McKinsey Global Institute

January 2010

Debt and deleveraging: The global credit bubble and its economic consequences

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James Manyika

Preface

Debt and deleveraging: The global credit bubble and its economic consequences is the latest research by the McKinsey Global Institute (MGI) on the continuing financial crisis. In this report, we analyze in detail how debt and leverage have evolved in the public and private sectors in ten mature economies and four emerging economies. We also built an extensive database covering 45 episodes since 1930 in which an economy deleveraged, or significantly reduced its total debt-to-GDP ratio. With this database, we were able to identify four typical paths, or "archetypes," for the deleveraging process. This enabled us to analyze the macroeconomic channels for deleveraging and the economic consequences of the process in the past. Finally, we have identified the practical implications of our work for policy makers, financial regulators, and business executives.

This project was led by Charles Roxburgh, an MGI director, and Susan Lund, MGI director of research. The project team comprised the following MGI fellows: Tony Wimmer, Eric Amar, Charles Atkins, and Ju-Hon Kwek. Nell Henderson provided editorial support. The team also benefited from the contributions of Deadra Henderson, MGI operations specialist, and Rebeca Robboy, MGI external communications manager.

This report would not have been possible without the thoughtful input and expertise of numerous McKinsey colleagues around the world. These include Ignacio Abengoechea, Stephen Bear, Tab Bowers, Lowell Bryan, Kevin Buehler, Christian Casal, Dominic Casserley, Toos Daruvala, Ramon Forn, Philipp Härle, and Carlos Trascasa. We also benefited from numerous interviews with regulators, bank executives, and practitioners in the field. And we especially wish to thank our external academic advisers, Martin N. Baily, a senior adviser to McKinsey & Company and a senior fellow at the Brookings Institution, and Kenneth Rogoff, a professor of public policy and economics at Harvard University.

Our aspiration is to provide business leaders and policy makers around the world with a fact base to better understand the most important trends shaping global financial markets today. With this report, we hope to stimulate discussion and improve the chances of financial stability in the future.

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January 2010

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Executive summary

The recent bursting of the great global credit bubble not only led to the first worldwide recession since the 1930s, but also left an enormous burden of debt that now weighs on the prospects for recovery. Today, government and business leaders are facing the twin questions of how to prevent similar crises in the future and how to guide their economies through the looming and lengthy process of debt reduction, or deleveraging.

To help address these questions, the McKinsey Global Institute launched a research effort to understand the growth of debt and leverage before the crisis in different countries, the economic consequences of deleveraging, and the practical implications for policy makers, financial regulators, and business executives. In the course of the research, we created an extensive fact base on debt and leverage[1] in each sector of ten mature economies and four emerging economies.[2] In addition, we analyzed 45 historic episodes of deleveraging, in which an economy significantly reduced its total debt-to-GDP ratio, that have occurred since 1930.

This analysis adds new details to the picture of how leverage grew around the world before the crisis, and how the process of reducing it could unfold. We find that:

- Leverage levels are still very high in some sectors of several countries—and this is a global problem, not just a US one.
- To assess the sustainability of leverage, one must take a granular view using multiple sector-specific metrics. Our analysis has identified ten sectors within five economies that have a high likelihood of deleveraging.
- Empirically, a long period of deleveraging nearly always follows a major financial crisis.
- Historic deleveraging episodes have been painful, on average lasting six to seven years and reducing the ratio of debt to GDP by 25 percent. GDP typically contracts during the first several years and then recovers.
- If history is a guide, we would expect many years of debt reduction in specific sectors of some of the world's largest economies, and this process will exert a significant drag on GDP growth.

Our findings hold several important implications for policy makers, regulators, and business leaders as they seek to navigate these unprecedented economic conditions and ensure greater financial stability and prosperity for the future.

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1 Throughout this paper, we use "debt" to refer to the outstanding amount of debt, comparing across countries by measuring it relative to GDP. "Leverage" refers to debt relative to assets or income and is measured differently, and often in multiple ways, for each sector. See *Appendix A: Technical notes* for more detail.

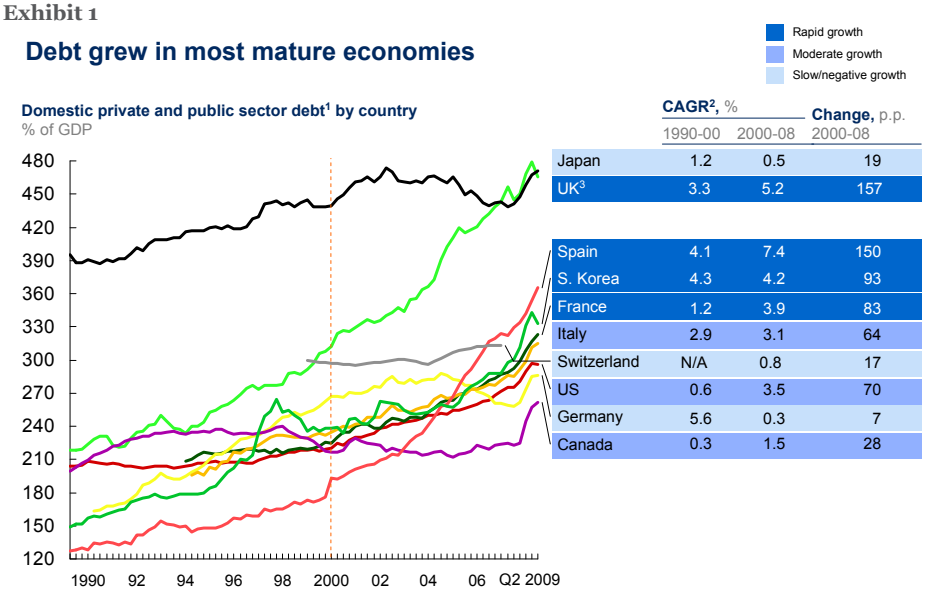
2 The mature economies we examined are Canada, France, Germany, Italy, Japan, South Korea, Spain, Switzerland, the United Kingdom, and the United States. The emerging economies we examined are Brazil, China, India, and Russia.

THE GROWTH OF DEBT AND LEVERAGE BEFORE THE CRISIS WAS A GLOBAL EVENT

Most analyses of the crisis have focused on the roles played by US mortgage lending and financial sector leverage. But our analysis shows that this view misses a large part of the picture. Enabled by the globalization of banking and a period of unusually low interest rates and risk spreads, debt grew rapidly after 2000 in most mature economies. By 2008, several countries—including the United Kingdom, Spain, South Korea, and France—had higher levels of debt as a percentage of GDP than the United States (Exhibit 1). But this crude metric is insufficient for judging whether current levels of leverage are sustainable.

Exhibit 1

Debt grew in most mature economies



	CAGR[2], % 1990-00	CAGR[2], % 2000-08	Change, p.p. 2000-08
Japan	1.2	0.5	19
UK[3]	3.3	5.2	157
Spain	4.1	7.4	150
S. Korea	4.3	4.2	93
France	1.2	3.9	83
Italy	2.9	3.1	64
Switzerland	N/A	0.8	17
US	0.6	3.5	70
Germany	5.6	0.3	7
Canada	0.3	1.5	28

1 "Debt" is defined as all credit market borrowing including loans and fixed-income securities.
2 Compound annual growth rate. Where data are unavailable, the longest possible period is used.
3 Even after removing foreign lending by UK banks, UK debt/GDP remains higher than every country except Japan.

SOURCE: Central banks; Haver Analytics; McKinsey Global Institute

Taking a more granular view of leverage within sectors of the economy, we find that households increased their borrowing substantially, particularly through home mortgages. Rising housing prices meant that the ratio of household debt to assets appeared stable in the years prior to the crisis. But household debt compared with disposable income increased significantly, which should have raised a red flag long before the crisis hit. The nonfinancial business sector in most countries entered the crisis with lower leverage, measured as the ratio of debt over book equity, than at the start of the decade. The exceptions were the commercial real estate sector and companies bought through leveraged buyouts. Government debt prior to the crisis was flat or even declining in most countries—a fortunate state, given the current amount of crisis-related public spending.

Within the financial sector, the growth of leverage varied greatly across different institutions and countries. The evidence shows that bank leverage in aggregate increased modestly relative to historic levels in most countries.[3] Only specific pockets of the financial sector—such as US broker dealers and certain European banks—experienced a substantial increase in leverage prior to the crisis. Just as importantly, many banks also had a marked deterioration in the quality of their capital,

3 This is true for many different measures of leverage. In this report, we use both gross leverage, or total assets to equity, as well as tangible assets to tangible common equity.

as they substituted hybrid forms of capital for common equity. The crisis has shown, however, that common equity was the only form of capital that absorbed losses. Given the broad array of incentives for banks to substitute debt for equity, our analysis supports actions already taken by regulators to improve the quality of capital by raising the amount of common equity that banks must hold.[4]

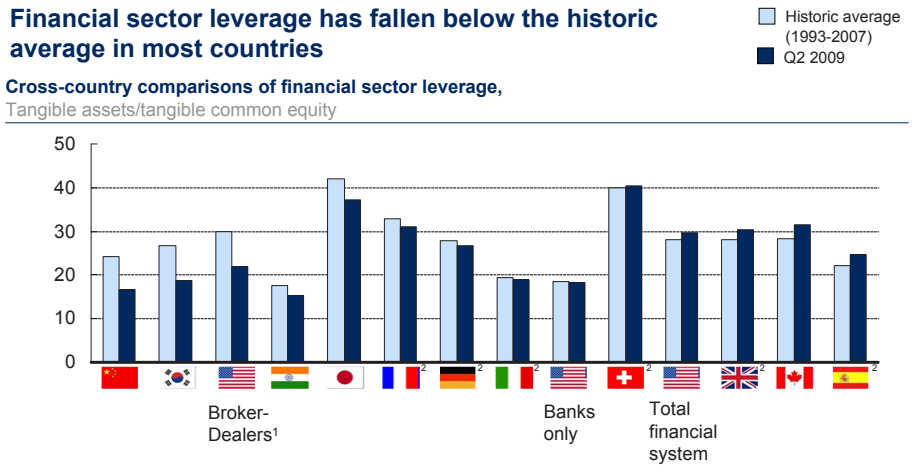
DELEVERAGING HAS ONLY JUST BEGUN

While the crisis abruptly halted the growth of credit in many economies, the process of deleveraging is just starting. As of the second quarter of 2009, we find that total debt relative to GDP had fallen, and only slightly, in just a handful of countries, including the United States, the United Kingdom, and South Korea. One reason for the small overall deleveraging to date has been the increase in government debt, which has offset declines in household sector debt. The current projections for rising government debt in some countries, such as the United Kingdom and the United States, may preclude any significant deleveraging of the total economy over the next few years.

Financial sector leverage, in contrast, has already fallen to the average historic levels prior to the crisis (Exhibit 2). We find that in most countries, by the second quarter of 2009, the banking system had deleveraged to the point at which capital levels were at or above the average levels of the 15 years preceding the crisis. Whether more capital is needed in addition to what banks have now accumulated remains unknown. And given the possibility of economy-wide deleveraging going forward, any such measures to boost capital requirements should be phased in very cautiously over time to minimize the reduction of credit provision.

Exhibit 2

Financial sector leverage has fallen below the historic average in most countries



1 Includes Morgan Stanley, Goldman Sachs, and Merrill Lynch as of Q4 2008.
2 Leverage based on an estimate of GAAP assets (converted from IFRS).

SOURCE: SNL Financial; Compustat; Bloomberg; national financial regulators; McKinsey Global Institute

4 Regulators have proposed increasing the ratio of Core Tier 1 capital to risk-weighted assets. Core Tier 1 capital includes common stock, reserves created out of retained earnings or surpluses related to share issuance, and minority interest in consolidated subsidiaries.

GOING FORWARD, SPECIFIC SECTORS OF FIVE ECONOMIES HAVE THE HIGHEST LIKELIHOOD OF DELEVERAGING

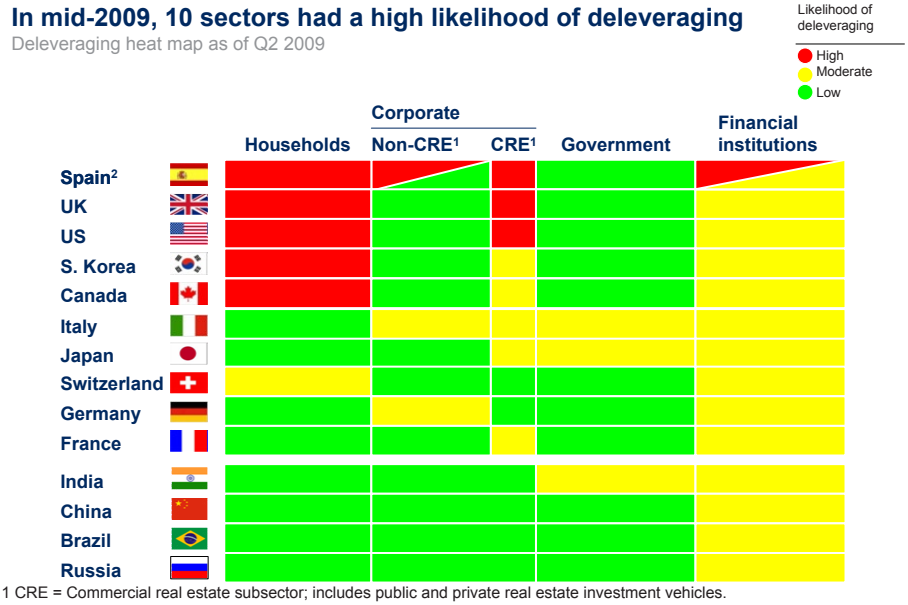
Our analysis finds that aggregate measures of leverage in an economy, such as the ratio of total debt to GDP, are in and of themselves not a reliable guide to the sustainability of debt or the likely speed or extent of deleveraging. Our historic case studies include economies that have gone through painful and significant deleveraging with relatively low debt-to-GDP levels, as well as countries that have maintained very high levels for many years. To assess the likelihood of deleveraging going forward, one needs to take a very granular approach and look at individual sectors. Even within sectors, one must use multiple lenses to assess the sustainability of debt, including the rate of growth of leverage, debt servicing capacity, and the borrowers' vulnerability to income interruptions or sharp increases in interest rates.

We have developed a set of such sector-specific metrics that are comparable across countries and constructed a preliminary "debt and deleveraging heat map" (Exhibit 3). It color codes each sector according to its likelihood of deleveraging: red is high; yellow is moderate; green is low. The map shows that ten sectors in five economies have the highest likelihood of deleveraging. These are the household sectors in five mature economies (the United Kingdom, the United States, Spain, and to a lesser extent Canada and South Korea), the commercial real estate sectors in three of these economies (the United Kingdom, the United States, and Spain), and the corporate sector and parts of the financial sector in Spain.[5] But the publicly available data are imperfect, inconsistent, and not sufficiently granular for robust policy making. A natural role for the institutions charged with maintaining national and international financial stability (such as the International Monetary Fund or Financial Stability Board) would be to develop and maintain this type of monitoring system and take it to the next level of detail.

Exhibit 3

In mid-2009, 10 sectors had a high likelihood of deleveraging

Deleveraging heat map as of Q2 2009



1 CRE = Commercial real estate subsector; includes public and private real estate investment vehicles.
2 A split box indicates some portion of a sector, not necessarily 50 percent.

SOURCE: McKinsey Global Institute

5 Spain's banks had not deleveraged as much as those in the United Kingdom, the United States, or Switzerland by the second quarter of 2009 because a higher proportion of loans are held on balance sheet and therefore not marked to market. There is a distinct difference, however, between Spain's largest banks and the smaller, regional ones: the latter have a high likelihood of deleveraging.

FINANCIAL CRISES ARE TYPICALLY FOLLOWED BY DELEVERAGING EPISODES THAT SLOW GDP GROWTH

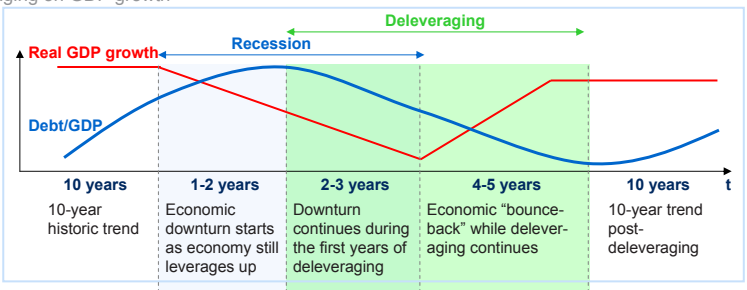
While we cannot say for certain that deleveraging will occur today, we do know empirically that deleveraging has followed nearly every major financial crisis in the past half-century. We find 45 episodes of deleveraging since the Great Depression in which the ratio of total debt relative to GDP declined, and 32 of them followed a financial crisis. These include some instances in which deleveraging occurred only in the public sector; others in which the private sector deleveraged; and some in which both the public and private sectors deleveraged simultaneously (*See Appendix B: Historical episodes of deleveraging*). The historic episodes of deleveraging fit into one of four archetypes: 1) austerity (or "belt-tightening"), in which credit growth lags behind GDP growth for many years; 2) massive defaults; 3) high inflation; or 4) growing out of debt through very rapid real GDP growth caused by a war effort, a "peace dividend" following war, or an oil boom.

The "belt-tightening" archetype was by far the most common of the four, accounting for roughly half of the deleveraging episodes. If today's economies were to follow this path, they would experience six to seven years of deleveraging, in which the debt-to-GDP ratio declines by around 25 percent. Deleveraging would begin two years after the start of the crisis, and GDP would contract for the first two to three years of deleveraging, and then start growing again (Exhibit 4).

Exhibit 4

Real GDP growth is significantly slower in the first 2-3 years of deleveraging

Impact of deleveraging on GDP growth



Average annual real GDP growth, %	10 years	1-2 years	2-3 years	4-5 years	10 years
1 "Belt-tightening" n = 16	4.7	0.6	-0.6	4.8	3.2
2 "High inflation" n = 8	4.3	-1.7	-1.4	4.1	4.2
3 "Massive default" n = 7	4.3	-1.8	-3.0	5.7	4.8
4 "Growing out of debt" n = 1	7.9	0.8	12.8[1]		2.3
Total n = 32	**4.6**	**-0.5**	**-1.3**	**5.1**	**3.8**

1 Deleveraging driven by off-trend growth is not linked to a recession.

SOURCE: International Monetary Fund; McKinsey Global Institute analysis

Several features of the crisis today, including its global nature and the large projected increases in government debt, could delay the start of deleveraging and result in a longer period of debt reduction than in the past. In past episodes, a significant increase in net exports often helped support GDP growth during deleveraging. But it is unlikely today that the most highly leveraged major economies could all simultaneously increase their net exports. Moreover, current projections of government debt in some countries, such as the United Kingdom, the United States, and Spain, may offset reductions in debt by households and commercial real estate sectors. We therefore see a risk that the mature economies may remain highly leveraged for a prolonged period, which would create a fragile and potentially

unstable economic outlook over the next five to ten years. They may then go through many years in which, all else being equal, GDP growth is slower than it would have been otherwise as debt is paid down.

POLICY MAKERS CAN TAKE SEVERAL STEPS TOWARD PREVENTING FUTURE CREDIT BUBBLES

Our analysis has several implications for policy makers and regulators seeking to ease the deleveraging process and enhance future financial market stability.

First, history shows that policy makers can enable healthy deleveraging by supporting GDP growth through multiple channels. Many historic examples, from the United States in the 1930s to Japan in 1997, show the danger of withdrawing support of the economy too soon. However, faced with large increases in public debt, many governments face an acutely difficult decision on how long to provide support and when to curtail public spending.

Additionally, our analysis shows that the right tools could have identified the unsustainable buildup of leverage in pockets of several economies in the years leading up to the crisis. Policy makers should work toward developing a robust system for tracking leverage at a granular level across countries and over time. Ideally, an international body should be tasked with collecting the data from individual countries. These data can inform macroprudential policies, as well as provide inputs into the risk models of banks and nonfinancial corporations. A revised Basel II framework could require banks to adjust their internal risk weights to reflect levels of leverage in the relevant sector of the real economy. Central banks, too, could use this information: although it may be difficult to identify asset bubbles based on price movements, the growth and nature of leverage may serve as a good proxy and could inform monetary policy.

Finally, policy makers should revisit the numerous incentives for borrowing, especially in real estate markets. This includes tax breaks for mortgages, as the United States provides, and other policies as well, because we observed high levels of household debt in Canada and the United Kingdom, which lack such tax incentives. Many governments provide subsidies and other programs to encourage home ownership. And multiple policies provide tax advantages and other incentives that induce companies to issue debt rather than equity. Certainly, ample credit is needed for the growth of modern, developed economies. But excessive borrowing, especially combined with loose lending standards, can cause serious harm to individual households, companies, and the broader financial system. Therefore, as part of longer term reform of the global financial system, it would be valuable to reassess the incentives that may contribute to excessively high leverage.

Business executives also will face challenges during the deleveraging process. An environment of tighter and more costly credit will alter the viability of some business models and the attractiveness of certain types of investments. With the household sectors likely to deleverage in several countries, consumption will probably grow more slowly than before the crisis, causing spending patterns to shift. Business leaders will need flexibility to respond to such changes

***

At this writing, the deleveraging process has barely begun. Each week brings news of another country straining under the burden of too much debt or impending

bank losses from over-indebted companies. The bursting of the great global credit bubble is not over yet. Just as worrisome is the fact that deleveraging is likely to be a significant component of the postcrisis recovery, which would dampen growth. Nevertheless, by learning lessons from historic experiences of deleveraging, today's policy makers may be better able to steer a course through these challenging waters.

Debt and deleveraging: The global credit bubble and its economic consequences

As is by now well known, the levels of debt and leverage grew steadily in the world's developed economies for more than a decade before the global financial crisis, and this growth accelerated after 2000. Today, with asset prices falling and credit losses mounting, it appears we may be entering a period of debt reduction, or deleveraging, both of the overall economy and within those sectors that experienced the highest buildup of debt before the crisis. Going forward, government and business leaders face the questions of how to navigate through the difficult times ahead and how to prevent similar crises in the future.

To help address these questions, the McKinsey Global Institute launched a research project to understand the growth of debt and leverage before the crisis and the economic consequences of deleveraging. We find that leverage remains very high in at least ten sectors of five major economies—Canada, Spain, South Korea, the United States, and the United Kingdom. While we cannot say for certain whether these sectors will deleverage, we do know that nearly every significant financial crisis in the post-World War II period was followed by a lengthy and painful period of deleveraging. These episodes lasted on average six to seven years, with total debt as a percentage of GDP declining by roughly 25 percent. GDP contracted in the initial years of deleveraging but rebounded in the later years. If history is a guide, therefore, we would expect a significant period of deleveraging to come, which will dampen GDP growth.

This report is organized as follows: First, we assess the increases in debt and leverage in ten mature economies and four emerging economies[6]—breaking down that data by each country's financial, household, nonfinancial business, and government sectors. We then analyze the sustainability of current levels of leverage in those sectors and construct a "heat map of deleveraging." The map shows which sectors in which economies are most likely to deleverage. Third, we analyze 45 episodes of deleveraging since 1930, focusing on the 32 episodes that occurred after a financial crisis. From these episodes, we draw insights into the macroeconomic channels through which a country can deleverage. Finally, we discuss the policy and business implications of our findings. In the appendices, we provide more detail on seven historic episodes of deleveraging and technical notes on our methodology.

With this report, we hope to help policy makers, regulators, and business leaders as they steer a course through the complex process of deleveraging in the years to come and seek to improve financial stability in the future.

THE GREAT GLOBAL CREDIT BUBBLE

While most analyses of the crisis have focused on the roles played by the US subprime mortgage market and leverage in the financial sector, we find a much broader pattern in the growth of leverage across most mature economies. We also

6 The mature economies we examined are Canada, France, Germany, Italy, Japan, South Korea, Spain, Switzerland, the United Kingdom, and the United States. The emerging economies we examined are Brazil, China, India, and Russia.

