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Debt reduction after crises[1]

Financial crises tend to be followed by a protracted period of debt reduction in the non-financial private sector. We find that a period of debt reduction followed 17 out of 20 systemic banking crises that were preceded by surges in credit. Debt/GDP ratios fell by an average of 38 percentage points, returning to approximately the levels seen before the increase. If history is any guide, we should expect to see a much more significant reduction in private sector debt, particularly of households, than has so far taken place after the recent crisis. The costs of this process in forgone output are difficult to pin down, but there are reasons to believe that they need not be high provided that the banking sector problems that led to the crisis are fixed.

JEL classification: E21, E51.

Private sector indebtedness surged in several advanced economies prior to the global financial crisis. The ensuing "subprime" debacle was named for a particular segment of the US mortgage market that experienced very rapid growth up to 2007 and subsequently saw massive repayment problems. Yet this was the tip of a much larger iceberg. US households increased their indebtedness from close to 100% of disposable income in 2000 to more than 130% in 2007. Similarly, over the same period, British and Spanish households raised their debt by approximately 60 percentage points to more than 160% and almost 130%, respectively, of disposable income. The expansion in debt was not confined to households. Non-financial corporations in several, but not all, of these countries also increased their debt substantially, mainly to finance real estate, and subsequently experienced servicing problems.

Mounting loan delinquencies are a clear indication that this rise in indebtedness was not sustainable. Some of the debt will not be repaid and will have to be written off, if it has not already been. But debt reduction may not stop there. Lower house prices may induce households to reduce their desired levels of debt. Similarly, a lower level of output and tighter financial conditions could put firms under pressure to reduce their leverage.

This article looks at the historical record for guidance on a number of questions related to the debt levels of households and firms. First, how far will

[1] We thank Claudio Borio, Stephen Cecchetti and Robert McCauley for useful comments and suggestions. The views expressed are those of the authors and do not necessarily reflect those of the BIS.

debt fall after the crisis? Second, what are the implications of declining debt for output growth? Third, how can policy help the necessary adjustment in debt without disrupting economic growth? Of course, we are not the first to study past crises in search of insights about the present one. The most closely related study is that by Roxburgh et al (2010), who look at debt reduction episodes in 10 advanced and four emerging economies. However, instead of starting with crises and then studying the consequences, as we do, these authors search for episodes of debt reduction and then ask whether they were preceded by a crisis. As a result, they do not pick up crises that were not followed by debt reduction.

In what follows, we restrict our attention to debt of the non-financial private sector. The evolution of leverage in the financial sector has been documented elsewhere (eg BIS (2010), He et al (2010)). Public debt ratios actually fell in most countries prior to the crisis, before surging as expenditure soared and tax receipts collapsed.[2]

We find that what goes up tends to come down. In 17 of the 20 systemic banking crises in our sample that were preceded by a surge in credit, there was a subsequent reduction in private sector indebtedness. On average, the ratio of credit to the private sector to GDP fell by 38 percentage points after these 17 crises, returning to a level similar to the pre-boom situation. The decline in debt ratios is due in approximately equal parts to a fall in (nominal) credit outstanding, GDP growth and inflation.

The structure of the article is as follows: the first section documents the increase in private sector indebtedness prior to the most recent crisis and the extent of debt reduction that has taken place so far. The second section looks at the debt dynamics around previous crises. The next two sections provide some tentative evidence on the macroeconomic costs of debt reduction and the role of public policy in facilitating the adjustment. A final section concludes.

