effective as a focal point coordinating private sector decisions. Furthermore, as noted earlier, the state is also usually the ultimate source of financial support for the banking sector. Weak banking sectors can exacerbate the harm done by NFS or government deleveraging. Finally, debt restructuring for sovereigns, while far from rare in a historical context, is often done inefficiently, as timely and orderly debt restructuring is often impeded by the lack of clear (contractual and/or statutory) procedures and by partisan political considerations;
- **if the banking sector is in poor shape.** Weak banking sectors strengthen precautionary saving motives of households and non-financial corporates, and often lead to liquidity hoarding behaviour by banks themselves. What is more, as discussed above, the risks of disorderly and contagious bank deleveraging and bank runs (encouraged by the ‘sequential service constraint’ on bank deposits when it is feared available reserves are insufficient to meet likely deposit withdrawals) are larger than for other sectors, not only owing to its higher leverage, but also because of the lack of clear and efficient procedures for bank debt restructuring in many countries – even though both excessive banking sector leverage and a lack of orderly resolution regimes for banks could be solved through collective action;
- **if more/larger sectors are attempting to deleverage at the same time.** Coordination becomes more complex and finding a sector that is willing to reduce its financial surplus, while others are attempting to raise theirs, becomes more difficult;
- **if the objective is to increase net wealth/reduce net debt** rather than to bring down gross balance sheet size or levels of debt, i.e. if there is a desire to increase active net financial deleveraging (a larger planned sectoral financial surplus) or to increase active net deleveraging (a higher planned sectoral saving rate). The capital adequacy ratio of an agent/sector can be raised and its leverage ratio reduced without this requiring either active net deleveraging ('saving') or active net financial deleveraging: the agent or sector does not have to raise its saving or reduce its investment. All that is required is that assets and liabilities be reduced by the same amount. This is true even if there are no capital gains or losses.

### Is default always costly?

The real resource cost of default can be considerable, representing an ex-post redistribution of resources from the creditor to the debtor

The answer depends on the counterfactual to default. Default is of course always costly for the creditor if the alternative is full servicing of the debt according to the letter of the debt contract. If that is not possible or unlikely, debt restructuring may, *ex-post*, be beneficial to the creditor also. Non-performance on a debt contract, typically by not paying interest due and/or principal due – represents an ex-post redistribution of resources from the creditor to the debtor. There will almost always be other consequences from a default, which in general turn a default into a negative sum event for the creditor and debtor jointly, and for society as a whole. The real resource cost of default can be considerable, and become even bigger if default is associated with liquidation or resolution of a firm or with the repossession of a mortgaged property.

When the debt is unsecured (not backed by any collateral), there are likely to be costs to the debtor ranging from jail time (in Victorian times) to reputational damage. Getting a bad credit score that impairs the debtor's future ability to borrow is a common consequence of default on unsecured loans like credit card debt.

For the creditor, obtaining title to the collateral in the case of default on secured debt is very costly....

...estimates for the US put the cost of foreclosing on a residential property at over €79,000 per property (Kingley et. al. (2009))

For the creditor, obtaining title to the collateral in the case of default on secured debt is a costly business. Repossessing a car, when the owner of the car defaults on his car loan, or repossessing a variety of consumer durables including 'white goods' and home entertainment systems is costly. Repossessing residential real estate, and ejecting families, with or without young children or elderly dependents, in the full glare of 21<sup>st</sup> century media publicity can be very costly. Estimates for the US put the cost of foreclosing on a residential property at over US\$79,000 per property (Kingley et. al. (2009)). As far as we can tell, these costs (time and other costs incurred by lawyers, courts, bailiffs and law enforcement agencies, impact on neighbouring property values etc.) represent only the reasonably easily quantified tip of the iceberg. In many cases the pecuniary, psychic and emotional cost of the threat and/or the reality of losing the family home and of homelessness has to be added to the US\$79,000 to get the full scope of the cost of residential mortgage default.

Private debt contracts can be performed by the state or by other private parties acting on behalf of the creditor

Many private debt contracts are enforced by a third party or an external agent. Contract enforcement can be performed by the state (formal enforcement) or by other private parties acting on behalf of the creditor (e.g. the enforcers employed by loan sharks). Some debt contracts (including the microfinance debt issued by Grameen Bank) have features of a 'collective debt contract', where a single creditor faces multiple debtors who are, in some sense, jointly and severally responsible for the aggregate debt of the collective. Community pressures, including moral suasion and the threat of social shunning can act as effective debt contract enforcement mechanisms when the debtors are linked through interpersonal bonds including kinship, physical proximity, or through membership in a range of formal and informal networks and institutions.

The private costs of default can be high and so can the collective costs of default

If external debt contract enforcement, through the courts and the wider legal system, results in fines for the defaulting debtor, there is redistribution from the debtor to the tax payer and/or the creditor, but no social cost. If the punishment for debt default is jail time (in the case of legal enforcement) or knee capping (in the case of informal private sector enforcement) there are social losses as well as private costs associated with default.

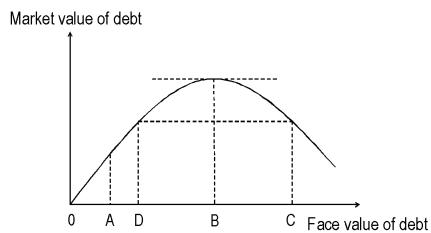
The private costs of default can be high and so can the collective costs of default. In most advanced economies, the private costs of default to the debtor have fallen significantly since the debtors' prisons of Victorian England and the extremely rigid personal insolvency laws of the pre-Great Depression or Pre-World War II era.

In certain circumstances, a default can result in a positive-sum outcome from a social perspective

### Socially efficient defaults

So default is always associated with private costs and sometimes with social costs. However, in certain circumstances, a default can result in a positive-sum outcome from a social perspective, relative to the alternative where default is avoided, because the total resources available to creditor and debtor (and to society as a whole) are higher than in the absence of default. The case, analysed below, of a sovereign default when the sovereign is on the wrong side of the 'sovereign debt Laffer curve', is an example. If very severe fiscal austerity or very high inflation are the only alternatives to sovereign default, then default may be the lesser evil. If the alternative to bank default is shifting the losses to the tax payers, both fairness and intertemporal incentives (the prevention or mitigation of moral hazard) may call for default, provided this can be implemented in a reasonable orderly manner and does not threaten systemic financial stability. More generally, the social costs of 'debt overhang' can exceed the costs of default in situations where debt is excessive.

Figure 45. Debt Laffer Curve



Source: Citi Research

As shown in Figure 45, a larger stock of debt by face value or notional value will, as soon as the probability of default becomes non-zero (at a face value of debt A in Figure 45), increase the market value or fair value of the debt (measured for simplicity by the net present value of current and anticipated future debt service) less than one for one. If the probability of default increases fast enough with the face value of the debt outstanding, the market value of the debt can decline if the face value of the debt rises beyond a certain level (at point B in Figure 45). The 'slippery slope of the debt Laffer curve' is the segment of the curve to the right of point B. Assume a debtor country has landed itself on a point like C. Clearly, a partial default on the debt, reducing it to any amount in face value greater than D but less than C, will make the creditors better off (the market value of their claims on the debtor country is higher) while the debtors are also better off, if there are costs to them that are increasing with the face value of the debt. Distortionary taxes required to service the debt could be one mechanism ensuring that sovereign debtors are better off when the face value of their debt is reduced, even if its market value increases. Another example is the adverse effect of a bad sovereign credit rating (associated with a large face value of the sovereign debt) on the credit ratings and access to funding of the private agents in its jurisdiction.

Even if a sovereign partial default or debt restructuring does not create a Pareto improvement where both debtor and creditors are better off, it can still be socially efficient in the weaker 'utilitarian' sense that the total resources available to both creditors and debtors (and of the wider society of which they are part) can increase as a result of a (partial) default or sovereign debt restructuring.

### Bad luck and bad faith default

Default can happen, because the resources of the debtor turn out to be insufficient to meet the debt service payments due (interest and/or principal) as the result of an unforeseen event, or 'bad luck'.

Default often is a choice for the debtor, not a necessity. If default is opportunistic/strategic, rational choice theory would suggest it can be analysed by considering the costs and benefits to the debtor of honouring the contract rather than defaulting. For private debt contracts, the benefits of default are obvious – you no longer service the debt that has been defaulted upon and can instead use these resources to boost your personal consumption today and in the future. We just discussed the costs of default for the private borrower, including reputational costs, legal sanctions and the real resource costs of dealing with the legal and other procedural consequences of default. As regards reputational costs, default today is likely to raise future potential creditors' assessment of the likelihood that you will

Default can happen, because the resources of the debtor turn out to be insufficient to meet the debt service payments due to a economic shock

Sovereign debt default can result in temporary or permanent exclusion from the capital markets and higher borrowing costs

In addition, sovereign default can jeopardize the legitimacy of the sovereign as the enforcer of contracts in its jurisdiction

The central bank has, in principle, the ability to inflate away the real value of any amount of outstanding sovereign and private debt denominated in domestic currency

default again in the future, should you be able to borrow again following the default. Being viewed as an opportunistic/strategic defaulter is likely to prevent you from issuing new debt for some period of time following a default and will likely raise your borrowing costs even after you regain access to external finance. Legal sanctions that may be imposed on defaulting private debtors by third-party enforcers, be they public or private.

Sovereign debt default results in many qualitatively similar reputational costs to those associated with private debt default. These consist of temporary or permanent exclusion from the capital markets and/or from access to bank borrowing, and higher borrowing costs, even after access to external funding is restored. The real resource costs of sovereign default to the sovereign debtor in those cases where sovereign debt has been issued in foreign jurisdictions and where legal disputes over the debt are settled by foreign courts are similar to those for private debt. Enforcing the rulings of a foreign court on matters involving the sovereign is however, likely to be a frustrating process if that sovereign refuses to accept the rulings of the foreign court. Third party enforcement of sovereign debt contracts is no longer part of normal practice. Gun boat diplomacy has gone out of fashion, although trade sanctions and boycotts of various kinds are still occasionally imposed by sovereigns on other sovereigns that have defaulted. The US boycott of Cuba is an example.

Finally, there is a special reputational externality associated with sovereign default that is not present when a private party defaults. The sovereign is the ultimate (third-party) enforcer of contracts in its jurisdiction. If the sovereign itself engages in opportunistic default, we are in a situation where the enforcer of the rules of the game itself refuses to play by the rules. This is likely to undermine respect for the supposed inviolability of contracts (sometimes rather idolatrously referred to as the 'sanctity' of contracts) and indeed for the rule of law in the jurisdiction of the defaulting government. We have called these systemic negative effects from sovereign default 'rule of law externalities'. They will be less of an issue if the default is a bad luck default (due to inability to pay despite best efforts) rather than a bad faith or opportunistic/strategic default.

### Why not inflate debt away when it is excessive?

There probably still exists a sovereign debt offering that offers a nominal yield that is safe, and/or a nominal principal value that is safe, but this is scant comfort for the ultimate wealth owners, who consume *real* goods and services, not nominal quantities of fiat currency.<sup>33</sup> As noted already, the central bank is an agency of the state. It has, in principle, the ability to inflate away the real value of any amount of outstanding sovereign and private debt denominated in domestic currency by creating unanticipated inflation or through a combination of inflation (anticipated or unanticipated) and financial repression. History supports the 'fiscal dominance' outcome over the 'monetary dominance' outcome when an unsustainable public debt burden must be resolved either by austerity (the outcome favoured by the central bank) or by monetization and inflation (the outcome favoured by the Treasury) or by public debt default (the outcome feared by both, but probably most by the central bank, because of its implications for financial stability).

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<sup>33</sup> For fixed rate nominal debt, there will be market (price) risk even if there is no default or credit risk. Even if the nominal stream of coupons and the nominal redemption value are free of default risk, the nominal market value will in general be risky, because longer maturity nominal interest rates are uncertain, even if there is no risk of default.

However, an inflationary solution to the current problem of excessive leverage seems very unlikely:

There is no guarantee that the current political equilibrium in DMs will necessarily favour inflating away the existing public rather than debt restructuring or financial repression

Even if the political will favoured an inflationary resolution, operational independence of central banks should serve as a hurdle

We do not see the recently announced OMT as a back-door to widespread monetization of government debt in the EA

However, there are many reasons to question the likelihood of inflation being used today as a route for significant public and private debt reduction in advanced economies. First, there can be no guarantee that the current political equilibrium in countries like the US, Japan, the UK and the euro area (where we use 'country' as shorthand for monetary union) will necessarily favour inflating away the existing public (and private) debt burden over alternatives like debt restructuring or financial repression. We consider it less than self-evident that central banks in advanced economies today would choose to reduce private and public debt burdens through inflation rather than through debt restructuring, when both methods hurt the interests of the political elite, who either own much of the debt or represent those who do.

Second, even if the political will favoured an inflationary resolution of the developed economies' debt problems, the operational independence of central banks (and in some cases even their target independence) is greater than it was during the great deleveraging periods of the past (generally the aftermaths of major wars, in the case of public sector deleveraging). It is therefore far from assured that central banks today would oblige even a pro-inflation political leadership or populists. This is true in the US, the UK, Japan and especially in the nation states of the euro area. The difference between an euro area member state finance minister and the finance minister of the US, the UK, or Japan is that a euro area national finance minister is one among 17. Even Germany accounts for no more than 27% of the voting equity of the ECB. It is therefore much harder to bring effective political pressure to bear on an unwilling ECB than on an unwilling Fed, Bank of England or Bank of Japan. This unique divide-and-rule power of the ECB plus, as noted earlier, the fact that the Defining Moment of the euro area central banks and central bankers tends to be the Weimar Republic's hyperinflation rather than the Great Depression of the 1930s – the defining moment for the Fed and the Bank of England -- renders an inflationary resolution of the euro area private and public debt problems all but impossible, in our view.

This is why we believe that the conditionality attached to the ECB's outright monetary transactions (OMT) is credible. In our view, the ECB cannot in the future be forced to maintain its OMT – purchases of sovereign debt with a remaining maturity of up to 3 years in the secondary markets, with the EFSF/ESM possibly simultaneously operating in the primary markets and the beneficiary sovereigns bound by a strict memorandum of understanding (MoU) governing fiscal austerity, financial restructuring and other structural reform – even if the sovereign in question were to become wilfully non-compliant with the conditionality of the MoU. OMT operations will therefore benefit only MoU-compliant euro area periphery sovereigns and should eliminate what is called 'convertibility risk', aka forced euro area exit risk or euro area break-up risk, by preventing countries with MoU-compliant sovereigns being driven out of the euro area when exit fear contagion causes the markets to impose a de-facto sudden funding stop on countries deemed by the markets to be at risk of exit.

OMT operations will not become open-ended, uncapped back-door mutualisation of sovereign debt for non-compliant or indeed for compliant sovereigns. There will be some mutualisation of periphery sovereign debt, limited and ex-post, by the ECB and the rest of the Eurosystem, when some of the sovereigns whose debt the ECB has purchased through OMT operations (and possibly through the earlier SMP operations as well) restructure their debt, and the ECB and the national central banks (NCBs) of the Eurosystem are bailed in. The ECB is not claiming preferred creditor status for its OMT purchases. We assume this means that if there is a 'voluntary' restructuring of the up-to-three-years-remaining-maturity debt acquired by the ECB or NCBs through the OMT, the ECB would participate. For its other

sovereign debt purchases (past Securities Market Programme and possibly future) it may decide to act as a hold-out, staying away from any ‘voluntary’ debt restructuring. If, as a hold-out, it still ends up not getting paid in full in any case, as seems likely, it will still be bailed in net present value terms.

Despite the recognition that there will be some ex-post back-door quasi-fiscal mutualisation of periphery debt through the OMT, we believe that this will be limited, that is, not open-ended and not sufficient to restore the beneficiary sovereigns to solvency and fiscal health. The OMT removes one key source of convertibility risk or break-up risk. It does not eliminate and indeed has only a second-order impact on euro area periphery sovereign default risk, including the risk of sovereign default for euro area periphery nations that will continue, post-default, to be members of the euro area.

In addition, as pointed out in Section 4, the central bank also has much more limited powers to fund ongoing *real* deficits of the state, once the inflation associated with the base money creation used to fund these deficits becomes anticipated.

While inflating debt would avoid the deadweight costs that default may entail, inflation can be a cruel and blunt instrument

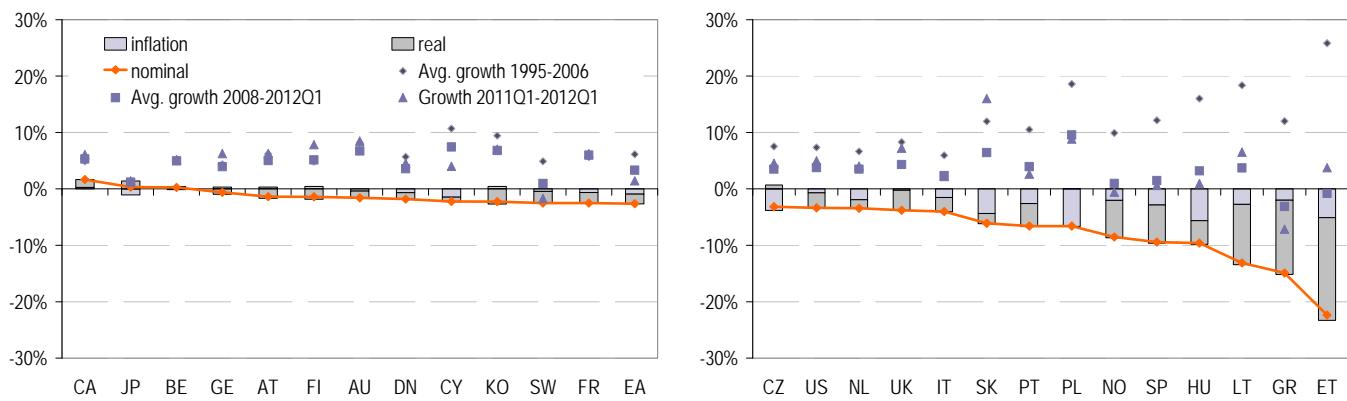
Whether reducing the real value of debt through inflation is desirable compared to the alternatives of austerity and restructuring (growth is, of course, not an instrument) is another question. Proponents of this approach would argue that the deadweight costs that default may entail would be avoided, and the spectre of large-scale financial disruption triggered by disorderly default episodes is sometimes raised when the reference to deadweight costs alone fails to convince proponents of restructuring through default that this is not the least bad option. Against that, in addition to the political and economic limits to ‘restructuring through inflation’, one would have to factor in the fairness and potential moral hazard implications of the ex-post redistribution of wealth from creditor to debtors – for all debtors, not only those with excessive debt levels. Inflation can be a cruel and blunt instrument. It can destroy the living standards of those whose nominal incomes are not adequately protected against inflation, either through formal indexation or through market processes or political processes achieving the same result.

## 8. How Much Deleveraging has Taken Place?

NFS debt growth grew by 3.8% pa in nominal terms between 2008 and Q2 2012 (vs. 9.3% pa in 1995-2006)

The leverage party has mostly stopped. Growth in debt and credit has fallen in most developed markets, sometimes precipitously. In the period 1995-2006, gross non-financial sector debt grew by 9.3% pa in nominal terms, on average, but nominal NFS debt growth fell to 3.8% pa between 2008 and Q2 2012.<sup>34</sup> In some emerging European countries, such as the Baltic countries, Hungary and Poland, the sharp deceleration in credit growth has to be seen in the context of the prior astronomical growth rates of close to or above 20% pa (Figure 46). But only in a few countries has credit growth not fallen relative to the pre-crisis trend. The fall in real credit growth is somewhat smaller on average than the drop in nominal credit growth rates, as inflation rates have also fallen in many countries recently (relative to pre-2006 growth rates), but real credit growth still fell in the post-2008 period relative to the pre-crisis trend in all but 4 countries in the sample (Belgium, Canada, Czech Republic and Japan). With very few (and small) exceptions, the most recent data do not indicate any pickup in the rate of NFS credit growth.

Figure 46. Selected Countries – Recent Growth in NFS Gross Debt vs. Trend (% pa)



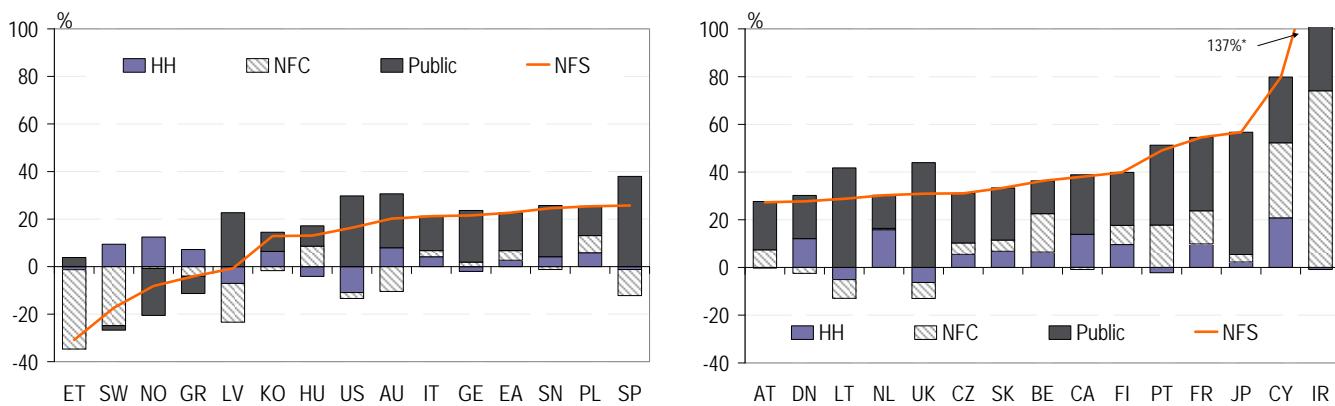
Note: Recent growth corresponds to 2008-latest while trend to 1995-2006. ‘Real’ gross debt equals nominal gross debt deflated by the GDP deflator. For Italy, the Netherlands, and Ireland latest data are for 2012Q1, while for the EA and Cyprus latest corresponds to 2011. For Cyprus and the EA we calculate average growth rates for 2008-2011 and 2010-2011. In addition, for the EA 1995-2006 average growth correspond to 1999-2006 average growth.