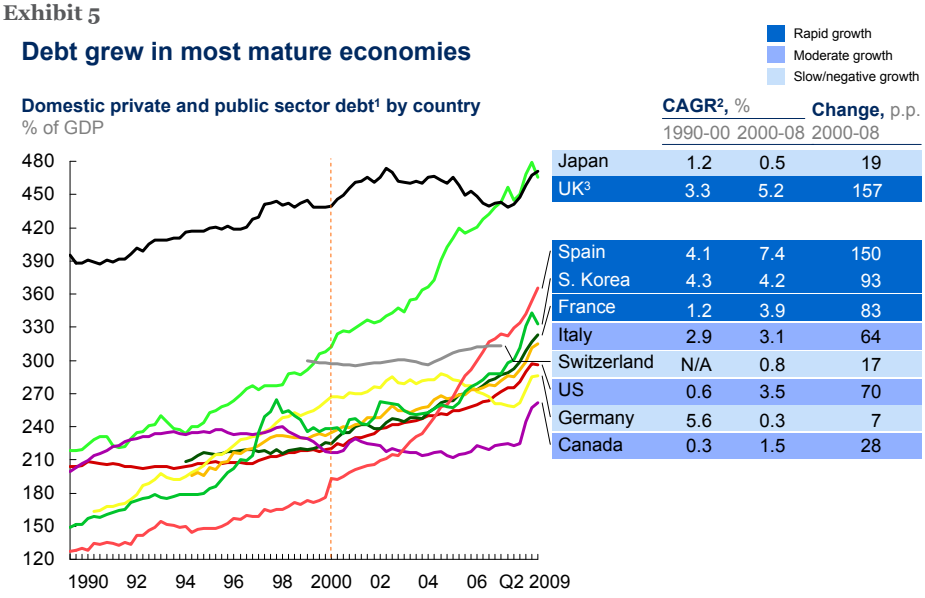
see that most of the growth in debt and leverage was not in the financial sector, but rather in the household, business, and some government sectors.

Borrowing accelerated in most developed countries

Total debt relative to GDP in the ten mature economies in our sample increased from about 200 percent of GDP in 1995 to over 300 percent by 2008. However, these countries' individual stories differ starkly, particularly since 2000 (Exhibit 5). The United Kingdom experienced the largest increase in total debt relative to GDP from 2000 through 2008, with its ratio reaching 469 percent. Even after adjusting for London's role as a global financial sector, the United Kingdom has the second-highest ratio of debt-to-GDP among major economies after Japan.[7] The next largest increases in debt relative to GDP occurred in Spain, South Korea, and France, while US debt to GDP grew more moderately.

Exhibit 5

Debt grew in most mature economies



	CAGR[2], % 1990-00	CAGR[2], % 2000-08	Change, p.p. 2000-08
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1 "Debt" is defined as all credit market borrowing, including loans and fixed-income securities.
2 Compound annual growth rate. Where data are unavailable, the longest possible period is used.
3 Even after removing foreign lending by UK banks, UK debt/GDP remains higher than every country's except Japan.

SOURCE: Central banks; Haver Analytics; McKinsey Global Institute

The exceptions to the pattern of rapidly rising total debt were Germany, Switzerland, Japan, and the emerging economies in our sample. Debt in the four emerging markets averaged 137 percent of GDP at the end of 2008, and it grew more slowly in the years before the crisis (Exhibit 6). If anything, these economies have room for more private sector borrowing to spur domestic consumption. The same might be said for Germany, where overall debt relative to GDP was flat from 2000 through 2008 and household debt to GDP actually declined, as we discuss below. Japan is a special case in which debt relative to GDP has remained very high, as private sector deleveraging has been offset by a growing government debt.

Within countries, the sectoral composition of debt and the importance of foreign lending vary widely, illustrating the importance of looking beyond aggregate measures of debt (Exhibit 7). Japan stands out with the largest amount of government debt. Households account for the largest share of total debt in the United

7 A similar adjustment would be required to account for the many large multinational corporations, such as in the United Kingdom and Spain, that take on debt to fund operations elsewhere. Unfortunately, reliable data for this exercise are not publicly available.

Small countries, big debts

Many countries beyond the 14 large ones in our sample increased their borrowing in the years prior to the crisis, amassing large debts relative to their GDP. For small economies—particularly those that tried to build international financial hubs—the results were dramatic.

In Iceland, an extraordinary credit boom took place after the country's banks were privatized in 2003 and were inadequately regulated. Total debt to GDP rose by more than 900 percentage points between 2000 and 2008, reaching an astonishing 1,189 percent. Iceland's financial sector debt alone reached 580 percent of GDP as Icelandic banks expanded rapidly, with the country's top three banks amassing assets worth more than 14 times GDP. Banks funded this expansion through the issuance of debt in international markets as well as through a surge in deposits from overseas investors drawn by Iceland's high interest rates from 2004 through 2008. Meanwhile, households and nonfinancial corporations also boosted borrowing, increasing their combined debt to GDP by 332 percentage points between 2000 and 2008.

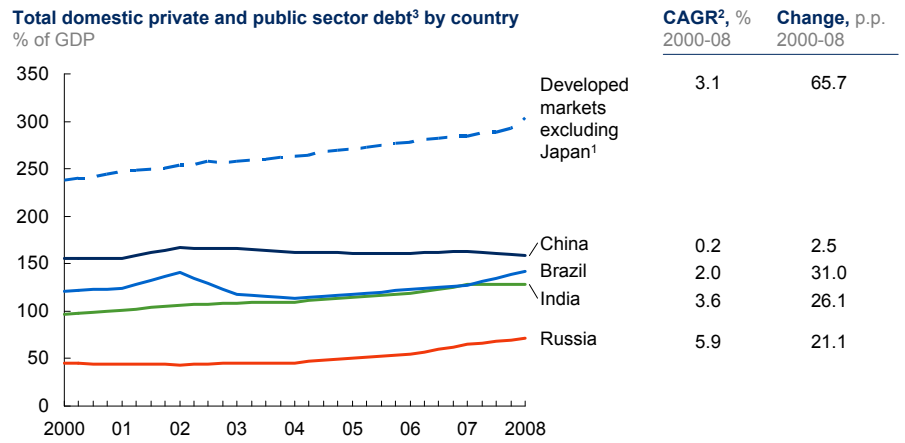
When the global financial crisis escalated in the fall of 2008, credit markets froze and wholesale bank funding—which accounted for half of Icelandic banks' liabilities—dried up, leaving them unable to roll over their short-term debts. Iceland's currency fell sharply. Asset prices collapsed. And the economy entered a severe recession, in which lower incomes rendered many borrowers insolvent and unable to service their debts. The scale of private sector borrowing in Iceland is unprecedented in the history of financial crises, and the economic effects of the financial crisis will be felt there for some time.

Ireland had a similar credit boom after 2001, when it actively sought to market itself as an international financial services hub. The Irish government offered tax incentives to attract foreign financial services firms and drew in large amounts of foreign capital. Ireland's total debt relative to GDP more than doubled from 2001 to 2008, to over 700 percent. Financial sector debt accounted for more than half of the total, at 421 percent of GDP. At the same time, the inflow of foreign capital fueled a property boom. By 2008, real estate accounted for 61 percent of Ireland's outstanding domestic credit. As with Iceland, the intensification of the financial crisis in late 2008 caused asset prices to fall steeply and plunged the economy into a deep recession. As in the larger, developed economies, the process of deleveraging the Irish economy may be prolonged and painful.

However, very high levels of aggregate debt are not the only indicator of the potential for financial distress. Even countries with relatively low levels of total debt can contain pockets of high leverage. As we write this report, another country, Greece, is in a situation in which mounting public sector debt poses a challenge for the government. The country's total economy debt level is not extraordinarily high at 230 percent of GDP. But investors have expressed concerns about the government's ability to manage its debt, which is equal to about 110 percent of GDP.

Exhibit 6

Emerging market debt levels are much lower than in mature markets

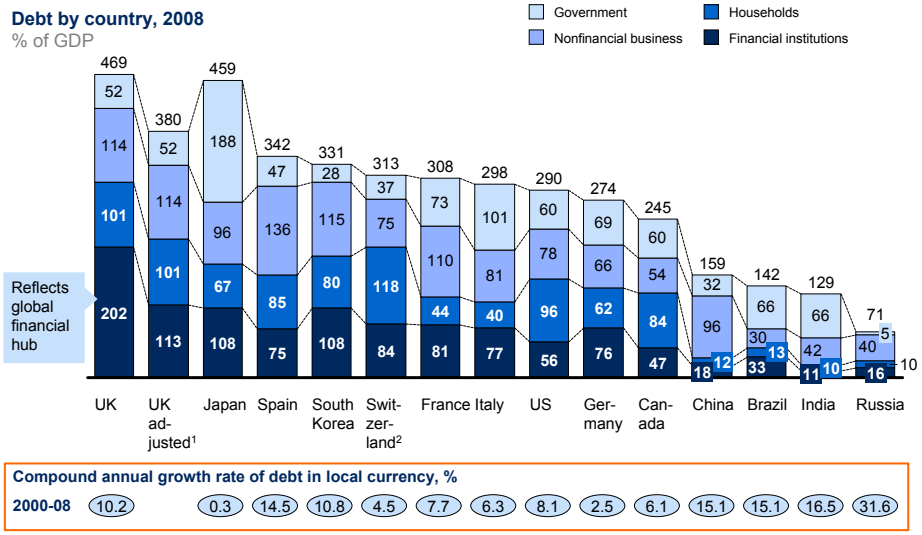


1 Includes Canada, France, Germany, Italy, S. Korea, Spain, Switzerland, the United Kingdom, and the United States; excludes Japan.
2 Compound annual growth rate.
3 "Debt" is defined as all credit market borrowing, including loans and fixed-income securities.

SOURCE: Central banks; Bank of International Settlements; Haver Analytics; McKinsey Global Institute

Exhibit 7

The sectoral composition of debt differs across economies



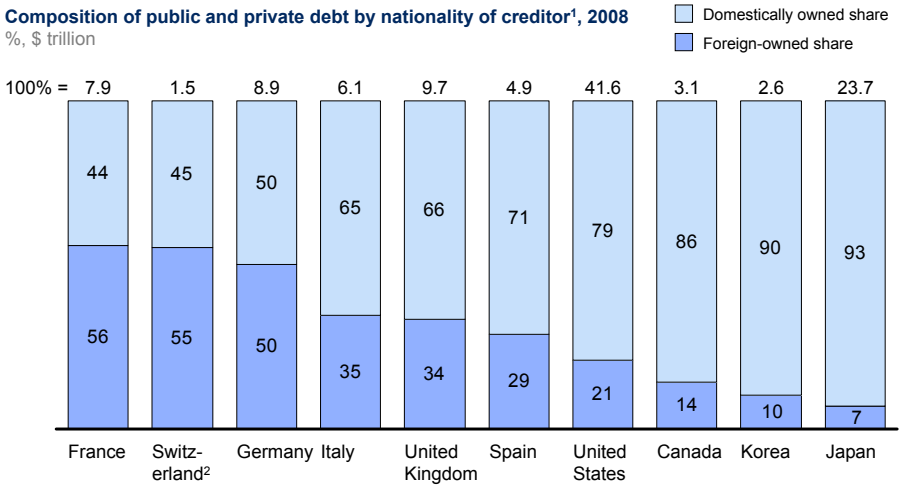
1 The UK financial sector was adjusted to reflect its position as a financial hub. See the technical appendix for details.
2 Data for Switzerland represent year-end 2007.

SOURCE: Haver Analytics; McKinsey Global Institute

States, Canada, and Switzerland, while nonfinancial businesses have the largest shares in South Korea and France. Foreign borrowing accounts for a larger share of the total in Europe, reflecting the integration of eurozone financial markets (Exhibit 8). These differences suggest that countries face different vulnerabilities going forward. Indeed, one major conclusion from our analysis is that overall measures of debt to GDP are a misleading guide. It is essential to take a more granular view and focus on debt levels within each sector of the economy. We therefore analyze leverage within each of the household, corporate, financial, and government sectors in the next section.

Exhibit 8

The share of external debt varies across countries



1 We calculate the percentage of foreign-owned debt by comparing the sum of foreign debt and loan liabilities, reported in the international investment position, with total debt calculated from national balance sheet accounts.
2 Switzerland represents year-end 2007 data.

SOURCE: Haver Analytics; McKinsey Global Institute Cross-Border Investments database; McKinsey Global Institute

The rise in debt occurred mainly in the real economy, and particularly in real estate

Policy makers and regulators have focused much attention on the growth in financial sector borrowing as a primary contributor to the crisis. Financial institutions increasingly issued debt—and particularly short-term debt—rather than rely on deposits to fund lending in the years before the crisis. This source of funding dried up when credit markets seized up in the fall of 2008, wreaking havoc in bank operations and contributing to the severity of the financial crisis.

However, across the mature economies, the increases in financial sector borrowing were dwarfed by the collective growth in the debt of households, corporations, and governments (Exhibit 9). Total debt increased by about $40 trillion from 2000 to 2008 in the mature markets we studied. Of that amount, financial institutions accounted for almost $11 trillion,[8] with the remaining $29 trillion divided roughly equally among households, nonfinancial businesses, and governments—the so-called real economy.

Real estate played an important role in the growth of leverage across countries.[9] Rising real estate prices were both a cause and a consequence of increased borrowing: as property prices rose, buyers borrowed more to purchase them, thereby pushing prices up even more. By 2007, bank lending for residential mortgages was equivalent to 81 percent of GDP in the United Kingdom and 73

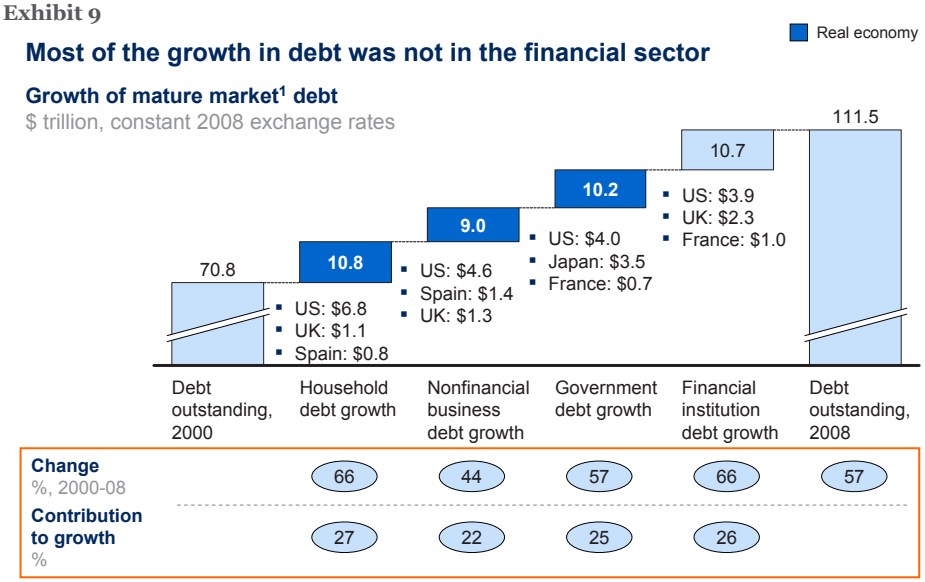
8 Financial sector borrowing includes all debt—loans and debt securities—raised by deposit banks, other financial intermediaries, and insurance companies. Lending between deposit banks is netted out, but lending from deposit banks to other financial intermediaries is included. Unlike other reports (e.g., *The Turner Review: A regulatory response to the global banking crisis*, Financial Services Authority, March 2009), we exclude asset-backed securities in financial sector borrowing because the underlying collateral (e.g., mortgages) is counted in the sector of the respective borrower. *See Appendix A: Technical notes* for more detail.

9 See *Global capital markets: Entering a new era*, McKinsey Global Institute, September 2009, available online at www.mckinsey.com/mgi.

percent in the United States (Exhibit 10).[10] In comparison, bank lending to businesses was equivalent to just 46 percent of GDP in the United Kingdom and 36 percent in the United States. In European countries, mortgage lending is lower.[11] But even there, mortgage lending across Western Europe accounted for the majority of *growth* in lending. In summary, the breadth of the housing bubble across many countries was perhaps greater than has been understood, and real estate leverage may warrant closer monitoring in the future.

Exhibit 9

Most of the growth in debt was not in the financial sector

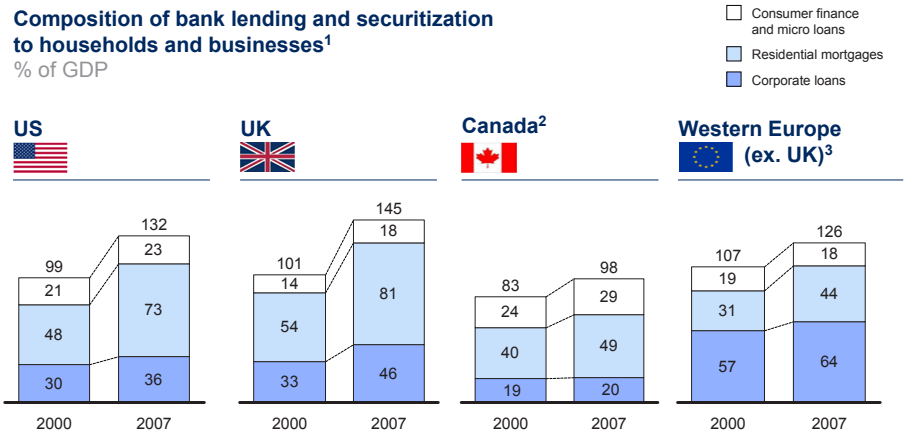


1 Countries included are Canada, France, Germany, Italy, Japan, S. Korea, Spain, Switzerland, the UK, and the United States.
Note: Including China would raise these numbers significantly. Over 2000-08, debt in China rose by $4.7 trillion and would have been in the top three countries in two sectors: nonfinancial business ($2.7 trillion) and government debt ($1.1 trillion).

SOURCE: McKinsey Global Institute

Exhibit 10

The growth in bank lending was concentrated in residential mortgages



1 We include consumer credit, residential mortgages (both securitized and on-balance sheet), corporate loans, and commercial mortgage loans. We exclude bonds, commercial paper, and foreign loans to nonfinancial business.
2 Canada's data include noncorporate business in the household sector.
3 Includes countries in the eurozone, Scandinavia, and Switzerland.

SOURCE: Central banks; Global Banking Profit Pools; McKinsey Global Institute

10 Residential mortgages include those that are both securitized and those held on-balance sheet.

11 In Germany, for instance, lending to business is equivalent to 51 percent of GDP, while mortgage lending is only 35 percent.

DEBT AND LEVERAGE WITHIN THE HOUSEHOLD, BUSINESS, AND GOVERNMENT SECTORS

The aggregate measure of debt relative to GDP is not the only indicator of leverage. Within each sector, leverage needs to be assessed using different metrics, as we discuss later in the report. Using more granular measures of leverage, we find that households became significantly more leveraged in many countries, while most corporations and governments entered the crisis with stable or even declining levels of leverage. However, our analysis also shows that total debt is rarely spread evenly within sectors, and that average levels of sector leverage mask pockets of very highly leveraged borrowers. It was these borrowers in each sector that got into trouble and caused most of the credit losses in the crisis. This suggests a need for far more granular tracking of debt and leverage within the economy.

Household leverage increased significantly in many economies

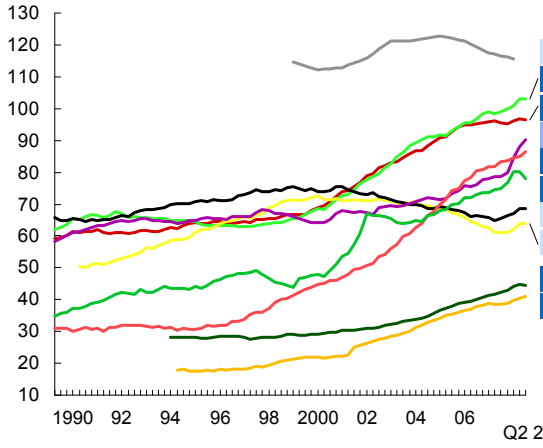
Households in almost all mature economies boosted their borrowing significantly relative to GDP since 2000. Although US household debt grew to 96 percent of GDP by 2008, UK and Swiss households had even larger amounts of debt, at 102 percent and 121 percent of GDP, respectively (Exhibit 11).[12] Canadian households also reached higher levels of debt to GDP in recent years. The exceptions were households in Germany and Japan, which had declining levels of debt relative to GDP.

Exhibit 11

Households in almost all countries increased their debt significantly relative to GDP

Rapid growth
Moderate growth
Slow/negative growth

Total household debt[3] by country
% of GDP



	CAGR[2], % 1990-00	CAGR[2], % 2000-08	Change, p.p. 2000-08
Switzerland	N/A	0.4	3
UK	0.5	5.0	32
US	1.2	4.2	27
Canada[1]	0.5	3.5	20
Spain	4.1	8.3	40
S. Korea	2.6	6.6	32
Japan	1.2	-1.3	-7
Germany	4.1	-2.0	-11
France	0.6	5.3	15
Italy	4.4	7.8	18

1 Canada's data include nonfinancial noncorporate business.
2 Compound annual growth rate. Where data are unavailable, the longest possible period is used.
3 "Debt" is defined as all credit market borrowing, including loans and fixed-income securities.

SOURCE: Central banks; Bank of International Settlements; Haver Analytics; McKinsey Global Institute

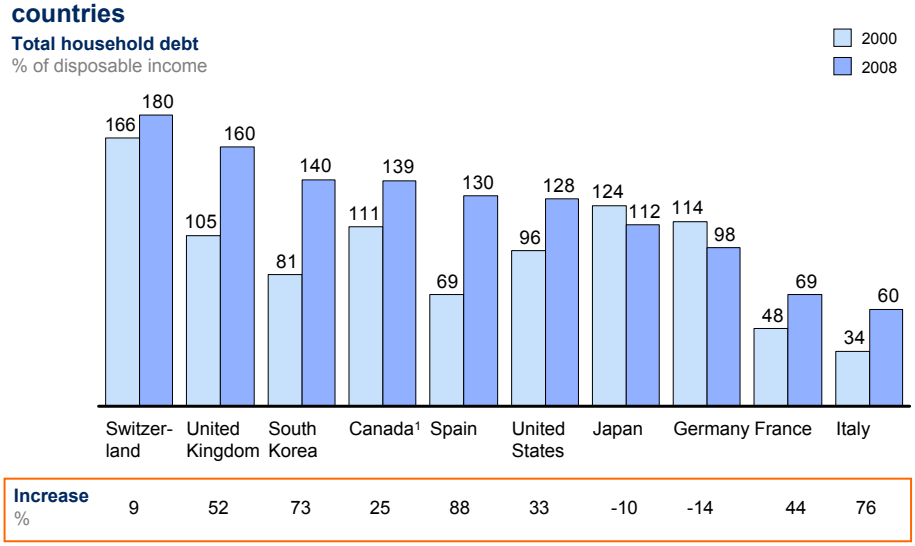
Rising real estate prices and equity market indices masked the rise in household leverage, as the ratio of household debt to assets appeared stable in the years before the crisis. However, when leverage is measured as household debt relative to disposable income, we see large increases across most countries (Exhibit 12).

12 The high indebtedness of Swiss households is a result of the domestic tax system. Both mortgage interest payments and maintenance costs are tax deductible. In addition, property taxes are assessed on notional rental value instead of market value. But the high level of indebtedness of Swiss households is sustainable for three reasons: high levels of household financial assets offset debt; the home ownership rate is very low (just 35 percent) and concentrated among wealthy households; and Swiss banks maintain strict underwriting standards with limits on both loan-to-value and interest payments-to-income ratios.

(Again, German and Japanese households, whose ratios declined, are exceptions). Despite low interest rates in the years leading up to the crisis, household debt service payments also increased as a percent of disposable income, although not by as much as the increase in the amount of debt. This illustrates the importance of assessing leverage through multiple lenses, because asset price appreciation can mask large and potentially unsustainable increases in leverage.