What has happened so far

Housing booms accompanied by soaring household and corporate debt

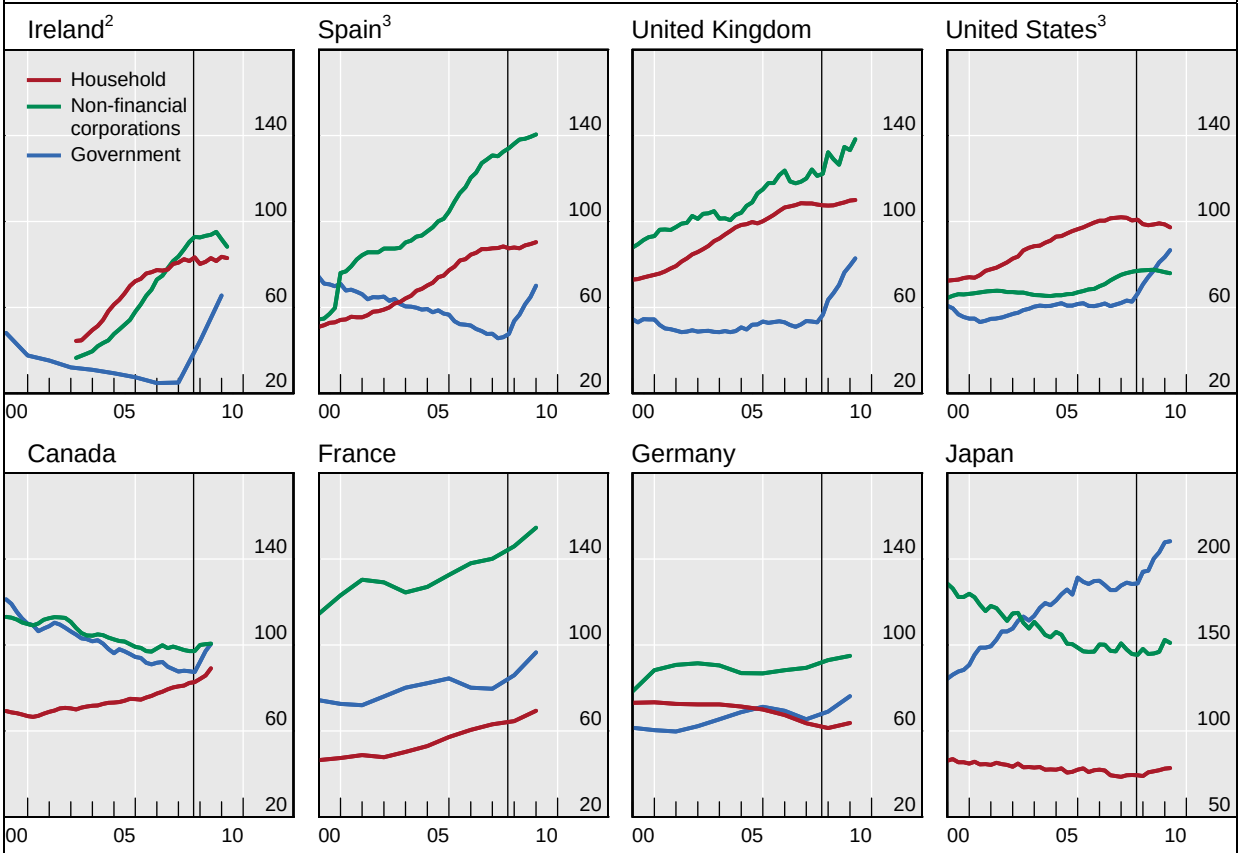
House prices and the debt of the private non-financial sector increased rapidly in many advanced economies in the years before the recent financial crisis. Household debt (red lines in Graph 1) in particular rose considerably in the countries that experienced a housing boom (Ireland, Spain, United Kingdom, United States and, to a lesser extent, Canada and France).[3] By contrast, households in countries with stable house prices (Germany, Japan) held their debt constant relative to GDP or even reduced it somewhat. Developments in the non-financial corporate sector were also associated with the housing boom, although the relationship was less immediate. Non-financial corporations sharply increased their debt in relation to GDP (green lines) in Ireland, Spain and the UK and, to a lesser extent, also in France. Real estate-related lending

[2] Reinhart and Rogoff (2010) analyse the dynamics of public debt around financial crises.

[3] We use total liabilities, stripping out shares and other equities where actual debt data is not available.

Debt to GDP ratios[1]

In per cent



The vertical line marks 15 September 2008, the date on which Lehman Brothers filed for Chapter 11 bankruptcy protection.

[1] Debt is measured as total liabilities for household and government sectors. Non-financial sector debt is characterised as total liabilities minus shares and other equity. [2] Due to data availability, total credit outstanding for the respective sectors substitutes for debt measures for households and non-financials. [3] Debt for non-financial sector is measured as total credit market instruments instead of total liabilities.

Sources: Central banks; national data; BIS calculations. Graph 1

accounted for much of these increases (Bank of England (2009), Fraile Izquierdo and Martínez Carrascal (2010)). Corporate debt ratios were much more stable, or even declined, in other countries, including the United States. Finally, government debt (blue lines) remained rather stable in most countries. Notable exceptions were Canada, Ireland and Spain, where public debt fell in relation to GDP, and Japan, which saw a steep increase.

Households have begun to reduce debt …

There are signs that households in some countries have started to reduce their debt. In the United States, both house prices and the ratio of household debt to GDP peaked in the middle of 2006 in the wake of higher interest rates and slowing economic activity. In other countries, house prices and household debt continued to go up at rates outstripping GDP growth for another couple of years. During the financial crisis, banks tightened credit standards and net credit growth slowed sharply or dropped into negative territory. Over the past three years, US households have been reducing their debt ratios, but the picture is less clear in the other countries that experienced a housing boom. The ratio of household debt to GDP fell by 5 percentage points in the United States, despite a sizeable fall in GDP. In Ireland, Spain and the United