Source: OECD, IMF, National Sources and Citi Research

The pace of deleveraging in recent years, in what follows mostly measured by the change in the stock of debt relative to GDP, has been very uneven across countries. Substantial deleveraging has taken place in some countries and sectors. Ten countries (Italy, Poland, Netherlands, Czech Republic, Slovakia, Belgium, Finland, France, Japan and Cyprus) have not seen any decrease at all in the NFS gross debt to GDP ratio by Q2 2012. In many countries, gross debt as a share of GDP has increased further since 2008, mostly through increases in the public debt ratio, while the private debt ratio has fallen more often (Figure 47). Thus, in 14 out of 28 countries the latest data indicate a reduction in gross debt-to-GDP ratios of NFCs relative to 2008 and in 11 countries for HHs, while only three countries had decreases in public debt – one of which is Greece as a result of its debt restructuring. As Figure 48 highlights, public debt ratios peaked only very recently in some countries and were in fact still rising in almost half of our sample (in 13 out of 28 countries).

<sup>34</sup> In both cases these values are GDP-weighted growth rates in local currency.

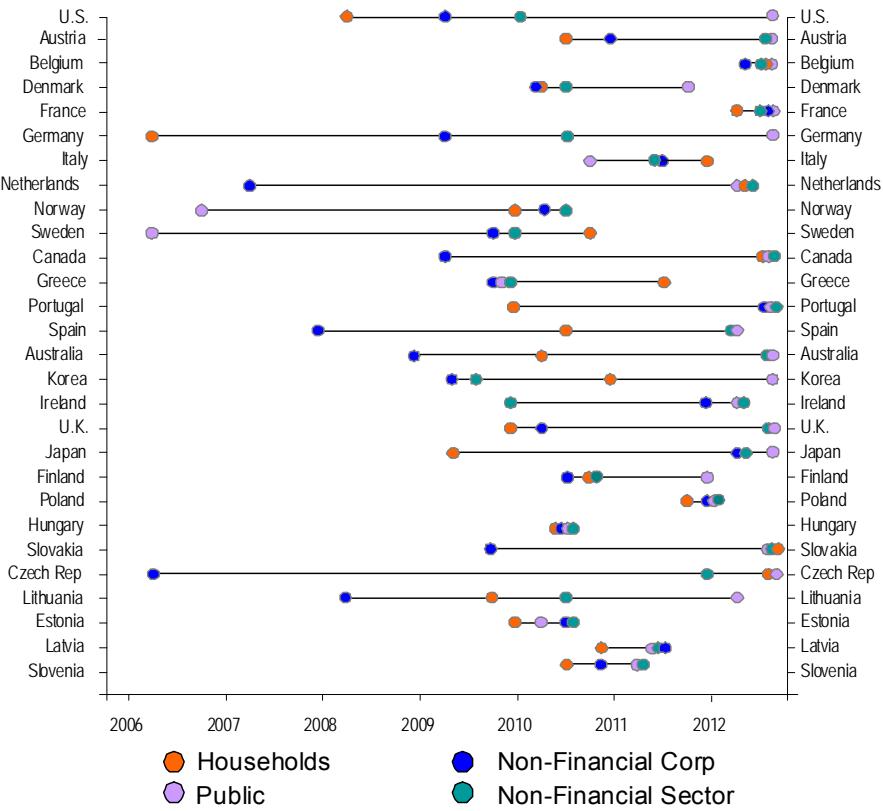
Figure 47. Selected Countries – NFS Gross Debt/GDP Ratio, Change 2008 – 2012Q2 (% of GDP)



Note: Total non-financial sector gross debt equals the sum of households (HH), non-financial corporations (NFC) and general government (public) gross debt. All values are expressed on a non-consolidated basis except for Australia and Portugal. For Italy, the Netherlands, and Ireland latest data correspond to 2012Q1, while for the EA and Cyprus correspond to 2011\*. In Ireland, HH gross debt to GDP ratio declined by 1pppts, NFC debt/GDP increased by 74pppts, while GG gross debt/GDP increased by 64pppts.

Source: OECD, Eurostat, National Sources and Citi Research

Figure 48. Selected Countries – Date of Peak of Gross Debt/GDP Ratios since 2006



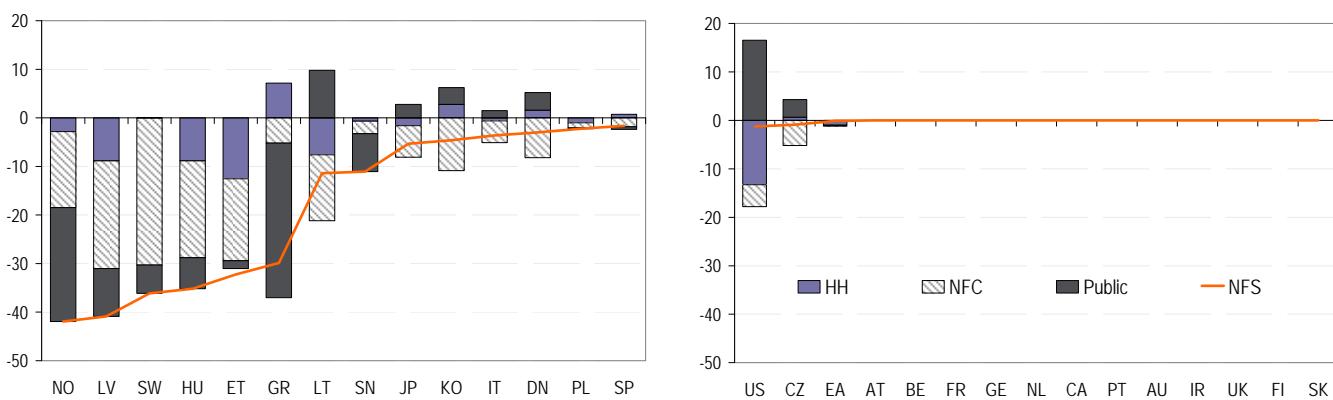
Source: OECD, Eurostat, National Sources and Citi Research

However, the most recent data suggest that private debt ratios at least have peaked in most countries – in all but two (Belgium and Portugal) for NFCs, and in all but four (Belgium, Canada, Slovakia and Czech Republic) for households, even though in many cases the peaks were very recent. The peaks for NFCs were generally earlier. Among the 26 (out of 28) countries for which at least one of the HH or NFC sector had seen their gross debt (relative to GDP) peak, the HHs sector was the first to peak in fourteen. In two more (Denmark, and Hungary), both HH and NFC gross debt to GDP ratios peaked in the same quarter.

In the Baltic and Scandinavian countries gross debt ratios have fallen strongly from their respective recent (post-2006) peaks

On the whole, gross deleveraging in recent years seems to have been a 'Nordic' phenomenon. In the Baltic and Scandinavian countries gross debt ratios have fallen strongly from their respective recent (post-2006) peaks (Figure 49). In many other countries, including the UK, Ireland, Portugal or France, NFS gross debt ratios have not fallen at all. In some countries, including the US and Spain, the aggregate amount of deleveraging has been rather small, but as noted already, more substantial private sector deleveraging has been met with increases in public debt.

Figure 49. Selected Countries – Non-Financial Sector Gross Debt/GDP Ratio, Peak – 2012Q2



Note: Peak corresponds to maximum since 2006 for NFS gross debt. All values are expressed on a non-consolidated basis except for Australia and Portugal. For Italy, the Netherlands, and Ireland latest data correspond to 2012Q1, while for the EA and Cyprus correspond to 2011

Source: OECD, Eurostat, National Sources and Citi Research

While more gross deleveraging has taken place in the NFC sector, public debt is still rising in most countries

Where gross deleveraging has taken place, it has been dominated by the non-financial corporate sector. Only in the US has the household sector been responsible for most of the deleveraging. And the public debt has increased on average in our sample of countries, and often substantially in individual countries.

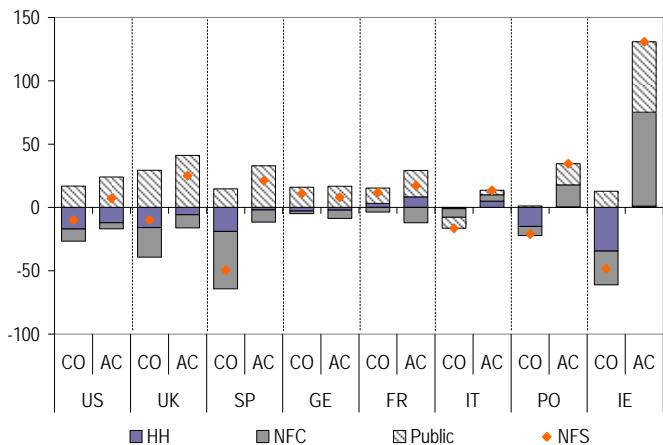
Deleveraging process is hampered by weak income growth in many countries

Where it occurred, deleveraging seems to have been driven by differential economic growth or default rather than variations in credit growth, i.e. the countries with the largest debt reductions were not generally the ones with the largest reductions in (nominal or real) credit growth. As noted above, nominal and real credit growth has fallen quite substantially in many countries, and particularly so in highly leveraged economies. Growth rates in debt-to-GDP ratios have also fallen quite substantially. But the fact that real and nominal GDP growth have been very weak in recent years has made the job of deleveraging much harder – the average yearly rate of nominal GDP growth between 2008 and 2011 was a whopping 5.5pps lower than for 2000-08, while nominal debt growth fell by 4.7pps.

An accounting exercise can illustrate the effect: Had nominal GDP grown at the (1998-2005) trend rate of growth in the years since 2006 and keeping everything else (unrealistically) constant, the decrease in NFS gross debt would have been much greater in a number of countries. In the US, NFS gross debt would have fallen by 10pps of GDP between 2008 and 2011 rather than risen by 7pps. The difference is even larger in Italy (17pps fall vs. 13pps rise), Portugal (21pps fall vs. 34pps rise), Spain (49pps fall vs. 21pps rise), Ireland (48pps fall vs. 131pps rise), or the UK (10pps fall vs. 25pps rise).<sup>35</sup>

<sup>35</sup> We stress that this calculation reflects an accounting exercise rather than an economically well-structured counterfactual. For nominal GDP growth to have been equal after 2006 to the trend rate of growth during the period 1998-2005 rather than

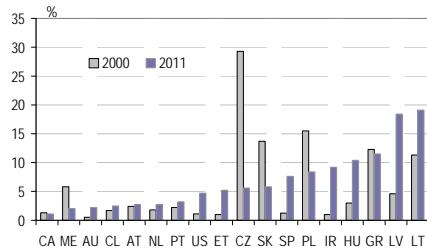
Figure 50. Selected Countries – NFS Gross Debt/GDP Actual vs. Counterfactual, 2008 – 2011 Change



Note: AC is actual 2008-2011 change in gross debt, CO is the counterfactual arrived at if nominal GDP had grown at its 1998-2005 trend.

Source: OECD, IMF, National Sources and Citi Research

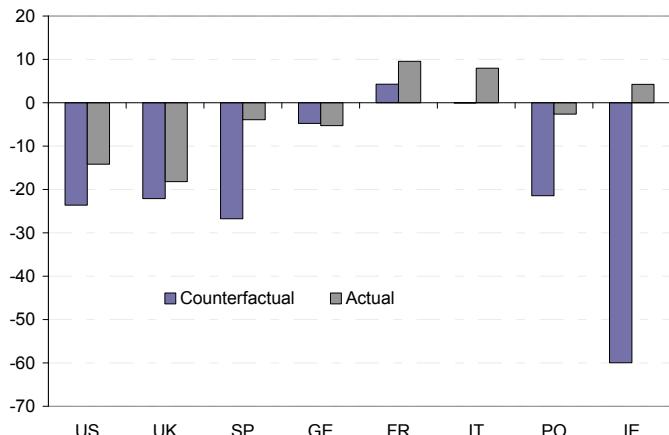
Figure 52. Selected Countries – Non Performing Loans to Total Gross Loans (%)



Note: ME correspond to Mexico and CL to Chile.

Source: Bank of Spain for Spain and World Bank for others, and Citi Research

Figure 51. Selected Countries – HH Gross Debt/Disposable Income Actual vs. Estimated, 2008 – 2011 Change



Note: AC is actual, CO the counterfactual arrived at if nominal HH disposable income had grown at its 1998-2005 trend).

Source: OECD, Eurostat, National Sources and Citi Research

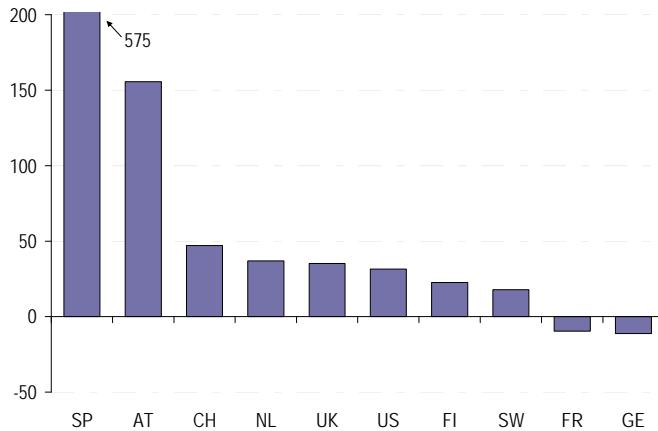
Gross deleveraging has been mostly absent in two groups of highly leveraged countries. In the first group, which contains Austria, Belgium, and France concerns about oversized financial balance sheets and/or credit constraints have not yet curtailed credit growth very much. In others, solvency and liquidity issues have become very acute, usually including for the sovereign, but as income or GDP growth have weakened, actual deleveraging has fallen far short of desired deleveraging and debt ratios have fallen less than desired and indeed have often continued to rise. This group includes Ireland, Portugal, and Spain.

Slow growth in income has implied that ratios of household gross debt to disposable income have not fallen in many countries, with the noticeable exceptions of the UK and the US, but also Spain. Again, had disposable income grown at its pre-crisis trend, ratios of gross debt to disposable income would have fallen much more in these countries, and again most dramatically in Spain (Figure 51).

The issue of how much default and debt restructuring have contributed to any decreases of debt is open to some debate. It has variously been argued that defaults in particular have contributed substantially to the reduction in US household and in particular household mortgage debt (see e.g. McKinsey (2010) and Dynan (2012)), and McKinsey (2012) argues for the presence of a similar role for default in the UK. However, BIS (2012) and Bhutta (2012) note that the effect of a fall in new lending has been more important and that the effect of debt restructuring – though still large – is overstated in US data, as mortgage modifications are partly recorded as a default followed by new lending at the value of the modified mortgage. Nevertheless, it is clear that the incidence of debt restructuring and insolvencies, both for corporates and for households has risen in many countries and so have non-performing loans.

much lower, other things would have had to be different also, which would have affected the trajectory of debt-to-GDP ratios.

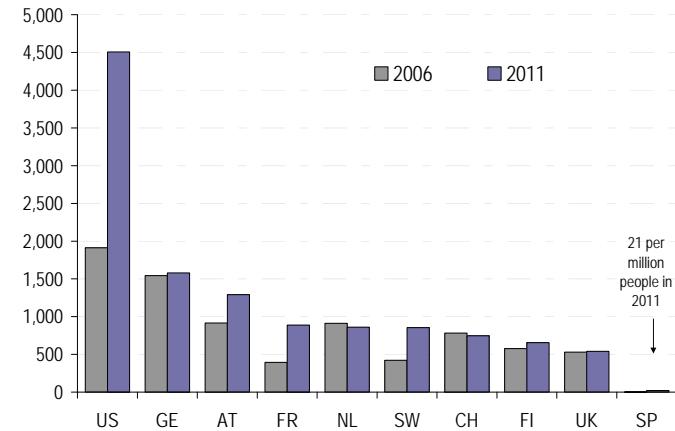
Figure 53. Selected Countries – Number of Corporate Insolvencies (%), 2006 – 2011, Change



Source: Bank of Spain for Spain and World Bank for others, and Citi Research

Another reason for the slow decline in gross debt ratios is the long maturity of some of the outstanding liabilities (e.g. residential mortgage debt)

Figure 54. Selected Countries – Number of Personal Insolvencies, non business, (per Million People), 2006 and 2011

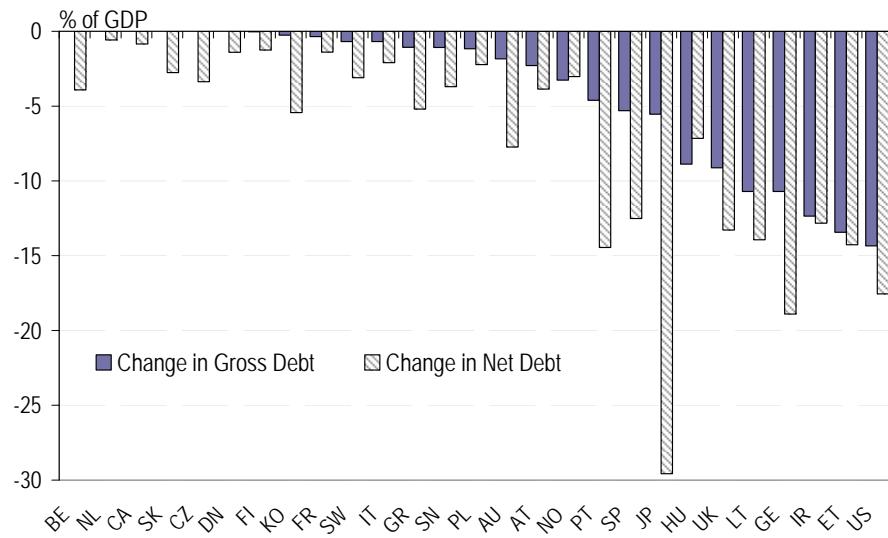


Source: DataStream, Creditreform, and Citi Research

Another reason for the slow decline in gross debt ratios is the long maturity of some of the outstanding liabilities. This applies in particular to residential mortgage debt. Even if a desire exists to improve the state of balance sheets, the long maturity and disincentives to early repayment complicate paying down debt quickly. It is often advantageous instead to increase savings by building up safe, liquid assets (if such can be found) in anticipation of repayment at the due date or an earlier opportune time. This is evident in the case of Spanish households. At 87% of GDP, the gross debt of Spanish households is still high and has only fallen by around 5pp of GDP from its peak in 2010 Q2. However, the reductions in net debt have been more than twice as large, as households have accumulated additional liquid assets, notably currency and deposits. In many other countries, including Ireland, Portugal and the UK, allowing for the accumulation of liquid assets highlights that more progress has been made on household deleveraging than would be obvious from looking at the gross numbers alone. In Japan, the difference between gross and net deleveraging for households in recent years has been dramatic. For NFCs, a similar logic applies, but the extent of the difference between gross and net deleveraging has been smaller.

The ratio of gross debt service (interest and principal payments) to income for households and the private sector as a whole has improved rather substantially in many countries since 2008, including in the UK and US (where they are back to 2003/4 levels, see Figure 12). In these countries, the improvement in general is due to a reduction in interest rates and sometimes decent income growth.

Figure 55. Selected Countries – Change in HH Gross Debt and Broad Net Debt (% of GDP), Peak – Latest (2012 Q2)



Gross debt service ratios have improved since 2008, sometimes due to growth in income but more generally to a widespread reduction in interest rates

Note: Peak since 2006. Broad net debt is defined as gross debt minus holding of assets currency and deposits. For Italy, the Netherlands, and Ireland latest data correspond to 2012Q1.

Source: OECD, Eurostat, National Sources, and Citi Research

In other countries, including France and Spain, there has been progress but in a more limited fashion. And in Italy and Ireland there has been very little progress, partly due to a lack of growth in household disposable income. The apparent progress in reducing debt service ratios has to be treated cautiously: The high share of variable-interest debt in Europe implies that reductions in policy rates and interbank rates have provided substantial relief to households and some corporates that could be tested in the (admittedly for the foreseeable future very unlikely) event of interest rate hikes.