Exhibit 12

Household leverage measured as debt/income increased in most countries



1 Canada includes noncorporate business, which exaggerates its relative size compared to other countries.

SOURCE: Haver Analytics; McKinsey Global Institute

Within the household sector, there are some pockets of very highly leveraged borrowers. In the United States, contrary to conventional wisdom, the greatest increase in leverage occurred among middle-income households, not the poorest (Exhibit 13). Most borrowers who did not qualify for the prime mortgage category, in fact, were middle- and higher-income households with poor credit histories, or no down payments, or poor documentation of income—not low-income households buying a house for the first time.[13] In Spain, by contrast, leverage increased most among the poorer households.

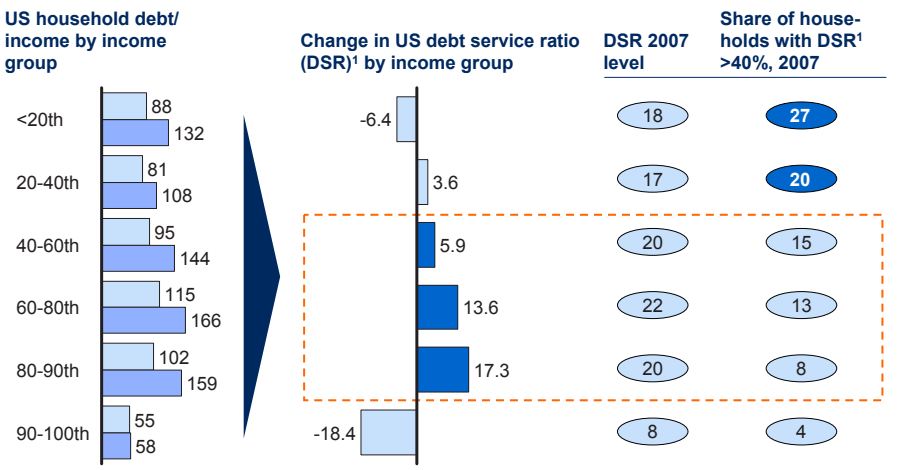
We believe this type of highly granular analysis can help inform economic policy making, because deleveraging by the middle class is likely to take a very different path than deleveraging by the poorest segments of society. Lower-income households have little or no savings, so deleveraging of these households is most likely to occur through default, with very little impact on consumption but a high cost to the banking system (US data confirm that the lowest income households have the highest default rates, despite their lower leverage). Middle-income households have much lower default rates and instead deleverage by saving more and consuming less, a process that avoids credit losses but slows economic growth.

13 The “subprime” designation refers to the borrower’s creditworthiness, not income. The “Alt-A” designation refers to mortgages with a risk profile falling between prime and subprime. Data do not exist on subprime mortgage originations. We use data from the Federal Reserve, which approximates these mortgages by identifying loans with rates at least 1.5 percentage points higher than the applicable average prime rate offer. For the years in this analysis, this definition would not have included jumbo mortgages unless the borrower had a very low credit score.

Exhibit 13

In the United States, middle-income households saw the largest increase in debt/income and debt service payments

%



1 Ratio of household debt, interest, and principal payments to total income.

SOURCE: Haver Analytics; Federal Reserve; McKinsey Global Institute

The corporate sector entered the crisis with stable or declining levels of leverage, with two exceptions

Leverage ratios of nonfinancial businesses, measured as debt to book equity, were stable or declining in most countries in the years prior to the crisis as businesses enjoyed rising profits and booming equity markets (Exhibit 14).[14] However, two exceptions stand out—commercial real estate and companies acquired in recent years through leveraged buyouts.

The commercial real estate sector, with its preponderance of fixed assets, has traditionally employed more leverage than the rest of the corporate sector. This increased to even higher levels before the crisis as underwriting standards were relaxed, commercial property prices rose rapidly, and interest rates remained low. In the United States, for example, commercial real estate leverage, measured as debt to book equity, doubled from 1998 to 2008 (Exhibit 15). A large amount of these loans will need to be refinanced in coming years: in the United States, $1.3 trillion of commercial real estate loans will come due between 2010 and 2014.[15] Refinancing will be challenging if securitization markets remain anemic. Spain has a similar problem.

Rapid appreciation of commercial real estate prices, like residential real estate prices, has been at the heart of many financial crises. In their definitive study of financial crises, Kenneth Rogoff and Carmen Reinhart find a strong association between real estate booms and banking crises.[16] Several factors could account for this empirical regularity. First is the positive feedback between asset values and credit availability through mechanisms such as loan-to-value ratios. In addition, commercial real estate

14 We use a proprietary McKinsey database with financial statements of more than 50,000 publicly listed companies in countries around the world. It excludes smaller, privately owned businesses.

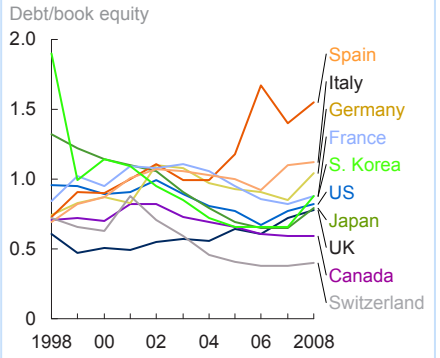
15 In addition, roughly $1 trillion of US residential mortgages will have interest rates that reset during the period and may need to be refinanced.

16 See Carmen Reinhart and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2009.

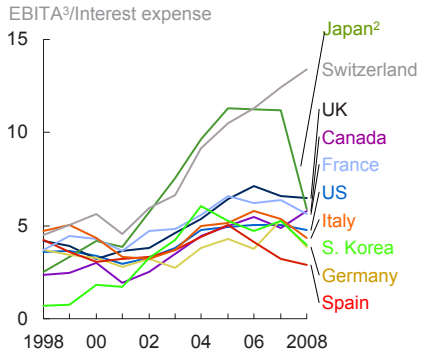
Exhibit 14

The nonfinancial corporate sector entered the crisis with lower leverage and improved interest coverage ratios in most countries

Leverage of listed nonfinancial corporations[1], 1998-2008



Interest coverage ratios of nonfinancial corporations, 1998-2008



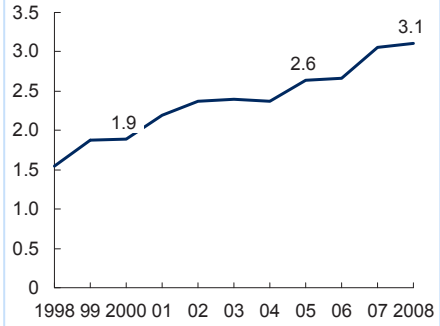
1 Even accounting for unfunded pension liabilities as debt, the leverage of most corporate sectors remains at reasonable levels (i.e. at or below 1x debt/book equity); Germany is the exception: unfunded liabilities representing 37 percent of shareholders' equity increase leverage to levels that are similar to the highly leveraged Spanish sector.
2 Corporate profits in Japan fell by about 65 percent between Q1 07 and Q4 08 as the effects of the global downturn were amplified by an appreciating yen, high oil prices, and a fall in the value of equities held on corporate balance sheets.
3 Earnings before interest, taxes, and amortization.

SOURCE: McKinsey Corporate Performance Analysis Tool; McKinsey Global Institute

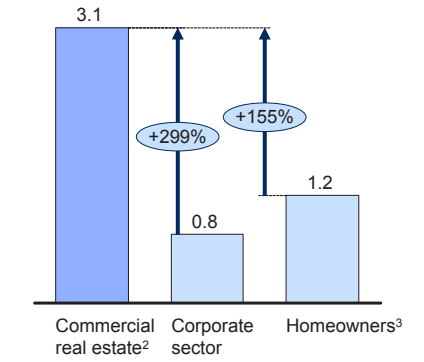
Exhibit 15

Commercial real estate is a pocket of leverage within the US corporate sector

Leverage in commercial real estate sector, 1998-2008
Debt/book equity[1]



Comparison of sectoral leverage, 2008
Debt/book equity, ratio



1 Assets covered are nonowner-occupied institutional grade rental properties in major markets. Commercial real estate owned and occupied by corporations and lower quality/smaller rental properties in smaller markets are excluded.
2 Includes publicly listed REIT segment, which is far more conservatively geared (debt/equity about 1.0). Excluding REITs, CRE leverage ratio would be about 3.8.
3 Based on NBER's estimate of 55% average loan-to-value ratio for households in 2008.

SOURCE: National Bureau of Economic Research; Urban Land Institute; Federal Reserve Board; McKinsey Global Institute

lending takes place with only limited disclosure available on the businesses of real estate developers, most of which are private companies. Third, long lead times in real estate supply can result in big price shifts when there is a change in demand. Finally, real estate developers have an asymmetric payoff due to limited liability, with large potential profits if the project succeeds while losses in the case of default are borne by banks and other investors.

Companies bought through leveraged buyouts are another exception to the pattern of stable leverage in the overall corporate sector. As the private equity industry attracted new investors, the number and size of buyout deals rose, as did the leverage employed in the deals. In the United States, companies acquired through buyouts were 2.7 times as leveraged as the average publicly listed corporation in

2002—but were 4 times as leveraged near the peak of the bubble in 2005. Like commercial real estate, most of these loans will need to be refinanced in the next few years. Globally, some $1 trillion of syndicated loans that financed buyouts are due to mature between 2009 and 2014, of which $434 billion is in the United States. Given the impact of the recession on corporate revenue and the continued impairment of banks, many of these companies may be forced to reduce their debt burdens as loans come due, and they will most likely face much more restrictive covenants on their refinanced debt.

The government sector entered the crisis with steady levels of leverage

Most mature economies' government debt relative to GDP did not change much from 2000 through 2008. In the United States, for example, even with extra borrowing to pay for wars in Iraq and Afghanistan, strong economic growth during the period caused the ratio of government debt to GDP to fall by about 2 percent a year. Government debt relative to GDP also fell slightly in Italy, Spain, and Switzerland and rose slightly in Canada, France, Germany, and the United Kingdom. While governments could have done more to reduce debt during the boom years, it is fortunate that most entered the crisis with ample room to expand public spending, as they have since done.

FINANCIAL SECTOR LEVERAGE INCREASED SIGNIFICANTLY ONLY IN CERTAIN COUNTRIES

Looking first at debt, we see that since 2000, financial institutions' borrowing grew faster than GDP in all ten countries we studied, except Japan (Exhibit 16). The United Kingdom and Spain stand out for having the biggest increases in financial sector debt relative to GDP. These figures reflect the rapid growth of the financial sectors in those countries as well as a gradual shift by their banks away from relying on deposits to fund lending toward raising money by borrowing in the wholesale markets.

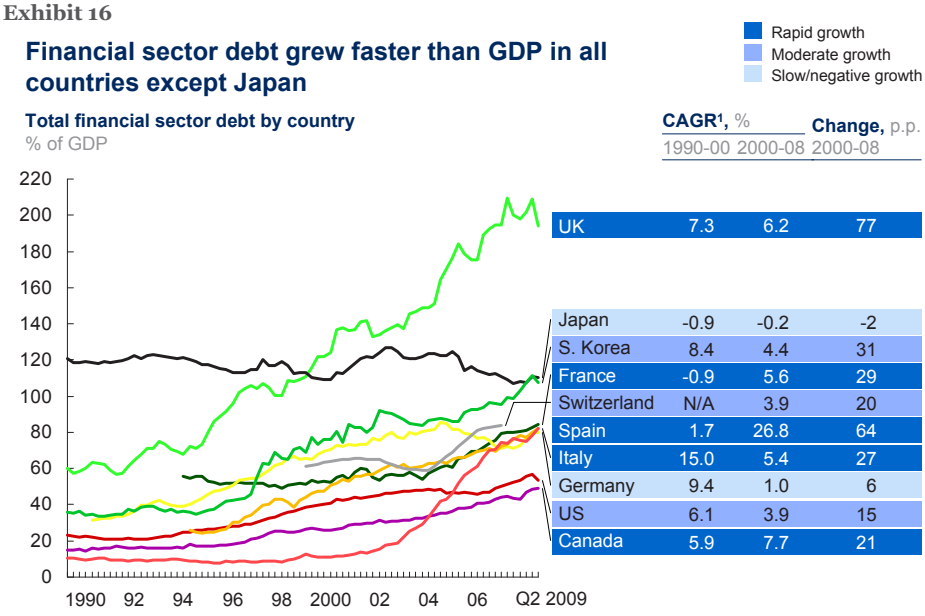
But despite the increase in financial sector *borrowing*, aggregate financial sector *leverage* in most countries—measured as the ratio of gross assets to equity—grew only modestly or declined in the years prior to the crisis (Exhibit 17). And in no country did it exceed previous historic[17] peaks (Exhibit 18). These observations also hold true after we adjust for some of the major cross-border differences in accounting that affect how bank assets are counted.[18] The relative stability of aggregate financial sector leverage in most countries despite large increases in lending to households and other borrowers is explained in part by two developments: first, the rise of securitization (which allowed banks to move loans off their balance sheets); and second, the financial sector's record profits in the years leading up to the crisis (which allowed institutions to add retained earnings to their equity base).

17 We see little value in very long-term time series going back to the 19th century. Though of historical interest, we cannot see the relevance to modern policy making of capital ratios in 19th-century America when, in line with the Jacksonian vision, there was no central bank, no bank regulation, and a weak federal government. As a consequence, there were frequent financial crises. We focus on the period since 1990 for both theoretical and practical reasons: this period marks the takeoff of globalized financial markets and also offers a wider range of comprehensive data across countries (see *Appendix A: Technical notes* for long-term time series of US bank leverage ratios).

18 We measure financial sector leverage by aggregating the balance sheets of major financial institutions, covering approximately 80 percent of the banking assets in each country. We correct for differences in treatment of assets between International Financial Reporting Standards (IFRS) and US Generally Accepted Accounting Principles (GAAP). See *Appendix A: Technical notes* for more detail on the data and methodology.

Exhibit 16

Financial sector debt grew faster than GDP in all countries except Japan

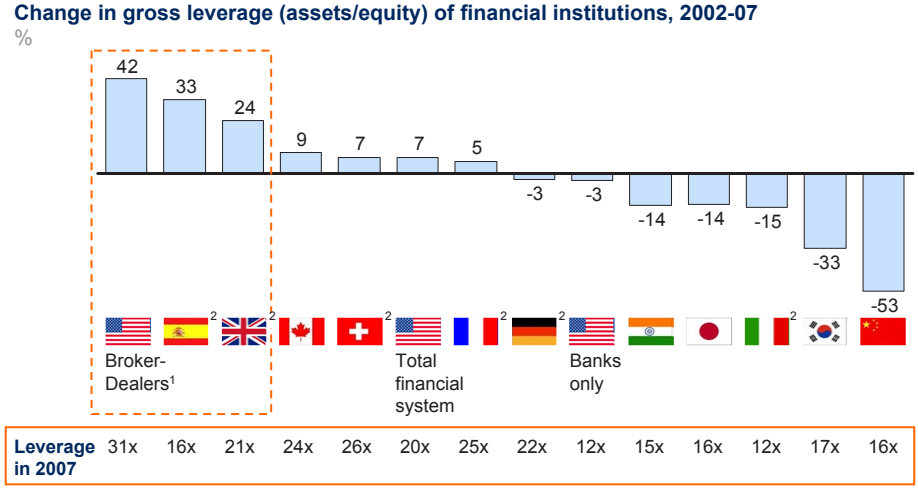


1 Compound annual growth rate. Where data are unavailable the longest possible period is used.

SOURCE: Central banks; Bank of International Settlements; Haver Analytics; McKinsey Global Institute

Exhibit 17

With a few important exceptions, financial institution leverage ratios were stable or falling before the crisis



1 Includes Morgan Stanley, Goldman Sachs, Merrill Lynch, Bear Stearns, Lehman Brothers.
2 Leverage is calculated based on an estimate of GAAP assets (converted from IFRS).

SOURCE: SNL Financial; Compustat; Bloomberg; national financial regulators; McKinsey Global Institute

The exceptions to this picture of moderate leverage were the large US broker-dealers,[19] plus in aggregate[20] the UK banks, Swiss banks, and parts of the US nonbank financial system such as the government-sponsored enterprises Fannie Mae and Freddie Mac (Exhibit 19). These institutions' leverage ratios increased by 25 percent or more in the years before the crisis. In addition, many of these institutions depended increasingly on short-term debt funding rather than deposits to fund

19 Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley.

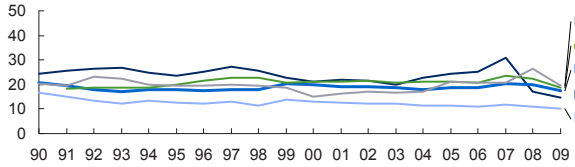
20 The aggregate picture conceals wide variations at the level of individual institutions. We do not mean to imply that all UK or Swiss banks were highly leveraged, nor that all other banks remained conservatively leveraged.

Exhibit 18

Financial institution leverage did not exceed previous historic peaks

Financial sector leverage: North America and United Kingdom

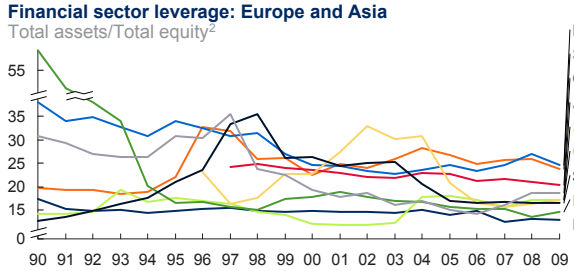
Total assets/Total equity[1]



	CAGR[4], %	
	1993-07	2002-07
UK	0	4
Canada	1	1
US Financial System	1	1
US Brokers[3]	1	6
US Banks	0	-1

Financial sector leverage: Europe and Asia

Total assets/Total equity[2]



	CAGR[4], %	
	1993-07[2]	2002-07
France	-2	1
Switzerland	2	1
Germany	-1	0
Japan	-3	-2
Spain	-1	5
China	-3	-14
S. Korea	0	-7
India	-5	-2
Italy	-1	-3

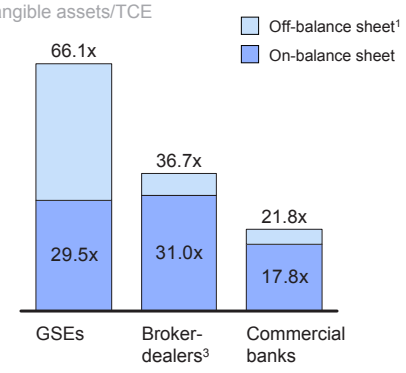
1 For the UK, Spain, Germany, Switzerland and France, leverage based on an estimate of GAAP assets (converted from IFRS).
2 1996-2007 for China; 1997-2007 for Germany.
3 Includes Morgan Stanley, Goldman Sachs, and Merrill Lynch for 1990-2008; Bear Stearns, and Lehman Brothers for 1990-2007.
4 Compound annual growth rate.
SOURCE: SNL Financial; Compustat; Bloomberg; national financial regulators; McKinsey Global Institute

Exhibit 19

The US broker-dealers and government-sponsored enterprises (GSEs) were pockets of high leverage

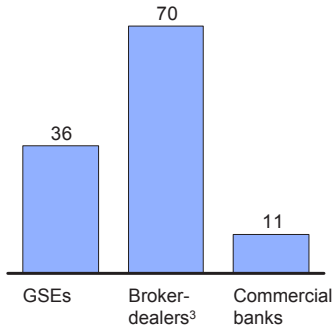
Leverage of selected financial intermediaries, 2006

Tangible assets/TCE



Funding profile of selected financial intermediaries, 2006

Short-term funding[2] as % of total assets



1 Estimated based on size of relevant securitized asset-backed security (ABS) pools, private ABS pools allocated to private intermediaries by asset size.
2 Includes repos, capital markets funding, all other short-term borrowing (e.g. commercial paper), and current portion of long-term debt.
3 Weighted average for 5 large broker dealers: Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, Morgan Stanley.

SOURCE: SNL Financial; Federal Deposit Insurance Corporation; Securities Exchange Commission; McKinsey Global Institute

their activities. So high leverage levels left them particularly vulnerable when credit markets seized up during the worst of the crisis, and they were unable to roll over their short-term debt.

A second issue confirmed by our analysis is a gradual decline in the quality of capital within some large financial institutions, particularly in the United States and the United Kingdom, as they funded their asset growth with increasing amounts of hybrid capital instruments, such as certain forms of preferred stock. Although this was in line with existing regulatory frameworks and the Basel II international framework for bank capital, these hybrid capital instruments failed to absorb credit losses during

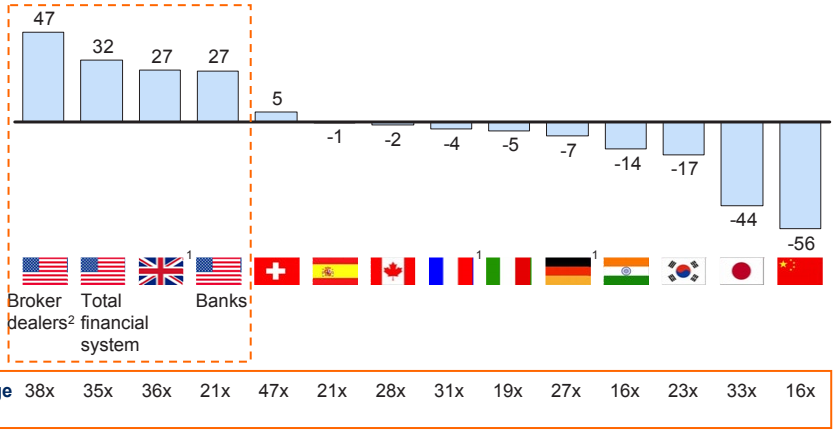
the crisis and left the institutions vulnerable to failure.[21] When these hybrid forms are excluded from bank capital (along with the portions of equity attributable to intangible assets such as goodwill and deferred tax assets), the precrisis increases in financial sector leverage in some countries become more apparent. For example, leverage measured as tangible assets to tangible common equity increased by 27 percent in UK banks and by 47 percent in US broker dealers (Exhibit 20). This suggests that the quality of capital is more important than simplistic gross leverage ratios in enhancing financial sector stability (see sidebar, *Whatever Happened to Modigliani & Miller?*).

Exhibit 20

Leverage measured by common equity rose significantly in some institutions

Change in tangible assets/tangible common equity (TCE) of financial sectors, 2002-07

%



1 For United Kingdom, Germany, Spain, Switzerland, and France, leverage is calculated based on an estimate of GAAP assets (converted from IFRS). Tangible Common Equity leverage ratios in the United Kingdom were especially elevated in 2007 due to crisis-related losses.
2 Includes Morgan Stanley, Goldman Sachs, Merrill Lynch, Bear Stearns, Lehman Brothers.

SOURCE: SNL Financial; Compustat; Bloomberg; national financial regulators; McKinsey Global Institute

SECTORS IN FIVE COUNTRIES ARE LIKELY TO DELEVERAGE

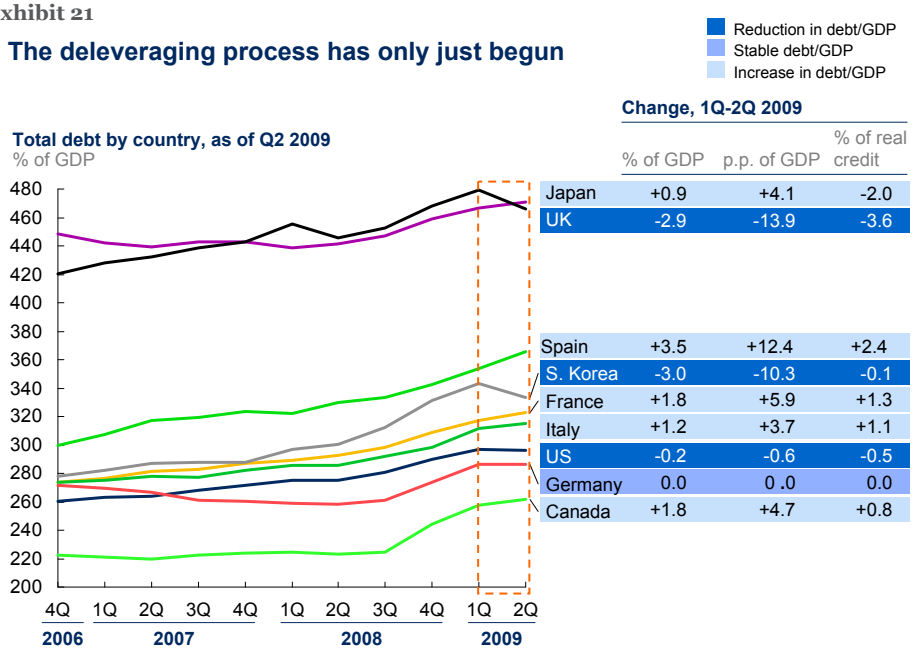
The crisis halted the buildup of debt in the mature economies, but the deleveraging process has barely begun. As of the second quarter of 2009, total debt to GDP had fallen, and only slightly, in just three major economies in our sample (South Korea, the United Kingdom, and the United States) (Exhibit 21). Looking at the economies by sector, we see that debt is just beginning to decline in the household and corporate sectors. However, government borrowing is increasing in some countries to finance crisis-related stimulus programs and financial sector bailouts. This rising government debt may preclude any significant reduction in total debt to GDP in the near term.