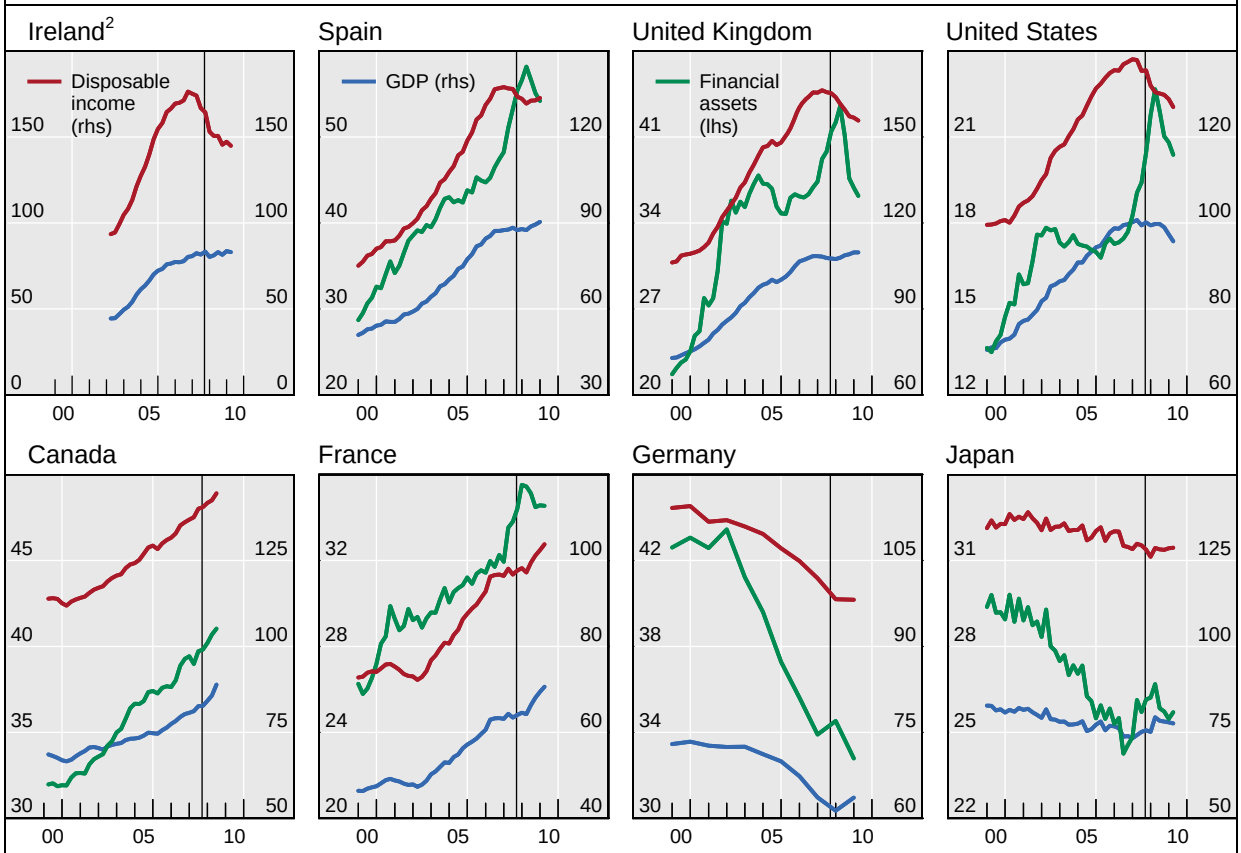
Kingdom, household debt fell, but not by enough to offset drops in GDP that were even sharper than in the US case. It is perhaps more informative to look at household debt relative to disposable income or financial assets, shown by the red and blue lines in Graph 2.[4] On these measures, household indebtedness also fell in Ireland, Spain and the United Kingdom. That said, households in all four countries remain substantially more indebted than at the outset of the housing boom, regardless of the measure used.

… but firms and the government have not

There were far fewer signs of debt reduction in the corporate sector after the crisis. On the contrary, corporate debt relative to GDP increased during the initial stages of the crisis in most countries, partly because firms drew on previously arranged credit lines. As the crisis deepened, corporations in most countries started to reduce their debt, although this did not translate into lower debt ratios owing to the sharp drop in GDP.

Household debt ratios[1]

In per cent of the indicators shown



The vertical line marks 15 September 2008, the date on which Lehman Brothers filed for Chapter 11 bankruptcy protection.

[1] Household debt measured as total liabilities for households and non-profit institutions serving households. [2] Due to data availability, total credit outstanding for the sector substitutes for household debt measures.

Sources: OECD; national data; BIS calculations. Graph 2

[4] Ideally, one would prefer to measure household leverage by dividing debt by total assets, including real estate and the present value of future labour income. Unfortunately, data on the value of households' property holdings are available only for a very few countries, while future incomes are inherently unobservable.

Finally, government debt shot up in all countries shown in Graph 1, with particularly large increases in the countries that had been through sizeable housing booms showing in the top row.

Financial crises and the credit cycle

Methodology

How does the reduction in private sector debt to date compare with the experience after previous crises? We start with the same set of 40 systemic banking crises as Cecchetti et al (2009), although data availability forces us to restrict the analysis to a smaller number of events. For three crises, we do not have quarterly credit and/or GDP data. Seven crises took place in economies that were in the early stages of a transition from a centrally planned to a market economy and three occurred in an environment of hyperinflation.[5] We believe that neither set is likely to provide useful insights for the current situation. This leaves us with a sample of 27 crises, listed in Table 1.