## 9. How Much More Deleveraging is to Come?

### What will the 'new normal' for private and sovereign debt look like?

Likely and desirable levels of sectoral debt are likely to be lower than prior to 2007

Economic theory provides little guidance on optimal levels of debt and leverage

In the absence of fundamentally-based criteria for debt sustainability, focal points can be useful benchmark

For public debt, the Maastricht Treaty of the EU provides one such focal point with a threshold of 60% for general government gross debt-to-GDP ratios

Cecchetti et al (2011) find that on average debt is associated with lower GDP growth when gross debt-to-GDP ratios exceeds 85% (public sector), 90% (NFCs) and 85% (HHs)

What can we say about the likely and desirable levels of sectoral debt other than that they will be significantly lower than what was considered acceptable or even desirable prior to 2007?

Economic theory is all but completely useless in addressing this question. The one well-articulated theory of optimal capital structure, that of Modigliani and Miller, implies that the optimal capital structure is indeterminate. Leverage is irrelevant. In the absence of helpful theory, we are reduced to two key observations in determining the optimal leverage ratios for various sectors.

First, they are bound to be much lower than those observed in 2007 when the North-Atlantic financial crisis started. We consider it inconceivable that the market will in the foreseeable future once again gracefully accept peacetime general government gross debt to GDP ratios well in excess of 100 percent. At the moment, only the US and Japan manage to get away with this, and we suggest in Section 10 below, that these anomalies are unlikely to last. Similarly, we consider it likely that sustainable levels of (gross) debt for HHs and NFCs are likely to be much lower than those observed in the years leading up to the financial crisis.

One way to proceed, in the absence of firm guidance from generally accepted first principles, governments, supranational entities like the IMF, the euro area and the EU, and national or international rule-setting and rule-enforcing bodies, regulators, supervisors and other authorities that will decide the appropriate level of future leverage for governments and banks, are likely to be guided by arbitrary, but conservative focal points, like the 60 percent gross general government debt to GDP ratios introduced in the Maastricht Treaty for the EU member states in 1992. It is true that the only reason 60 percent was picked rather than any other positive real number, was that 60 percent was the average gross debt to GDP ratio of the 12 European Community member states in 1991-92, when the Maastricht Treaty that introduced the 60% of GDP gross general government debt ceiling was drafted (it was signed in February 1992 and came into force in November 1993). However, this does not necessarily weaken the normative significance of that number, once a sufficient number of participants in the sovereign debt game have, somehow, converged on using that number as the focal point for collective rule design (Buiter, Corsetti and Roubini (1993)).<sup>36</sup> Indeed, the 60 percent debt ceiling is part of the Fiscal Compact agreed earlier this year.

An alternative to the 60 percent benchmark would be one based on desire to get the debt ratios below the 'pain thresholds' identified by Reinhart and Rogoff (2009) and by Cecchetti et al. (2011), based on statistical association between debt-to-GDP ratios and economic growth. Cecchetti et al. (2011) find that on average debt is associated with lower GDP growth when gross debt-to-GDP ratios exceed, 85% for the public sector (close to the Reinhart and Rogoff (2009) threshold of 90% of GDP), 90% for the non-financial corporate sector and 85% of GDP for HHs (even though the threshold was not statistically significant in the case of HHs).

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<sup>36</sup> The general government gross debt as a share of GDP for the EC12 in 1991 was 58.6%; for 1992 it was 61.9%. Source: European Commission (2003).

Actual debt ratios prevailing during a period without financial excesses (e.g. prior to 2003) can also serve as useful reference points

Both sector-specific and aggregate debt levels are likely to matter, due to the many interlinkages between the different sectors

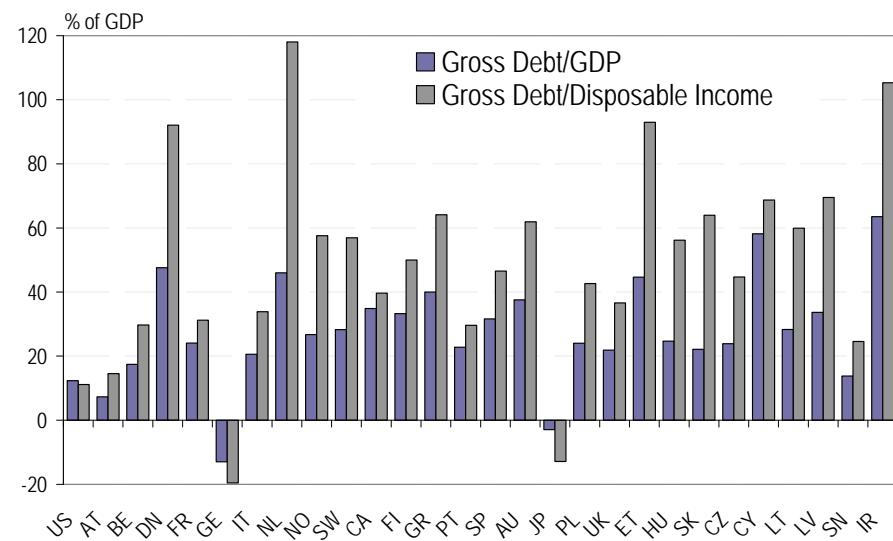
Another way to proceed, in the absence of clear guidance from theory, is to use the actual debt ratios prevailing during a period where financial excesses had not yet manifested themselves to a significant degree. Although picking such a period is inevitably arbitrary, we regard any date between 1995 and 2003 as somewhat reasonable, and use 1999 and 2001 as our preferred reference years.

An important issue is whether the anticipation that we are moving towards a lower leverage paradigm applies to each sector, to each sector simultaneously or just to some aggregate such as NFS debt. Does it apply to the government? Clearly, the optimal leverage and the optimal speed of deleveraging of the government are not independent of the leverage in the private sector. The presumption that the future will be characterised by lower leverage is most unlikely to apply to the central banks, except possibly in the very long run. Will international agencies like the IMF or the ESM be the bastions of future leverage, alongside the national or EA-wide central banks?

Two central messages of our work since the crisis started have been that both public and private debt matter crucially for real economic performance, and that there are many linkages between the debt situations of the HH, NFC and public sectors. Inter-sectoral migration of debt, through non-market mechanisms like bail-outs, is a key part of the story. Even so, when considering the need to deleverage and the magnitude and speed of debt burden reductions, starting at the sectoral level is useful.

### Households are likely to require plenty of additional deleveraging

Figure 56. Selected Countries – HH Change in Gross Indebtedness Required to Return to 2001 Levels



Note: HH refers to households. Values correspond to the difference between HH gross debt divided by GDP or disposable income at the latest available date and in 2001.

Source: OECD, Eurostat, National Sources, and Citi Research

On (an unweighted) average, HHs would need to reduce their gross debt by around 30ppts of GDP to get back to 2001 levels – and little progress has been achieved since 2009

Figure 56 highlights the difference between HH gross debt levels (relative to GDP and disposable income) today and in 2001. On average (unweighted), HHs would need to reduce their gross debt by around 30ppts of GDP to get back to 2001 levels, not a small order given that debt only fell by around 1.5ppts of GDP on average in the two and a half years since the end of 2009. While the magnitudes differ, the picture painted by ratios of HH gross debt relative to HH disposable income is very similar.

If we distinguish the countries in our sample according to the pressures for households to deleverage, we arrive at the following.

First, there are countries with unambiguously large and likely long-lived deleveraging pressures for HHs. This group includes countries that have had very large increases in gross debt over the past decade, substantial increases in most measures of net debt and recent (or likely future) substantial reductions in net worth (financial and non-financial). Levels of gross and net debt are also often relatively high in these countries and the degree of deleveraging achieved in recent years has been modest. Among the countries in this group are Cyprus, Greece, Ireland, Spain, and Portugal, where HH gross debt relative to GDP are 58ppts of GDP, 40ppts, 63ppts, 32ppts and 23ppts, respectively, and higher than in 2001. House prices in these countries have fallen in recent years, generally leading to falls in HH net worth, including non-financial assets where data are available (except Portugal where they have declined by rather little to date).<sup>37</sup> The latest available data indicate that HH nominal gross debt is falling at an annual rate of around 2.5% in Spain, 4-4.5% in Portugal and Ireland, and 7% in Greece and still increasing in Cyprus. Assuming that deleveraging continues at this pace, bringing gross debt back to their 2001 levels would under our assumptions for nominal GDP growth take around or above another decade in these five countries.<sup>38</sup>

Second, there are countries with more moderate, but still deleveraging pressures, at least in the medium-term. This group includes countries with relatively large increases in HH gross debt (and usually high levels of gross debt) but where HH net worth (often reflecting a combination of financial and non-financial wealth) has remained relatively robust. This group of countries includes Australia, Canada, Denmark, Korea, Norway, Sweden, the Netherlands, and the UK. In our view, the large increases (and often high levels) of gross indebtedness and the fact that house prices are often high in these countries suggests that at least some gross deleveraging will likely be necessary in coming years in these countries. In some, such as Denmark, house prices have already fallen substantially, and led to some pressures to reduce debt. In most other countries (except the UK), deleveraging has not yet started in earnest.

For these countries, the fact that public debt levels tend to be relatively low, that private gross deleveraging may be needed more than net deleveraging for the time being (as long as asset prices hold up), that they have independent national central banks (except in the Netherlands), and that private investors for the time being

Countries with unambiguously large and likely long-lived deleveraging pressures for HHs include Cyprus, Greece, Ireland, Spain, and Portugal

Countries with moderate deleveraging pressures include those with large increases in gross debt and large rises in asset prices (e.g. Canada, Denmark, Korea, Norway, Sweden, the Netherlands, and the UK) ...

... and those with more moderate debt increases but more fragile economies (France, Belgium, Italy, and CEE countries)

Countries with very modest increases in gross debt and no need for net deleveraging include Austria, Germany and Japan

<sup>37</sup> Generally, in countries with very long housing booms, even after recent falls in house prices, house price levels are still up from the levels of the later '90s or early '00s, with the level of non-financial asset holdings up by more still, as supply has increased.

<sup>38</sup> Our assumption for nominal GDP growth is based on the average Citi forecasts (IMF for Cyprus) for 2012-2016 for real GDP and CPI inflation. Under these assumptions, returning HH gross debt-to-GDP to its 2001 levels would take 6 years in Portugal, 7 years in Greece, 11 years in Ireland and 13 years in Spain. These assumptions would not suggest any deleveraging in Cyprus but assuming that HH gross debt-to-GDP falls by 3ppts/year, it would take 16 years there.

mostly treat this group of countries as safe havens, implies that the private deleveraging process need not result in as dramatic a weakening of domestic demand as in some (other) euro area countries. However, as recent developments in Denmark, the Netherlands and the UK show, with the public sector in belt-tightening mode, private sector deleveraging may still be both quite costly and quite difficult in these countries, and could get even more difficult if asset prices collapse.

The group of countries with moderate deleveraging pressures on HHs also includes countries such as Belgium, France (where increases in gross debt have been sizable but smaller, and where HH net worth has also held up) and Italy (where HH gross debt is low, but has also risen quite a bit in the past decade, and where HH net worth has suffered and where deleveraging has also not yet started). This group also includes the US (where HH deleveraging has gone quite a long way, but HH net worth has fallen), and a number of Eastern European countries (where HH debt and house prices have fallen after sizable prior increases, but where levels of debt remain low).

In the group of countries with moderate deleveraging pressures the time horizon over which the deleveraging will play out is difficult to pin down – precisely, because for the most part there is no significant deleveraging process in place by now. In the US, another two years of deleveraging at the current pace would return HH gross debt levels to their levels in 2001, while in the UK it would still take another 9 years.

Third, there is a small and select circle of countries with very modest increases in HH gross debt and no need for net deleveraging. This select circle includes Austria, Germany and Japan, and maybe Switzerland. Germany and Japan are in fact the only countries among the 30 countries in our sample, where gross debt-to-GDP ratios for HHs at the latest available date (usually Q2 2012) were below those in 2001.

According to the (statistically insignificant) 85% of GDP threshold of Cecchetti et al. (2011), HH sectors in 14 out of our 30 countries (Australia, Canada, Cyprus, Denmark, Ireland, Korea, Netherlands, Norway, Portugal, Spain, Switzerland, Sweden, UK, US) could increase growth prospects by reducing their debt, with the extent of the deleveraging needed ranging from 1.4ppts of GDP in Sweden and Spain to 73ppts in Cyprus.

### **Non-financial corporations**

HH sectors in 14 out of our 30 countries

have gross debt-to-GDP ratios above the 85% threshold identified by Cecchetti et al (2001)

For NFCs, gross debt is on average (unweighted) 26% of GDP higher than it was in 2001

Gross debt increased strongly in Cyprus, Ireland, Portugal, and, Spain, but also in Belgium and the UK and a number of countries in Emerging Europe

For non-financial corporations, gross debt is on average (unweighted) 26ppts of GDP higher than it was in 2001, but with greater differences between the countries – in Ireland, gross debt levels of NFCs are 165ppts of GDP higher! In a number of countries, NFC gross debt has fallen relative to GDP since 2001 (the Netherlands, Sweden, Japan, Poland, and the Czech Republic). Accounting for currency and deposit accumulation leaves the picture broadly unchanged, but considering narrower measures of net debt (i.e. netting out broader sets of assets) suggest lower increases in indebtedness.

Generally, the list of countries where prior debt increases (and therefore future deleveraging needs) were high is rather similar to that for HHs: gross NFC debt increased strongly in Cyprus, Ireland, Portugal, and, Spain, but also in Belgium and the UK and a number of countries in Emerging Europe. In few of these countries have levels of gross debt to GDP come down substantially from the peak. However, even in these countries NFC financial net worth is often still substantially higher than it was in 2001 -- including in Portugal, Spain, and Ireland -- highlighting the role of gross debt and access to liquidity in current deleveraging pressures.

In the US, NFC gross debt-to-GDP ratios have started to come down recently

On average, debt to equity ratios have also risen in many countries since 2001

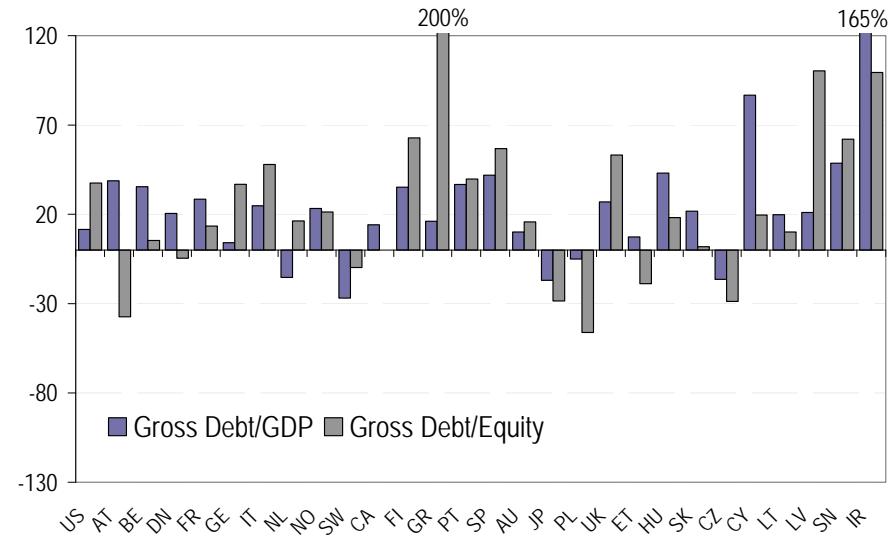
NFC sectors in 23 out of our 30 countries have gross debt-to-GDP ratios above the 88% threshold identified by Cecchetti et al (2001)

In Greece, the levels of gross debt and broad measures of net debt are low in the cross-country comparison, and the increases have been below the cross-country average. But equity has fallen even more steeply, so that debt-to-equity ratios have seen among the largest rises in our sample (Figure 57). In the US, NFC gross debt-to-GDP ratios have recently come down and have registered below average increases in the previous decade.

However, we consider the argument that developed market corporates generally have a strong balance sheet position to be overplayed. First, Figure 57 highlights that debt to equity ratios -- while very volatile -- have risen, not fallen, in many countries since 2001. Second, profit margins are high and are unlikely to rise further in many countries, and could well fall over time, putting pressure on measures of corporate leverage that are based on earnings or profits. Third, in an environment where public sectors are under pressure to consolidate finances, cash-rich corporate balance sheets may offer an opportune source of revenue for fiscal consolidation. A number of countries, including Spain, have already raised corporate taxes in recent years against a year-long trend of falling corporate tax rates. Of course, the opposite holds in the few countries that currently have lots of fiscal space – i.e., Sweden just decided to lower its corporate tax rate to stimulate a slowing economy.

Taking the Cecchetti et al-suggested value of 88% of GDP as a benchmark, many countries (23) could raise potential GDP growth by reducing corporate debt. Only in Australia, the US, Germany, Greece, Slovakia, Poland and Lithuania, did NFCs remain below that threshold, with Irish NFCs at 206pppts above the benchmark.

Figure 57. Selected Countries – Change in Leverage Required to Return to 2001 Levels



Note: Values correspond to difference between NFC gross debt/GDP and gross debt/equity at the latest available date and 2001.

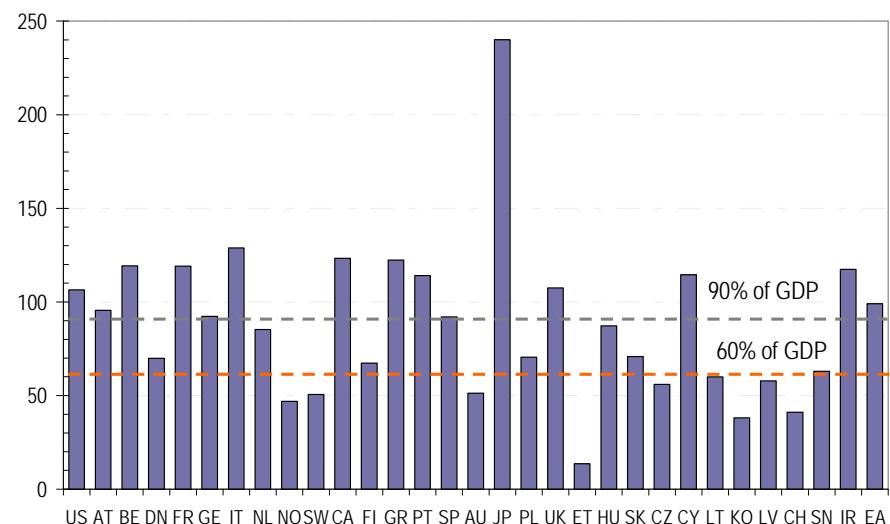
Source: OECD, Eurostat, National Sources, and Citi Research

### Public debt

There have been two possible benchmarks of public gross debt-to-GDP ratios: the 60% of GDP reference of the Maastricht Treaty and the 90% of GDP identified by Reinhart and Rogoff (2009) and Cecchetti et al (2011)

Calculations of public debt sustainability have become their own industry in recent years, with the IMF probably the undisputed leader (by brand recognition). However, truly rigorous approaches remain elusive as they would need to reflect unobservables such as the maximum sustainable primary surplus, as well as assumptions about real growth rates and interest rates. In the absence of more rigorous approaches, even relatively arbitrary benchmark values can be of some use. Two possible benchmarks have been discussed already: the 60% of GDP reference value for gross general government debt of the Maastricht Treaty and the 90% of GDP Reinhart and Rogoff (2009) and Cecchetti et al (2011), benchmark at which debt becomes statistically associated with lower GDP growth. We politely ignore the 120% of GDP benchmark that has repeatedly been used by the troika, most prominently in the case of Greece, to demarcate the solvent from the insolvent sovereign. We consider this number to be well inside the danger zone. Its choice by the troika can probably be explained by its uncanny resemblance to the level of gross debt of the euro area member state with the next highest level of debt – Italy – when the troika went through these sustainability exercises.

Figure 58. Selected Countries – General Government Liabilities (% of GDP), Q2 2012



Note: For Italy, the Netherlands, and Ireland latest data correspond to 2012Q1, while for Cyprus and the EA it correspond to 2011

Source: OECD, Eurostat, National Sources, and Citi Research

Figure 58 presents the levels of general government gross liabilities to GDP for our sample of countries in Q2 2012.<sup>39</sup> Of the 30 countries in the sample, 21 were above the 60% of GDP benchmark. Among those that were below 60% of GDP, four (Estonia, Czech Republic, Lithuania, Latvia) are EMs. 14 of the 30 countries were above the 90% of GDP benchmark, too, by only a small margin for Spain and

<sup>39</sup> We use the general government gross liabilities as presented in Flow of Funds Accounts rather than the more commonly used measures for General Government Debt for the following reasons. First, it often paints a more accurate and timely picture of government indebtedness. Conventional measures of general government debt, such as those under the EU's Excessive Deficit Procedure Definition, exclude some items, such as accounts payable, which later transition into recognized items under the EDP measures, but with a lag. Second, these data are available quarterly for most countries, while the general government debt data can often only be obtained on an annual basis.

Of the 30 countries in the sample, 21 were above the 60% of GDP benchmark for public debt, while 14 were above 90% of GDP

Moreover, public debt levels are still rising in many countries

We consider debt restructuring is needed to restore the solvency of the sovereign in a number of countries, including Greece, Ireland, and Portugal, and potentially Spain, Italy, Cyprus, and Slovenia

Germany (both at 92% of GDP) up to Japan with general government liabilities of a staggering 240% of GDP. The US and the UK have both recently crossed even the higher threshold. These numbers are not what one would expect for safe haven countries, a designation used not just for the US but also for the UK these past two years.