In contrast, the data show that financial institutions' leverage in most countries has already fallen below the averages that prevailed for 15 years before the crisis (Exhibit 22). This deleveraging has been associated with rapid declines in bank lending as banks have sought to slow the growth of (and in some cases even shrink) their balance sheets and as they have raised capital. Further deleveraging by the financial sector may result from changes in capital requirements, particularly the requirement that banks hold more common equity.

21 Under rules set by the Basel framework and national regulators, certain forms of preferred stock can be included in Tier 1 and Tier 2 capital. Preferred stocks are a cheaper source of financing for banks, since they are less risky for investors, but they absorb losses only after all common equity has been wiped out. Interventions by the government in many banks have prevented losses from extended to preferred stock shareholders.

Exhibit 21

The deleveraging process has only just begun



	Change, 1Q-2Q 2009		
	% of GDP	p.p. of GDP	% of real credit
Japan	+0.9	+4.1	-2.0
UK	-2.9	-13.9	-3.6
Spain	+3.5	+12.4	+2.4
S. Korea	-3.0	-10.3	-0.1
France	+1.8	+5.9	+1.3
Italy	+1.2	+3.7	+1.1
US	-0.2	-0.6	-0.5
Germany	0.0	0 .0	0.0
Canada	+1.8	+4.7	+0.8

SOURCE: Central banks; Bank of International Settlements; Haver Analytics; McKinsey Global Institute

Whatever Happened to Modigliani & Miller?

The deterioration of bank capital, with the substitution of debt and debt-like instruments for common equity, is at odds with the theorem—developed by Franco Modigliani and Merton Miller—that a corporation should be indifferent as to the mix of debt and equity in its capital structure.

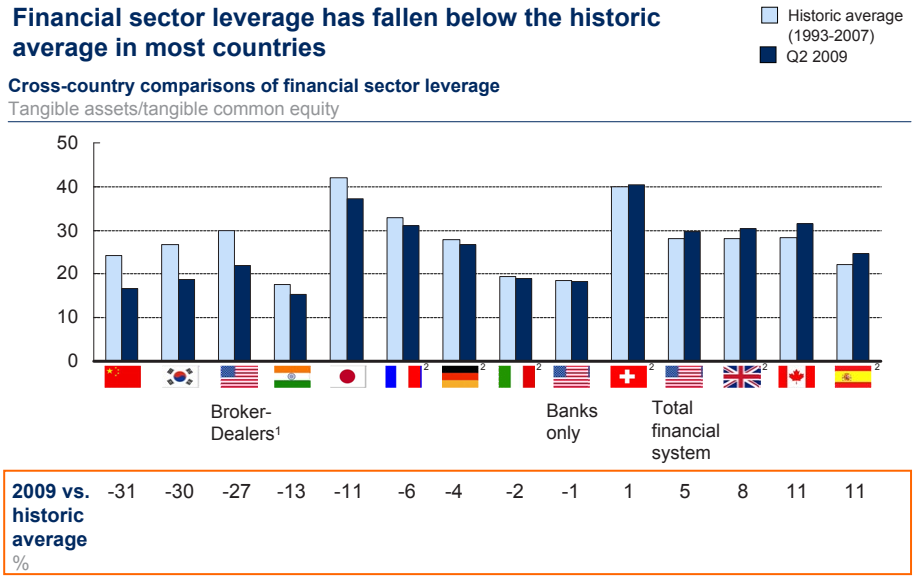
It has long been recognized that the tax treatment of interest payments is a major factor increasing the attractiveness of debt over equity. However, tax advantages are not the only, or even major, reason that banks find debt instruments attractive. In the United States, banks have increased their use of debt funding despite falling tax rates. Since the 1960s, corporate tax rates have fallen by about a quarter while the banks' use of debt funding has tripled. If taxes were the only barrier to a world in which management were indifferent between debt and equity, falling tax rates ought to have resulted in reduced levels of debt as the value of the tax shield declined.

In addition to the tax benefits of debt, multiple factors create an incentive for management to minimize equity in the capital structure of a bank. These include management incentives (in which performance is judged by return on equity and earnings per share); explicit guarantees on deposits and implicit guarantees on debt for some large banks (which reduce the relative cost of non-equity funding); investor preferences (i.e., many pensions and insurance companies can hold highly rated debt but not equity); transaction costs (the costs of issuing new equity are relatively higher than issuing new debt or securing additional deposits); and the supply of equity capital (replacing the stock of financial sector debt with equity in the 14 countries we studied would require more than 60 percent of existing global equity capital).

This leads us to the conclusion that the simplest and only effective policy tool to address the deterioration in the quality of capital is to mandate minimum levels of core capital (such as Core Tier 1 capital), as regulators in some countries have now done.

Exhibit 22

Financial sector leverage has fallen below the historic average in most countries



1 Includes Morgan Stanley, Goldman Sachs, and Merrill Lynch as of Q4 2008.
2 Leverage based on an estimate of GAAP assets (converted from IFRS).

SOURCE: SNL Financial; Compustat; Bloomberg; national financial regulators; McKinsey Global Institute

Multiple lenses are needed to assess the sustainability of leverage

The aggregate level of leverage in an economy is not a reliable guide to the likely speed or extent of deleveraging. Instead, one needs to look at individual sectors and through multiple lenses. To do this, we have developed a five-part framework to assess the sustainability of leverage for individual sectors of an economy.[22] The components are:

1. *Level of leverage*. High levels of leverage in a sector, compared with sectors in peer countries, is one indicator of unsustainability. However, for structural reasons, some economies may be able to sustain much higher levels of leverage than others, so this is not a strong indicator of sustainability if taken in isolation.

2. *Growth of leverage*. Significant increases in a sector's leverage, compared with historical trends or growth in peer countries, can indicate a higher risk of poor-quality assets coming onto the sector's balance sheet.

3. *Debt service capacity*. The ratio of interest and principal repayments to a borrower's income indicates the ability to make required debt payments. A higher ratio signals potential problems. In the corporate sector, an inverse metric, the "interest coverage ratio," is a standard measure.

4. *Vulnerability to income shocks*. Borrowers with highly variable income streams have a higher risk of default and therefore should not carry as much debt. However, a borrower's ability to draw down savings, reserves, or liquid assets can offset the risk of income declines and justify higher levels of sustainable debt.

22 Other proposals include a variety of metrics to assess the sustainability of leverage. For example, the recently published discussion paper by the Bank of England, "The role of macroprudential policy," proposes assessing a range of qualitative and quantitative metrics to determine the degree of "exuberance" in credit markets. Our framework has strong similarities, although we believe that a purely national view will be insufficient and that it will be critical to assess these metrics across as many countries as possible.

5. *Vulnerability to funding and interest rate shocks*. Borrowers with fixed-rate, long-term loans can sustain higher levels of debt because debt service payments do not vary. Borrowers with variable-rate loans, or short maturities, face greater interest rate risk, which limits the sustainable level of debt.

This framework yields specific metrics for each sector that together create a comprehensive view on the sustainability of leverage (Exhibit 23). For instance, for the household sector, we examine the level and change in the ratio of household debt to income; debt service payments as a percent of income; debt as a percent of financial assets; and the share of variable-rate debt in total debt.

Exhibit 23

We use a set of granular metrics to assess the likelihood of deleveraging

	Households	Corporates	Financial institutions	Governments
Absolute level of leverage	▪ Debt/income	▪ Debt/equity (book value)	▪ Tangible Assets (TA)/ Tangible Common Equity (TCE)	▪ Gross debt/GDP
Growth of debt and leverage	▪ CAGR[1] for debt/income	▪ CAGR[1] for debt/equity	▪ CAGR[1] for loans outstanding ▪ Variance of TA/TCE from 15-year average	▪ CAGR[1] for debt/GDP
Debt service capacity	▪ Debt interest payments over disposable income	▪ Interest coverage ratio (EBITA[2]/interest)	▪ N/A	▪ Interest/tax revenue
Vulnerability to income shocks	▪ Debt as percent of financial assets ▪ Variable rate mortgage percent of total	▪ Excess cash as percent of total assets	▪ Liquid assets as percent of total assets	▪ Net debt/GDP
Vulnerability to funding shocks		▪ Short-term debt as percent total debt	▪ Short-term wholesale funding as percent of assets ▪ Loans/deposits	▪ Foreign-owned debt/total debt

1 Compound annual growth rate.
2 Earnings before interest, taxes, and amortization.

SOURCE: McKinsey Global Institute

The data exist to use this framework reliably only at the broad sector level (households, financial institutions, government, corporate sector). We have attempted a further breakout to highlight the commercial real estate sector, for a total of five sectors in each country. Ideally, if the data could be obtained, we would want to refine this approach further by looking more closely at numerous subsectors and different types of debt to detect dangerous pockets of leverage. For example, in the household sector, it would be useful to distinguish between secured and unsecured debt. In financial institutions , it would be helpful to distinguish banks from nonbanks and to assess the variability of earnings. In the corporate sector, one would want to adjust for the different industry mix within countries. At present, the data available from national statistics are not sufficiently granular for this level of analysis. But even the aggregate sector assessment reveals interesting results.

Ten sectors in five countries have the highest likelihood of deleveraging

Assessing these five sector-specific metrics together reveals which sectors have the highest likelihood of deleveraging.[23] Based on data availability, our assessments present a view as of the second quarter of 2009.

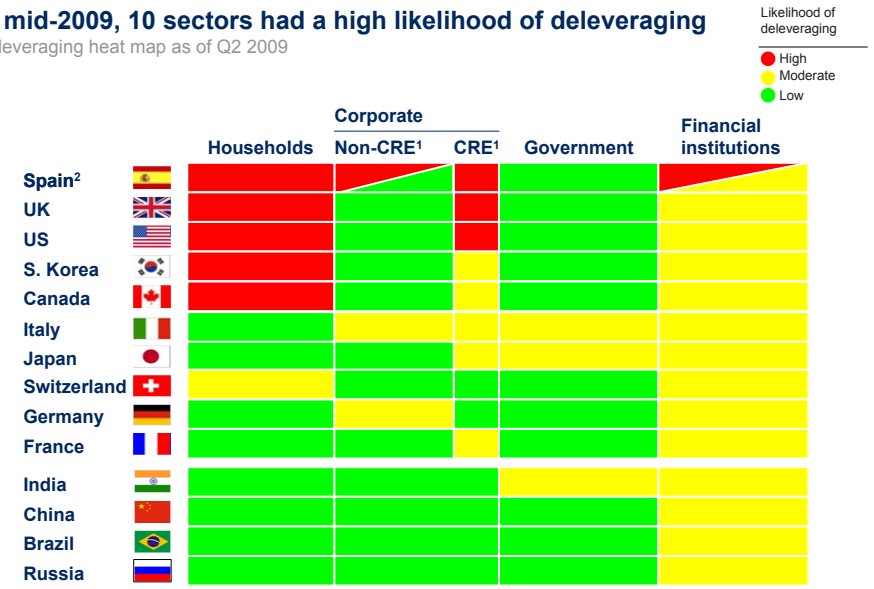
23 See *Appendix A: Technical notes* for more detail on the methodology.

The resulting "heat map" in Exhibit 24 shows that ten sectors in five countries have a high likelihood of deleveraging (color-coded red or partially red) in the years ahead.[24] Of these, five are household sectors (the United Kingdom, United States, Spain, and to a lesser extent Canada and South Korea); three are commercial real estate sectors (the United Kingdom, United States, and Spain); one comprises parts of Spain's financial sector (especially the smaller banks); and one comprises the construction and real estate-related parts of Spain's corporate sector excluding commercial real estate.

Exhibit 24

In mid-2009, 10 sectors had a high likelihood of deleveraging

Deleveraging heat map as of Q2 2009



1 CRE = Commercial real estate subsector; includes public and private real estate investment vehicles.
2 A split box indicates some portion of a sector, not necessarily 50 percent.

SOURCE: McKinsey Global Institute

Households have a high likelihood of deleveraging in five countries. It is not clear what the "right" level of household leverage is for any country. It could change over time because of economic development and demographic shifts, and it may vary across countries depending on land availability and housing preferences. However, we can say today that household leverage (measured as the ratio of debt to disposable income) in the United States, United Kingdom, Spain, Canada, and South Korea is at historic peaks and has increased dramatically since 2000 (for instance, by 88 percent in Spain and 73 percent in South Korea). In South Korea, Spain, and the United Kingdom, more than 90 percent of household debt has variable rates, leaving borrowers exposed to future interest rate movements. We therefore classify these households as having a high likelihood of deleveraging. Households in some of these countries have already started to reduce debt, but have a long way to go.[25]

The commercial real estate sectors look ripe for deleveraging in three countries. In Spain, the United Kingdom, and the United States, leverage in the commercial real estate sector increased in the years before the crisis as rising real estate prices buoyed the apparent value of the collateral used to secure bank loans and as the expansion of the market for commercial mortgage-backed securities increased the supply of available funds. The rapid fall in commercial real estate prices during the

24 A split box indicates that some portion of the sector is color-coded a certain way, but not necessarily 50 percent.

25 Some governments are also taking steps to slow household borrowing. The South Korean government, for instance, has instituted regulatory controls to slow growth in mortgage loans.

crisis has reversed this dynamic. For example, delinquency rates on US commercial real estate loans have almost doubled from precrisis levels. In addition, commercial mortgage-backed securities maturing in 2010 through 2012 are highly concentrated in five-year interest-only loans originated from 2005 through 2007. Finding new lenders to replace these maturing securities might be highly challenging for the borrowers, potentially resulting in further defaults and deleveraging of the sector.

The financial sectors in all countries face a moderate likelihood of further deleveraging. The reasons in each country differ. For some, such as the United Kingdom, high reliance on short-term wholesale funding may prompt further deleveraging. In other countries, such as the United States, deteriorating commercial real estate assets will force some banks to raise more capital or reduce lending. And banks in all countries could be affected by regulatory changes that increase capital ratios.

Spain's private sector leverage overall has increased. With the creation of the euro in 1999, Spain went from having high and volatile interest rates to much lower, more stable interest rates. This change increased the demand for credit, much of it for real estate. As a result, real estate and construction are now a large part of Spain's economy. As of 2008, the Spanish construction industry accounted for 11 percent of GDP (compared with 5.4 percent in the United States). In Spain, 60 percent of domestic lending was related to real estate (compared with 53 percent in the United States). Now the collapse of the real estate bubble is affecting not just household borrowers but also the financial institutions, construction-related industries, and other businesses that prospered and borrowed heavily during the expansion.

Spain's corporate sector overall has a markedly higher leverage ratio (measured as debt to book equity) than that in other countries and it has increased significantly since 2000. However, this aggregate figure includes some very highly leveraged construction companies. It may also reflect the industry mix in Spain, which has more large, global companies in industries that are typically more highly leveraged. We therefore split our assessment into red for the construction and real estate-related companies and green for the remainder.

For Spain's financial sector, we recognize a marked divergence in the position of the larger Spanish banks compared with the smaller, regional ones.[26] Going forward, the deflating Spanish real estate bubble is likely to affect most heavily the small and medium-size savings banks (the *cajas*), which have a larger proportion of their balance sheets exposed to domestic real estate and which have experienced significantly higher rates of nonperforming loans than larger banks. Large Spanish banks such as Santander and BBVA are not in a materially different position than other global banks, given the international diversity of their assets and their strong capital ratios. We therefore rate the Spanish financial sector in the heat map as yellow for the larger banks but red for the smaller banks, which have a higher likelihood to deleverage going forward. We also recognize that given widespread capital raising by the banks after the second quarter of 2009, the financial institutions sector might now be further down the path of deleveraging.

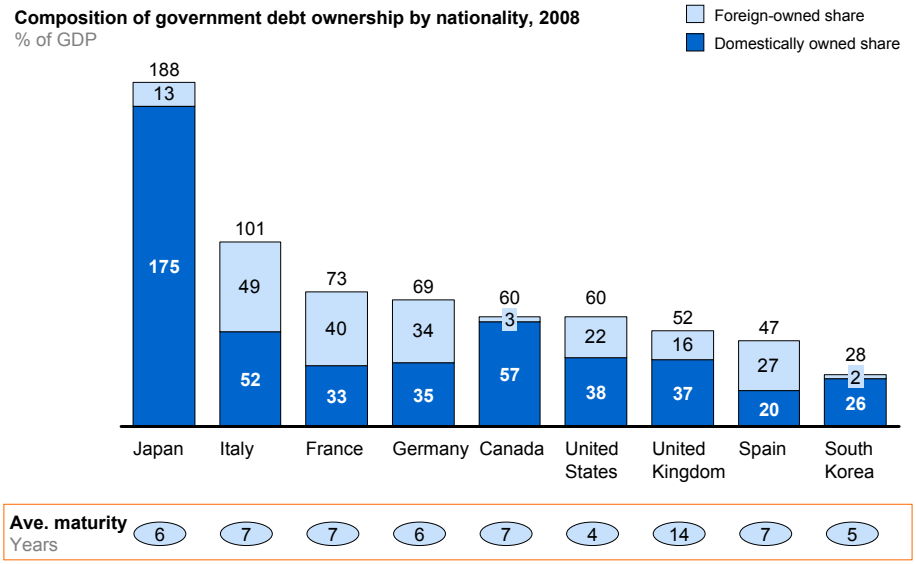
Developed economy governments appear unlikely to deleverage anytime soon. With the exception of Japan, governments in the mature economies entered the crisis with stable debt burdens and declining debt service payments. We characterize the governments of Japan and Italy as having a moderate likelihood of deleveraging.

26 It's worth noting that the Spanish banks had, and still have, relatively low levels of leverage.

Japan's government debt, although very large, is offset by high levels of financial assets[27] and is amply funded by domestic household savings (Exhibit 25). Italy's government debt is high, but nowhere near Japan's level, and its debt service capacity is near the median of other countries in our sample.[28] For the other mature economies, there is little likelihood of government deleveraging in the near future. The government debt-to-GDP ratios in many mature economies are projected to rise over the next two to three years, which may well put them into the yellow or red categories, at which point they will likely start to deleverage.[29]

Exhibit 25

Japan's government debt is mostly owned by domestic investors



SOURCE: Bank of International Settlements; International Monetary Fund; central banks; McKinsey Global Institute

Emerging markets are unlikely to deleverage. In the four emerging-market economies we examined, no sector appears highly likely to deleverage. In most sectors, leverage is far below that of developed economies because of conservative borrowing practices and limited access to credit (government debt in India and Brazil are the exceptions). Nonetheless, the very rapid growth in credit in the first half of 2009 in both China and India could indicate trouble ahead in the quality of loan portfolios. There is a strong historical correlation between past rates of loan growth and future nonperforming loans, as credit underwriting standards slip when new volumes are very high.[30]

27 In both South Korea and Japan, government debt is significantly offset by government assets. If we subtract intra-government debt holdings, central bank holdings of government debt, and foreign reserves, we find Japan's net government debt is 142 percent of GDP and South Korea's becomes less than zero. For all other countries in our sample, the difference is less than 10 percentage points.

28 Italy's current debt service consumes 11 percent of tax revenue, compared with 22 percent for Japan. The figures for the United States and the United Kingdom, in contrast, are 9 percent and 6 percent, respectively.

29 Global Insight projects that by the end of 2012, US government debt will reach 105 percent of GDP, UK debt will reach 91 percent, Spain's will rise to 74 percent, Japan's will reach 225 percent, and Italy's will reach 119 percent.

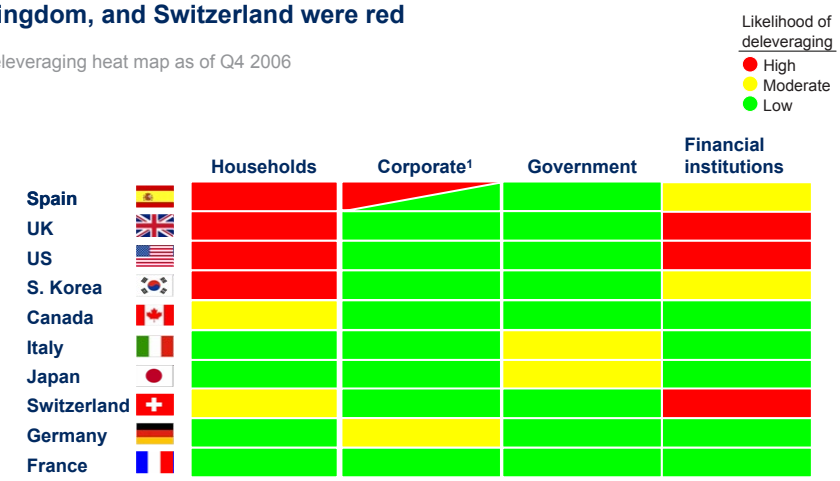
30 See Dominic Barton, Roberto Newell, and Gregory Wilson, *Dangerous Markets: Managing in Financial Crises*.

The heat map in 2006 would have shown financial sectors in the United States, the United Kingdom, and Switzerland coded red. To test our methodology, we created a similar heat map for 2006 to see how effectively the tool would have been in spotting emerging pockets of leverage. While not definitive in proving the robustness of this framework, it showed that by 2006 households in Spain, South Korea, the United Kingdom, and the United States already had potentially unsustainable levels of leverage (Exhibit 26). Canadian households in 2006, in contrast, were not yet as leveraged. In the financial sector, the heat map shows that Switzerland, the United Kingdom, and the United States were "flashing red" in the run-up to the crisis. Their yellow coding as of the second quarter of 2009 reflects their significant deleveraging since the start of the crisis. The Spanish banking sector was coded yellow in 2006, reflecting that its aggregate leverage ratio was below its historic average. The rapid deterioration of Spain's real estate-related assets became apparent in 2007 and 2008.

Exhibit 26

At the end of 2006, the financial sectors in the United States, the United Kingdom, and Switzerland were red

Deleveraging heat map as of Q4 2006



1 Excludes commercial real estate subsector.

SOURCE: McKinsey Global Institute

THE SOBERING LESSONS FROM PAST EPISODES OF DELEVERAGING

We cannot say with certainty that the most highly leveraged sectors today will necessarily reduce their debt because many factors are at play, including economic, policy, and behavioral factors. However, we do know that deleveraging has followed nearly every major financial crisis in the post-World War II period. If history is a guide, certain sectors in these economies are therefore likely to go through a painful process in which the ratio of debt relative to GDP falls over many years. And while the world's major mature economies are expanding once again, deleveraging may present a drag on GDP growth rates for some time.

We arrived at this conclusion after creating a detailed database of deleveraging events since 1950. We augmented this with additional case studies from the United States during and after the Great Depression (1929-43). The result was 45 episodes of deleveraging, 32 of which followed a financial crisis (see *Appendix B: Historic episodes of deleveraging* for more detail on these episodes). This historical record offers several lessons, and some guide to what may lie ahead.