Due to the limited availability of flow of funds data, we cannot replicate the analysis at the sector level of the previous section for the past crisis. Instead, we are limited to measuring indebtedness as the ratio of domestic and foreign bank credit to the private sector of a country to its GDP.[6] This means that we ignore other sources of financing, eg securities issuance. That said, this is much less likely to matter for past crises than for the current one, since bank credit was by far the dominant source of finance for both households and non-financial corporations in all the crises in our sample.

Credit booms common in run-up to crises ...

The data in Table 1 show that financial crises often take place after a rise in the ratio of credit to GDP, as happened in the recent crisis. Some 20 of the 27 crises in the sample were preceded by a period in which credit/GDP expanded for a number of consecutive quarters (column A). Many of these increases were strong enough to qualify as credit booms, although precisely how many depends on the definition. If we follow Mendoza and Terrones (2008) and define a credit boom as a period in which the credit ratio exceeds its long-term trend by a certain threshold (column B),[7] then 13 of the 28 crises were preceded by credit booms. Finally, using a related definition by Borio and Drehmann (2009), 18 of the 28 crisis episodes were preceded by credit booms (column C).

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[5] Lack of data: Argentina 1980, Bolivia 1994, Estonia 1992. Transition: Bulgaria 1996, Croatia 1998, Czech Republic 1996, Latvia 1995, Lithuania (1995), Ukraine 1998, Vietnam 1997. Hyperinflation: Argentina 1989, Brazil 1990 and 1994.

[6] Data on domestic credit and GDP are obtained from the respective central bank through the BIS databank. If these are not available, we use IMF data. The foreign component of credit is from the BIS consolidated banking statistics. For developed economies, this data became available only in 1999. We therefore use the ratio of domestic credit to GDP for earlier crises in these economies.

[7] Mendoza and Terrones (2008) use annual data on per capita credit instead of quarterly data on credit/GDP. This has implications for the threshold that defines a credit boom. After some sensitivity analysis we settled on a somewhat simplified procedure and a threshold of 0.5.

Systemic banking crises and the credit cycle

Country	Crisis date	Credit boom			Boom followed by bust
		A	B	C	
Argentina	01/1995	Yes	No	Yes	No
Argentina	12/2001	Yes	Yes	Yes	Yes
Chile	11/1981	Yes	No	No	Yes
Colombia	07/1982	No	No	No	…
Colombia	06/1998	Yes	No	Yes	Yes
Dominican Republic	04/2003	No	Yes	Yes	Yes
Ecuador	08/1998	Yes	Yes	Yes	No
Finland	09/1991	Yes	Yes	Yes	Yes
Ghana	01/1982	No	No	No	…
Indonesia	11/1997	Yes	No	No	Yes
Ivory Coast	01/1988	Yes	No	Yes	Yes
Jamaica	12/1996	No	No	Yes	…
Japan	11/1997	Yes	No	No	Yes
Korea	08/1997	Yes	No	No	No
Malaysia	07/1997	Yes	Yes	Yes	Yes
Mexico	12/1994	Yes	Yes	Yes	Yes
Nicaragua	08/2000	Yes	Yes	Yes	Yes
Norway	10/1991	yes	Yes	Yes	Yes
Paraguay	05/1995	Yes	No	Yes	No
Philippines	07/1997	Yes	No	Yes	Yes
Russia	08/1998	Yes	Yes	No	Yes
Sri Lanka	01/1989	No	Yes	No	…
Sweden	09/1991	Yes	Yes	Yes	Yes
Thailand	07/1997	Yes	No	No	Yes
Turkey	11/2000	No	Yes	No	…
Uruguay	01/2002	Yes	No	Yes	Yes
Venezuela	01/1994	No	No	Yes	…

A: Visible increase in credit/GDP in years prior to the crisis. B: Credit boom as defined by Mendoza and Terrones. C: Credit boom as defined by Borio and Drehmann. Table 1

… tend to be followed by sizeable debt reductions …

A second finding in Table 1 is that what goes up tends to come down. More specifically, 17 of the 20 crises that were preceded by an increase in credit/GDP saw a subsequent reduction in that ratio.[8] Exceptions are Argentina and Paraguay in 1995, and Korea in 1997. In Argentina and Paraguay, credit growth merely paused for a while, before continuing. In both cases, the crises were caused by the fallout from the Mexican crisis in late 1994 (the so-called tequila effect) rather than primarily domestic factors. In

[8] None of the three crises without debt reduction experienced a credit boom as defined by Mendoza and Terrones. Debt ratios also declined in some of the crises that were not preceded by increases in credit/GDP. However, we exclude these to make our results more comparable to the current situation.

Korea, credit ratios barely slowed and continued to grow at a rapid pace after the crisis, unlike the experience of other East Asian economies at the time. However, the increase in the credit ratio went hand in hand with a change in the composition of credit from the non-financial corporate sector to the household sector.[9]

Both the build-up in private sector indebtedness before the crises and the subsequent reduction tended to be sizeable (Table 2). On average, private sector credit over GDP increased by 44 percentage points before the crisis, followed by a drop of almost the same magnitude (38 percentage points). Although there is significant variation across these means, it is striking that even the smallest amount of debt reduction (in Chile, where debt/GDP fell by 10 percentage points between end-1982 and the third quarter of 1983) was larger than what we have seen to date after the most recent crisis.