What is more, as indicated above, public debt levels are still rising in many countries (see also Figure 59 and Figure 60), including the US, Japan and the UK.

Now that the illusion of the existence of risk-free sovereign debt is broken (probably beyond repair) we doubt that private investors will continue to finance or refinance such levels of government debt for very much longer at anything near current levels of yields (even in the safe havens), without much friendly or not-so-friendly encouragement (aka financial repression) by the relevant national authorities (usually a combination of the treasuries, central banks and regulators/supervisors). Financial repression and/or continued activity by the central bank as the buyer of last resort may for a while still maintain the appearance of 'market access' for many of these sovereigns. High levels of private saving and limited capital mobility make the job of financial repression somewhat easier, but many fiscally weak euro area countries do not have either. For private investors to stay or to return voluntarily, sustainably and with confidence, a long and painful period of gradual public debt reduction through fiscal pain is likely to be needed in many countries. In countries where government debt is above 90% of GDP and still rising, the period of fiscal pain needed to bring debt down to sustainable levels is likely to cover most of the rest of this decade. In a number of countries, including Greece, Ireland, and Portugal, and potentially Spain, Italy, Cyprus, and Slovenia, sovereign debt restructuring is necessary to restore solvency of the sovereign. In others, a short period of swift and, one hopes, orderly sovereign debt restructuring may be a benign alternative to years of fiscal pain.

Figure 59. Selected Countries – Public Debt (% of GDP) – 2001-2016F

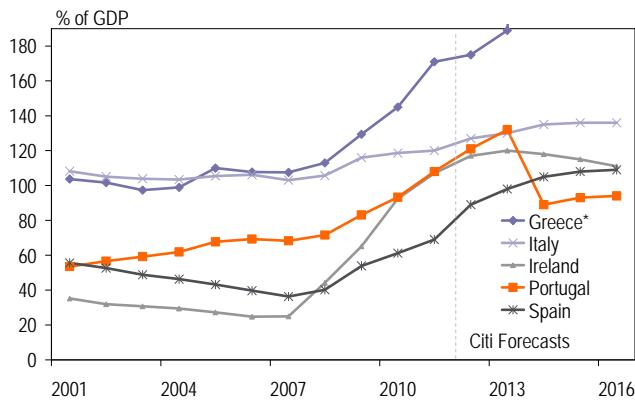
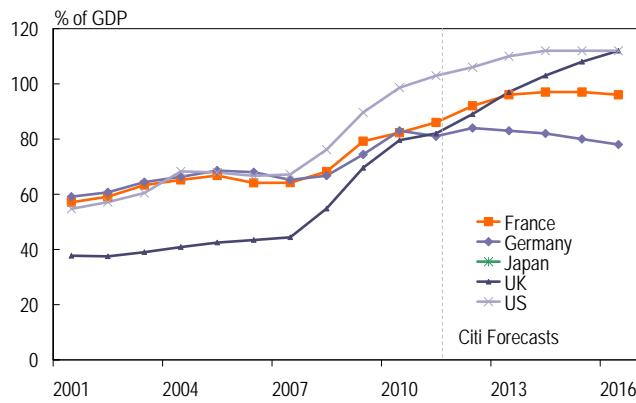


Figure 60. Selected Countries – Public Debt (% of GDP) – 2001-2016F



Note: Values correspond to general government gross debt (% of GDP). Citi Research forecasts from 2012. \*we forecast that Greek debt would reach 446% of GDP in 2014, 471% of GDP in 2015 and 468% in 2016, following Greek exit from the euro area and a substantial depreciation of the new Greek currency (while its debt remains euro-denominated). We also assume sovereign debt restructuring in Portugal in 2014.

Source: Eurostat, IMF and Citi Research

## 10. When Will Public Deleveraging Come to the US and Japan?

The US and Japan continue to borrow at very low rates despite their manifest fiscal unsustainability

The global reserve currency status of the US dollar creates a safe haven equilibrium for the US

However, there also exists another equilibrium – the fear equilibrium or fiscal fiasco equilibrium or bad equilibrium

The fear equilibrium could result in a re-pricing of US sovereign risk, producing 10-years sovereign rates at, say, 550 basis points instead of 175 basis points

Two large G7 economies, the US and Japan, have sovereigns that manage to borrow at very low rates at all maturities despite manifest fiscal unsustainability. What accounts for this defiance of the economic laws of gravity?

The uniqueness of the US results from the global reserve currency status of the US dollar and from some complementary characteristics like the depth, breadth and liquidity of its financial markets, the size of its economy, its adequate rule of law (despite the growing threat of rule of lawyers), etc. Because the only recent rival for global reserve currency status, the euro, is now in intensive care, and because the renminbi is not yet ready for prime time as a global reserve currency, the global reserve currency status of the US dollar is as secure today as it has been for decades, despite the worsening creditworthiness of the US sovereign.

The global reserve currency status of the US dollar creates equilibrium -- a safe haven equilibrium, comfort equilibrium or good equilibrium -- in which the US sovereign can fund itself at remarkably low rates at all maturities. However, the safe haven equilibrium depends on the belief in the markets that, one way or another, the US sovereign (mostly the federal government) will restore fiscal sustainability without recourse either to *de jure* sovereign default, or to *de facto* sovereign default through unexpected inflation, or to inflation (expected or unexpected) combined with financial repression. Currently, the markets indeed appear to believe that, sooner or later, some combination of growth and fiscal austerity will restore US fiscal sustainability without recourse to sovereign default or the (unanticipated) inflation tax.

But there also exists another equilibrium – the fear equilibrium, fiscal fiasco equilibrium or bad equilibrium – supported by the same fundamentals but with different potentially self-fulfilling beliefs. In the fear equilibrium, market participants look at the US as a country with social democratic public spending preferences and Tea Party tax preferences. Its general government debt, currently at 103% of GDP (2011, IMF WEO), is much higher than the euro area average of 88% of GDP (2011, IMF WEO). Its general government deficit is also much larger than that of the euro area on average (9.6% of GDP for the US in 2011 vs. 4.1% for the euro area (IMF WEO)). The difference between the public spending and tax preferences translates into a structural primary deficit for the general government of around 6% of GDP, about \$1 trillion on an annual basis at current GDP levels. This funding gap can only be eliminated through a growth miracle, which is highly unlikely, through fiscal austerity through inflation or through sovereign debt restructuring.

In the fear equilibrium, there is a firm belief that only an external shock of some severity can jolt the (current and/or future) Congress and the Administration into thus far inconceivable concessions on entitlement cuts and tax increases. The leading candidate for such a shock is an attack by the bond market vigilantes. This results in a re-pricing of US sovereign risk and/or inflation risk, producing 10-year sovereign rates at, say, 550 basis points instead of 175 basis points, as well as a US dollar whose effective exchange rate is, say, 25 percent weaker than it is today. Note that it is not necessary, in order for this re-pricing of sovereign risk and/or inflation risk to occur, that there be a credible, let alone a superior alternative to the US dollar as a global reserve currency, or for US Treasury bills and bonds as the world's favourite safe asset. In the textbook version of a shift from the good equilibrium or comfort equilibrium to the bad equilibrium or fear equilibrium, there is instead a general re-pricing of sovereign risk and/or inflation risk which means that,

A move to the fear equilibrium will likely require a form of informal coordination that probably needs a widely observed trigger of some kind

in the new fear equilibrium, everyone holds exactly what they held before (in the safe haven equilibrium), but asset prices and yields reflect the new more pessimistic beliefs about the capacity of the US political system to get its fiscal act together without being forced to do so by the markets.

Economics has little to say about what causes a market switch from one focal point (the comfort equilibrium or safe haven equilibrium) to another (the fear equilibrium or fiscal fiasco equilibrium). A radical mood swing by the markets of this kind requires a form of informal coordination that probably needs a widely observed trigger of some kind. A default of a large US city could be one such trigger. So could another act of brinkmanship by the US Congress and the White House over the debt ceiling, or indecision in face of the fiscal cliff, followed by further ratings downgrades. It is true that US sovereign rates have come down since the August 4, 2011 downgrade of the US sovereign by S&P, but that provides no guarantee of future immunity.

The often-noted fact that so much US Treasury debt is held by official creditors has no clear-cut implications, as there are a range of plausible but contradictory views as to how the drivers of official demand differ from those of private demand for US Treasuries. The facts are as follows. There is \$11.5 trillion worth of US Treasuries held by the public (and just under \$5 trillion by other US government entities and agencies). Of this as of August 2012, \$5.4 trillion was held abroad; \$3.9 trillion of which was held by foreign official entities, of which in turn China accounted for \$1.2 trillion or just over 10 percent. Japan accounts for \$1.1 trillion, after that it tails off fast. Fundamentally, China matters no more or less than any other holder or collective of holders of 10 percent of the US Treasury debt, except for the fact that a single holder can, presumably, coordinate buying or selling actions better than a set of multiple independent holders.

Could there be geopolitical reasons (or any reasons other than the risk-adjusted financial rate of return on its asset portfolio) that could cause China to 'dump' a significant amount of its US Treasury debt on the markets? We believe there must be cheaper ways to make a political point, as any decision to exit US Treasuries on a significant scale for non-financial return reasons would likely cost China dearly, through the effect of the sale on the realized sale price and the valuation of any remaining holdings, unless market demand were to be highly elastic at the prevailing market price.

We noted in our discussion of why debt matters, that in efficient financial markets, where home-made arbitrage rules the roost, demand and supply don't matter for price. Even though the markets for US Treasuries are the deepest and most liquid securities markets in the world, they clearly are not fully efficient in the sense required to be able to exit, say, \$1 trillion worth of US Treasury debt in a hurry without having a material effect on their price. With markets as they are, a large-scale fast exit of China from its holdings of US Treasuries would drive up the yield on US Treasuries, hurting the US economy but hurting China as a portfolio investor also. Although one can think of geopolitical calamities that would cause China to dump its US Treasury debt for non-economic reasons, we think it more plausible to view China as a conservative portfolio and foreign exchange investor who could well lag other big holders of US Treasury debt (including domestic US holders) if they anticipated a sharply increased risk of inflation or sharply increased sovereign credit risk.

We believe that the ability of the US sovereign to borrow at very low rates will come to an end sooner or later

The Japanese sovereign's shield against normal market discipline: Past record of extraordinarily high private saving rates and, extraordinary home bias in portfolio allocation

However, we believe that the ability of the Japanese sovereign to borrow at very low rates will come to an end too

A call for less austerity and more growth is meaningless unless it is combined with greater access to funding

Because what is unsustainable cannot go on forever, the ability of the US sovereign to borrow at very low rates at all maturities will come to an end sooner or later. Unfortunately, the timing of the shift to the fear equilibrium is not predictable.

The Japanese sovereign's buffer against normal market discipline is quite different from that of the US. It is, first, Japan's past record of extremely high private saving rates and, second, Japan's extraordinary home bias in portfolio allocation. The first means that the stock of private financial wealth is vast – indeed large enough to ensure that, despite a general government gross debt of 230 percent of GDP and a general government net debt of 127 percent of GDP in 2011 (IMFWEO), the country as a whole has a net foreign investment position of 54 percent of GDP (IMF). The second – home bias - means that, despite the capital account being wide open technically and legally, 92 percent of JGBs are held domestically.<sup>40</sup> This second feature acts very much like a form of financial repression. In the case of the largest single holder of JGBs, the Japanese Postal System, this financial repression is most likely informal but real: a nudge and a wink from the Ministry of Finance to the Postal System. In the case of Japanese retail investors, the *de facto* financial repression is self-imposed and voluntary. It probably reflects long-standing attitudes towards what constitutes an adequate, safe rate of return. In addition, with prices falling steadily in Japan over much of the past 15 years, ex-post rates of return on JGBs for Japanese households have not been all that low.

But for Japan too, the unsustainable cannot go on forever. At some point, even the Japanese retail investor will doubt the ability of the Japanese sovereign to generate future primary surpluses at least equal in net present value to the outstanding public debt. It may be that the trigger that moves Japan from its comfort equilibrium to its fear equilibrium will be a persistent change in the country's external accounts from a current account surplus to a current account deficit. Most likely, when Japan becomes a persistent capital importer, the marginal buyers of new issues of Japanese sovereign debt will not be the Japanese postal system or Japanese retail investors but instead the global investing community, which may well demand a higher nominal rate of return than 85 basis points over 10 years. With the general government deficit at 10.7 percent of GDP in 2011 and household saving rates way below the highs of the past (reflecting the rapid aging of Japan's declining population), it is the financial surpluses of Japan's corporates that keep the external current account in surplus. The corporate financial surplus is mainly due to weak capital expenditure rather than unusually high corporate profits. It is likely that, without early (and politically unlikely) fiscal tightening, Japan will become a persistent current account deficit country towards the second half of the decade.

Again, therefore, no undue comfort should be derived from the fact that Japan has been able to build up public debt burdens and run continuing deficits of magnitudes that make Italy and Spain appear fiscally conservative by comparison. Like the US, but through a very different mechanism, Japan's situation is unique and, we would argue, irrelevant as regards the fiscal options open to the euro area and most of the rest of the EU today. In Europe, austerity is now demanded by the markets – and we expect the same call to be heard sooner or later for the US and Japan. A call for less austerity and more growth is therefore no more than either a call for increased non-market, concessional funding of the sovereigns in question by the international community – the EFSF, the ESM and the IMF -- or a call for highly indebted sovereigns to default or inflate away their outstanding debt. For countries with significant primary sovereign deficits, long-term monetization of deficits is not an option, as the result would be hyperinflation once the monetization of ongoing real deficits and their impact on inflation are incorporated in private sector inflation

<sup>40</sup> <http://www.ft.com/cms/s/0/9d1c8970-b9f5-11e1-937b-00144feabdc0.html#axzz24xe0bVws>

expectations. As noted earlier, the maximum share of GDP that can be extracted through base money creation once inflation is anticipated may be as little as two percent for countries with serious currencies and as little as half a percent of GDP for countries with minor-league currencies.

A *temporary* fiscal stimulus, *permanently* financed by an increase in the stock of base money (a combined monetary-fiscal stimulus known as 'helicopter money') is, of course, always possible and is probably indeed desirable in Japan, the US, the euro area and the UK. But that is a quite different policy option from the open-ended financing of a two or three percent of GDP or higher government deficit by borrowing from a central bank that monetizes its debt purchases.

## 11. The Forgotten Sector: The Role of Central Banks in the Recent Deleveraging Period

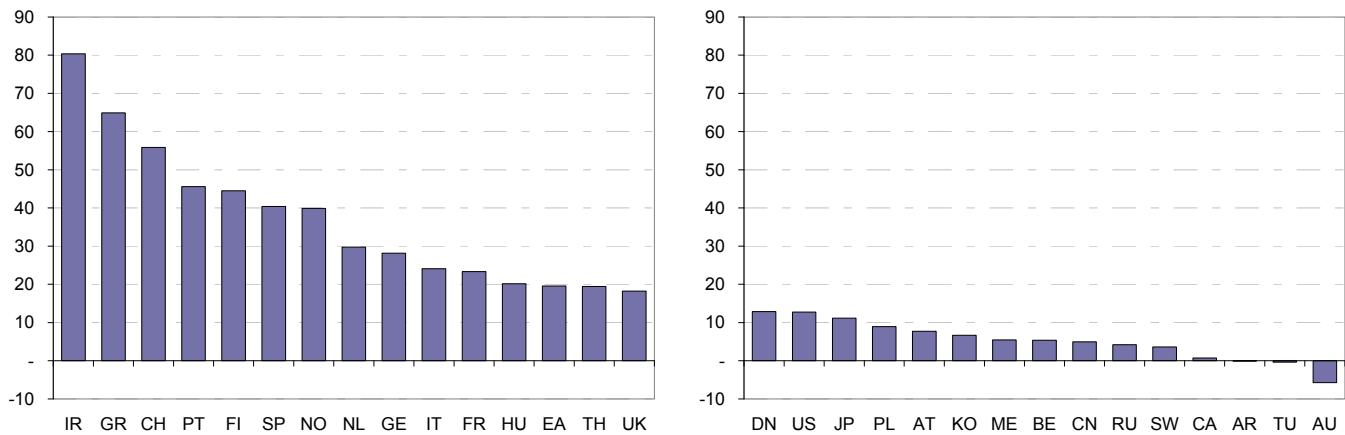
The balance sheet size of the major central banks has increased sharply since 2008

In a sample of 30 economies, NCB balance sheets (as % of GDP) increased in all but three countries (Argentina, Australia and Turkey) since 2008

There is one (sub-) sector that shows no sign of any desire or need to deleverage: central banks. The balance sheet size of the major central banks has increased sharply since 2008, with the size doubling for the ECB, tripling for the Fed and quadrupling for the Bank of England (Figure 37). Relative to GDP, the changes have been more similar (at around 10-20ppts of GDP), including for the Bank of Japan, which has seen the smallest percentage increase in balance sheet size of the major central banks.

The increase in central bank balance sheets has not been restricted to the major central banks, however (Figure 61). In a sample of 30 economies – a different sample from the one used in the previous sections, and one that includes a number of emerging markets – balance sheets increased in all but three (Argentina, Australia and Turkey) relative to GDP.<sup>41</sup> The most remarkable increases have been in Ireland, Greece, Portugal, Spain (owing to more substantial support for domestic banking sectors), but also Switzerland and Norway (accumulating foreign exchange reserves to arrest the appreciation of the domestic currency as well as, in the case of Switzerland, support for the domestic banking sector) and in Finland and Germany (as a result of increases in lending to the Eurosystem).

Figure 61. Selected Countries – National Central Banks Balance Sheet (% of GDP), 2007-2012 Change



Note: Values correspond to changes in National Central Banks balance sheet (as % of GDP) between Jun-07 and Jun-12. "EA" stands for the Eurosystem, "TH" for Thailand, "ME" Mexico, "CN" China, "RU" Russia, "AR" Argentina and "TU" for Turkey.

Source: National Central Banks and Citi Research

In a sample of 11 financial crisis episodes, NCBs on average expanded their balance sheet on average by around 100% its balance sheet (in real terms)

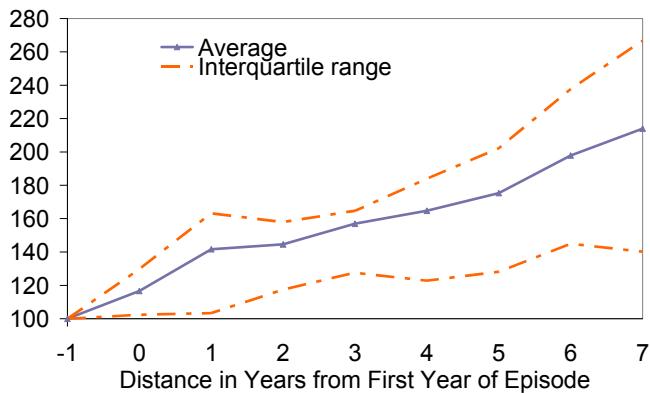
Balance sheet increases of the major central banks in recent years have been much larger

The increase in balance sheet size of central banks during the current crises also has historical form. Central bank balance sheets increased during and after past financial crises. Figure 62 plots the average response of central bank balance sheets for 11 financial crises, and shows that the average balance sheet increase was around 50% in real terms in the first two years and another 50% or so in the following years. During the current episode the expansion in the balance sheets of the central banks was both faster and sharper than in most historical episodes. Looking at the major central banks only, it is clear that the response by the Fed and the Bank of England was much stronger than for the historical average, while the

<sup>41</sup> For the Eurosystem, both individual NCBs as the Eurosystem for the EA as a whole are included.

response of the Bank of Japan has been relatively more restrained. In terms of balance sheet increases, the ECB/ Eurosystem moved fairly decisively early on, but then retreated somewhat, only to reaccelerate the increase of its balance sheet again more recently, with the most recent measure of the Eurosystem balance sheet (September 2012) reaching more than 32% of euro area GDP, the largest of all the major central banks.

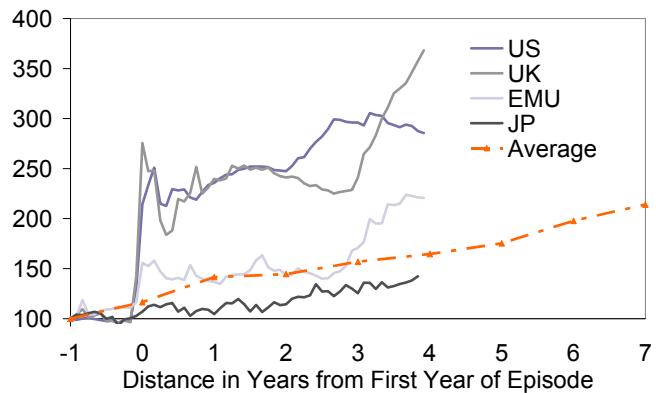
Figure 62. National Central Bank Average Response following a Financial Crisis with Deleveraging



Note: Values correspond to the average accumulated expansion in the National Central Bank balance sheet in real terms (2005=100) following a financial crisis (where T is the beginning of the crisis) with subsequent deleveraging adjustment. Average responses for the following episodes: Japan (1997), Norway (1991), Korea (1997), Argentina (2001), Indonesia (1997), Philippines (1997), Mexico (1994), Finland (1991), Malaysia (1997), Sweden (1991), and US (1929).