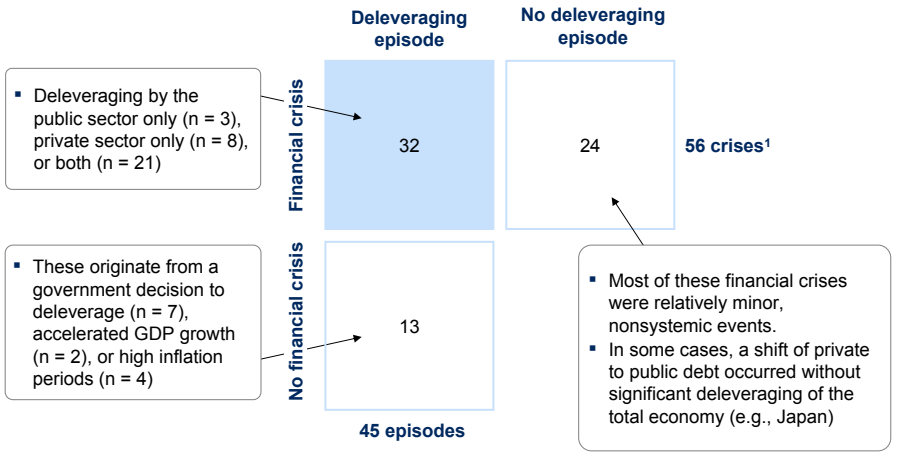
Deleveraging nearly always follows a financial crisis

We define a significant deleveraging episode as one in which the ratio of total debt to GDP declines for at least three consecutive years and falls by 10 percent or more. We identified 45 such episodes since 1930, ranging from the US Great Depression (1929–43) to Argentina today (2002–present). In some cases, deleveraging was accomplished primarily by the government, in others primarily by the private sector, and in some by both.[31]

We then cross-referenced these deleveraging episodes with the set of financial crises documented by economists Carmen Reinhart and Kenneth Rogoff.[32] We found that with only one exception (Japan), every *major* financial crisis during the period studied has been followed by a period of deleveraging (Exhibit 27).[33] It therefore appears likely that some sectors in the United Kingdom, United States, Spain, Canada, and South Korea will eventually go through a period of deleveraging.

Exhibit 27

We identified 45 episodes of significant deleveraging since 1950, of which 32 followed a financial crisis



1 Financial crises as identified by C. Reinhart and K. Rogoff.

SOURCE: C. Reinhart and K. Rogoff, *This Time is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

31 See *Appendix B: Historic episodes of deleveraging* for the full list of deleveraging episodes, as well as a detailed description of a selection of these episodes.

32 Carmen Reinhart and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2009. Our work complements this work: Reinhart and Rogoff comprehensively analyze the history of financial crises, including patterns and crisis resolution. We focus on the patterns of debt reduction rather than the causes of crises. We also assess the current state of debt and leverage and of potential deleveraging going forward.

33 Minor banking crises that do not result in a severe recession and are not systemic do not usually prompt deleveraging. That was the case, for example, in the US savings and loan crisis of the late 1980s and the Credit Lyonnais crisis in 1994 in France.

We also find that some deleveraging episodes do not follow a financial crisis. These can be the result of above-trend GDP growth in a postwar situation (e.g., Egypt 1975–79) or oil boom (e.g., Nigeria 1968–71); episodes that are due to periods of high inflation (e.g., Italy 1975–81); or simply government policy choices (e.g., Belgium in the years prior to joining the euro). We focus our analysis on the postcrisis deleveraging episodes because they are the most relevant to the situation today.

Four historic archetypes of deleveraging

Across the 32 episodes of postcrisis deleveraging, the most common path, fitting 16 of the episodes, was through a prolonged period of austerity, or "belt-tightening" (Exhibit 28). During this period, most countries experienced some growth in credit, but the pace was far below the precrisis rate of credit growth and was slower than nominal GDP growth. (In only a handful of severe cases did the stock of nominal debt actually decline). During these 16 episodes, the saving rate increased as borrowers slowly reduced their debt. Examples of deleveraging through belt-tightening include the US economy during the Depression years of 1933-37; Finland and other Scandinavian countries in the 1990s; and South Korea and Malaysia after the Asian financial crisis in 1997.

Exhibit 28

We have observed 4 archetypes of the deleveraging process

	Archetype	Number of episodes after a crisis (total[1])	Description	Examples	Years
1	**"Belt-tightening"** *Most common deleveraging path*	**16** (23)	▪ Episodes where the rate of debt growth is slower than nominal GDP growth, or the nominal stock of debt declines	▪ Finland ▪ Malaysia ▪ US ▪ S. Korea	91-98 98-08 33-37 98-00
2	**"High inflation"** *Absence of strong central banks, often in emerging markets*	**8** (12)	▪ Periods of high inflation mechanically increase nominal GDP growth, thus reducing debt/GDP ratios	▪ Spain ▪ Italy ▪ Chile	76-80 75-87 84-91
3	**"Massive default"** *Often after a currency crisis*	**7** (7)	▪ Stock of debt decreases due to massive private and public sector defaults	▪ US ▪ Argentina ▪ Mexico	29-33 02-08 82-92
4	**"Growing out of debt"** *Often after an oil or war boom*	**1** (3)	▪ Economies experience rapid (and off-trend) real GDP growth and debt/GDP decreases	▪ US ▪ Nigeria ▪ Egypt	38-43 01-05 75-79

1 Includes 13 deleveraging episodes that were not preceded by a financial crisis.

SOURCE: McKinsey Global Institute

We identified three other archetypes of deleveraging as well—"high inflation," "massive default," and "growing out of debt"—but they were relatively rare and occurred in conditions that are not present today in the mature economies. High inflation causes deleveraging by increasing nominal GDP growth, thereby reducing the ratio of debt over GDP. This pattern, which occurred in Chile from 1984 to 1991 and Spain from 1976 to 1980, typically reflects the absence of a strong and independent central bank. Massive defaults have usually followed currency crises, as in Argentina in 2002–08 and Mexico in 1982–92. And in just three cases in our sample were economies able to grow out of debt solely because of rapid economic expansions—and all three were fueled by war, such as the US experience during World War II, or oil booms. This record suggests that today's mature economies are most likely to deleverage through a belt-tightening process.

Deleveraging episodes last an average of six to seven years and are accompanied by a recession in the initial years

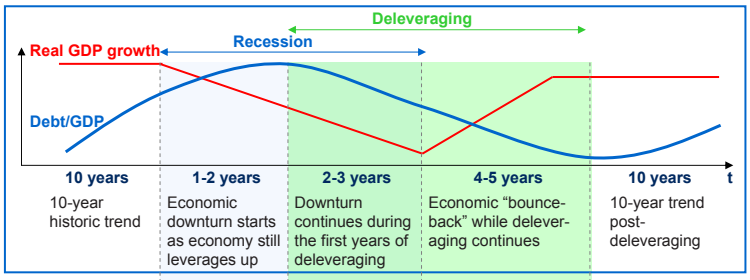
History shows that deleveraging is usually a long and difficult process. In the past, "belt-tightening" deleveraging episodes have lasted an average of six to seven years and reduced debt to GDP by about 25 percent (the median). Credit growth in most cases slows dramatically: in the mature economies in our sample, credit growth in the ten years prior to the crisis averaged 17 percent annually, but fell to just 4 percent during deleveraging.

The sharp reduction in credit growth has been associated with declining real GDP in the first two to three years of deleveraging (Exhibit 29). Interestingly, we find that deleveraging typically begins about two years after the start of the financial crisis and economic recession—just where the United States and Europe are as we write this report. In nearly every episode we examined, GDP growth declined in the early years of the process but then rebounded in the next four to five years while deleveraging continued. In the belt-tightening episodes, credit growth also resumed in the later years, although more slowly than GDP, allowing for further deleveraging.

Exhibit 29

Real GDP growth is significantly slower in the first 2-3 years of deleveraging

Impact of deleveraging on GDP growth



Average annual real GDP growth, %	10 years	1-2 years	2-3 years	4-5 years	10 years
1 "Belt-tightening" n = 16	4.7	0.6	-0.6	4.8	3.2
2 "High inflation" n = 8	4.3	-1.7	-1.4	4.1	4.2
3 "Massive default" n = 7	4.3	-1.8	-3.0	5.7	4.8
4 "Growing out of debt" n = 1	7.9	0.8	12.8[1]		2.3
Total n = 32	**4.6**	**-0.5**	**-1.3**	**5.1**	**3.8**

1 Deleveraging driven by off-trend growth is not linked to a recession.

SOURCE: IMF; McKinsey Global Institute

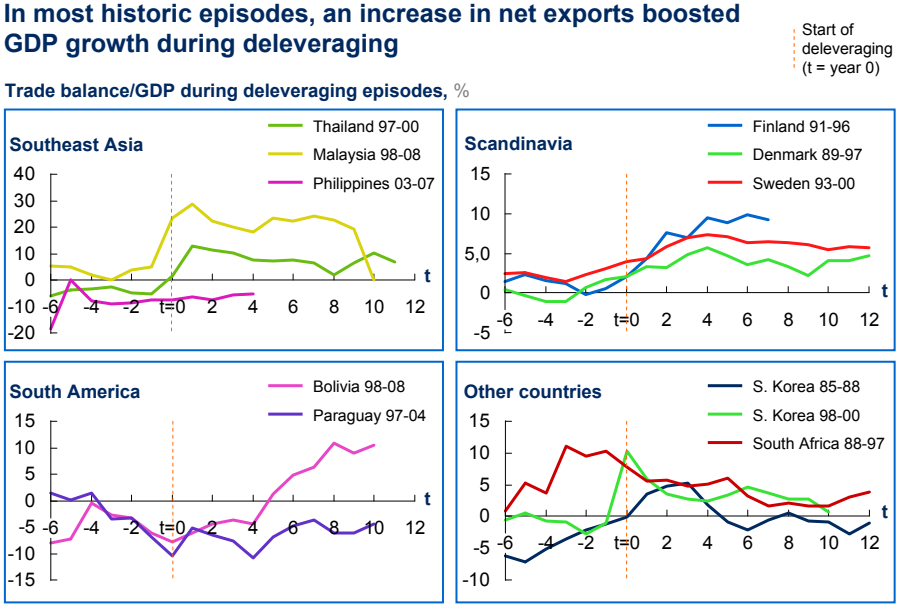
DELEVERAGING CAN OCCUR THROUGH DIFFERENT MACROECONOMIC CHANNELS

The historic episodes show that deleveraging can occur through different macroeconomic channels. These either reduce the growth of credit, increase nominal GDP growth, or both. Each archetype is associated with different channels. The "massive default" archetype results in deleveraging by reducing the outstanding stock of credit as loans are written down. The "high inflation" archetype works by increasing nominal GDP growth. The "growing out of debt" archetype works through a marked acceleration in real GDP growth, which historically has been the case only in war time or during commodity booms.

The most common "belt-tightening" archetype works by slowing credit growth and increasing net saving while maintaining nominal GDP growth. Other channels, such as defaults or inflation, can also play a role in belt-tightening episodes. The difficulty is how to support nominal GDP growth as private saving increases, since that implies a reduction in consumption growth. If households save more and businesses invest less, GDP will be reduced unless it is supported by another factor. Many countries historically have expanded net exports to offset those dampening effects. This occurred, for instance, in the Scandinavian countries in the 1990s and in the Asian countries after 1997 (Exhibit 30). But net exports are not the only mechanism to increase GDP growth: productivity growth can boost real GDP, as in the US experience in 1933–37, as can increasing the labor supply (through increased labor force participation, working longer before retirement, or immigration). Modest and controlled inflation would also increase nominal GDP growth.

Exhibit 30

In most historic episodes, an increase in net exports boosted GDP growth during deleveraging



SOURCE: International Monetary Fund International Financial Statistics; McKinsey Global Institute

There are also several other ways in which an economy can deleverage without increasing national saving. For example, borrowing between financial intermediaries could fall. This could be an important driver of deleveraging in the United Kingdom, where bank lending to mortgage finance companies and other nonbank financial institutions contributed to the rise in total debt in the economy. In addition, deleveraging could occur if corporations increase the share of equity financing used to fund operations and reduce the share of debt. Lastly, falling house prices could mean smaller mortgages, slowing the rate of mortgage growth. Policy actions could also encourage deleveraging. For instance, reducing the tax preferences given to debt could shift household and corporate behavior, while tightening limits on the loan-to-value ratio could slow mortgage growth. Given the low personal saving rates in the United States and the United Kingdom today, policy measures such as these, while politically difficult, could be helpful in achieving a benign path of deleveraging.

It is doubtful today that one single macroeconomic factor will enable deleveraging, given the large sizes of the economies involved. It is more likely that deleveraging will occur through marginal improvements in many factors: some improvement in net exports, perhaps some increase in labor force participation, further defaults, maybe some inflation, and hopefully sustained productivity growth. Policies to enable and support these changes will be critical.[34]

DELEVERAGING TODAY MAY START LATER AND TAKE LONGER

While the historic record is helpful, several aspects of the crisis today could make deleveraging more difficult than in the past. Most of the past episodes involved one economy or a few relatively small economies following a national or regional crisis. Today, however, the crisis is global in scale, affecting the world's biggest economies, many of which are still in recession or experiencing very tepid growth. It is difficult to see how all the affected economies could simultaneously deleverage by boosting net exports, as many countries have done in the past.

Moreover, rising government debt may delay the start of deleveraging. Government debt is projected to increase sharply in Spain, the United Kingdom, and the United States. This could more than offset any deleveraging by the private sector, and thus delay the point at which an entire economy's debt-to-GDP ratio declines. Should these economies start deleveraging sooner through far more severe reductions in debt in the private sector, the economic recovery may be derailed.

Another possible path is that of Japan, where growing government debt has offset deleveraging by the private sector since 1990 (see sidebar, *Japan's experience: A cautionary tale*). As of the second quarter of 2009, Japan had the highest debt-to-GDP ratio of any country in our sample, with government debt alone equal to 197 percent of GDP. There are important differences between Japan's situation and that of the other highly leveraged mature economies today. Nonetheless, to avoid the Japan route, they will have to reverse the rise of government debt after the crisis passes and GDP growth revives, which will require hard policy choices.

Japan's experience: A cautionary tale

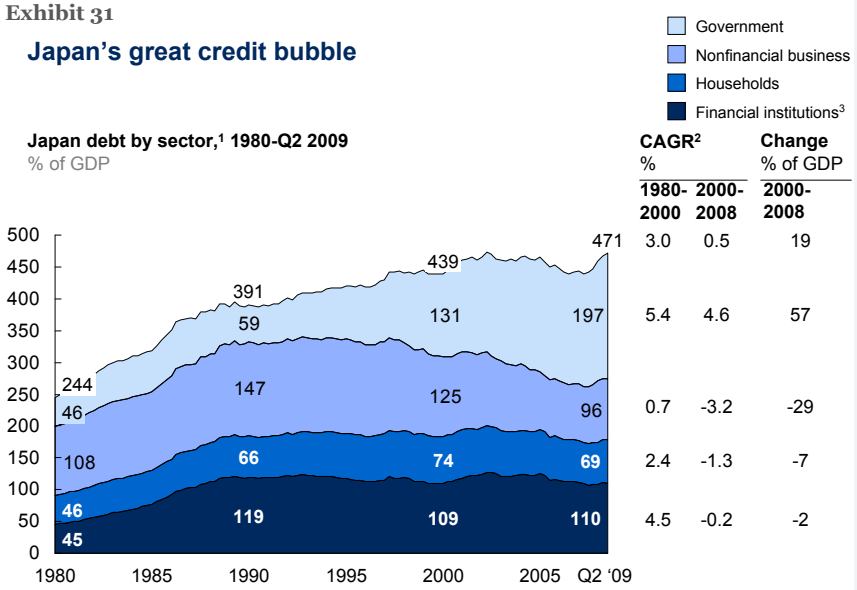
Could today's highly indebted countries follow Japan's example, with private sector deleveraging offset by a growing government debt? This question has been asked frequently because of the similarities between the current situation and Japan's experience in the 1980s and '90s. Japan's total debt-to-GDP ratio increased substantially in the 1980s as asset prices rose steeply in real estate and equity markets (Exhibit 31). The collapse of the Japanese asset bubbles in the early 1990s caused a financial crisis, an economic downturn, and widespread damage to private sector balance sheets. The Japanese crisis was followed by many years in which rising government debt offset deleveraging by the private sector—contributing to a "lost decade" of sluggish GDP growth. Today, similarly, while the US and UK private sectors have started to deleverage, public sector debt is rising.

Despite these similarities, several important differences separate Japan in the past and the mature economies' situation today. First, the scale of recent

34 See *Will US consumer debt reduction dampen the recovery?*, McKinsey Global Institute, March 2009, available at www.mckinsey.com/mgi.

Exhibit 31

Japan's great credit bubble



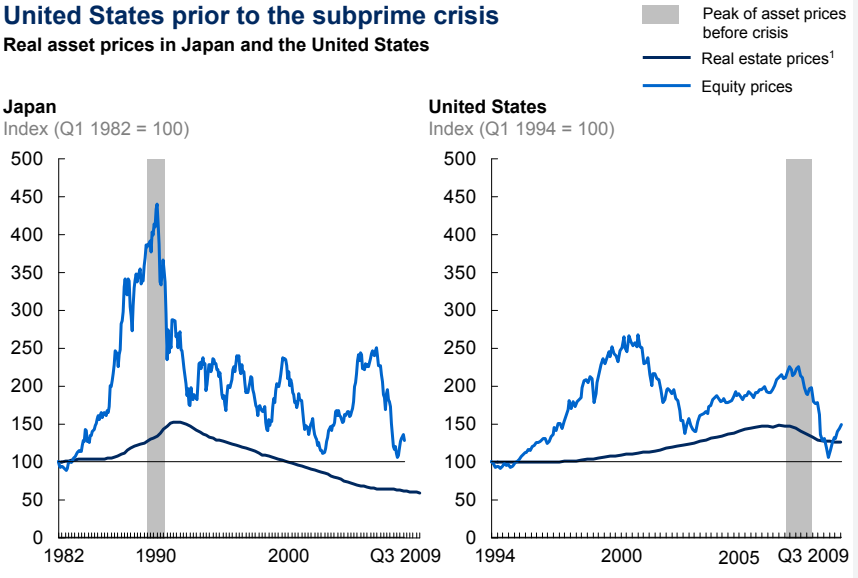
1 Some figures do not sum due to rounding.
2 Compound annual growth rate.
3 Asset-backed securities have been removed from financial sector borrowing to avoid double counting of the underlying loan.
SOURCE: Haver Analytics; McKinsey Global Institute

asset price appreciation, particularly in equity markets, before the current crisis was nowhere close to the levels seen in Japan from 1985 through 1989 (Exhibit 32). And after the bubbles burst, Japanese asset prices fell further and for a substantially longer period than we have seen so far today, resulting in a much larger destruction of wealth—more than 325 percent of GDP in Japan, compared with around 125 percent of GDP in the United States. Second, US and European banks have been far quicker to write down their loan losses, enabling the closure of unproductive businesses and the resumption of lending to new businesses. Third, monetary and fiscal authorities in today's

Exhibit 32

Asset price appreciation was greater prior to Japan's crisis than in the United States prior to the subprime crisis

Real asset prices in Japan and the United States



1 Real estate prices are the urban land price index in Japan and the FHFA purchase-only index in the United States.
SOURCE: Haver Analytics; McKinsey Global Institute

highly indebted countries have responded much more quickly and forcefully than did Japan's government, with large and unprecedented economic stimulus programs aimed at shoring up total demand. Finally, Japan faced structural rigidities in its labor and product markets that have hampered productivity growth, and an older and more rapidly aging population that made it more difficult to maintain GDP growth.

In other ways, however, the mature economies today may be in a worse position. Because of the global nature of this crisis, these economies have been unable to sustain exports; in contrast, Japan was able to export to other, healthier economies after its crisis. In addition, the United States and the United Kingdom today rely on foreign investors to fund their government debt, while Japan has been able to sustain high levels of government debt because it can draw on a large pool of domestic savings. This leaves countries today vulnerable to possible changes in foreign investor sentiment that could drive up interest rates, quashing an economic recovery.

All of this leads us to a conclusion that the most likely path forward today—particularly in the United States, the United Kingdom, and Spain— is one in which deleveraging is postponed until after the crisis passes and government debt growth is reined in. Then, these economies' debt burdens will most likely decline more slowly and over a longer period than the historical average. That is because not only will the private sector need to deleverage, given precrisis growth in debt, but the public sector will also have a large debt to pay down (see sidebar, *Sovereign deleveraging through history*). These highly leveraged economies may therefore remain vulnerable to economic shocks for some time. While we do not forecast GDP, it is likely that deleveraging will dampen GDP growth compared with what it would have been otherwise, possibly slowing the recovery.

Sovereign deleveraging through history

Government debt is projected to rise steeply in many crisis countries, which will likely offset any private sector deleveraging. The total debt-to-GDP ratio may therefore not change for some time—and when deleveraging does begin, these countries will face a larger government debt to pay off.

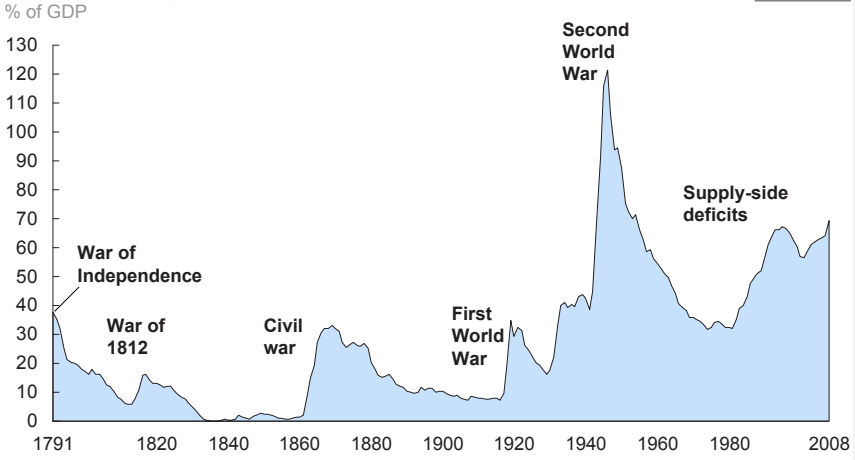
Fortunately, history provides many examples of successful government deleveraging. Looking back over US history since 1791, we find six sovereign deleveragings, with the earliest occurring soon after the War of Independence and the latest during the economic boom of the 1990s (Exhibit 33). Similarly in Great Britain, we see six examples of government deleveraging since 1692 with the greatest occurring after the end of a series of wars in 1812 (Exhibit 34). More recently, since 1990, we find a range of examples of government deleveraging: Canada, Spain, Belgium, and the Netherlands, among many others.

These historical episodes provide instructive lessons. Many sovereign deleveraging episodes occurred after wars as government spending declined, freeing up resources for the domestic economy—the so-called

peace dividend. This helped spur economic growth and increase tax revenue. Although the United States and United Kingdom today have spent heavily on the ongoing conflicts in Afghanistan and Iraq, the amounts are much smaller relative to GDP than in many past wars. So while an end to those conflicts could possibly create some small peace dividend, the reductions are unlikely to boost GDP growth significantly.