Our results show surprisingly little difference between developed and developing economies. The debt dynamics surrounding the four crises that

Debt reduction after systemic banking crises

Country	Crisis date	Credit cycle dates			Change in credit/GDP[1]		Debt reduction decomposition[1]		
		First trough	Peak	Second trough	Up	Down	Credit	Real GDP	Price level
Argentina	2001Q4	1991Q4	2002Q2	2005Q3	28	–30	–14	–10	–6
Chile	1981Q4	…	1982Q4	1983Q3	…	–10	…	…	…
Colombia	1998Q2	1992Q1	1998Q4	2005Q1	17	–16	5	1	–21
Dominican Republic	2003Q2	1995Q2	2003Q2	2007Q1	29	–26	6	–6	–26
Finland[2]	1991Q3	1980Q1	1992Q1	1998Q1	51	–44	–24	–11	–9
Indonesia	1997Q3	1993Q1	1998Q2	2002Q2	83	–104	–53	–19	–33
Ivory Coast	1988Q1	1984Q3	1988Q1	1994Q3	14	–27	–15	–5	–6
Japan	1997Q4	1980Q4	1999Q2	2008Q4	…	–26	–18	–19	12
Malaysia	1997Q3	1993Q3	1998Q1	2001Q1	72	–33	2	–24	–11
Mexico	1994Q4	1988Q3	1995Q1	1996Q4	24	–16	1	–1	–16
Nicaragua	2000Q3	1996Q2	2000Q4	2002Q1	19	–15	–11	–1	–3
Norway[2]	1991Q4	1980Q1	1990Q2	1996Q4	66	–38	6	–25	–19
Philippines	1997Q3	1991Q2	1997Q4	2007Q3	60	–50	…	…	…
Russia	1998Q3	1996Q1	1999Q1	2001Q2	29	–27	13	–15	–25
Sweden[2]	1991Q3	1985Q3	1990Q3	1996Q1	46	–35	–7	–12	–17
Thailand	1997Q3	…	1997Q4	2001q4	…	–78	–66	–7	–5
Uruguay	2002Q1	1995Q1	2002Q3	2007Q1	70	–64	–31	–11	–22
Average					44	–38	–14	–11	–14

[1] Percentage points. [2] Domestic credit. Table 2

[9] Data reported in Table 4 of Mohanty et al (2006) indicate that the share of housing-related lending in total bank credit increased from less than 10% shortly after the crisis to approximately one third five years later. Conversely, the share of business credit fell from 69% of total credit in 1999 to 47% in 2004. Consumer lending remained stable (in relative terms), at 17–18% of total bank credit. The share of lending to households also increased in Malaysia and Thailand over the same period, but credit ratios fell.

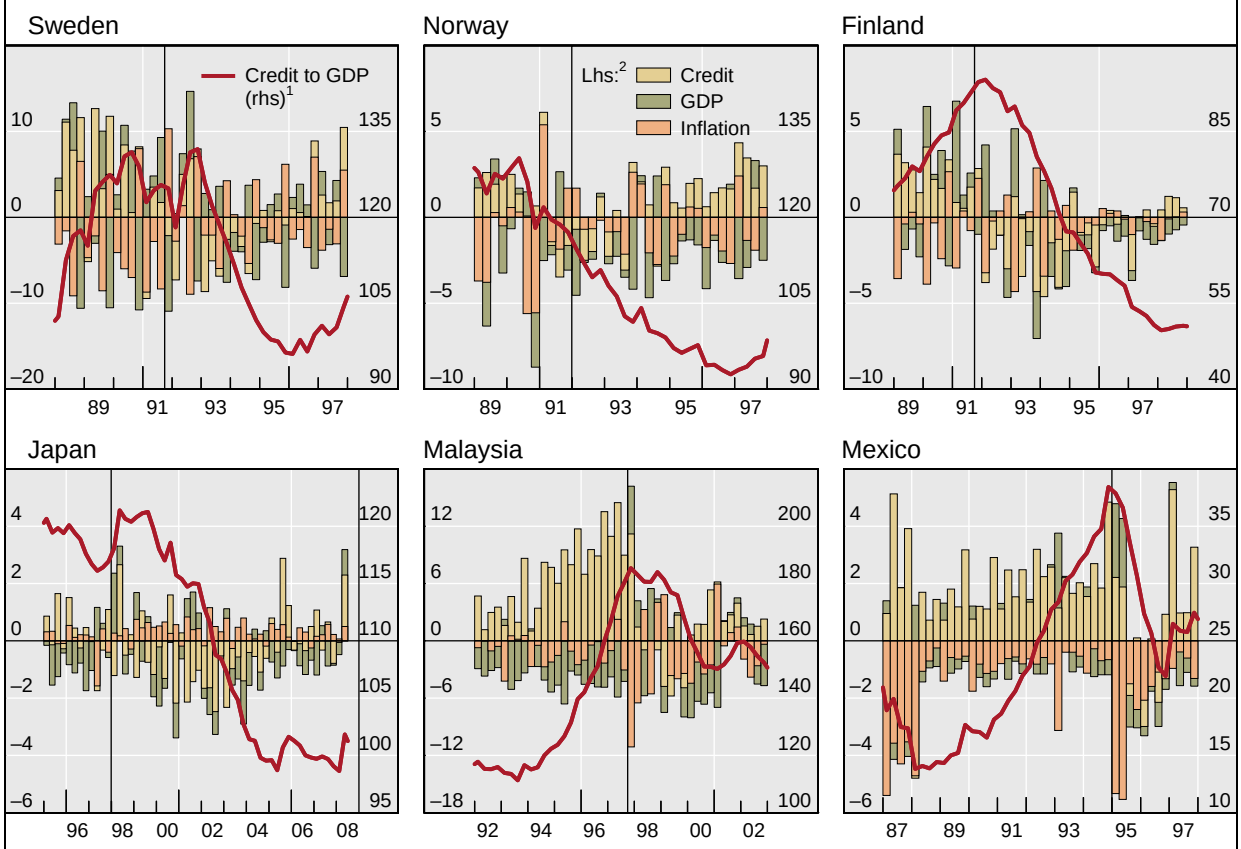
took place in developed economies (Finland, Norway and Sweden in 1991, Japan in 1997)[10] were not much different from those found in the developing world. The amplitudes of the credit boom/bust cycles experienced by the Nordics were quite close to the sample average. Japan experienced a slightly smaller reduction in debt (27 percentage points compared to a sample average of 38 percentage points), but this was still well inside the bulk of the distribution.