Source: IMF, National Central Banks and Citi Research

Figure 63. Selected Countries – National Central Bank Response in Current Crisis



Note: For each country, values correspond to accumulated expansion in the National Central Bank balance sheet in real terms (2005=100) since Sep-2007 (where the period of episode corresponds to Sep-2008).

Source: IMF, National Central Banks and Citi Research

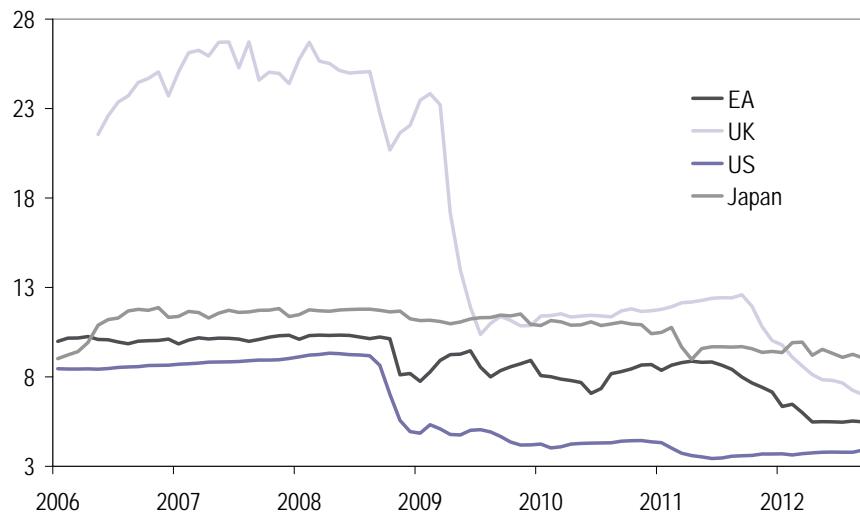
However, it is not only the size of the central banks' balance sheets that matters. In fact, balance sheet increases for the various central banks have to some extent been driven by common themes, but also by idiosyncratic factors, including differences in operational objectives. In the pursuit of the recently rediscovered ultimate objective of financial stability (following a decade of almost exclusive attention to macroeconomic stability or price stability), central banks in different parts of the world have to varying degrees taken on the role of lenders of last resort to banks and sovereigns and of market makers of last resort (mostly buyers of last resort) for various financial assets. For instance, outright large scale asset purchases (LSAPs) were a central part of the policy response in the UK and the US, but played a much more limited role in the euro area. The converse is true for concessionary collateralised lending to banks. The Bank of Japan in turn has bought a much wider variety of assets, comprising not only government bonds, but also real estate-related assets, and even equity.

The composition of the balance sheet increase on both the asset and the liability side should matter for the economic effects of central bank actions

Although we are not aware of systematic research into the issue, it is highly likely that the composition of the balance sheet increase on both the asset side and the liability side of the balance sheet matters for the economic effects of central bank actions. Once an economy is at the zero lower bound (ZLB) for nominal interest rates (strictly speaking the effective lower bound (ELB), since, because of the high carry cost of currency, the lower bound on short-term nominal interest rates is not zero but something like -0.75% or -1.00%), the composition of the central bank's liabilities between monetary liabilities (M0) and non-monetary liabilities loses much of its relevance. Because the private sector and, in the euro area, also the public sector, issues debt instruments of sometimes low liquidity and high credit risk, the composition of the asset side of the central bank's balance sheet should always matter for the real economy, even at the ELB.

Over the last few years, major central bank actions have taken place amid collapses in money and credit multipliers. Thus, even though the monetary base or narrow money have increased in many countries, broader measures of the money supply or credit have not (yet) recovered.

Figure 64. Selected Countries – Money Multipliers, 2006-2012



Note: Money multiplier is defined as money supply M3 over monetary base M0. For the US, M3 corresponds to M2 due to data availability.

Source: National Central Banks and Citi Research

## 12. Death of the Default Risk-Free Security - Balancing Sovereign Debt Supply and Demand in Global Markets

We believe that, as regards debt that offers a safe real rate of return or a safe real value of its principal, we are already in a world where there is no absolutely safe debt

One of the remarkable features of the debt explosion of the past 15 years or so is how little safe debt there is in this sea of debt. Even the concept of safe DM sovereign debt is at risk of becoming an oxymoron. We believe that, as regards debt that offers a safe real rate of return or a safe real value of its principal, we are already in a world where there is no absolutely safe debt, even in the inflation index-linked sovereign debt sphere. Figure 65 and Figure 66 show the credit default swap (CDS) spreads on 5-years sovereign securities for a wide range of developed markets. As these figures indicate, sovereign CDS rates even for the supposed 'safe havens' of the day, including the US, UK, Germany and Japan are much higher than they used to be in the pre-financial crisis period, even though they have come down somewhat recently.

Figure 65. Selected Countries – 5-year CDS spreads, 2003 – November 2012

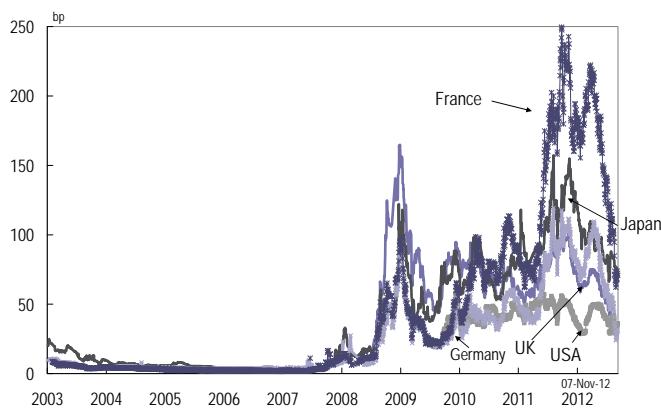
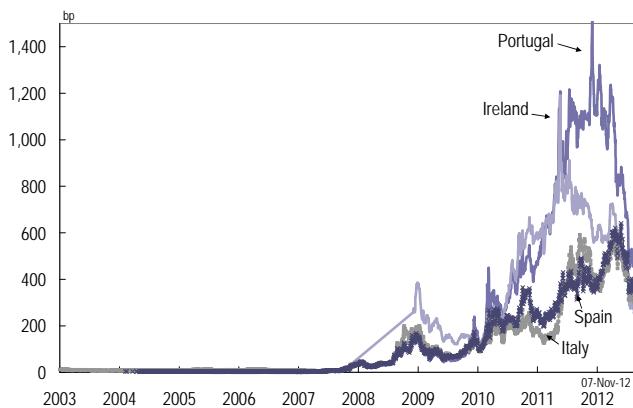


Figure 66. Selected Countries – 5-year CDS spreads, 2003 – November 2012



Source: Bloomberg and Citi Research

In a world without a safe benchmark, risk-free yields would need to be computed through financial engineering

Banking and finance in a world without a nominal or real safe benchmark that is in positive net supply to the private sector is likely to be a challenge. Clearly, nominal and real risk-free yields can still be computed, but they can be achieved only, in such a world, through financial engineering – the pooling of risky assets with imperfectly correlated returns and their tranching in order of seniority. The highest creditworthiness tranche might be considered 'safe'.

Globally or in the advanced economies, there is no overall excess supply of or excess demand for sovereign debt. In efficient financial markets, where home-made or personal arbitrage and leverage are possible to an unlimited extent, the very notion of an aggregate excess supply of or demand for an 'inside' financial instrument (where every creditor is matched by a debtor, unlike 'outside' assets, like land and real capital for which there is a positive net supply) makes no sense. If there were 'too little' sovereign debt with given risk characteristics, households and private firms would create more themselves. If there were too much, households and other private entities would retire their own debt with the appropriate risk and other payment stream characteristics and if necessary they would go short the sovereign-debt-equivalent instrument. This rarified world is, as noted before, the basis for the famous Modigliani-Miller theorem according to which corporate capital structure does not matter, and of its extension to public sector debt instruments (Modigliani and Miller (1958, 1963), Wallace (1981)).

Imbalances between the supply of and demand for sovereign debt are present at most in *specific types* of sovereign debt, not for sovereign debt as a whole

However, there is a growing disequilibrium between the demand for and supply of risk-free financial instruments

We are likely to continue to see both low levels of *implied safe yields* at all maturities, and low levels of actual market yields perceived as being the relatively safest

Even in the real world, where the conditions for the Modigliani-Miller theorem fail to hold spectacularly and where relative and absolute gross supplies of 'inside' financial instruments affect their yields, there is at most an imbalance between the supply of and demand for *specific types* of sovereign debt, not for sovereign debt as a whole. As noted, with the risk-free sovereign relegated to the (recent) economic history books, risk free nominal yields are at unprecedentedly low levels. In Japan, the 10-year JGB yield is 75bp while the 10-year CDS rate is 103bp, implying a negative 10-year risk-free yield of -28bp (as of November 8<sup>th</sup>). In Germany and the Netherlands, sovereign yields up to two years maturity are close to zero or even negative, and with positive CDS spreads the risk-free nominal yields at these maturities must be close to the ELB on nominal interest rates set by arbitrage (in the presence of carry costs for currency) between zero nominal interest rate currency notes and other nominal financial instruments.

The scarcity of risk-free sovereign debt, the failure of home-made leverage and the existence of the ELB mean that there is a growing disequilibrium between the demand for and supply of risk-free financial instruments. Unless and until sovereigns and/or private issuers of the highest credit worthiness re-enter the markets in strength, something that seems highly unlikely for the foreseeable future, industries dependent on an ample supply of risk-free or even just low-risk instruments, including banks under the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) of Basel 3, may find themselves at a considerable disadvantage, unless there are significant concessions in the operational interpretation of the words 'safe' and 'liquid'.

Without the ELB on nominal interest rates, the disequilibrium in the market for safe (sovereign) debt would be eliminated by safe nominal interest rates becoming deeply negative. This would, of course, create existential problems for financial institutions and instruments that depend on the existence of positive nominal interest rates (constant net asset value money market funds are one example), but their roles could be rather easily taken over by entities and instruments that can function normally with negative nominal yields, like bank deposits and variable net asset value money market funds.

As noted, we expect that financial engineering (such as the pooling of risky assets with imperfectly correlated default risks, and their tranching in order of seniority) will become a source of supply of low-risk and zero risk financial instruments. Such financial engineering is a limited form of 'home-made arbitrage'. It will be welcome, but it is unlikely to eliminate completely the growing shortage of risk-free instruments.

Given the shortage of risk-free assets (defined as assets both free of default risk and of inflation risk and other real value market risk), we are likely to continue to see both low levels of *implied safe yields* at all maturities (like the Japanese sovereign debt yields minus the appropriate sovereign CDS spread) and low levels of actual, market yields of those instruments that are perceived by the markets as being the relatively safest, like US Treasuries, Bunds, JGBs and even, *mirabile dictu*, UK Gilts. Quantitative easing through the purchase of longer-dated sovereign debt by the Fed, the Bank of England and, to a lesser extent the Bank of Japan, undoubtedly contributes to these very low yields on the long-dated securities issued by those sovereigns that win the 'relative least ugly contest'. These are the sovereigns, like the US, Germany, Japan and the UK, that, although not perceived as absolutely safe, and certainly perceived as less safe than before the crises started, remain the relatively least unsafe compared to the rest. They may now even have a wider safety margin over other sovereigns that used to be considered reasonably safe by regulators and markets in the past, including euro area periphery sovereigns and euro area sovereigns in the 'soft core'. These relatively

least ugly sisters may well be the beneficiaries of a growing hunger for the safest available assets.

The low safe yields (and/or the low yields on the safest available instruments) are at best a mixed blessing for the economies that might be thought to benefit from them. There may be beneficial effects of low (relatively) safe yields on the prices of long-lived relatively liquid assets (equity) and low long-term yields may be associated with a weaker external value of the currency and stronger commodity prices, but the evidence on this is underwhelming. Effects on long-lived real assets traded in less liquid markets, like land and real estate, are hard to identify at all. A recent comprehensive study by the BIS (Gambacorta et. al. (2012), see also Sheets (2012, 2011)) suggests that QE and other unconventional monetary policy measures tend to have merely transitory impacts on economic activity, real and (surprisingly) nominal, and that such impacts as can be identified tend to occur during periods of acute crisis and financial market disorder. The at best modest and temporary real-activity-boosting effects of QE and other policies supporting very low long-term interest rates on (relatively) safe assets should be set against the detrimental effect of low long-term safe rates on pension funds, insurance companies and other entities that, for regulatory or other reasons, discount their future commitments at these very low rates, with often devastating consequences for their capital positions, funding ratios or other regulatory balance sheet benchmarks.

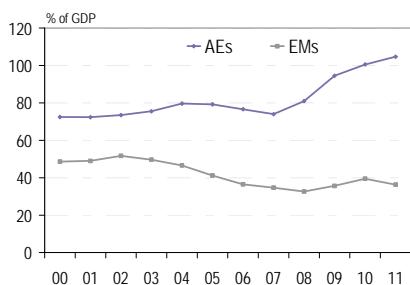
Potential output can be adversely affected by policies that damage key financial intermediaries and, through them, capital expenditure

The future path of potential output can be adversely affected by policies that damage key financial intermediaries and, through them, capital expenditure. Lower long-term sovereign yields in the US, the UK or Japan probably do little to improve the cost and availability of funding for private economic agents whose borrowing and spending plans are currently constrained by the cost and availability of external funding, especially households and small and medium enterprises (SMEs). Clearly, even if lower long-term yields for (relatively) high grade sovereigns and the likely associated lower long-term prime mortgage rates don't help much through the external funding cost and credit availability channels of financially constrained ultimate saving and spending entities, they don't hurt either, *through these channels*. Therefore, persisting with QE, other large-scale asset purchases, credit easing policies and enhanced credit support may well make sense. However, if regulatory or behavioural distortions cause persistently low nominal and real long-term interest rates to inflict damage on important institutions or asset classes, and if these distortions cannot be corrected promptly, then policy support for extremely low long-term (relatively) safe rates may not be the no-brainer it is often argued to be.

Ultimately sovereign risk will be priced more or less appropriately and the world will live to learn without the availability of risk-free instruments

There is no corresponding threat of disequilibrium in the risky corner of the sovereign debt market – which now constitutes a growing part of it. Yields can rise freely to price the risk perceived by the markets – there is no effective upper bound on nominal or real rates. Ultimately, except for the irreducible market failure created by the ELB on nominal interest rates, sovereign risk will be priced more or less appropriately and the world will live to learn with the reality of a scarcity of risk-free financial instruments for private investors.

Figure 67. AEs and EMs – Government debt (% of GDP), 2000–2012



Note: Gross general government debt of 34 Advanced economies (AEs) and 150 emerging and developing economies (EMs).

Source: IMF WEO and Citi Research

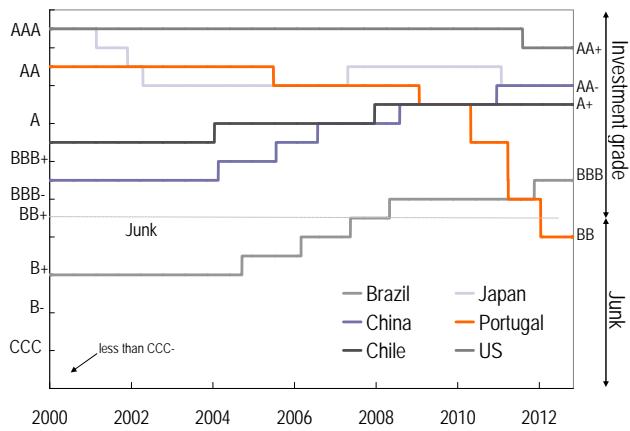
Many fundamental and market measures show that the riskiness of many EM sovereigns has fallen in the last decade – in absolute terms, and even more so relative to advanced economies

## The great convergence between EM and AE sovereign debt

Not all debt or even sovereign debt is considered riskier than before. At least if judged by fundamental metrics (such as gross government debt-to-GDP ratios), market prices (such as sovereign spreads or CDS rates), or analyst opinions (such as credit ratings), the riskiness of sovereign debt in many EMs has gone down over the past decade. Relative to many AEs, certainly many EMs have become less risky. While that of course is chiefly a function of the increased riskiness of sovereign debt in AEs, progress on several dimensions in many EM countries should not be underestimated. Governance, both political and economic, and within the economic sphere, both in terms of macropolicy and for policies with microeconomic relevance, has improved vastly in many countries, admittedly often from a very modest benchmark. Growth itself has been strong, of course partly driven by these very improvements in governance, as well as other factors, such as increases in commodity prices and favourable demographics.

The available data speak very impressively on the change in the relative riskiness of EM and AE sovereigns. Countries, such as Ireland, Italy, Portugal and Spain have suffered many downgrades in recent years. Even the US and France have been stripped of their AAA-label by one rating agency each. Meanwhile, a long list of EMs has enjoyed successive upgrades. Turkey for the first time achieved investment grade status from a major rating agency since 1994 when Fitch upgraded it on November 5, 2012. Brazil enjoys investment grade status from all three major rating agencies. And China's rating is on par with Japan's for each of the three. Market prices deliver a similar – and often even more striking – message. The CDS rates of not only Brazil and China, but a number of other EMs are now much lower than those of many countries of the euro area periphery.

Figure 68. Selected Countries – Sovereign Ratings 2005 – 2012

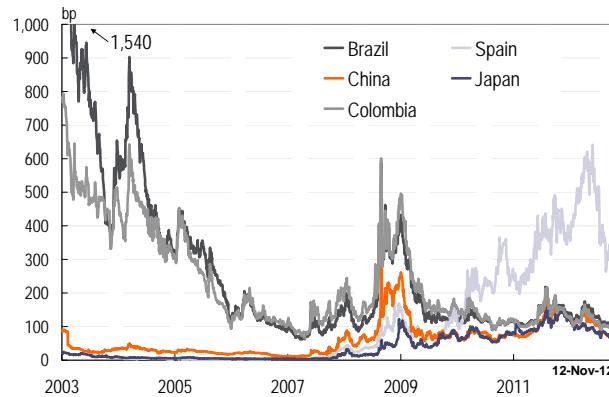


Note: S&P long-term sovereign credit rating.

Source: Bloomberg and Citi Research

Progress in many EMs has been real, but most of these countries are still risky, and the recent exuberance with which they are regarded may in fact raise the risks of an eventual bust

Figure 69. Selected Countries – 5-Y CDS rates (bps), 2003 – 2012



Source: Bloomberg and Citi Research

We have never put much credence into the ‘low risk, high returns’ view of EMs, even though we highlighted above the evident fundamental improvements in some countries. These days, it is increasingly often the ‘high returns’ bit that is in doubt, as prices for EM assets have sharply re-rated and now sometimes look expensive even by developed market standards. But one of the important principles of good risk management should also be heeded in the context of EMs today, namely that institutions, businesses and countries often are most vulnerable when market reflections of their riskiness are at their most reassuring levels. It would be surprising if the recent periods of selective EM exuberance were not to sow the seeds of their own crises in due course, given (1) the fast-rising gains in prosperity

for so many EMs, (2) the growing integration of most EMs in the global financial markets and the associated increased cross-border capital mobility, (3) the repeated walls of QE driven liquidity rushing from the AEs towards the EMs and (4) the steady development and liberalization of local domestic financial markets in EMs. Despite the many lessons taught by history, including the lessons being taught or yet to be taught in the AEs, we doubt whether things will be different this time for the current star pupils of the global economy.

## 13. Conclusion: What Lies Ahead?

There remains far too much debt on the balance sheets of most advanced economies

Debt reduction will likely take many years

Net deleveraging is planned across many sectors and countries at the same time which will reduce output below its potential level

An inflationary solution to the excessive leverage seems very unlikely (impossible for the EA)

Private and public austerity will continue to be the key mechanisms for deleveraging in the years to come

Mutualisation can only play a limited role (too much debt!)

There remains far too much debt in the balance sheets of most advanced economies. Reducing this debt burden to more tolerable levels will take many years unless recourse is had to debt restructuring on a much greater scale than currently contemplated. Higher real growth is neither a policy nor a realistic expectation as a means to deliver painless deleveraging in the excessively indebted advanced economies. As regards the growth of potential output, most of these economies are at or close to the technology frontier and have unfavourable demographics. Even under favourable circumstances, in the absence of excessive leverage, the growth rates of potential output would be modest (see Gordon (2012)). Clearly, many of the most afflicted economies in the euro area have deeply distorted and dysfunctional labour markets, closed-shop professions, badly managed and poorly regulated utilities, excessive state ownership of productive resources and a host of other man-made supply-side distortions whose removal could lift potential output significantly. Unfortunately, the reforms are slow in coming and will often require considerable time to be implemented. And even when they have been implemented, the benefit in the form of higher actual output still requires demand to come from somewhere. Animal spirits alone are unlikely to do the job with acceptable speed.

In addition, net deleveraging by sovereigns and banks (in most countries), by households in many countries and by the non-financial corporate sector in some countries, means that these sectors attempt to run financial surpluses without matching increases in planned financial deficits by other sectors, except possibly the central banks. The result is that the paradox of thrift strikes and activity is well below its potential level.