Exhibit 33

The US government debt grew significantly during World War II

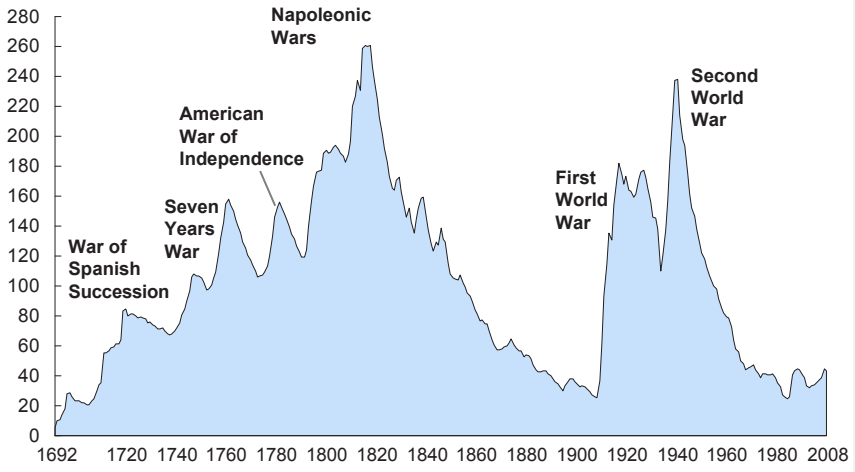


1 To construct this long-term time series, we use US gross federal debt which includes debt held by the public as well as intra-government holdings; this methodology differs from the methodology we use to construct the medium-term time series across 14 countries (mainly that the long-term time series includes debt owed to social security funds, but excludes state debt); see *Appendix A: Technical Notes* for more details

SOURCE: US Treasury Department; McKinsey Global Institute

Exhibit 34

The UK government has experienced several large expansions in public debt since 1692



SOURCE: HM Treasury; Gregory Clark (2008), ukpublicspending.co.uk; Office of National Statistics; McKinsey Global Institute

POLICY MAKERS CAN TAKE STEPS TO PREVENT FUTURE CREDIT BUBBLES

Our analysis has several implications for policy makers and regulators seeking to ease the deleveraging process and enhance future financial market stability, and for business executives as they navigate through these turbulent times.

History shows that policy makers can enable healthy deleveraging by supporting GDP growth through the process. This will require working through multiple channels, such as spurring increases in net exports, productivity growth, and the labor supply. Additionally, policy makers need to carefully consider the timing of reducing government support of aggregate demand. Many historic examples, from the United States in 1938 to Japan in 1997, show the danger of prematurely withdrawing fiscal and monetary support of the economy. However, faced with rising public debt, many governments face an acutely difficult decision on the precise timing of the necessary public spending cuts.

In addition, the analysis presented in this report supports arguments in favor of at least seven measures for enhancing future stability that regulators and policy makers should note:

1. *Policy makers should work toward developing an international system for tracking leverage at a granular sector level across countries and over time*. Our analysis shows that identifiable pockets of leverage grew in several sectors in several major economies prior to the crisis. With our heat map, we have taken the first step toward developing a system for monitoring this type of leverage buildup in the future. But the data available today are limited and not always comparable across countries. We believe there would be great value in refining and strengthening this framework further. Some policy makers and regulators are already moving in a similar direction.[35] However, a purely national approach will not suffice, given the modern degree of cross-border lending and investment as well as the insights gleaned from cross-country comparisons. An international monitoring system could be maintained by, say, the Financial Stability Board or the International Monetary Fund (IMF). These international institutions would work with national governments to collect the required data, similar to the IMF's current role in collecting national balance of payments data. This would provide objective, international comparisons of debt and leverage essential to flagging future credit bubbles.

2. *Bank executives should adjust their internal risk models to reflect leverage in sectors of the real economy*. The first line of defense against unsustainable levels of leverage is bank management. Internal risk models should not only incorporate past rates of default on different types of assets but should also be adjusted to reflect growing leverage in sectors of the real economy, and ideally within pockets of borrowers within sectors. A revised Basel II framework could require banks to adjust their internal risk weights to reflect levels of leverage in the relevant sector of the real economy. This would need to be taken forward as part of the industry-wide debates on improving risk management, and there are considerable challenges to overcome to develop such a system. An international "early warning system" of high leverage (see point 1 above) would provide important guidance to

35 For example, the Bank of England has proposed a set of qualitative and quantitative metrics to assess the degree of "exuberance" in different sectors of the economy. See Bank of England, "The role of macroprudential policy," November 2009. Our framework has many conceptual similarities but differs in several ways, including the tracking of consistent metrics across countries to enable comparison.

bank executives in managing their risks and would give boards more ammunition to challenge management about the need to rein in risk appetite as leverage in specific sectors of the real economy increases. Given the need to measure and manage risk at a highly granular level, it would be both necessary and preferable for bank management, rather than regulators, to make these decisions, through risk management systems that properly reflect risk in the real economy. However, the expertise and resources required to maintain such a system at a bank management level would be significant.

3. *Macroprudential policy should also reflect leverage in specific sectors of the real economy*. The analysis in our report supports the current moves toward macroprudential policy. Some of the current proposals, such as that by the Bank of England, recognize the need to base policy on rising leverage within sectors of the real economy. The details of how to execute such a policy based on such information have yet to be worked out. It would be impractical and undesirable for regulators to intervene at a very micro level of detail. The right balance will need to be struck between regulators providing guidance on risks building up in the economy and bank management driving the execution of their own risk management systems.

4. *Financial regulators should reassess the need for further rapid increases in bank capital ratios*. This analysis provides strong support for many of the actions already taken by regulators—most importantly, the actions to rein in pockets of leverage (for example, at US broker dealers and at specific institutions) and in raising the quality of capital across the industry through higher Core Tier 1 ratios. Our analysis provides little support, however, for some other aspects of the current agenda of change: for instance, gross leverage ratios do not appear to be a reliable guide to bank capital adequacy. Moreover, we find that the banking system has now deleveraged to the point where capital levels are at or above the average over the 15 years before the crisis.[36] Whether more capital is needed on top of what banks have accumulated to date remains unknown.[37] Moreover, the likelihood of deleveraging in many mature economies argues for a very measured pace to any further increases in bank capital. Further deleveraging of the banks will either restrict credit supply to the real economy or raise the cost of credit. Either way, it will act as a drag on economic growth at exactly the time that these highly leveraged economies face other strong headwinds.

5. *Monetary policy makers should act to prevent pockets of leverage*. Central bankers note that it is difficult to identify an asset bubble until after the fact. We contend it is easier to see rising leverage in pockets of the economy, which very frequently point to an asset bubble, whether in real estate, equities, or debt instruments. This might imply that central bankers should adjust interest rates with an eye toward slowing (or stimulating) growth in leverage as well as controlling inflation. An alternative would be to restrain asset bubble growth with regulatory

36 On the basis of the ratio of risk-weighted assets to Core Tier 1 capital, the leverage of the US commercial banks declined from 16.3 in 2007 to 13.3 by the third quarter of 2009. This was slightly lower than the 15-year precrisis average of 13.8.

37 A forthcoming working paper by the McKinsey Risk Practice (Buehler, Samandari, and Mazingo, *Capital ratios and financial distress: Lessons from the crisis*) analyzes the relationship between capital ratios and financial distress. It finds that three-quarters of the banks in financial distress would have weathered the crisis had their ratio of tangible common equity to risk-weighted assets been above 6.5 to 7.5 percent. Requiring a higher ratio than 7.5 percent entails sharply higher incremental costs to credit availability and would prevent a diminishing number of bank failures.

tools, such as margin requirements or restrictions on loan-to-value ratios in mortgage lending.

6. *Tax preferences for debt, and especially for real estate lending, should be revisited*. Given the disproportionate role of real estate in driving both the current crisis and many in the past, policy makers should reconsider the highly preferential tax and capital treatment of residential mortgages. Doing so would be politically difficult. However, the evidence is clear: real estate absorbs far more bank lending than do small and medium-size enterprises and corporations. Real estate is prone to speculative bubbles, which have the potential to do considerable damage to the broader economy. Therefore, the degree to which residential real estate enjoys preferential tax treatment, low capital charges, and implicit government subsidies in some countries should be questioned. More broadly, the tax incentives for corporations to issue debt (or disincentives to issue equity) might be reconsidered to create a more level playing field between debt and equity financing.

7. *Regulators should also revisit the broader set of incentives for households taking on debt*. The surge in household debt was not limited to countries with very favorable tax treatment of residential real estate debt (for example, the United States). Countries without the tax incentives for real estate debt, such as Canada, Spain, and South Korea, also experienced steep increases in household leverage. Regulators should revisit the ease of access to credit for borrowers. For instance, they should consider limiting loan-to-value ratios, especially for less creditworthy borrowers.

Steering companies at a time of deleveraging is also a challenge for business executives. The process portends a prolonged period in which credit is less available and more costly, altering the viability of some of business models and changing the attractiveness of different types of investments. In historic episodes, private investment was often quite low for the duration of deleveraging. Today, the household sectors of several countries have a high likelihood of deleveraging. If this happens, consumption growth will likely be slower than the precrisis trend and spending patterns will shift. Business leaders will need flexibility to respond.

* * *

At this writing, the deleveraging process has barely begun. Each week brings news of another country straining under the burden of too much debt or impending bank losses from over-indebted companies. The bursting of the great global credit bubble is not over yet. Yet a challenging set of choices lies ahead. Deleveraging is likely to be a significant component of the recovery in many economies, which will dampen growth. Nevertheless, by learning lessons from historic experiences of deleveraging, today's policy makers may be better able to steer a course through these challenging waters. With thoughtful and brave policy choices, these economies may well emerge in a few years' time in good health—better balanced, more productive, more competitive, and back on a path of sustained long-term growth.

Appendix A: Technical notes

These technical notes provide more detail on some of the methodologies employed in this report. We discuss the following topics in more detail:

1. Methodology for assessing sustainability of leverage
2. Methodology for compiling comparable time series on financial institutions leverage
3. Methodology for compiling time series of debt to GDP

1. METHODOLOGY FOR ASSESSING SUSTAINABILITY OF LEVERAGE

We have developed a framework to assess the sustainability of leverage for individual sectors of the economy. The five components of this framework are the level of leverage, growth of debt and leverage, debt service capacity, vulnerability to income shocks, and the vulnerability to funding and interest rate shocks (see Exhibit 23 of the main section of this report). In this appendix section, we discuss in more detail a how we have analyzed these metrics to assess each sector's likelihood of deleveraging.

Metrics by sector

As we mention in the main section of this report, we have taken the first step toward developing a system for monitoring this growth of leverage in each sector of the economy. But the data available today are limited and not always comparable across countries. The metrics below represent trade-offs between fitness for purpose, data availability, and comparability across countries. We believe there would be great value in refining and strengthening this framework further.

To assess sustainability of leverage, we have used the following metrics in each sector.[1]

A. Household sector

1. *Absolute level of leverage*. We use household debt relative to disposable income as our main metric. This metric is preferable to household debt relative to assets, which may obscure leverage because of asset appreciation, and to debt relative to GDP, which does not take differing household income shares into account.

2. *Growth of debt and leverage*. We use the change in debt relative to disposable income between 2000 and 2008. Rapid growth in leverage can be a proxy for declining debt quality due to deteriorating underwriting standards, and it is one indicator of higher potential defaults in the future. Rapid leverage growth can

1 We use these five metrics as a starting point and make appropriate adjustments to our assessment to reflect idiosyncratic characteristics of a sector not captured in quantitative metrics. See section on scoring methodology.

also indicate asset booms, which are empirically linked to historical deleveraging episodes and crises.[2]

3. *Debt service capacity*. We use debt interest payments relative to disposable income. The ideal metric to use would be a debt service ratio, which includes both the interest payments and the principal repayment. However, this metric is publicly available only in select countries (e.g., the United States) and therefore would not allow for a comparison across countries.

4. *Vulnerability to income shocks*. We use debt relative to financial assets to assess vulnerability of households in case of an income disruption. The lower the ratio, the greater amount of assets relative to debt that can be drawn down to service interest payments if a borrower becomes employed. Ideally, we would use debt over financial assets, as these are more liquid. However, these data are not available across countries.

5. *Vulnerability to funding and interest rate shocks*. We use the share of variable-rate mortgages as a percentage of total mortgages. Although variable-rate mortgages typically lower debt service payments, they also make borrowers more vulnerable to interest rate increases.

B1. Corporate sector—Excluding commercial real estate subsector

1. *Level of leverage*. We use debt to book equity,[3] which we compile using a proprietary McKinsey database with financial statements of more than 50,000 publicly listed companies around the world. This ratio therefore excludes smaller, privately owned businesses for whom there is no publicly disclosed data. We have corrected for this through a qualitative assessment of the role and vulnerability of the small and medium-size enterprise sector in each country.

2. *Growth of leverage*. We use the change in the ratio of debt to book equity from 2000 to 2008. Sharp increases in leverage can be seen as a sign of increasingly imprudent borrowing and investment decisions (along with a corresponding deterioration of underwriting standards) and can be used as an indicator for higher potential nonperforming loans and defaults in the future.

3. *Debt service capacity*. We use the commonly used interest coverage ratio, defined as EBITA[4] over interest payments. A higher ratio indicates better debt-service capacity.

4. *Vulnerability to income shocks*. We use excess cash relative to total assets, with excess cash being defined as cash holdings over and above the cash portion of working capital typically required within a particular industry. A large proportion of excess cash holdings—a highly liquid asset—can be used to service debt in case of an income shock.

5. *Vulnerability to funding and interest rate shocks*. We use short-term debt relative to total debt. A high proportion of short-term debt might make companies

2 See Carmen Reinhart and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2009.

3 We estimate that the incorporation of unfunded pension liabilities as a form of debt increases the leverage of most corporate sectors by 10 to 20 percent. These liabilities are particularly large in Germany, where they increase leverage by about 40 percent, and the United Kingdom, where they increase it by about 30 percent.

4 Earnings before interest, tax, and amortization.

vulnerable to funding shocks. Companies with longer-term funding can sustain higher levels of debt due to reduced rollover risk.

B2. Corporate sector—Commercial real estate subsector

We have made an attempt to split out the commercial real estate (CRE) subsector from the overall corporate sector, as the dynamic of CRE-related borrowing differs from typical corporate borrowing in its high sensitivity to real estate asset prices. The CRE subsector includes public and private real estate investment vehicles (e.g., investment partnerships, real estate funds, REITs, and the investment portfolios of developers). It does not include businesses related to real estate, such as construction companies or building material supply companies, which are in the non-CRE corporate sector of our analysis. Because commercial real estate companies are generally private entities, there is a scarcity of publicly available data, particularly data that are comparable across countries. The metrics used here have thus been selected based on availability and do not map directly onto our standardized framework. A more complete scoring system should incorporate additional factors such as loan-to-value ratios as a measure of leverage and debt service coverage ratios as a measure of service capacity. In addition, refinancing needs would have to be evaluated on a short-term (say, monthly) basis. We have used the following metrics:

1. *Projected rent growth for prime office rentals in major commercial cities*. Highly negative rent growths indicate challenges for CRE companies because of lower income and therefore lower ability to service debt.

2. *Historic total return to direct investment*. We compare the returns over 2004–07 with historic returns to gauge the extent of the CRE asset bubble. High returns on face value are good, but they also are a potential indicator for a bubble. If returns are particularly high over a prolonged period, it's worth a second look at the fundamentals. Also, if the fundamentals support higher returns, we would expect new players to enter the market and drive down returns.

3. *Distressed CRE assets relative to GDP*. We use this metric as a proxy for the potential magnitude of deleveraging driven by defaults in the CRE subsector.

4. *Capitalization rates for commercial office buildings in prime central business district areas*. Capitalization rates are defined as net operating income relative to the market value of the property. We use this metric as a proxy for assessing the riskiness of CRE investments. Capitalization rates reflect the yield that investors are demanding as compensation for investing in a particular area. The higher the capitalization rates, the riskier the investments (as perceived by investors).

5. *CRE debt expiring within five years relative to total debt*. A high proportion of debt that needs to be refinanced in the short to medium term might make companies vulnerable to funding shocks, particularly in an environment of higher interest rates.

C. Financial institution sector

1. *Level of leverage*. We use tangible assets relative to tangible common equity.[5] This metric reflects the quality of capital better than the gross leverage ratio of assets to equity and is widely used by banking analysts.

2. *Growth of leverage*. We use the variance of tangible assets to tangible common equity from a longer-term, 15-year average in order to identify financial institution sectors that have elevated levels of leverage. As a second metric, we use medium-term (2007 to 2009) growth rates of loans. Sharp increases in financial institutions' loan books can be seen as a proxy for declining asset quality (because of likely deterioration of underwriting standards).

3. *Debt service capacity*. We do not use this metric as it is not meaningful for the financial institution sector.

4. *Vulnerability to income shocks*. We use liquid assets relative to total assets, with liquid assets including cash, deposits, interbank assets, repurchase agreement assets, and holdings of bonds of national governments. A higher proportion of these liquid assets will help financial institutions pay down debt in the event that income is lower than expected.

5. *Vulnerability to funding and interest rate shocks*. We use short-term wholesale funding relative to assets. A high proportion of short-term wholesale funding makes financial institutions more vulnerable to funding shocks—the current financial crisis was a prominent example for this. We also use the commonly used loans-to-deposits ratio. A lower ratio of loans to deposits means that more of the financial institutions' lending activities are funded by deposits, which are a relatively long-term source of funding.

D. Government sector

1. *Level of leverage*. We use the level of government debt relative to GDP.

2. *Growth of leverage*. We use change in government debt relative to GDP between 2000 and 2008.

3. *Debt service capacity*. We use interest payments relative to tax revenue. High interest payments relative to tax revenue leave governments with less room for debt repayment.

4. *Vulnerability to income shocks*. We use net debt relative to GDP, where net debt is defined as gross government debt less foreign exchange reserves, intra-government and central bank holdings of government debt. Net debt represents the debt in excess of liquid assets. The higher net debt levels, the more challenging it might be for governments to meet short-term funding requirements.

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5 Intangible assets include goodwill, deferred tax assets, and other items such as certain servicing rights and software expenses that accounting rules permit banks to capitalize and hold on their balance sheet as assets. Tangible assets and tangible common equity are calculated by deducting the value of these intangibles from total assets and total common equity respectively.

5. *Vulnerability to funding and interest rate shocks*. We use the foreign-owned share of total government debt. Historically, there has been a tendency of creditors reluctant to continue funding foreign debt in case of crisis.[6]

Scoring methodology

Given that multiple noneconomic factors will determine the trajectory and extent of a sector's deleveraging, the assessment that we make with the heat map is necessarily probabilistic in nature. We thus use the above framework as a basis to systematically assess the *likelihood* of deleveraging in a particular sector. We do this with a relatively short-term focus, i.e., our assessment should be read in the context of sectors starting deleveraging within one to two years.

Assessing the likelihood of deleveraging with our suggested framework involves an iterative evaluation of five quantitative metrics along with qualitative insights derived from expert sources. For a particular sector, each quantitative metric is evaluated against the median level of that metric for the ten mature economies in our sample and (where relevant) its deviation from historical norms. The two primary metrics are the level of leverage and the growth of leverage. A high score on one or both of these metrics warrants the rating of "higher likelihood of deleveraging" unless remaining metrics are exceptionally low (indicating mitigating factors that make high leverage sustainable). The converse applies for "lower likelihood of deleveraging" ratings. Ratings are then cross-checked with insights from expert sources (such as International Monetary Fund country reports), and adjustments are applied as necessary if there are important but idiosyncratic characteristics of a sector not captured by the quantitative metrics.

In the following, we provide more detail on how the above scoring methodology was applied to the individual sectors. Our ratings are color-coded: red indicates high likelihood of deleveraging; yellow indicates moderate likelihood; green indicates low. We also provide more details on assessments that we feel require further clarification. The full assessment can be found in the main section of this report (and in Exhibit 24 of the main section of this report).

A. Household sector

The primary metrics for households are the ratio of debt to disposable income and its growth. All sectors with debt-to-disposable income ratios above the median and double-digit leverage growth are rated "higher likelihood of deleveraging," with debt service ratios considered as a secondary measure. Switzerland's deleveraging risk is reduced to "moderate likelihood of deleveraging" because all other factors (e.g., funding and liquidity) point to a particularly strong ability by Swiss households to weather shocks.

B1. Corporate sector—Excluding commercial real estate subsector

The primary metric considered is debt to book equity. Here we see a clustering around a moderate range, with the Spanish sector as the clear outlier. Spain's corporate sector overall has a markedly higher leverage ratio (measured as debt to book equity) than that in other countries and it has increased significantly since 2000. However, this aggregate figure includes some very highly leveraged construction companies. It may also reflect the industry mix in Spain, which has more large, global companies in industries that typically are more highly leveraged. We therefore split

6 In the 1997 Asian financial crisis and the 1998 Russian crisis, bank lending was also the most volatile type of capital flow. See Martin N. Baily, Diana Farrell, and Susan Lund, "The color of hot money," *Foreign Affairs*, March/April 2000.

our assessment into red for the construction and real estate-related companies and green for the remainder.

B2. Corporate sector—Commercial real estate subsector

Total returns that are higher than historic total returns provide an indictor of a potential real estate bubble. Forecast rental growth or declines provide insight into the ability of the sector to service its debts. Countries with high total returns and large forecast rental declines are considered "at risk." These "at risk" countries are then run through the filters of the troubled asset ratio (which indicates that there is a material adverse impact on sector health) and capitalization rates (which approximate investors' views on risk premia), and they are evaluated for refinancing risk. "At risk" sectors that rank poorly on two or more of these criteria are scored as "higher likelihood of deleveraging."

C. Financial institution sector

Given the structural differences in the balance sheets of financial sectors, leverage is evaluated primarily against 15-year historical averages rather than against a peer median. Asset growth (specifically bank lending), a second primary risk factor, is used as a proxy for the deterioration of asset quality on balance sheets. The data show that financial institutions' leverage has already fallen to the averages that prevailed for 15 years before the crisis in most countries.

The financial sectros in all countries face a moderate likelihood of further deleveraging. The reasons differ by country. For some, such as the United Kingdom, high reliance on short-term wholesale funding may prompt further deleveraging. In other countries, such as the United States, deteriorating commercial real estate assets will force some banks to raise more capital or reduce lending. And banks in all countries could be affected by regulatory changes that increase capital ratios.

For Spain's financial sector, we recognize a marked divergence in the position of the larger banks compared with the smaller regional ones. The deflating Spanish real estate bubble is likely to affect most heavily the small and medium-sized savings banks (the cajas), which have a larger proportion of their balance sheets exposed to domestic real estate and which have experienced signficantly higher rates of nonperforming loans than larger banks. Large Spanish banks such as Santander and BBVA are not in a materially different position than other global banks, given the international diversity of their assets and their strong capital ratios. We therefore rate the Spanish financial sector in the heat map as yellow for the larger banks, but red for the smaller banks, which have a higher likelihood of deleveraging going forward. We also recognize that given widespread capital raising by the banks after the second quarter of 2009, the financial institutions sector might now be further down the path of deleveraging.

D. Government sector

Debt to GDP is the primary metric of interest: all countries with levels above peer medians (and in excess of 100 percent of GDP) are deemed to be at risk (i.e., Italy and Japan). As discussed in the main section of this report, developed economy governments appear very unlikely to deleverage anytime soon. With the exception of Japan, governments in the mature economies entered the crisis with stable debt burdens and declining debt service payments. And government debt-to-GDP ratios in the affected economies are projected to rise in coming years due to spending in response to the financial crisis and recession. Although we characterize the

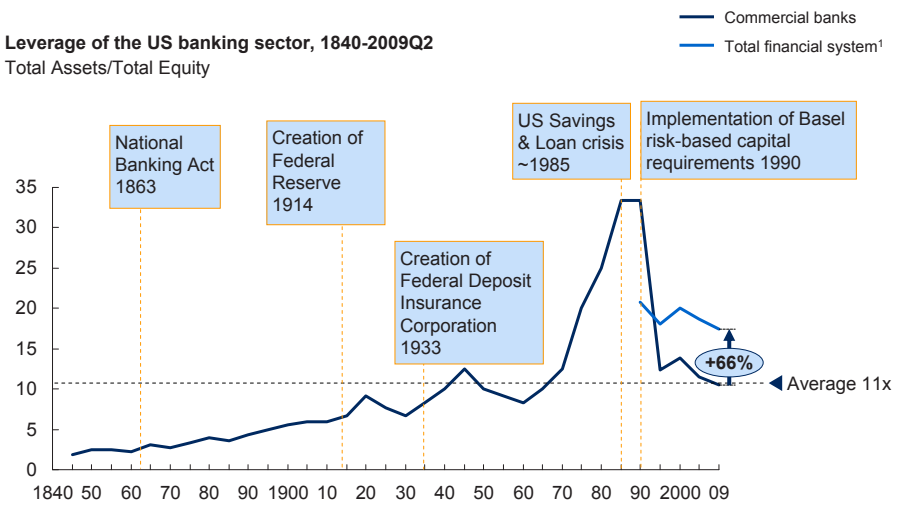
governments of Japan and Italy as "at risk" of deleveraging, we don't see either of them as having a "high likelihood of deleveraging" (red) in the next few years, for different reasons: Japan's high government debt is offset by high levels of financial assets and is amply funded by domestic household savings; Italy's debt levels are mitigated by its strong debt service capacity. In the longer term, however, aging populations may make it harder for some governments (especially Japan and Italy) to sustain their debt levels.