… involving reductions in credit, inflation, and economic growth

Debt ratios can be cut in various ways: paying off or defaulting on debt outstanding (we cannot distinguish between the two on the basis of the available data), economic growth, or inflation. We find that all three effects played roughly similar roles. Of the average decline in credit to GDP of 40 percentage points (excluding Chile 1982 and Philippines 1997, where quarterly real GDP data is not available), inflation and lower credit contributed 14 percentage points each, and real economic growth a further 11 percentage points.

These averages hide a considerable amount of variation across countries, confirming that there is no single way to reduce debt. Usually, debt reduction is

Credit ratios around six banking crises



The vertical reference lines mark the crisis episode.

[1] In per cent. [2] Contributions to percentage point change in credit to GDP ratio, in percentage points.

Sources: IMF *IFS*; IMF *WEO*; national data; BIS calculations. Graph 3

[10] See below for the dating of the Japanese crisis.

the result of a combination of factors. The exceptions were Colombia and Mexico, where the decline in debt ratios were (almost) entirely driven by inflation.

The importance of the various factors in the debt reduction process also varies over time. The stacked bars in Graph 3 show the decomposition of the quarterly changes in debt ratios in six economies. The graphs show that factors rarely have a consistently positive or negative impact on debt ratios, even if they explain a large proportion of the overall reduction. This is particularly true for real GDP growth (green bars). In the case of Finland, for example, GDP plummeted in 1990 and 1991. This pushed up debt ratios, as can be seen by the sizeable positive green bars. By 1992, however, the contraction bottomed out and the Finnish economy began to recover. As a consequence, GDP growth now exerted a downward pressure on debt ratios, as indicated by the negative green bars.

How costly is debt reduction?

Conflicting objectives: keep credit flowing and reduce debt

Public policy was caught on the horns of a dilemma during the crisis: on the one hand, the priority was to prevent a sharp contraction in the supply of credit to the private sector and, as a consequence, a collapse in economic activity. On the other hand, it was also vital for at least some sectors of the economy to repair their balance sheets, given that lax lending had clearly been a major factor leading to the crisis. In the light of these two seemingly contradictory aims, the big question is how to facilitate the necessary adjustment without disrupting economic growth. Since economic activity was already falling sharply between late 2008 and mid-2009, policymakers understandably leaned towards supporting credit rather than reducing debt. What can the crises of our sample tell us about the apparent trade-off between adjustment and supporting output growth?

A strict comparison of growth rates during the period of the surge in credit ratios with those during the debt reduction phase will not do the trick. The reason is that financial crises are often followed by a collapse in real activity. GDP fell by almost 8% on average after the 17 financial crises that were followed by a reduction in private sector debt to GDP.[11] Most of this decline took place during a relatively short period around the peak in credit ratios, in some cases before and in some after. This means that the average growth rates in the two periods are very sensitive to the choice of the sample and the exact dating of the peak.

Costs of crises not driven by debt reduction

Even so, there are reasons to believe that this sharp drop in output is not the consequence of the debt reduction process but would have occurred anyway. The first reason to suspect that debt reduction need not be costly is based on the dynamics of output and credit ratios after the crisis. Output often starts to contract before real credit, reaches a trough more quickly, and then

[11] Calculation based on data reported in Table 2 of Cecchetti et al (2009).

recovers at a rapid pace even though debt ratios are still falling. This makes it unlikely that the decline in credit ratios is the main driver of the output losses.