An inflationary solution to the excessive leverage is all but impossible in the euro area, highly unlikely in Japan, unlikely in the US and quite unlikely in the UK. The reason for this, as noted in Section 7, is the much increased independence of central banks in the advanced economies and their commitment to price stability. Financial repression will play a modest role in the deleveraging process of the DMs. This will occur partly through central bank purchases of sovereign debt in the primary markets at yields below those prevailing in the secondary markets (except for the ECB which cannot engage in primary market purchases of sovereign debt because of Article 123 of the Treaty). Sovereign and private debtors can also benefit from purchases in the secondary markets that drive down yields there -- sovereign bond markets are inefficient and the supply of and demand for sovereign debt influences its yield. Banks and other regulated financial intermediaries will be cajoled by the national authorities to hold more sovereign debt than they would choose to hold voluntarily at yields lower than what they would accept voluntarily, with financial repression sometimes masquerading as prudential probity, as in the case of the LCR and the NSFR. In the absence of at least moderately high inflation (say 5 percent or more per annum), financial repression only has a modest effect on real bond yields, however.

Private and public austerity will continue to be important mechanisms for deleveraging in the years to come. In the euro area, so will mutualisation of sovereign debt and restructuring of sovereign debt and bank debt. Restructuring of household debt (especially mortgage debt) would be desirable in many countries with excessive gross household debt (e.g. the Netherlands, Denmark, Ireland and Spain) but is for political reasons unlikely on a large scale.

Because there is too much debt *overall* in most advanced economies, mutualisation can only play a limited role. If we allow for likely future further migration to the public sector balance sheet by euro area periphery banking sector bad or impaired assets,

it is clear that the core euro area sovereigns (or nations) cannot credibly mutualise the sovereign debt of the periphery (present and anticipated in the near future). The core euro area sovereigns (or nations) would bankrupt themselves in the process. Some mutualisation through the euro area sovereigns will occur, for instance when they absorb losses on loans made to periphery sovereigns under troika programmes, or on future purchases in the primary or secondary markets by the EFSF and ESM of periphery sovereign debt. It will be quite limited however. Some further mutualisation through the back door, by the ECB and the NCBs of the Eurosystem, will undoubtedly also occur as they in due course take losses on their past acquisitions of periphery sovereign debt under the Securities Market Programme (now terminated since the announcement of OMT) and on future purchases through the OMT. In addition, periphery sovereign debt at risk of default has been accepted as collateral by the Eurosystem for loans to banks that themselves are likely to be insolvent when the sovereigns whose debt they offer as collateral default on their debt.

Debt restructuring, for sovereigns in the periphery and for banks in both periphery and core is inevitable during the next two or three years...

The consolidated sovereign and banking sector is likely insolvent in Spain

Debt restructuring, for sovereigns in the periphery and for banks in both periphery and core is, in our view, inevitable during the next two or three years. This is likely to start with Greece, regardless of whether it exits the euro (as we expect to happen during 2013 or 2014). Portugal, with its inexorably rising sovereign debt burden, poor growth prospects and growing austerity fatigue will probably have to restructure its sovereign debt, most likely when its current troika programme terminates, in the second half of 2014. Unless Ireland achieves ample retroactive mutualisation of public debt incurred as a result of its banking sector bail-outs since 2008, it too will have to restructure its sovereign debt.

In Spain, the consolidated sovereign and banking sector is most likely insolvent, in our view, so the operational question is what combination of debt mutualisation through the euro area sovereigns or the Eurosystem, bank debt restructuring and sovereign debt restructuring will be used. We thought during June and July of 2012, that mutualisation would be part of the package. It was agreed then that the EFSF/ESM would provide the Spanish sovereign with up to €100 billion to recapitalise its banks. We believed then that, when the ESM becomes capable of recapitalizing banks directly, without going through the sovereign (once the ECB has become established as the apex of the Single Supervisory Mechanism (SSM) for euro area banks), this up to €100 billion loan to the Spanish sovereign would become an ESM exposure. Unfortunately, the German, Dutch and Finnish authorities have made it clear since September 2012 that, with the possible exception of Ireland, there will be no mutualisation of 'legacy' sovereign debt issued in the past to recapitalise banks. This of course increases the burden on the Spanish, Greek, Portuguese and (unless they indeed get special treatment) the Irish sovereigns.

We know that there will be unsecured bank debt restructuring in Spain, because any Spanish bank that has recourse to the EFSF/ESM bank recapitalisation resources will have to bail in its unsecured creditors below the senior unsecured level. We expect that, in Spain and elsewhere, some senior unsecured bank creditors (other than depositors) will also be bailed in sooner or later, simply because there are insufficient funds available from other sources to recapitalize the systemically important banks adequately.

As regards the Spanish sovereign, avoiding sovereign debt restructuring likely requires entering into an OMT-compatible programme soon, and avoiding the following three contingencies on a sufficiently large scale. First, public support to satisfy the capital needs of the Spanish banking system that cannot be covered by the available resources, including the €100 billion EFSF/ESM money (despite the

Spanish authorities' confidence that the further capital needs of the Spanish banking system are no more than €60 billion, and that only €40 billion will have to be used of the EFSF/ESM money). Second, for the central government to lose the political war of wills with the 17 autonomous regions over the required degree of fiscal austerity in the autonomous regions. Third, significant hidden, off-balance sheet contingent liabilities that could result in unexpected legacy losses for the sovereign. Examples would be debt incurred by special purpose vehicles (SPVs) created by the municipalities, the regional social funds, the autonomous regions and the central government and guaranteed by them. As many of these SPVs default, the guarantees are called and turn into actual sovereign liabilities. Time will tell.

Cyprus will require bank debt restructuring unless the bad assets of the bank are transferred to the sovereign, in which case Cyprus will require sovereign debt restructuring. Slovenia faces a similar conundrum.

As recently suggested by S&P and hinted by Moody's, Cyprus may well provide the first euro area test case where prior bank debt restructuring and/or sovereign debt restructuring is made a prerequisite for financial support from the troika. S&P on October 17<sup>th</sup>, 2012 suggested that Cyprus' banks -- or the sovereign itself -- could be forced to reschedule their debt in order to meet the terms of an official lending programme, which could reach upwards of €15 billion.<sup>42</sup> Moody's made it clear in its statement of October 9, 2012, motivating its downgrade of three Cypriot banks' ratings, that it does not consider the Cypriot sovereign capable of providing material and effective support to its banking sector out of its own resources.<sup>43</sup>

Cyprus is small and its fundamental trade and financial external linkages are limited. Contagion risk can be contained by the OMT and LRTO-type ECB interventions on behalf of the banks in the rest of the euro area. The debt involved, although large relative to the size of the Cypriot economy, is small in relation to the resources of the troika; except for bank lending to the real estate sector, mortgage lending and domestic retail deposit taking, much of the banking sector's activities does not impact on the local economy either on the funding side or on the investment/lending side. Cyprus therefore offers a convenient 'laboratory' for prior bank and/or sovereign debt restructuring from the perspective of the troika, although the guinea pigs in question are no doubt apprehensive at the prospect. Faced with the choice of emulating Iceland (where the government refrained at the last minute from trying to save a banking sector that was too big to bail) or Ireland (where the government did guarantee almost 300 percent of GDP worth of unsecured bank liabilities and is paying a very heavy price for having done so), it would be wise for the troika to follow Iceland's example in the case of Cyprus.

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<sup>42</sup><http://www.standardandpoors.com/ratings/articles/en/us/?articleType=HTML&assetID=1245342178923>

<sup>43</sup> "In Moody's view, the government's capacity to provide support to the banks is very limited. However, Moody's expects that support would be forthcoming from external parties, specifically the Troika (European Commission, European Central Bank and the International Monetary Fund) via the Cypriot government."<sup>43</sup> Although Moody's did qualify its dim view of the "...constrained capacity of the Cypriot government to provide support to the banking system..." with a reference to "...the additional resources Moody's expects will be made available to Cyprus in the context of its membership in the European Monetary Union." It then went on to further qualify this qualification with reference to "...a material risk that external support would not be sufficient to stabilise the banks.". For source, see previous footnote.

While Italy should be *able* to service its sovereign debt in full, there remain some political risks

A shift from debt-type instruments towards more equity-type instruments would be highly desirable

Finally Italy, despite its strategic-sovereign-default-inviting combination of a very large public debt and a primary general government surplus, is certainly able to service its sovereign debt in full (again, following accession to a programme that grants it access to OMT support). One risk is that the next elections (no later than April 2013) could produce an anti-euro, nostalgia-for-the-lira, populist coalition government. Another risk is that Italy, under the Fiscal Compact, will have to run significantly larger primary government surpluses than it does today if it is to bring down its general government debt ratio from well over 120 percent of GDP to the 60 percent level demanded by the Compact. It is certainly possible to run persistent significant primary surpluses for 20 years or so without undue negative effects on actual and potential output: Belgium demonstrated that before 2008, when it brought down its general government gross debt ratio from 138.2 percent of GDP at the end of 1993 to 84.1 percent at the end of 2007.<sup>44</sup> But it won't be easy. Belgium's debt ratio now is back up at 100% of GDP as a result of the crises. Remaining compliant and living with the threat of the withdrawal of OMT support and loss of access to the financial markets in case of non-compliance for a couple of decades will not make for a politically comfortable ride.

In addition to, and where possible, instead of reducing the *size* of gross liabilities of sovereigns, banks, and in many cases also households and non-financial corporations through haircuts or write-downs, a change in the *composition* of these liabilities away from debt-type instruments and towards more equity-type instruments is highly desirable. In the case of banks, we would hope that bailing in unsecured creditors would not take the form of haircuts but of a mandatory partial or complete conversion of unsecured debt into equity. For households, the equitisation of existing mortgages, when a non-performing household has negative equity, plus a much greater future issuance of equity-type mortgage products would make sense.

Islamic or joint-equity-type mortgages have much better risk sharing properties than conventional Western repayment or interest-only mortgages, whose inflexible debt contract features are most inappropriate for households – typically entities with very limited flexibility whose main asset, their human capital, cannot be sold or used as security. With a stylised Islamic mortgage, the seller of a residential home sells it to the bank. When the bank deals with a would-be buyer, the mortgage-equivalent contract consists of two parts. The first is a contract between the bank and the buyer to establish a joint ownership. The buyer commits to buy, typically in a sequence of purchases over time, the share of the bank (which could be 100% initially). At the same time, the bank leases its share to the buyer – effectively a rental contract for the share of the property not owned by the buyer. As the buyer over time purchases additional fractions of the bank's equity, the stream of rental payments from the buyer to the bank diminishes. If the household cannot make these rental or lease payments, it can be evicted, like any tenant who does not pay the rent.

With a 20-year mortgage, say, the benchmark or expectation is that the household purchases 5% of the equity each year. But should the household's financial circumstances unexpectedly change; the household can pass on the expected new equity purchases for one or more years. Indeed, the household may even be able to sell some or all of the equity in the house it purchased in the past back to the bank. All these equity sales and purchase would be at a predetermined price. It is possible to make the right to skip a year's equity purchase or the right to sell equity back to the bank contingent on certain independently verifiable contingencies like ill-health or job loss. With such an Islamic or joint-equity mortgage, the risk of foreclosure and

<sup>44</sup> Source: European Commission and Eurostat.

The sequence of crises the advanced economies have inflicted on themselves and on the rest of the world since 2007 is by no means over

eviction is significantly diminished. It is clearly a far superior financial product to the inflexible mortgage debt contract that remains the standard in the West.<sup>45</sup>

Finally, sovereigns should not only incur fewer liabilities, their liabilities should be more equity-like. Real GDP growth warrants or a long-term floating rate instrument where the ‘interest rate’ is some constant plus the growth rate of nominal GDP, are examples. When the government’s ability to service its debt is lower, its debt service is likely to be lower also. There are practical problems: inflation and real GDP data can be manipulated by unscrupulous governments. One would hope that an agency like Eurostat in the EU would be able to prevent the opportunistic deliberate manipulation of macroeconomic price and quantity data in the future.

Following the Asian crisis of 1997 and the Russian crisis of 1998, there was a major transformation in the attitudes of many EM policy makers towards public debt (historically the most important component of EM debt, given the relative financial underdevelopment of most EMs). The economic and social costs of the austerity required to restore financial sustainability and the sense of national humiliation at having to surrender a large measure of fiscal, financial, monetary and regulatory policy sovereignty to the Bretton Woods institutions – especially the IMF – resulted in a widespread determination to avoid falling into an excessive debt trap again.

Even a decade after the Asian and Russian crises, few EM countries had forgotten the expensive lessons learnt then. Public sector debt burdens and deficits tended to be low, banks held a lot of capital and were tightly regulated. Few corporates borrowed abroad in hard currencies on a large scale.

Recently, there is more evidence of slippage as regards some EMs’ practice of fiscal and financial responsibility, e.g. in India – which was of course not impacted significantly by the 1997-98 crisis – South Africa and Egypt. The research of Reinhart and Rogoff (2009) suggests that lessons learnt through financial crises that follow earlier financial excesses are not a permanent or even a long-lasting obstacle to a repeat of the same seductive but ultimately destructive policies and behavioural patterns. It is likely that as the decade wears on and the 1997-1998 Asian and Russian crises are no longer part of the first-hand experience of policy and business leaders in the EMs, the siren calls of excessive leverage while the going is, or appears to be, good will be hard to resist for many EMs.

The sequence of crises the advanced economies have inflicted on themselves and on the rest of the world since 2007 is by no means over. Entire new chapters remain to be written. Mr. Micawber’s recipe for happiness deserves to be on the wall in every financial kitchen.

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<sup>45</sup> Such a product is called diminishing Musharakah in the Islamic finance literature. See Ayub (2007).

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# Appendix

## Nonfinancial sector debt

### 1) Financial Accounts by Sector:

The time series constructed are taken either from national balance sheet statistics (flow of funds) from the OECD or national sources (usually national central banks) at an annual and quarterly frequency. The 30 countries included in the sample are: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, South Korea, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, the UK and the US. These countries accounted for 62.3% of world GDP at market exchange rates in 2011.

On average annual data start around 1995, but the data go back to 1950 (US), 1980 (Spain, Canada, Korea, Japan) and 1990 (Germany, Netherlands, Hungary) for some countries, and generally end in 2011. Annual data going back to 1980 were extended/backdated<sup>46</sup> using data from Cecchetti, Mohanty, and Zampolli (2011) for Austria (for which data from the original source start in 1995), Belgium (1994), France (1994), Germany (1992), Italy (1995), the Netherlands (19990), Sweden (1995), Finland (1995), Greece (1995), Portugal (1995), Australia (1990), and the UK (1987).

Quarterly data start as early as 1952 (US), 1964 (Japan), 1975 (Korea), 1980 (Spain), 1987 (UK), 1990 (Canada), 1991 (Germany), and 1993 (Belgium). For all other countries, quarterly data start after 1995. The quarterly data generally end in 2012:Q2. Data for Cyprus and Switzerland are not available quarterly and these countries are therefore not included in any analysis that relies on quarterly data. For Ireland the data start in 2001, for Switzerland in 1999, for Slovenia in 2001, and for Latvia in 1998, hence these countries are not included in the comparisons of debt levels between 1995 and today.

The sectors covered are (i) households and non-profit institutions serving households, (ii) nonfinancial corporations, and (iii) general government. Following Cecchetti et. al (2011), debt is defined as the following: gross liabilities for households and general government, and total liabilities less shares and other equities for nonfinancial corporations. For US nonfinancial corporations, “credit market instruments” is used as a measure of gross debt.<sup>47</sup>

OECD countries missing in the general analysis include: Chile (data start in 2005), Iceland (no data for the household sector available), Israel (data only for 2010), Luxembourg (data start in 2006), Mexico (data from 1997), New Zealand (no data for the household and non-financial sector), and Turkey (no data for the household and non-financial sector).

For household disposable income (net), we use OECD and Eurostat data that define it as the sum of household final consumption expenditure and saving (minus the change in net equity of households in pension funds). These values are equivalent to the sum of wages and salaries, mixed income, net property income, net current transfers and social benefits other than social transfers in kind, less

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<sup>46</sup> By extrapolating the time series, for which the level of the new series and growth rates of the reference series are reflected in the final time series.

<sup>47</sup> Credit market instruments include the following financial liabilities for nonfinancial corporations: i) commercial papers, ii) municipal securities, iii) corporate bonds, iv) total loans and v) mortgages.

taxes on income and wealth and social security contributions paid by employees, the self-employed and the unemployed. Due to data availability, values for the UK, Portugal and Spain are taken from respective national sources. For the UK and Portugal, values are for gross disposable income, which do not discount the change in net equity of households in pension funds

## 2) Other data used in the analysis

Domestic credit to the private sector (IMF): total domestic credit provided by domestic banks to resident private sectors of the economy (e.g. other financial corporations -insurance companies, pension funds, and the like-, nonfinancial corporations, and households). Domestic banks include all deposit-issuing financial institutions operating within the country. They include domestic banks and domestic branches of foreign banks.

### Deleveraging episodes

#### Identification

Based on our data for NFS gross debt across 86 countries for the period 1960-2006 (constructed as the sum of private sector credit and public sector debt, both provided by the IMF), we identify deleveraging episodes, following McKinsey (2010), episodes where either the ratio of total debt to GDP declined for at least three consecutive years and fell by 10ppcts of GDP or more OR an episode in which the total stock of nominal debt declined by 10ppcts or more.

These exercise provided 31 deleveraging episodes, of which 18 were preceded by a financial crisis.<sup>48</sup>

Figure 70. Deleveraging Episodes – Overview Table

	Deleveraging		NFS Debt (% of GDP)		Domestic Credit (% GDP)		Public Debt (% of GDP)		Financial Crisis
	start	end	start	end	start	end	start	end	start
Argentina	2003	2009	150.2	72.6	10.8	13.5	139.4	59.0	2001
Bolivia	1998	2008	125.2	72.2	64.1	34.7	61.2	37.5	1994
Chile	1986	1994	227.7	89.1	62.7	48.1	165.0	41.0	1981
Dominican Republic	2004	2008	60.3	46.2	23.4	20.9	36.9	25.3	2003
Ecuador	2000	2008	112.6	47.4	29.9	26.3	82.6	21.1	1998
Finland	1993	1999	135.1	99.0	80.8	53.3	54.2	45.7	1991
Indonesia	1998	2008	125.8	59.8	53.2	26.6	72.5	33.2	1997
Japan	2000	2003	361.3	354.7	219.3	187.6	142.1	167.2	1997
Korea	1998	1999	82.8	91.0	68.6	74.7	14.3	16.3	1997
Malaysia	1998	2008	194.6	143.2	158.5	100.3	36.1	42.8	1997
Mexico	1995	1999	86.0	72.0	29.2	20.4	56.8	51.6	1994
Nicaragua	2002	2008	255.3	113.8	19.6	37.6	235.7	76.2	2000
Norway	1994	1996	106.1	95.3	54.7	58.1	51.4	37.2	1991
Paraguay	1999	2005	69.6	55.6	30.4	17.6	39.2	38.0	1995
Philippines	2004	2007	102.0	76.7	32.2	28.9	69.7	47.8	1997
Sweden	1993	2000	189.8	107.0	111.7	42.3	78.2	64.7	1991
Thailand	1998	2001	206.2	154.1	155.9	96.9	50.3	57.2	1997
Uruguay	2003	2007	142.5	86.4	43.2	23.4	99.3	63.0	2002

Note: The list corresponds to deleveraging episodes that were preceded by a financial crisis

Source: IMF and Citi Research

<sup>48</sup> Financial crisis list episodes are from Laeven and Valencia (2008).

### Estimating Macroeconomics responses

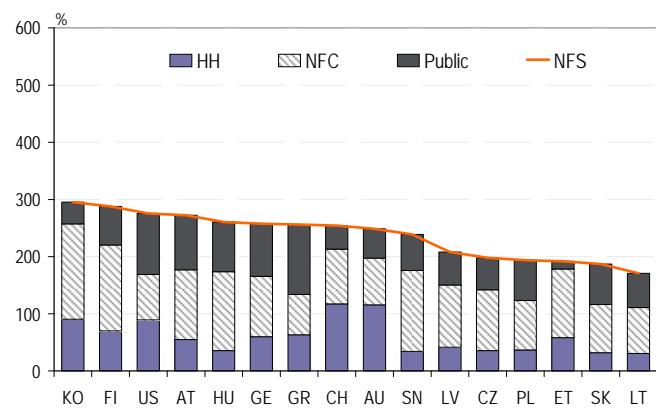
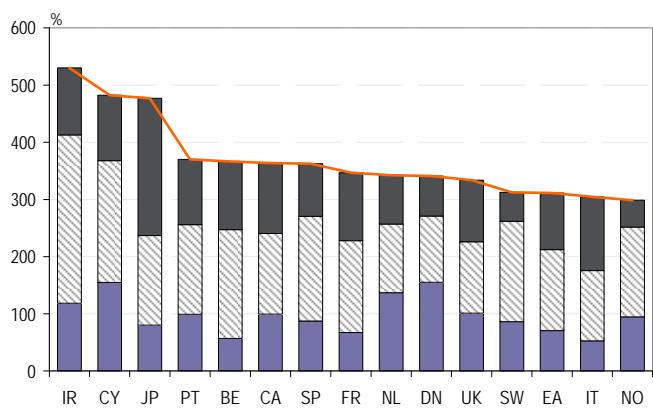
We estimate responses in macroeconomic variables following a deleveraging episode for real GDP, private consumption, gross capital formation, net exports, the stock of domestic credit to the private sector (from IMF, see above), and public debt.