2. METHODOLOGY FOR COMPILING COMPARABLE TIME SERIES ON FINANCIAL INSTITUTIONS LEVERAGE

We have chosen to compile the time series used to compare financial institutions leverage across countries from 1990 onward. Focusing on the period since 1990 provides both theoretical and practical benefits: this period marks the takeoff of globalized financial markets, a modern era of central banks and formal banking regulation. It also offers a wider range of comprehensive data across countries. For completeness, we have included a long-term time series of US bank leverage ratios in Exhibit A.1.

Exhibit A.1

Evolution of leverage in the US banking sector



1 Aggregate leverage of banks, finance companies, government-sponsored entities, and pools of securitized assets.

SOURCE: Adapted from A. Berger, R. Herring, and G. Szego, "The role of capital in financial institutions," 1995.

We adopt a "bottom-up" approach to develop our time series data on levels of financial sector leverage in each country. This approach involves the creation of a "sectoral" balance sheet for each country through the aggregation of balance sheet items from individual institutions as reported in their financial statements and regulatory filings. This provides us with a detailed breakdown of the components of assets and capital, which allows us to develop a picture of leverage across multiple metrics (specifically assets to equity, tangible assets to tangible common equity, and risk-weighted assets to Tier 1 capital). The approach also allows us to conduct a more detailed analysis of the drivers of changing leverage and, where necessary, to make appropriate accounting adjustments to ensure that data are comparable across countries.

Data for our leverage calculations are drawn from multiple sources. Whenever possible, we draw on local databases that provide balance sheet information for all

financial institutions within a particular country. For example, in the United States, we use SNL Financial, which aggregates data from financial and regulatory filings of all banks, thrifts, broker dealers, and finance companies. In the case of Canada and India, similar detailed data are available via online repositories held by national financial regulators.

Where comprehensive local databases do not exist at the level of detail required for our leverage calculations, we identify a list of the major publicly listed financial institutions that constitute the majority the banking sector assets (in most of the countries cover by this study, the top 20 institutions cover about 70 percent of banking assets). Financial statements of these institutions are then sourced from private databases such as Bloomberg, Compustat and Thomson Reuters and are then aggregated into a proxy for the national financial sector balance sheet. The results of our leverage calculations are then cross-checked against broad sectoral measures derived from regulatory sources to ensure a consistency in trends.

Germany and Italy are the two countries for which our bottom-up methodology does not apply. This is because of the relatively low levels of concentration in these two banking sectors, where the significant assets are held by large numbers of small privately owned savings banks, credit cooperatives, and mutual banks (the *Sparkassen* in Germany and the *Banche Popolari* and *Banche di Credito Coopertivo* in Italy) for which detailed bottom-up data are not available. In this case, we use as our baseline gross leverage numbers that we calculate from aggregate sectoral data available via the European Central Bank. Figures for tangible common equity and Tier 1 Capital are then calculated using estimates of the ratio of these numbers to total equity. These ratios are derived via a sampling of publicly listed banks and input from internal experts.

Accurate cross-border comparisons of bank leverage are notoriously difficult because of differences in national accounting rules. Broadly speaking, European banks filings are made in accordance with International Financial Reporting Standards (IFRS), while the United States and other countries use Generally Accepted Accounting Principles (GAAP) or equivalent systems. For large financial institutions, balance sheets reported under IFRS tend to be significantly larger than if they were reported under GAAP. This variance is driven by the different provisions of IFRS and GAAP for such reporting items as derivative positions, reverse repurchase agreements/borrowed securities, and brokerage and securities-related receivables. In an extreme case, leverage ratios under IFRS can be more than double their equivalents that are calculated under GAAP.

We have developed a methodology for adjusting sectoral data for countries in our sample into a common GAAP basis. We focus on correcting for the differences in reported derivative positions, which can account for 90 percent of the variance in balance sheet size across the two accounting methods. For each European country in our study, we selected two to three of the largest financial institutions and conducted a deep dive into their full financial statements and regulatory filings, which yielded a detailed translation of their 2007–08 derivative assets into GAAP-equivalent terms. We then interviewed a series of experts in each of these countries to determine the percentage of derivative trading that is concentrated by the selected large financial institutions (generally in the range of 80–90 percent). We used these estimates to “gross up” the derivatives adjustments that we had calculated for the large banks to larger adjustment that could be applied to the entire financial sector (i.e., to account for derivative assets held by smaller banks). To translate these

adjustments back in time for earlier periods, we created an index based on global over-the-counter derivative volumes (as reported by the Bank for International Settlements) with 2008 set as the base year. The sector-wide derivative adjustments for years prior to 2008 were calculated by multiplying the dollar adjustment for 2008 to the corresponding value of the volume-based index for a particular year. We tested this methodology against a sample of manually reconciled bank financials from earlier years and found that it was accurate enough for our purposes.

A final note is warranted for the leverage ratios that we have presented for the United States. The US financial system is unique in the high levels of specialization among its financial intermediaries. In addition to commercial banks, important players in the financial system include large broker-dealers, finance companies, government-sponsored enterprises (GSEs), and securitization markets. Focusing purely on banking institutions would thus present a misleading picture of financial leverage. As a result, we have included in our calculations a leverage ratio for the "US financial system" that is distinct from the ratio for the "US banking system." We generate this number by summing up the assets and equity of all financial intermediaries: the commercial banks, savings institutions, credit unions, broker dealers, and finance companies. To control for the outsized share of securitization in the US financial system, we have also added the aggregate assets of issuers of asset-backed securities as reported by the Federal Reserve's flow of funds. While not technically on the balance sheets of financial institutions, these assets are included on the assumption that many, if not all of them, bore some form of guarantee by their originators.

3. METHODOLOGY FOR COMPILING TIME SERIES OF DEBT TO GDP

To construct time series of sector level debt relative to GDP, we draw extensively on national balance sheet statistics published by central banks (flow of funds). Following the methodology of the Federal Reserve in the United States, we count as debt those instruments that constitute direct credit market borrowing. This includes all bond market borrowing, including commercial paper, and all loans regardless of lender. We exclude all equity-type funds (e.g., mutual fund shares, beneficiary certificates).

To define the entities included in each sector, we have followed the standard followed by most central banks, SNA 93. The household sector includes households, nonprofit institutions serving households, and private unincorporated businesses, such as sole proprietorships. In the case of Canada, this category also includes nonfinancial non-corporate business.

The nonfinancial business sector includes all companies regardless of whether they are publicly or privately held. This category also includes so called quasi-corporations such as partnerships (e.g., law firms) as well as state-owned enterprises.

The government sector includes debt raised by central, local, and provincial/state governments. Debt is presented on an unconsolidated basis in most cases and includes intra-government debt holdings. There exists some discrepancy in how countries report social security fund holdings, which can make a material difference in the level of debt. For instance, US government debt holdings in the Social Security Trust Fund are excluded from national balance sheet statistics; if included, they would raise total government debt outstanding by more than 50 percent. In contrast, Japan reports its full holdings of government debt in the social security trust fund.

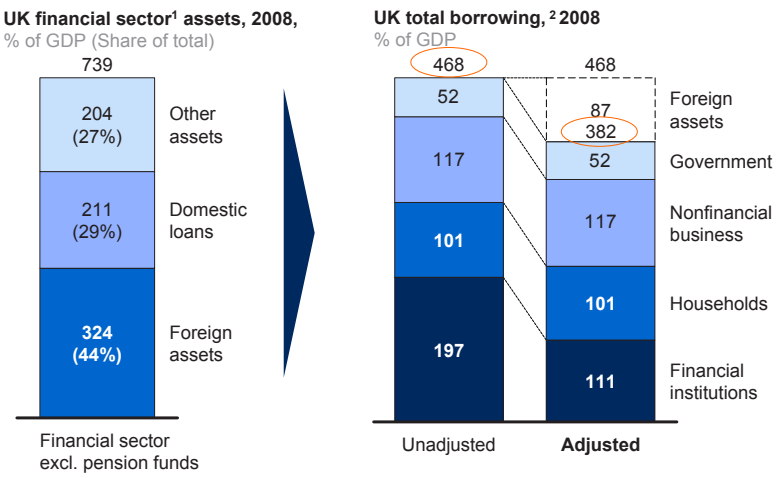
The financial sector includes a broad range of financial institutions. Both central banks and all other deposit-taking banks are included in this category. In addition, this category includes many non-deposit-taking institutions such as broker-dealers, finance companies, public financial agencies (e.g., Fannie Mae), and financial auxiliaries such as stock exchanges. We make a significant adjustment to the officially reported figures by removing asset-backed securities from debt figures. This is because the underlying loan collateral is counted in the relevant sector and the inclusion of asset-backed securities would result in the double-counting of debt. Where these data are unavailable from the central bank, we draw on a combination of data from the European securitization forum and Dealogic to create our own estimates of outstanding asset-backed securities.

For countries such as the United Kingdom, which play a role as financial and business hubs, the methodology of establishing the domicile of a business is an important determinant of the level of aggregate debt. Central banks follow balance of payments methodology in compiling national balance sheet accounts, and every business with significant operations in the host country will be counted as local by the central bank. For instance, the UK subsidiary of an American company will be counted as a UK company in the national balance sheet accounts.

In the case of the UK financial sector, which functions as a global financial hub, we present two versions of its outstanding debt figures—an unadjusted figure and a figure adjusted for its offshore banking activities (Exhibit A.2). As a result of its role as a foreign banking hub, the United Kingdom has significant foreign banking assets and liabilities. Given that some foreign liabilities fund local domestic activities, it would be inappropriate to exclude these liabilities from total financial sector debt. Instead, we adjust financial sector debt by multiplying it by the share of financial sector assets that are local rather than foreign in nature. This removes some of the financial sector debt that has no bearing on the aggregate performance of the UK economy, such as the London offices of German banks purchasing US assets abroad. However, in some measures this adjustment also goes too far: also excluded are local funds raised by British banks to lend to non-UK borrowers. If these banks run into financial trouble,

Exhibit A.2

Even after removing foreign lending by UK banks, UK debt / GDP remains higher than every country's except Japan (382 percent)



1 In national accounting methodology, all banks with domestic business are classified as domestic irrespective of parent company ownership e.g. Deutsche Bank London subsidiary (Deutsche Bank A.G.).
2 Some figures do not sum due to rounding.

SOURCE: McKinsey Global Institute

the responsibility may lie on the shoulders of the British government to backstop these financial institutions irrespective of the ultimate location of their loans.

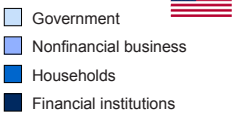
An adjustment similar to the one for the UK financial sector debt would be required for the UK nonfinancial business debt to reflect the UK's position as domicile of large international corporations' headquarters, which are taking on debt to fund operations outside the UK (e.g., BP, Rio Tinto, and SABMiller). Unfortunately, reliable data to adjust for this position are currently not publicly available. However, a data point that can be used for a rough triangulation for debt funding domestic nonfinancial business operations is the GBP £475 billions (as of 2008) of Sterling lending to UK nonfinancial corporations, which represents roughly 33 percent of UK GDP. This figure is significantly lower than the 114 percent of total UK nonfinancial corporations debt relative to GDP and by definition neglects foreign-denominated debt, but gives a lower bound for the UK corporate sector debt.

We have constructed our estimates of debt for Brazil, China, India, and Russia from a variety of sources. These sources include central bank estimates of bank loan composition, estimates of outstanding bonds and external loans from the Bank for International Settlements, and estimates of domestic private credit from the International Monetary Fund's International Financial Statistics. While these estimates are by no means comprehensive, they capture the debt through the major channels of credit allocation.

Finally, in presenting these figures, we have normalized them by GDP. We have followed the methodology of the Bureau of Economic Analysis in the United States by annualizing seasonally adjusted quarterly GDP figures. When comparing our quarterly estimates with annual estimates, this may result in small differences in aggregate debt to GDP, particularly at the end of 2008 where GDP fell in many countries during the fourth quarter. We present below our data on debt to GDP by country for our sample (see Exhibits A.3 to A.16).

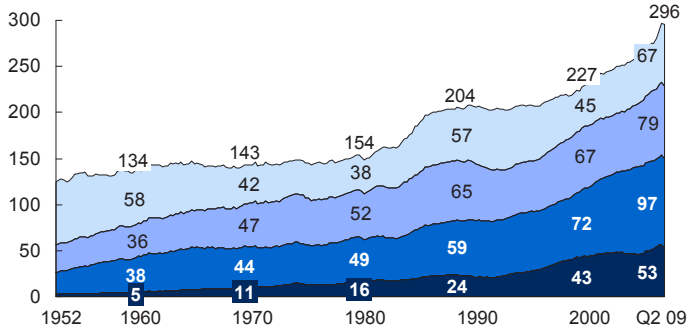
Exhibit A.3

US borrowing relative to GDP accelerated after 2000, reaching 296 percent in the second quarter of 2009



US debt[1] by sector,[2] 1952-Q2 2009
% of GDP

	CAGR[3] %		Change % of GDP
	1970-2000	2000-2008	2000-2008
Government	1.4	3.5	70
Nonfinancial business	0.2	3.6	15
Households	1.0	2.3	13
Financial institutions	1.6	4.2	27
	4.3	3.9	15

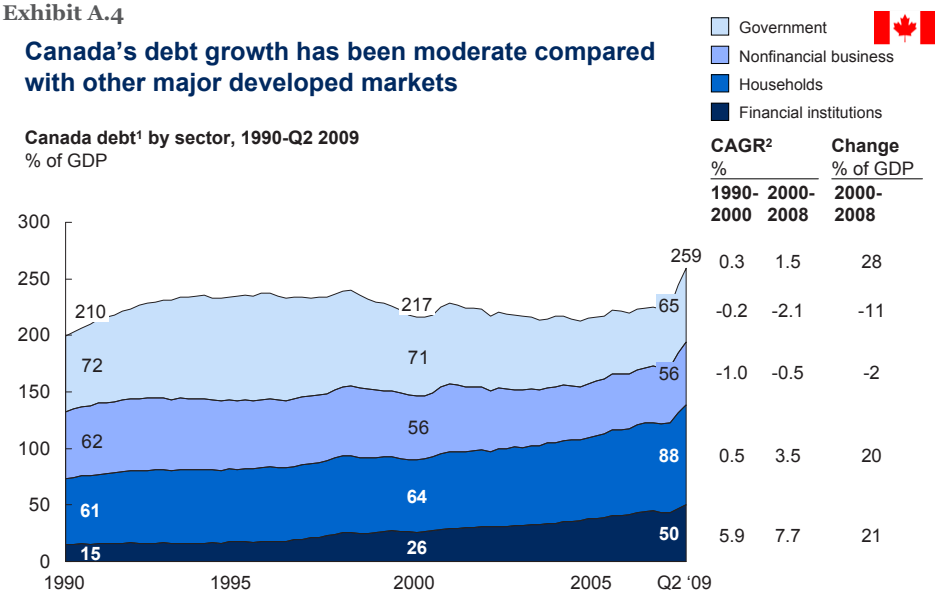


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Federal Reserve Flow of Funds; McKinsey Global Institute

Exhibit A.4

Canada's debt growth has been moderate compared with other major developed markets

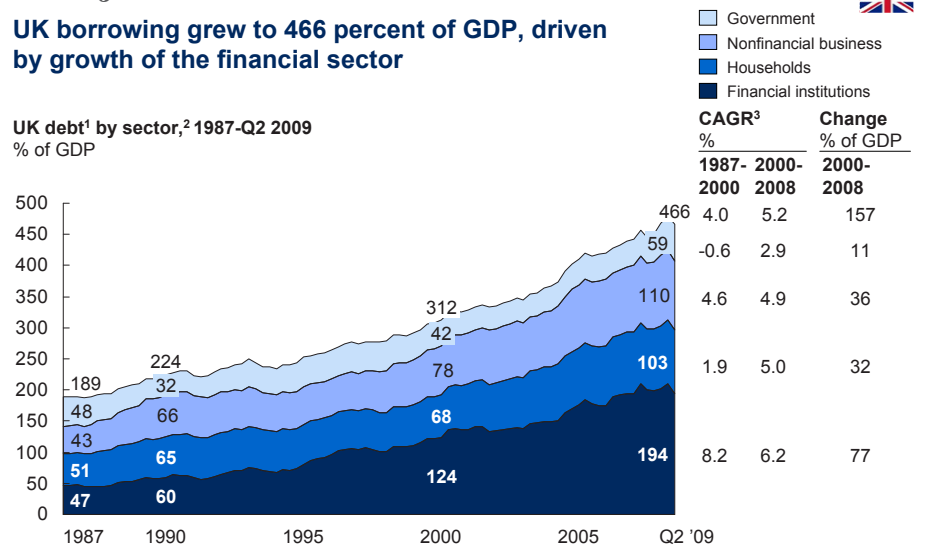


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.5

UK borrowing grew to 466 percent of GDP, driven by growth of the financial sector



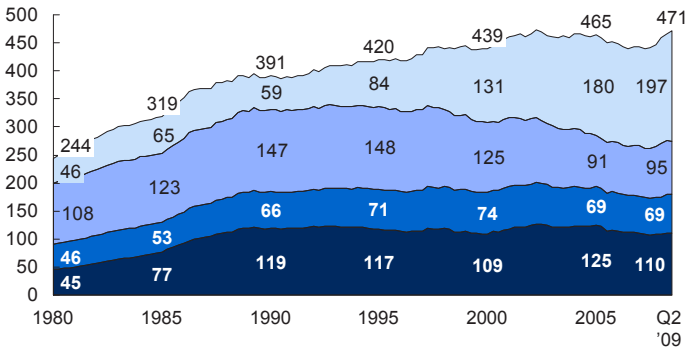
1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.6

Japan's debt outstanding has stabilized overall, with government debt displacing falling private sector debt

Japan debt[1] by sector,[2] 1980-Q2 2009
% of GDP



	CAGR[3] %		Change % of GDP
	1980-2000	2000-2008	2000-2008
	3.0	0.5	19
	5.4	4.6	57
	0.7	-3.2	-29
	2.4	-1.3	-7
	4.5	-0.2	-2

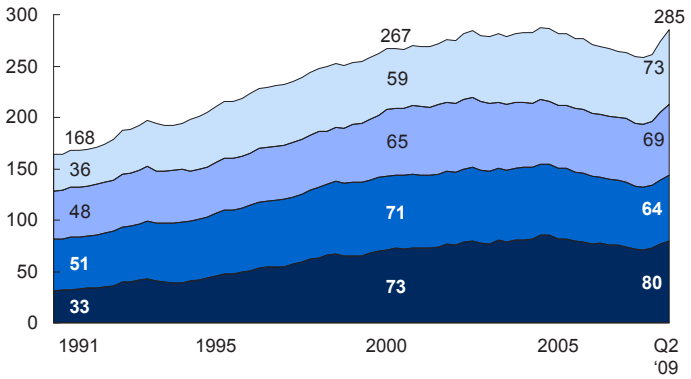
1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.7

Germany's debt growth took off after reunification but stabilized after 2000

Germany debt[1] by sector,[2] 1991-Q2 2009
% of GDP



	CAGR[3] %		Change % of GDP
	1991-2000	2000-2008	2000-2008
	5.3	0.3	7
	5.8	1.9	10
	3.3	0.3	2
	3.9	-2.0	-11
	8.9	1.0	6

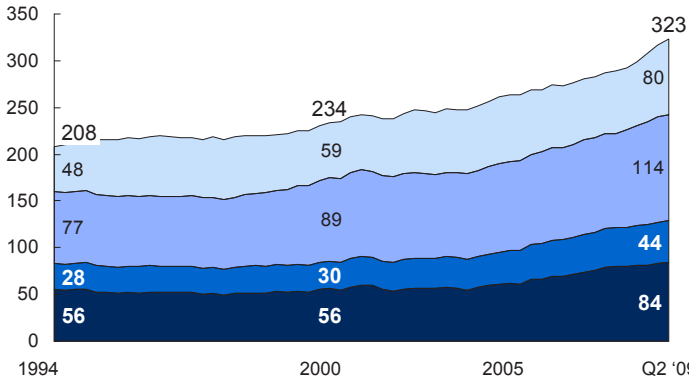
1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.8

France experienced an acceleration in borrowing after 2000, reaching 323 percent of GDP in Q2 2009

France debt[1] by sector,[2] 1994-Q2 2009
% of GDP



	CAGR[3] %		Change % of GDP
	1994-2000	2000-2008	2000-2008
Government	1.3	4.0	83
Nonfinancial business	3.5	2.8	14
Households	1.6	3.4	26
Financial institutions	0.6	5.3	15
	-0.9	5.6	29

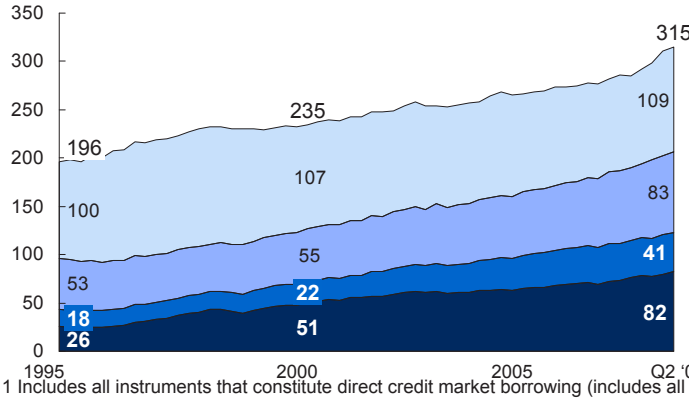
1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.9

Italy's government debt accounts for a substantial part of its overall borrowing

Italy debt[1] by sector,[2] 1995-Q2 2009
% of GDP



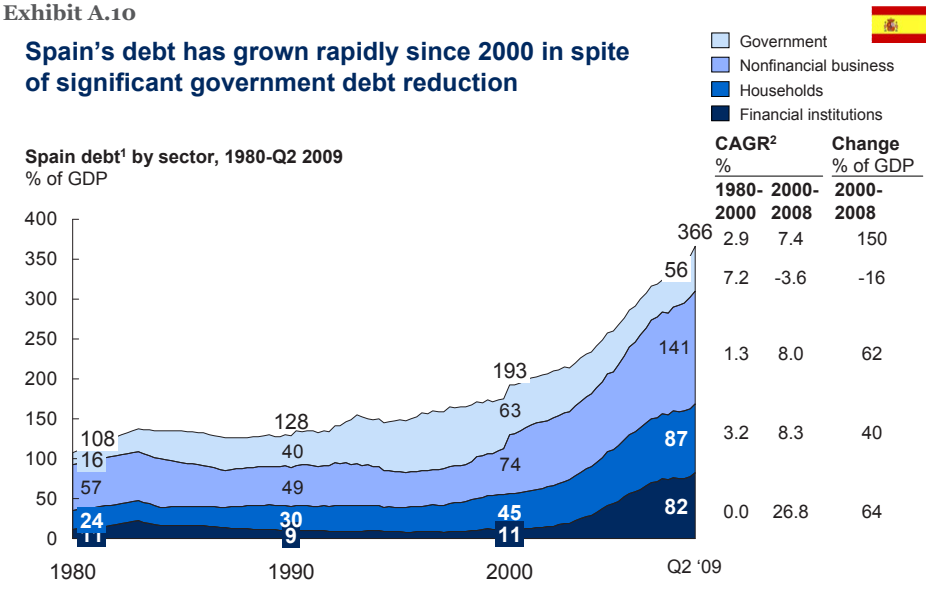
	CAGR[3] %		Change % of GDP
	1995-2000	2000-2008	2000-2008
Government	2.9	3.1	64
Nonfinancial business	-0.2	-0.8	-7
Households	1.3	5.0	26
Financial institutions	4.4	7.8	18
	15.0	5.4	27