A second reason for doubting that the reduction in debt ratios is the main cause of output losses after crises is the experience of crises preceded by a credit boom but not followed by a debt reduction. As mentioned above, there were three such crises in our sample, of which two were followed by drops in output of a magnitude similar to those associated with the crises followed by debt reduction, although the third one was not. Output contracted by 6% in Argentina in 1995 and by 9% in Korea in 1997, whereas Paraguay experienced no output losses around its crisis in 1995.

Finally, there is also a theoretical argument that debt reduction need not reduce growth on a sustained basis. Biggs et al (2009) suggest that changes in the *flow* of credit (ie the second derivative of credit) are more relevant for output growth than changes in the *stock* (ie the first derivative).[12] This means that only the initial adjustment of households to new income levels leads to a drop in growth rates, but not the subsequent repayment of debt.

How to reduce debt: lessons from Japan

What can public policy do to facilitate the necessary adjustment in debt while mitigating the adverse impact on output? We try to answer this question by taking a closer look at the dynamics of output and the debt reduction process surrounding the Japanese crisis of the 1990s, a particularly instructive case.[13]

Successful debt reduction …

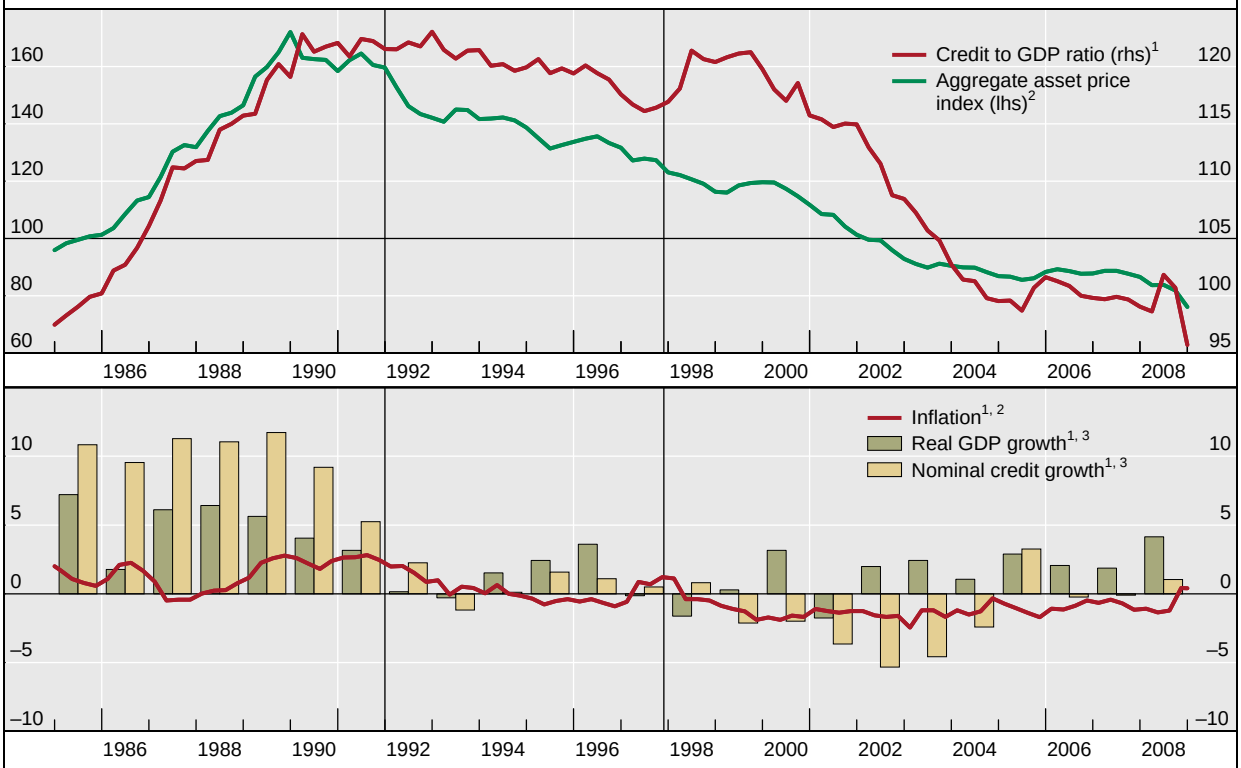
Japan actually went through two episodes of debt reduction, the first between end-1992 and mid-1997, when the ratio of credit to GDP fell by just 7 percentage points, and the second between mid-1999 and end-2008, when the debt ratio declined by 26 percentage points (Graph 4, top panel). Both phases showed moderate growth, the Japanese economy expanding at an average annual rate of 1.6% through 1993–97, and at 1.9% through 1999–2008. Despite the similar growth performance, the two periods were quite different in character.

The first period of debt reduction, between 1993 and 1997, culminated in the Japanese credit crunch. The bursting of the asset price bubble in the early 1990s and the subsequent years of stagnation had left Japanese banks with a large number of non-performing loans on their balance sheet. As a

[12] Mayer (2009) illustrates this point with some simple arithmetic: suppose a closed economy in which investment is funded entirely by borrowing: $I_t=\Delta D_t$. Since investment is equal to saving, $Y_t=C_t+\Delta D_t$ and $\Delta Y_t=\Delta C_t+\Delta\Delta D_t$. Biggs et al show that this holds true also in a more standard growth model.