Responses were approximated by estimating deviations from the pre-recession (pre-deleveraging) trend after the episode, following IMF (2009). This approach consists of comparing the medium-term level of the variable to the level it would have reached following the pre-crisis (pre-deleveraging) trend, with the medium term defined as seven years after the crisis.

First, we estimate a linear trend through the actual (output) series during a seven-year pre-crisis period that ends three years before the onset of the crisis (e.g. between t-10 and t-3, t being the year of the crisis). This trend is then applied to values from t onwards to construct a (output) series trend (e.g.  $GDPt = GDPt - 1*(1+trend)$ , with  $GDPt = GDP$  trend at t). The (output) series is then subtracted from the (output) series trend.

### Levels of debt

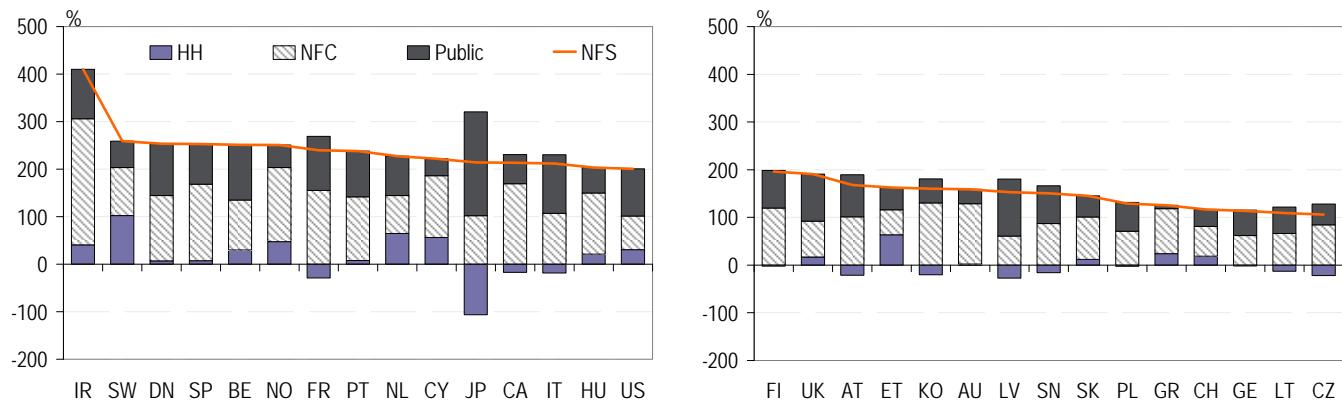
Figure 71. Selected Countries – Gross Debt (% of GDP), 2012 Q2



Note: Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

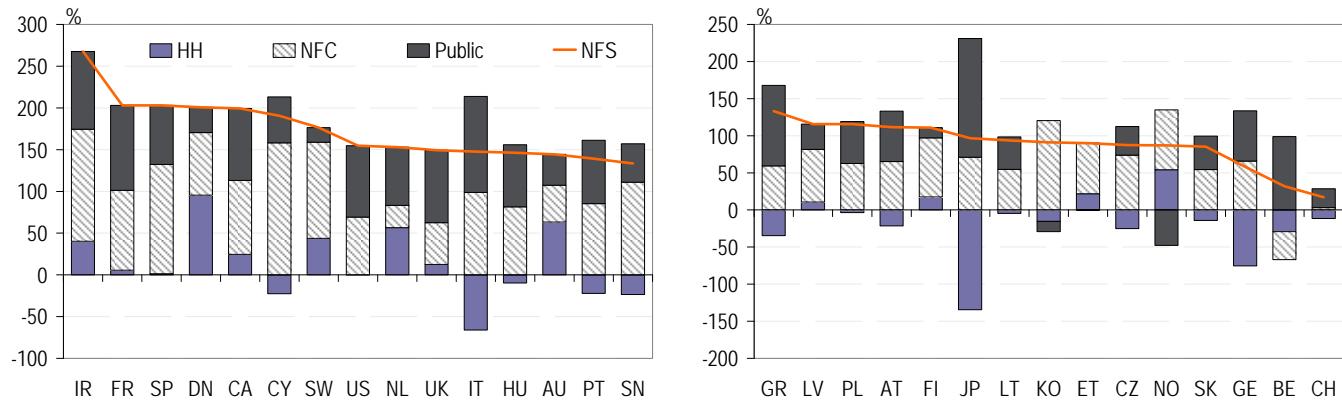
Figure 72. Selected Countries – Broad Net Debt (% of GDP), 2012 Q2



Note: Broad net debt defined as gross debt minus holding of financial assets currency and deposits. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

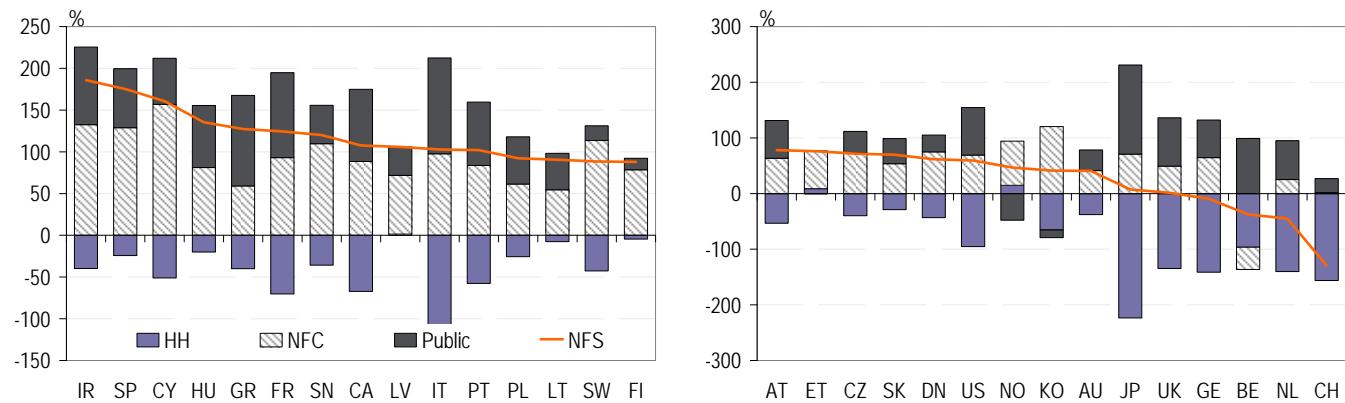
Figure 73. Selected Countries – Net debt 2 (% of GDP), 2012 Q2



Note: Net debt 2 defined as gross debt minus holding of financial assets i) currency and deposits, ii) securities others than shares, and iii) loans. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

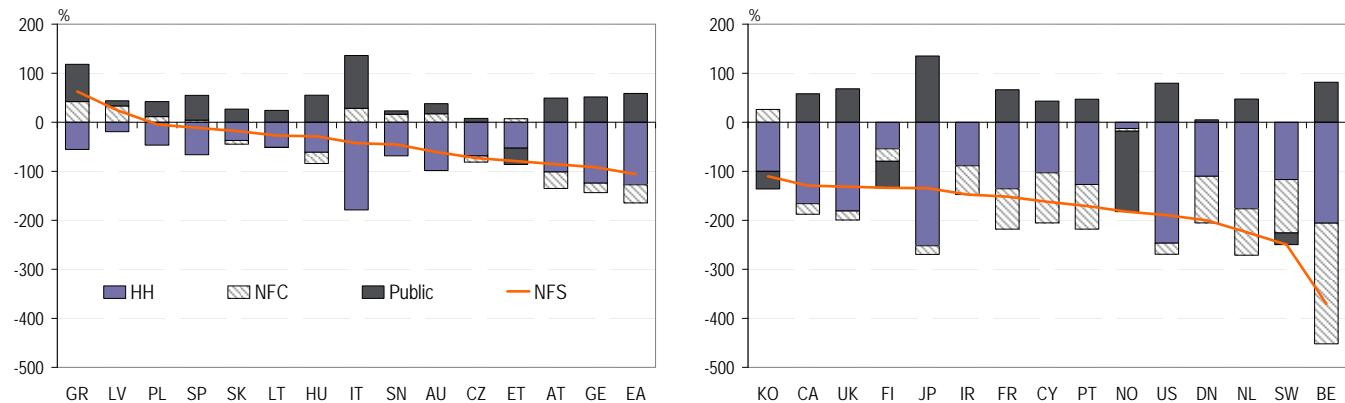
Figure 74. Selected Countries – Net Debt 3 (% of GDP), 2012 Q2



Note: Net debt 3 defined as gross debt minus holding of financial assets i) currency and deposits, ii) securities others than shares, iii) loans and iv) insurance technical reserves. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

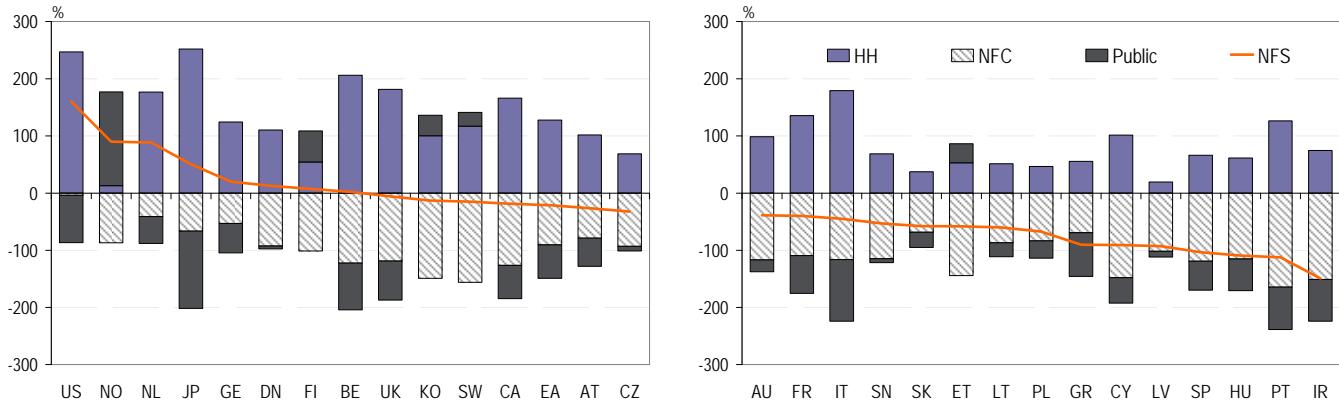
Figure 75. Selected Countries – Narrow Net Debt (% of GDP), 2012 Q2



Note: Narrow net debt defined as gross debt minus holding of financial assets. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

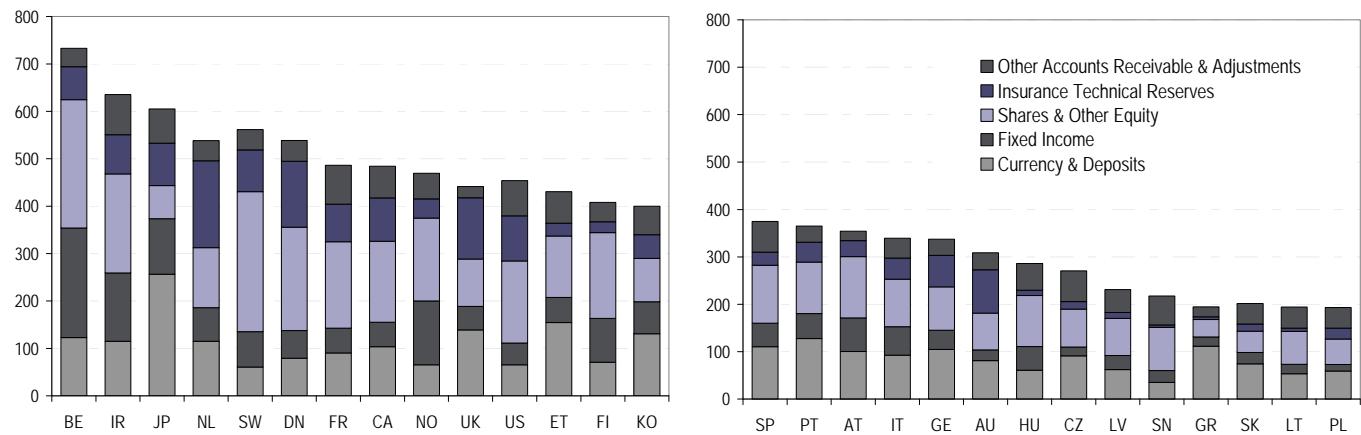
Figure 76. Selected Countries – Net Worth (% of GDP), 2012 Q2



Note: Net worth corresponds to financial assets minus financial liabilities. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

Figure 77. Selected Countries – Financial Assets (% of GDP), 2012 Q2

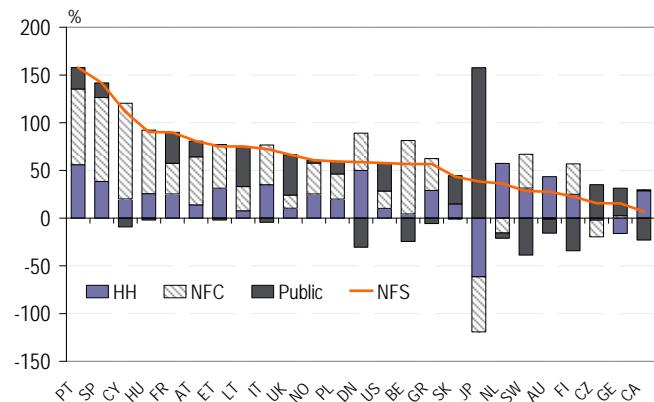


Note: Fixed income corresponds to securities other than shares and loans. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OECD, Eurostat, National Sources, and Citi Research

### Change in debt

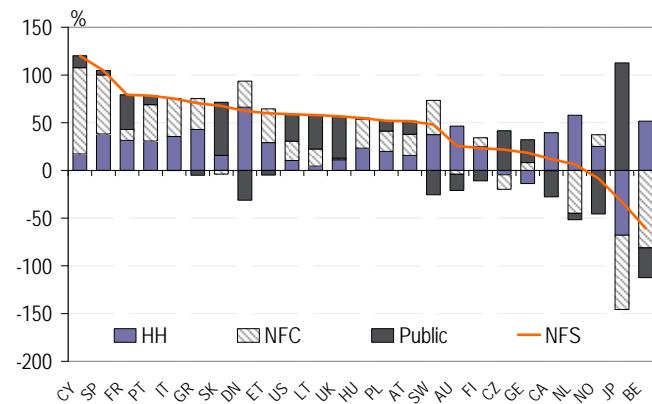
Figure 78. Selected Countries – Change in Broad Net Debt (% of GDP), 1995 – 2011



Note: Broad net debt defined as gross debt minus holding of financial assets currency and deposits.

Source: OCED, Eurostat, National Sources and Citi Research

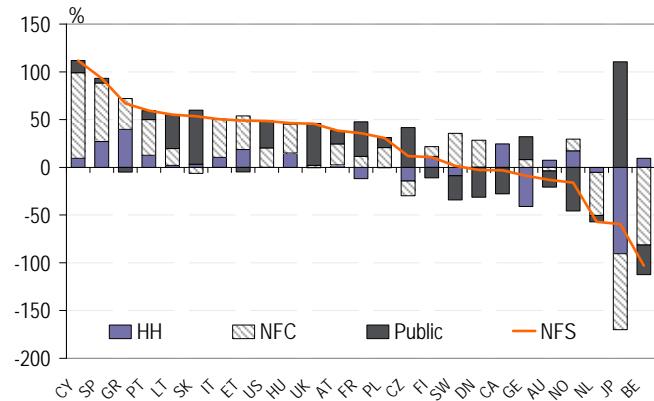
Figure 79. Selected Countries – Change in Net Debt 2 (% of GDP), 1995 – 2011



Note: Net debt 2 defined as gross debt minus holding of financial assets i)currency and deposits, ii)securities others than shares, and iii)loans.

Source: OCED, Eurostat, National Sources and Citi Research

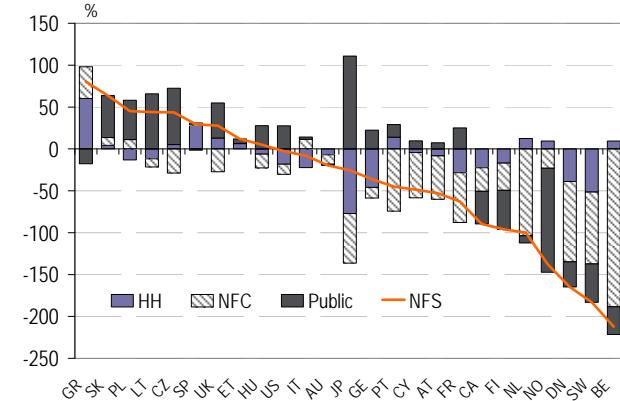
Figure 80. Selected Countries – Change in Net Debt 3 (% of GDP), 1995 – 2011



Note: Net debt 3 defined as gross debt minus holding of financial assets i) currency and deposits, ii) securities others than shares, iii) loans and iv) insurance technical reserves.

Source: OCED, Eurostat, National Sources and Citi Research

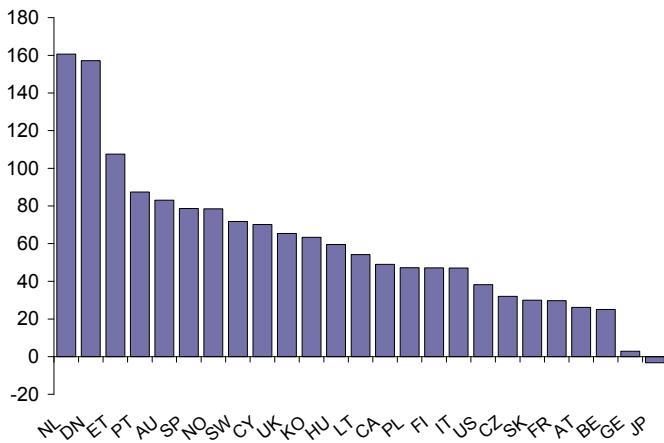
Figure 81. Selected Countries – Change in Narrow Net Debt (% of GDP), 1995 – 2011



Note: Narrow net debt defined as gross debt minus holding of financial assets.

Source: OCED, Eurostat, National Sources and Citi Research

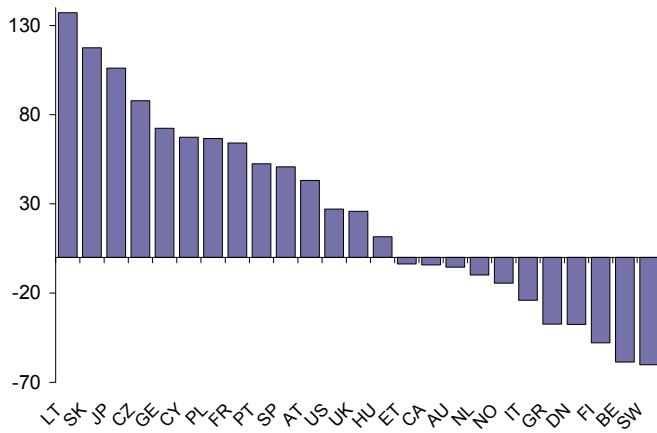
Figure 82. Selected Countries – Change in Household Debt/Disposable income (%), 1995-2008



Note: Values are for HH total financial liabilities over HH disposable income (net), defined as the sum of HH final consumption expenditure and savings minus the change in net equity of HH in pension funds. For the UK, Spain and Portugal values do not discount the change in net equity of households in pension funds. Countries missing include Ireland (data start in 2001), Latvia (1998), Slovenia (2001), Switzerland (1999), and Greece (2000).

Source: OECD, Eurostat (Latvia, Lithuania, Cyprus, Spain and Estonia), Office for National Statistics (UK), and Citi Research

Figure 83. Selected Countries – Change in General Government debt / Current Revenues (pp), 1995-2011

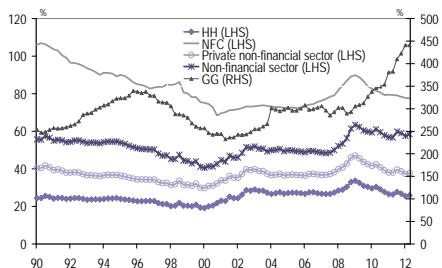


Note: Values correspond to change in the ratio general government gross debt to total current revenues between 1995 and 2011. General government gross debt is defined as total financial liabilities outstanding.