[13] Dating a financial crisis is often difficult, but rarely more so than in this case. Laeven and Valencia (2008), on which the crisis dating in Cecchetti et al (2009) and this paper are based, trace the beginning of the Japanese crisis to November 1997, when the problems in the banking sector finally surfaced. However, these problems were not new but had existed for many years. Other observers, including Reinhart and Rogoff (2009), thus date the beginning of the Japanese crisis to 1992, after the bursting of the bubble led to the bankruptcy of many *jusen* (a type of non-bank financial institution).

Debt reduction in Japan



The vertical lines mark the beginning of the financial crisis in Japan: 1992, as indicated by Reinhart and Rogoff (2009), and November 1997, as in Laeven and Valencia (2008).

[1] In per cent. [2] Aggregated asset price index is an indicator for equity and property prices, 1985 = 100. [2] Calculated from the IMF *IFS* GDP deflator. [3] Changes in annualised real GDP and nominal credit.

Sources: IMF *IFS*; national data; BIS calculations. Graph 4

consequence, banks cut back their supply of new credit.[14] Neither allowing banks to book real estate loans at higher values nor capital infusions by the government proved to be effective in stimulating new lending. Allen et al (2009) argue that this was the case because the measures did not force banks to deal with the non-performing loan problem on their balance sheets. It was only after a rigorous examination of banks' non-performing loan portfolios in 1998 and a second round of capital infusions that banks began to lend again. However, it was not this timid recovery in lending that ended the period of debt reduction, but the contraction of economic activity that pushed up the ratio of debt to GDP in 1998 (Graph 4, bottom panel), thereby offsetting most of the debt reduction of the previous years.[15]

[14] See Watanabe (2007 for evidence on the credit crunch in Japan. Banks not only curtailed their supply of credit but also misdirected much of the lending that did take place to the wrong sector. Peek and Rosengreen (2005) argue that not forcing banks to write down loans (and shrink their lending) gave them incentives to evergreen loans, ie rolling over non-performing loans to firms that should have been bankrupt. This contributed to stagnation by preventing restructuring and thus curtailing profit opportunities for healthy firms (Caballero et al (2008)).

[15] The reasons for the sharp contraction in the Japanese economy are manifold. The credit crunch may have been a contributing factor, but the external shock posed by the East Asian financial crisis certainly played a major role.

The second period in debt reduction that started in mid-1999 resulted in a much more substantial reduction in debt/GDP than the first period. Nominal credit outstanding fell considerably over the period, driving down debt ratios by 19 percentage points, although this was partly offset by deflation. The Japanese economy's return to growth in 1999–2000 and after 2002 also pushed down debt ratios. What is surprising is that there is much less evidence of restrictions in credit supply than in the first period, despite the much sharper fall in nominal credit outstanding. The likely reason is that this time Japanese policymakers had dealt with the problems in the banking sector that had been left lingering in the first period.

… requires banks to recognise losses and raise capital

The Japanese experience offers a key lesson for policymakers on how to reduce private sector debt: fix the banking system first. This involves the early full recognition of losses and the restructuring of bank balance sheets. The latter requires raising the necessary amount of capital. Only then will banks be able to provide new loans.[16]

Conclusions

Reducing private sector debt may not be on top of policymakers' minds when output is falling rapidly, as in late 2008 and early 2009. But as the economy recovers it is important to address the problems that led to the crisis in the first place. In addition to, and as a result of, inadequate regulation there was a sharp build-up in private debt, particularly mortgage lending to households, in several countries.

The historical record casts doubt on whether debt reduction can be avoided. Almost all the crises in our sample that were preceded by a credit boom were followed by sizeable drops in the ratio of credit to GDP. Of course, to quote Mark Twain, history does not repeat itself, but it rhymes. We are not aware of any compelling reason why this particular episode should be an exception. Admittedly, the low level of interest rates in most of the crisis countries may reduce pressures to adjust debt levels, but this could quickly change.

A possible concern is that a sustained period of debt reduction might lead to low growth in the future. Our analysis casts doubt on this. Growth rebounds rather quickly in most of our episodes, even though debt ratios continue to fall. We take this as indication that it is possible to reduce debt and still experience healthy growth. For this to be the case, policymakers have first to fix the problems in the banking system that led to the financial crisis. The experience of Japan, but also that of other crises, indicates that this requires essentially two things: to (i) recognise losses, and (ii) rebuild bank capital.

[16] These lessons are not new. In their much more detailed analysis, Hoshi and Kashyap (2010) come to similar (and additional) conclusions. Similar lessons can be drawn from other crises. Borio et al (2010) argue that the Nordic banking crises of the early 1990s offer three main lessons: (i) problems have to be recognised early and measures have to be taken quickly, (ii) intervention has to be comprehensive (a point also raised by Hoshi and Kashyap), and (iii) systemic costs have to be balanced with moral hazard.

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