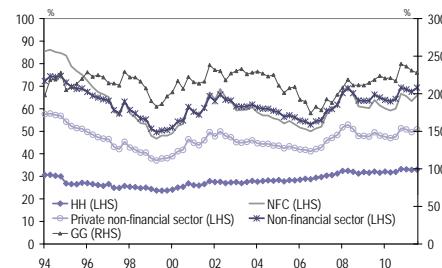
Source: OECD, IMF, National Sources, and Citi Research

Figure 84. Selected Countries – Gross Debt to Financial Assets (%) by Sector, 1990-2012 Q2

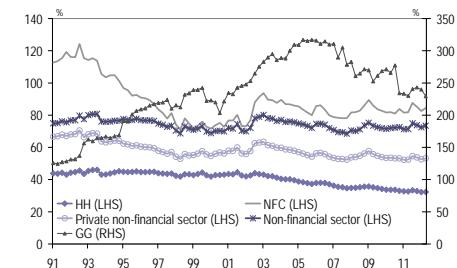
### United States



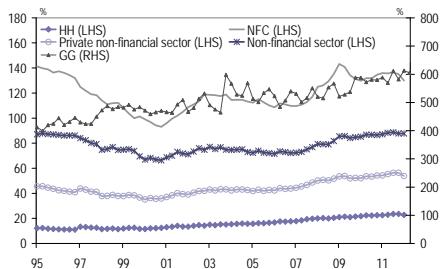
### France



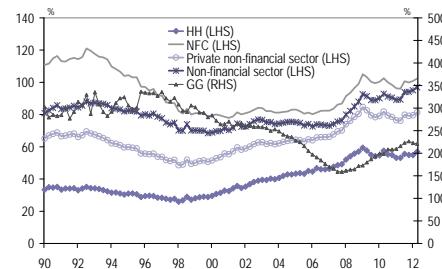
### Germany



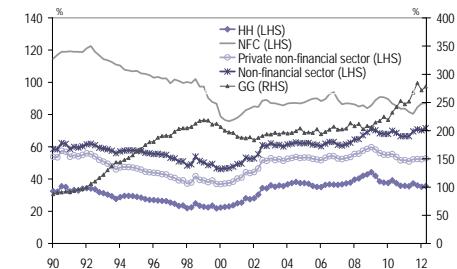
### Italy



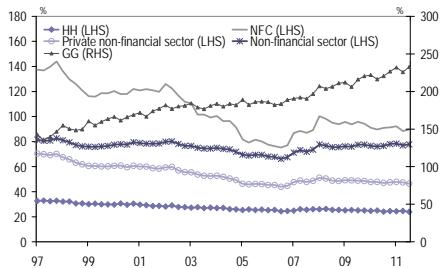
### Spain



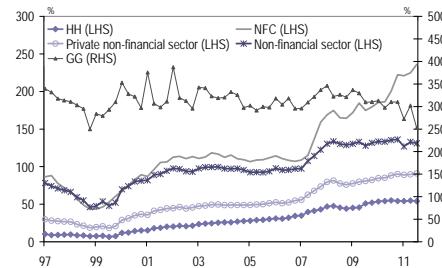
### United Kingdom



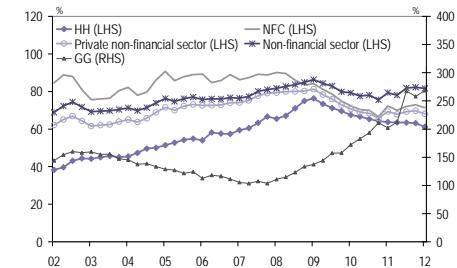
### Japan



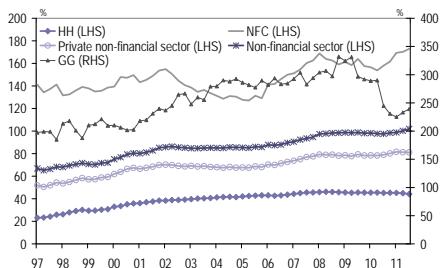
### Greece



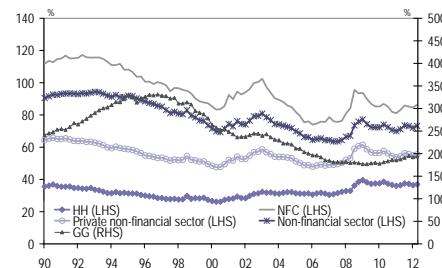
### Ireland



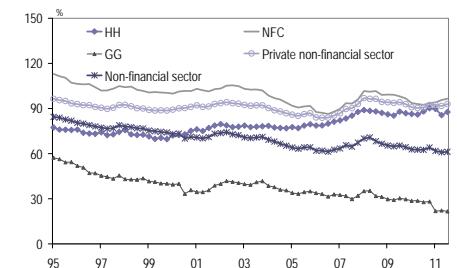
### Portugal



### Canada



### Norway

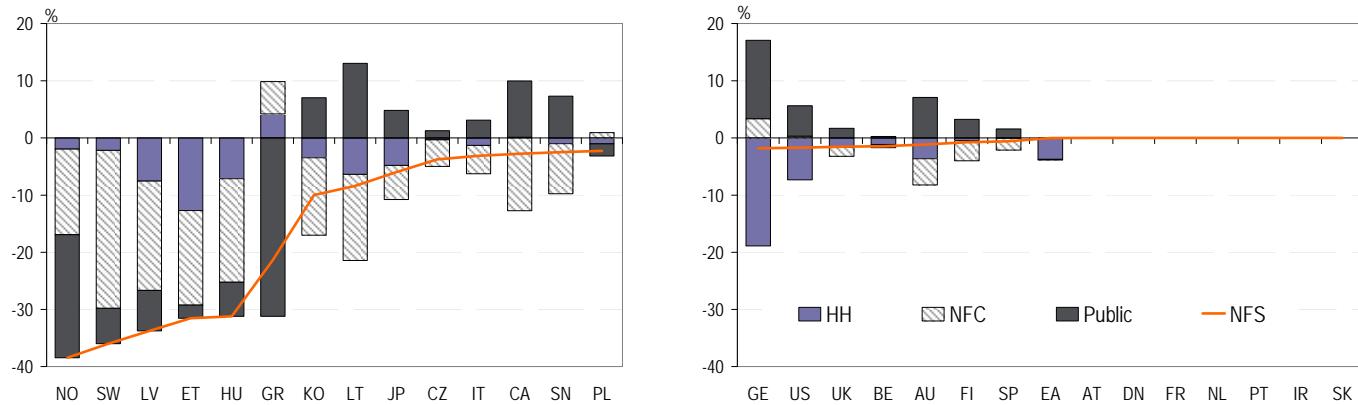


Note: Values correspond to gross debt over financial assets. Private non-financial sector is comprised of households and non-financial corporations.

Source: National sources, OECD, and Citi Research

### Deleveraging

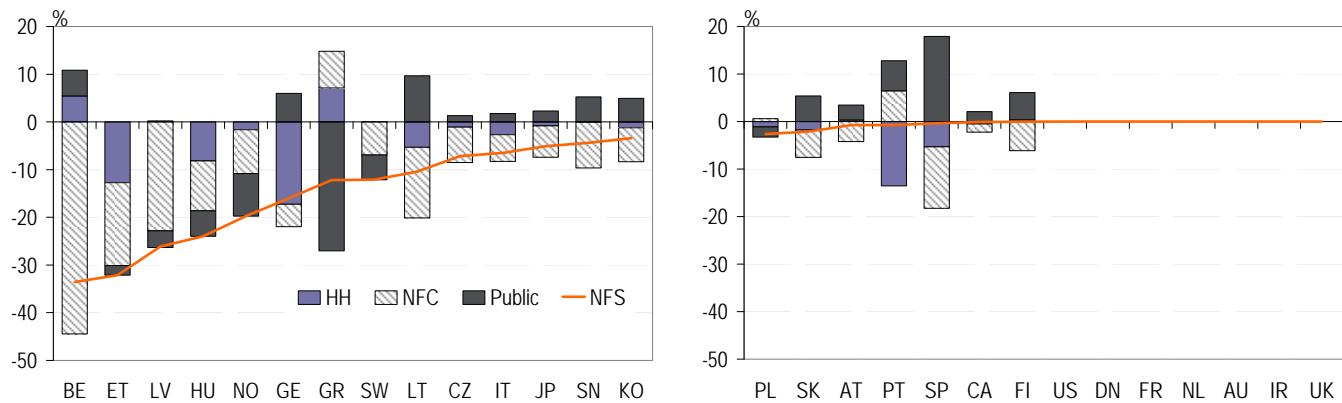
Figure 85. Selected Countries – Change in Broad Net Debt (% of GDP), Latest (2012 Q2) vs. Peak (since 2006)



Note: Broad net debt defined as gross debt minus holding of financial assets currency and deposits. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus and the EA it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi ResearchSource: OCED, Eurostat, National Sources and Citi Research

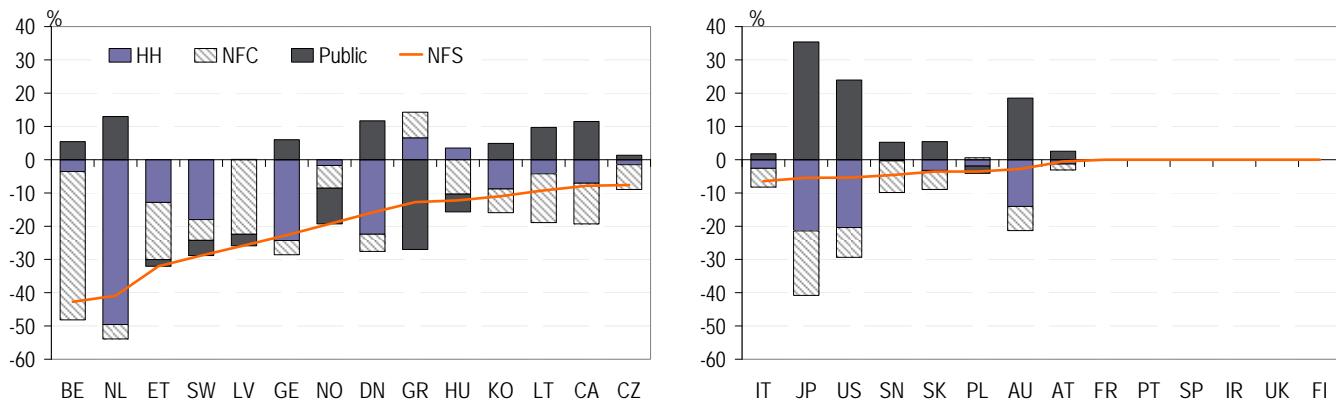
Figure 86. Selected Countries – Change in Net Debt 2 (% of GDP), Latest (2012 Q2) vs. Peak (since 2006)



Note: Net debt 2 defined as gross debt minus holding of financial assets i) currency and deposits, ii) securities others than shares, and iii) loans. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

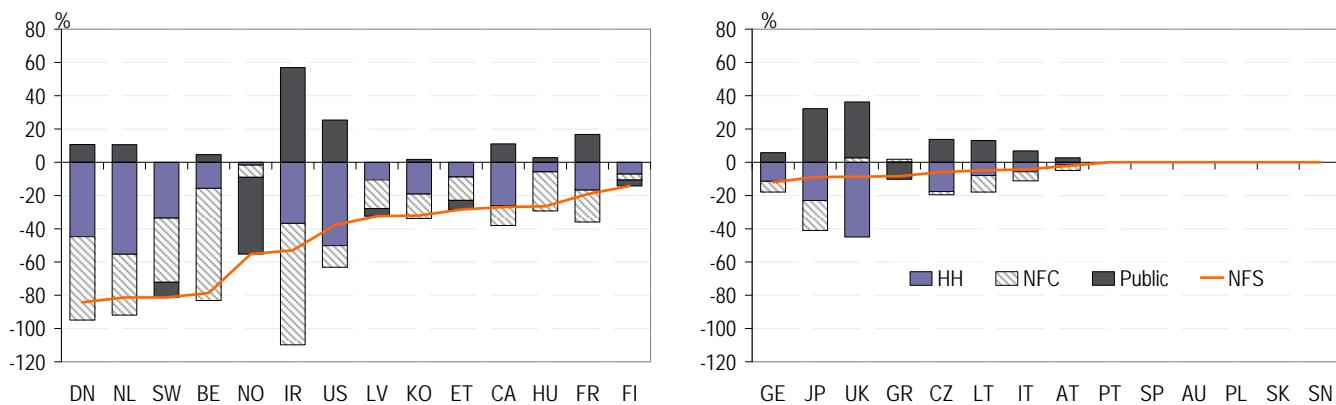
Figure 87. Selected Countries – Change in Net Debt 3 (% of GDP), Latest (2012 Q2) vs. Peak (since 2006)



Note: Net debt 3 defined as gross debt minus holding of financial assets i) currency and deposits, ii) securities others than shares, iii) loans and iv)insurance technical reserves. Values for Cyprus correspond to Dec-11. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

Figure 88. Selected Countries – Change in Narrow Net Debt (% of GDP), Latest (2012 Q2) vs. Peak (since 2006)



Note: Narrow net debt defined as gross debt minus holding of financial assets. Values for Italy, Ireland and the Netherlands correspond to Mar-12, while for Cyprus it correspond to Dec-11

Source: OCED, Eurostat, National Sources and Citi Research

### Net debt vs. GDP loss

Figure 89. Selected Countries – GDP Loss in 2011 (% vs. trend) and Prior Increase in Broad Net Debt

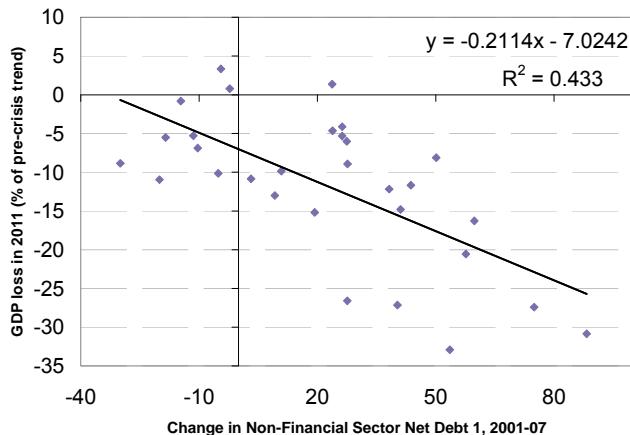
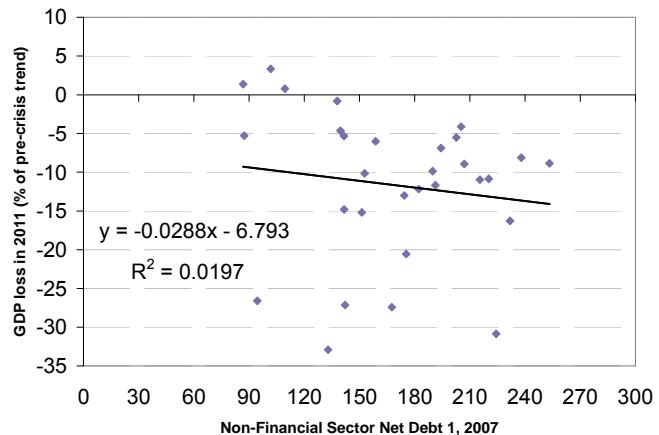


Figure 90. Selected Countries – GDP Loss in 2011 (% vs. trend) and 2007 Broad Net Debt Levels



Note: Broad net debt corresponds to gross debt minus assets item currency and deposits for households, non-financial corporations and general government. GDP loss is estimated as deviation from pre-recession trend. The trend was estimated by taking the average growth rate over t-10 to t-3 years, setting t at 2008. This pre-recession trend growth is then extrapolated from the year t-1, following "What's the Damage? Medium-Term Output Dynamics after Financial Crises", IMF World Economic Outlook, September 2009. Non-financial sector.

Source: IMF, OECD, National Sources, and Citi Research

Figure 91. Selected Countries – GDP Loss in 2011 (% vs. trend) and Prior Increase in Net Debt 2

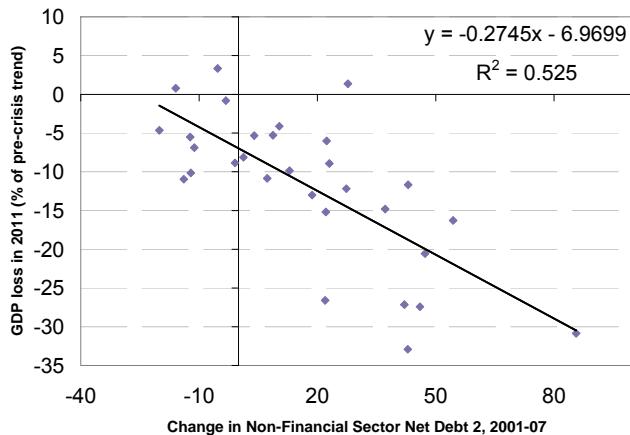
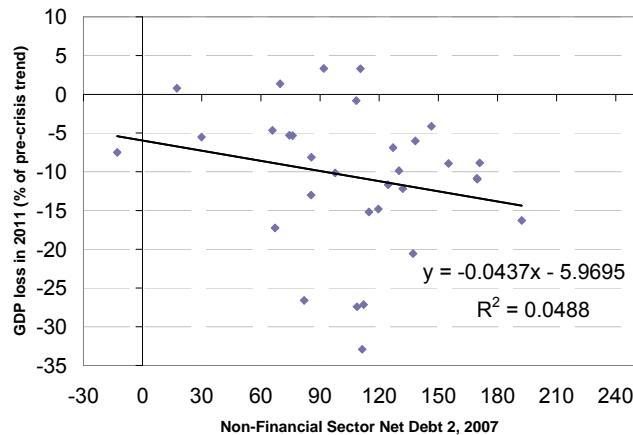


Figure 92. Selected Countries – GDP Loss in 2011 (% vs. trend) and 2007 Net Debt 2 Levels



Note: Net debt 2 corresponds to gross debt minus assets items: i)currency and deposits, ii)securities others than shares, and iii)loans, for households, non-financial corporations and general government. GDP loss is estimated as deviation from pre-recession trend. The trend was estimated by taking the average growth rate over t-10 to t-3 years, setting t at 2008. This pre-recession trend growth is then extrapolated from the year t-1, following "What's the Damage? Medium-Term Output Dynamics after Financial Crises", IMF World Economic Outlook, September 2009. Non-financial sector.

Source: IMF, OECD, National Sources, and Citi Research

Figure 93. Selected Countries – GDP Loss in 2011 (% vs. trend) and Prior Increase in Net Debt 3

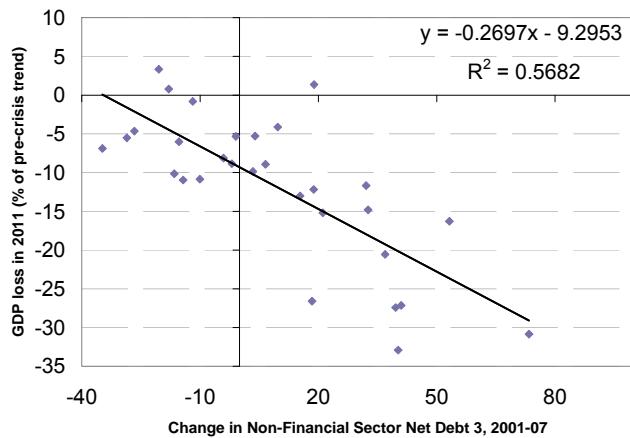
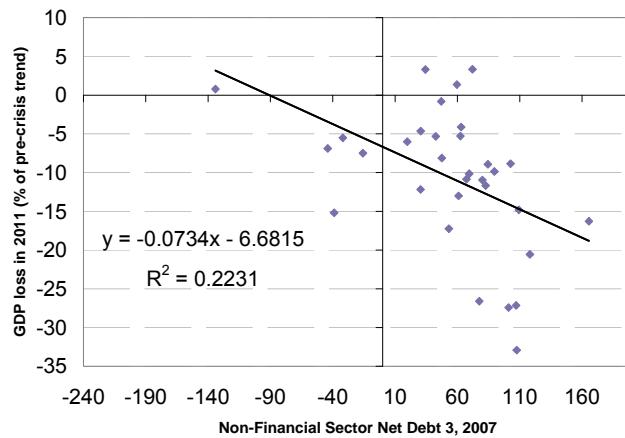


Figure 94. Selected Countries – GDP Loss in 2011 (% vs. trend) and 2007 Net Debt 3 Levels



Note: Net debt 3 corresponds to gross debt minus assets items: i) currency and deposits, ii) securities others than shares, iii) loans, and iv) insurance technical and reserves, for households, non-financial corporations and general government. GDP loss is estimated as deviation from pre-recession trend. The trend was estimated by taking the average growth rate over t-10 to t-3 years, setting t at 2008. This pre-recession trend growth is then extrapolated from the year t-1, following "What's the Damage? Medium-Term Output Dynamics after Financial Crises", IMF World Economic Outlook, September 2009. Non-financial sector.

Source: IMF, OECD, National Sources, and Citi Research

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# NOW/NEXT

## Key Insights on Global Debt



### POLICY

Some of the adverse consequences that large-scale debt reduction brings with it are probably inevitable. / Policy responses should be focused on minimizing the avoidable costs of deleveraging, allowing gross deleveraging to take place in an orderly and coordinated fashion, ensuring ready access to sufficient liquidity, providing orderly and efficient debt restructuring mechanisms and procedures, and encouraging net deleverage through increased saving rather than reduced investment.



### GLOBAL REACH

The entire process in the Euro Area of deleveraging sovereign, banking and in many countries household sectors and/or non-financial corporates could take the rest of the decade. / As Europe gradually exits the crisis phase of its sovereign and banking sector deleveraging process, the US and Japan are the probable next staging posts for painful and likely protracted sovereign deleveraging processes.



### SHIFTING WEALTH

The leverage party that started in the 1980's has come to a halt. Countries with the highest rates of nominal or real GDP growth between 2005 and 2008 generally tended to have the larger increases in non-financial sector gross debt. / Growth during the upcoming period of deleveraging is likely to be low across most advanced economies. Deleveraging following an asset price bust and in the aftermath of financial crises tends to be a particularly painful and protracted process.