1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.10

Spain's debt has grown rapidly since 2000 in spite of significant government debt reduction

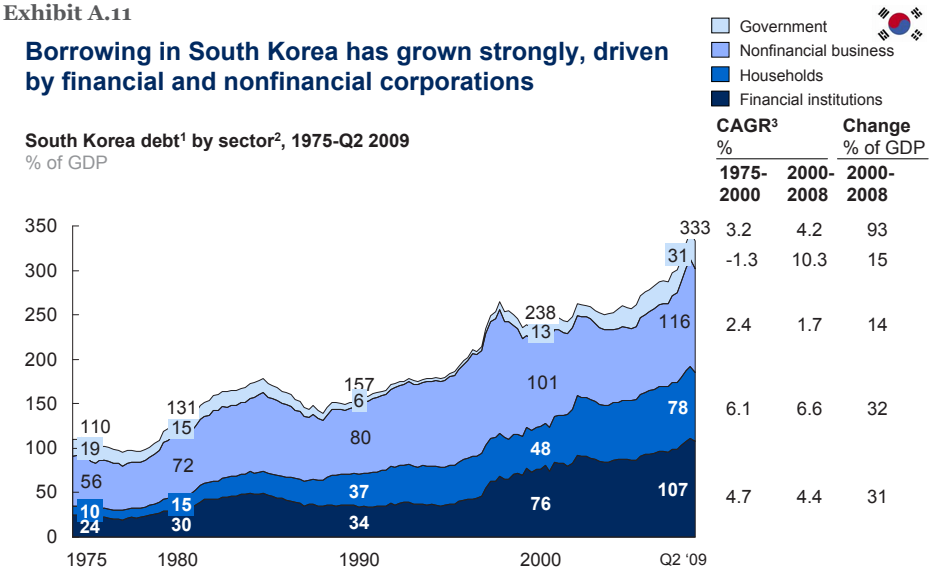


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.11

Borrowing in South Korea has grown strongly, driven by financial and nonfinancial corporations

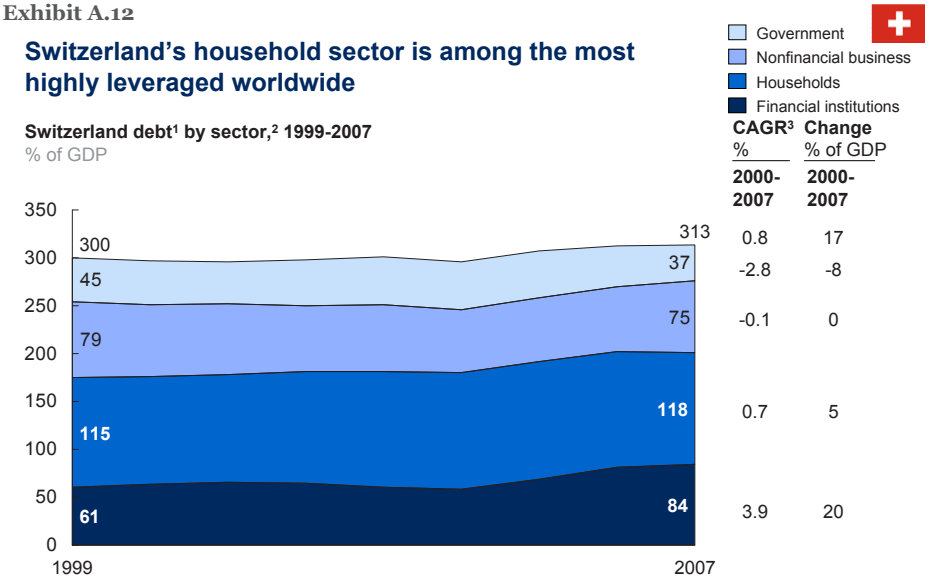


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Bank of Korea; Haver Analytics; McKinsey Global Institute

Exhibit A.12

Switzerland's household sector is among the most highly leveraged worldwide

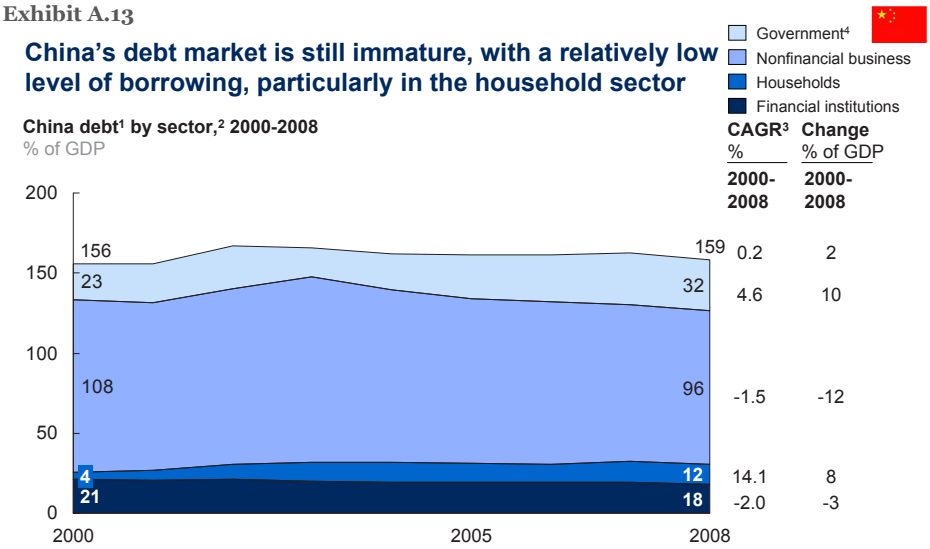


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.13

China's debt market is still immature, with a relatively low level of borrowing, particularly in the household sector

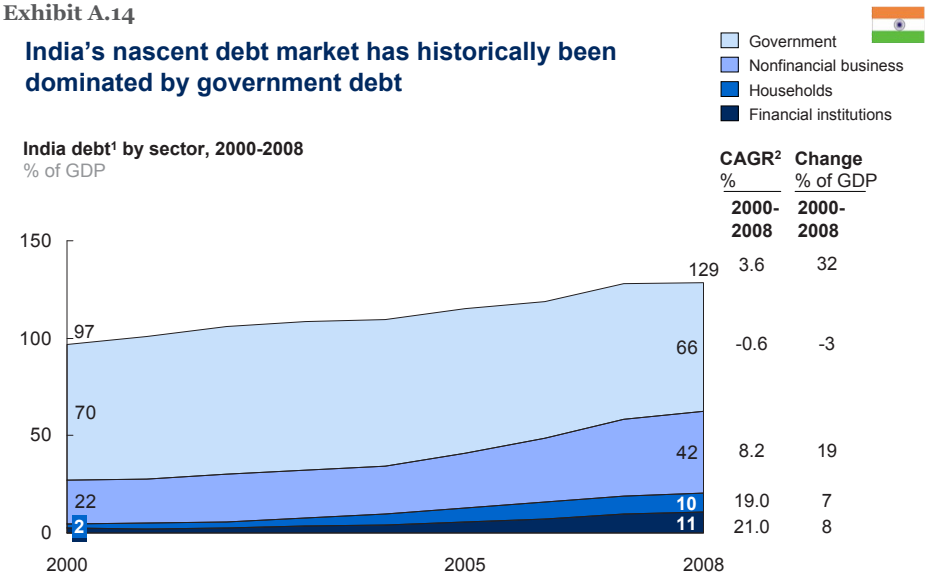


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.
4 Includes central bank stabilization bonds.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.14

India's nascent debt market has historically been dominated by government debt

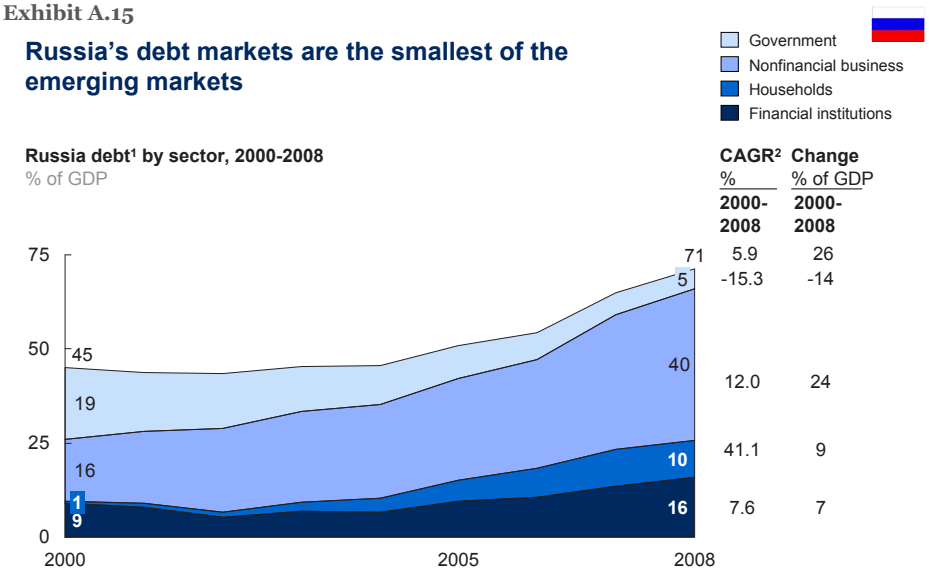


1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.15

Russia's debt markets are the smallest of the emerging markets



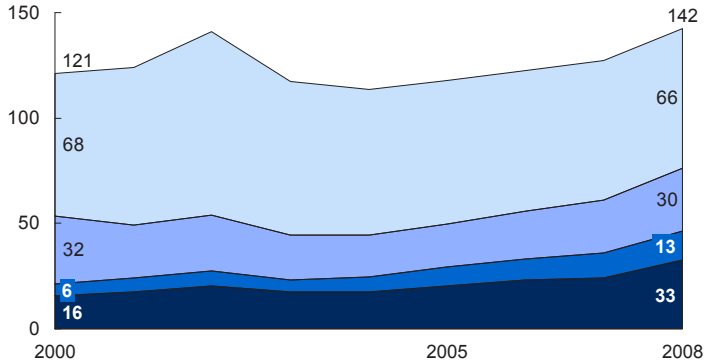
1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Exhibit A.16

Brazil's debt market is dominated by its large government debt

Brazil debt[1] by sector,[2] 2000-2008
% of GDP



	CAGR[3] % 2000-2008	Change % of GDP 2000-2008
	2.0	19
	-0.3	-9
	-0.8	5
	11.3	7
	9.5	15

1 Includes all instruments that constitute direct credit market borrowing (includes all bond market borrowing and commercial paper); excludes asset-backed securities to avoid double counting of the underlying loan.
2 Some figures do not sum due to rounding.
3 Compound annual growth rate.

SOURCE: Haver Analytics; McKinsey Global Institute

Appendix B: Historic episodes of deleveraging

This appendix presents more detail on historic deleveraging episodes. We will discuss:

A. The methodology employed to analyze historic episodes of deleveraging and the list of episodes identified.

B. A detailed discussion of seven case studies of deleveraging that cover most of our four deleveraging archetypes: the United States 1929–43, the United Kingdom 1947–80, Finland 1991–98, Malaysia 1998–2008, Mexico 1982–92, Argentina 2002–08, and Spain 1976–80.

C. A discussion of deleveraging episodes that did not follow a financial crisis.

A. METHODOLOGY FOR ANALYZING HISTORIC EPISODES OF DELEVERAGING

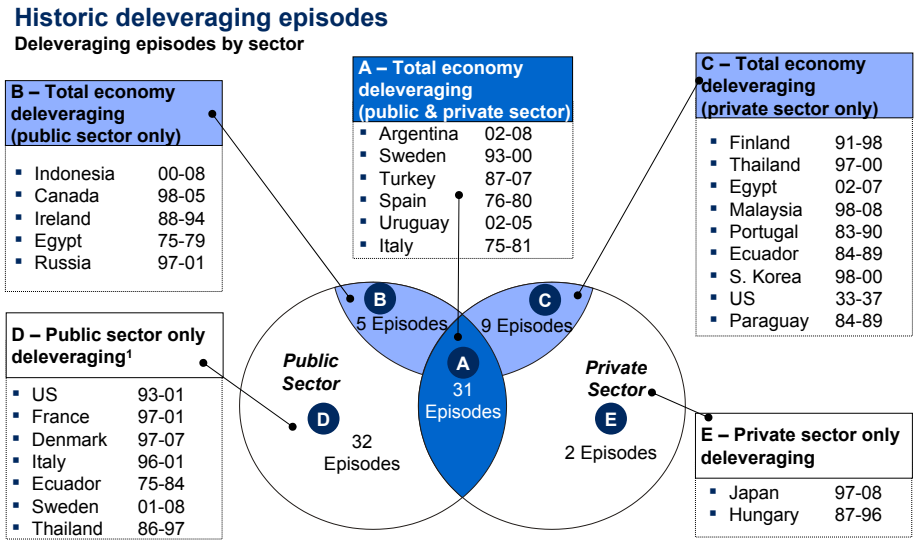
We have built a detailed database of debt across 50 countries[1] since 1950 to identify episodes in which economies went through a phase of deleveraging. We augmented this with additional case studies from the United States during and after the Great Depression (1929–43). These long-term time series were built using two key sources: International Monetary Fund (IMF) data series on bank credit (including domestic bank lending, but lacking any data on capital markets and foreign credit) as well as McKinsey Global Institute proprietary data on private debt securities (i.e., ABS, corporate bonds, bonds issued by financial institutions) and government bonds. We split the debt into private and public sector debt.

Definition of "deleveraging"

We consider only "significant" episodes of deleveraging in our analysis, defined either as an episode in which the ratio of total debt to GDP declined for at least three consecutive years and fell by 10 percent or more or an episode in which the total stock of nominal credit in the economy declined by 10 percent or more. Doing so, we identified 45 episodes of deleveraging: in 31 cases, both private and public sector debt-to-GDP ratios declined; in nine cases, only the private sector debt-to-GDP ratio declined (while the public sector either had an increasing or stable debt-to-GDP ratio); in five cases, only the public sector debt-to-GDP ratio declined (Exhibit B.1). We also identified 32 episodes (e.g., the United States in 1997–2001) in which the public sector deleveraged but the total economy did not deleverage because private sector debt increased. And we found two episodes (Japan 1997–2008 and Hungary 1987–1996) in which the private sector deleveraged, but the total economy did not deleverage because of an increase in government debt to GDP.

1 Countries included in the database are: Argentina, Austria, Belgium, Bolivia, Brazil, Bulgaria, Cambodia, Canada, Chile, Colombia, Costa Rica, Croatia, Denmark, Ecuador, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Indonesia, Ireland, Italy, Japan, Lithuania, Luxembourg, Malaysia, Mexico, Netherlands, Nicaragua, Nigeria, Paraguay, Philippines, Poland, Portugal, Romania, Russia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, the United States, United Kingdom, and Uruguay.

Exhibit B.1



1 The 25 other public sector only deleveraging episodes were: Austria 87-92, Austria 95-08, Bulgaria 02-08, Costa Rica 04-08, Croatia 05-08, Ecuador 75-84, Estonia 04-07, Finland 68-74, Finland 01-08, France 86-91, Greece 00-08, Indonesia 87-92, Ireland 94-06, South Korea 88-94, Malaysia 91-97, Netherlands 72-77, Netherlands 95-02, Portugal 65-71, Portugal 94-00, Russia 02-08, South Africa 04-07, Spain 96-07, United Kingdom 98-01, United Kingdom 87-90, United States 49-74 .

SOURCE: International Monetary Fund; McKinsey Global Institute

Archetypes of deleveraging

We then identified common characteristics of the 45 deleveraging episodes and classified them into four archetypes of deleveraging, using the following sequential classification rules:

1. Any deleveraging episode that was recognized by Federico Sturzenegger and Jeromin Zettelmeyer in their book, *Debt Defaults and Lessons from a Decade of Crises*, as a period of significant default was classified under the "massive default" archetype (seven episodes).[2]

2. Any deleveraging episode that was not already classified as a "massive default" and in which the economy experienced rapid (and off-trend) productivity and real GDP growth was classified under the "growing out of debt" archetype. We defined off-trend GDP growth as episodes in which the compound annual growth rate of GDP during the episode was least 100 percent higher than in the ten years before the crisis, or the longest time series available (three episodes).

3. Any deleveraging episode that was not already classified as "massive default" or "growing out of debt," and in which the inflation rate during the episode was on average at least 10 percent in mature economies or 20 percent in emerging markets, was classified under the "high inflation" archetype (12 episodes).

4. In the 23 remaining episodes, debt growth was slower than GDP growth or the nominal stock of debt declined. We classified these as "belt-tightening."

We then cross-referenced the 45 deleveraging episodes with the set of financial crises documented by economists Carmen Reinhart and Ken Rogoff.[3] We found that 32 of the 45 deleveraging episodes followed a financial crisis. Of the 13 that were not

2 Federico Sturzenegger and Jeromin Zettelmeyer, *Debt Defaults and Lessons from a Decade of Crises*, Cambridge, MA: The MIT Press, 2007.

3 Carmen Reinhardt and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2009.

after a financial crisis, seven episodes originated from government policy choices to reduce debt or slow down debt growth (e.g., Belgium 1997–2004 due to joining the euro monetary union); four episodes were due to high inflation (e.g., Italy 1975–81); and two were due to off-trend GDP growth (Egypt 1975–79 because of a war and Nigeria 2001–05 during an oil boom). We discuss these episodes in more detail in section C of this appendix.

Severity and impact of deleveraging

To better understand how deleveraging might play out in the future, we focused on the 32 deleveraging episodes that followed a financial crisis. Exhibit B.2 summarizes the duration[4] of the deleveraging episodes by archetype, as well as the extent of deleveraging in terms of the relative and absolute decrease of total debt to GDP.

Exhibit B.2

Duration and extent of deleveraging following a financial crisis

	Archetype	Number of episodes	Duration[1] years	Extent of deleveraging Debt / GDP change %	Extent of deleveraging Debt / GDP change pp	Debt CAGR[4] Trend vs. Episode[3]
1	"Belt-tightening"	16	6-7	-29	-40	21 vs. 2
		Median	5	-24	-34	21 vs. 3
2	"High inflation"	8	7	-53	-93	50 vs. 46
		Median	8	-62	-34	36 vs. 27
3	"Massive default"	7	6	-36	-46	41 vs. 10
		Median	8	-55	-72	28 vs. 9
4	"Growing out of debt"	1	6	-25	-44	0 vs. 12
	Total[2]	**32**	**6-7**	**-37**	**-54 pp**	**32 vs. 14**

1 Duration is defined as the period during which debt/GDP levels decrease.
2 Two outliers have been removed from the averages: Turkey 87-03, Poland 87-95.
3 Historic trend defined as the 10 years or longest time series available before the start of the deleveraging episode.
4 Compound annual growth rate.
Note: Averages remain similar when including episodes of deleveraging not induced by a financial crisis.

SOURCE: International Monetary Fund; McKinsey Global Institute

The belt-tightening episodes, constituting the most common archetype, last on average six to seven years. The median decline in debt to GDP is 25 percent. The growth rate of credit slows to just 2 percent per year, compared with 21 percent annual growth in the years leading up to the crisis.

The annual real GDP growth during the deleveraging episodes of each archetype can be found in Exhibit 29 of the main section of this report. A sharp reduction in credit growth has been associated with declining real GDP in the first two to three years of deleveraging. Interestingly, we find that deleveraging typically begins about two years

4 Duration is defined as the period during which debt-to-GDP levels decrease.

after the start of a financial crisis and economic recession—just where the United States and Europe are as we write this report. In every episode we examined, GDP growth declined in the early years of the process but then rebounded strongly and grew for the next four to five years while deleveraging continued. In the belt-tightening episodes, credit growth also resumed in the later years, although more slowly than GDP, allowing for further deleveraging.

Tables 2.1 to 2.4 list the deleveraging episodes identified in our analysis.

Table 2.1 - Historic deleveraging episodes, "belt-tightening" archetype

	Deleveraging period			Total debt/GDP			
Country	Start	End	Financial crisis	Start, %	End, %	Relative change, %	Absolute change, percentage points of GDP
Bolivia	1998	2008	yes	68	34	-50	-34
Costa Rica	1965	1969	yes	32	26	-18	-6
Denmark	1989	1997	yes	234	214	-10	-20
Ecuador	1984	1989	yes	24	12	-48	-12
Ecuador	2000	2003	yes	82	35	-57	-47
Finland	1991	1998	yes	108	74	-32	-35
S. Korea	1998	2000	yes	265	234	-12	-31
S. Korea	1985	1988	yes	173	138	-20	-35
Malaysia	1998	2008	yes	272	229	-16	-43
Paraguay	1997	2004	yes	32	18	-42	-14
Philippines	2003	2007	yes	128	93	-27	-35
South Africa	1988	1997	yes	181	129	-29	-52
Sweden	1993	2000	yes	193	176	-10	-17
Thailand	1997	2000	yes	196	163	-16	-33
UK	1947	1980	yes	286	110	-62	-176
US	1933	1937	yes	258	171	-34	-87
Belgium	1997	2004	no	150	98	-34	-52
Canada	1998	2005	no	242	217	-10	-25
Chile	2002	2006	no	135	102	-25	-33
Egypt	2002	2007	no	91	78	-14	-13
Ireland	1988	1994	no	183	145	-21	-38
Nigeria	2001	2005	no	49	30	-38	-19
Switzerland	1969	1974	no	135	101	-25	-34

Source: International Monetary Fund; C. Reinhart and K. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

Table 2.2 - Historic deleveraging episodes, "high inflation" archetype

	Deleveraging period			Total debt/GDP			
Country	Start	End	Financial crisis	Start, %	End, %	Relative change, %	Absolute change, percentage points of GDP
Chile	1984	1991	yes	132	86	-35	-46
Costa Rica	1987	1995	yes	41	19	-55	-22
Greece	1989	1998	yes	80	62	-22	-18
Poland	1987	1995	yes	1211	51	-96	-1160

Romania	1990	2000	yes	351	17	-95	-334
Spain	1976	1980	yes	120	106	-12	-14
Ukraine	1993	1996	yes	31	9	-70	-22
Uruguay	1984	1994	yes	230	38	-84	-192
Italy	1975	1981	no	240	181	-25	-59
Nigeria	1986	1991	no	43	18	-58	-25
Paraguay	1983	1987	no	19	13	-31	-6
Portugal	1983	1990	no	106	70	-34	-36

Source: International Monetary Fund; C. Reinhart and K. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

Table 2.3 - Historic deleveraging episodes, "massive default" archetype

	Deleveraging period			Total debt/GDP			
Country	Start	End	Financial crisis	Start, %	End, %	Relative change, %	Absolute change, percentage points of GDP
Argentina	2002	2008	yes	181	64	-65	-117
Indonesia	2000	2008	yes	97	55	-43	-42
Mexico	1982	1992	yes	383	65	-83	-318
Russia	1997	2001	yes	86	39	-55	-47
Turkey	1987	2003	yes	25371	92	-100	-25279
US	1929	1933	yes	160	258	61	98
Uruguay	2002	2005	yes	136	65	-53	-71

Source: International Monetary Fund; C. Reinhart and K. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

Table 2.4 - Historic deleveraging episodes, "growing out of debt" archetype

	Deleveraging period			Total debt/GDP			
Country	Start	End	Financial crisis	Start, %	End, %	Relative change, %	Absolute change, percentage points of GDP
US	1938	1943	yes	180	136	-25	-44
Egypt	1975	1979	no	46	40	-14	-6
Nigeria	1968	1971	no	15	8	-48	-7

Source: International Monetary Fund; C. Reinhart and K. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

B. A DETAILED DISCUSSION OF SEVEN CASE STUDIES OF DELEVERAGING

In the following, we discuss in detail seven historic episodes of deleveraging:

1. The US Great Depression, 1929–43
2. United Kingdom, 1947–80
3. Finland, 1991–98
4. Malaysia, 1998–2008

5. Mexico, 1982–92

6. Argentina, 2002–08

7. Spain, 1976–80

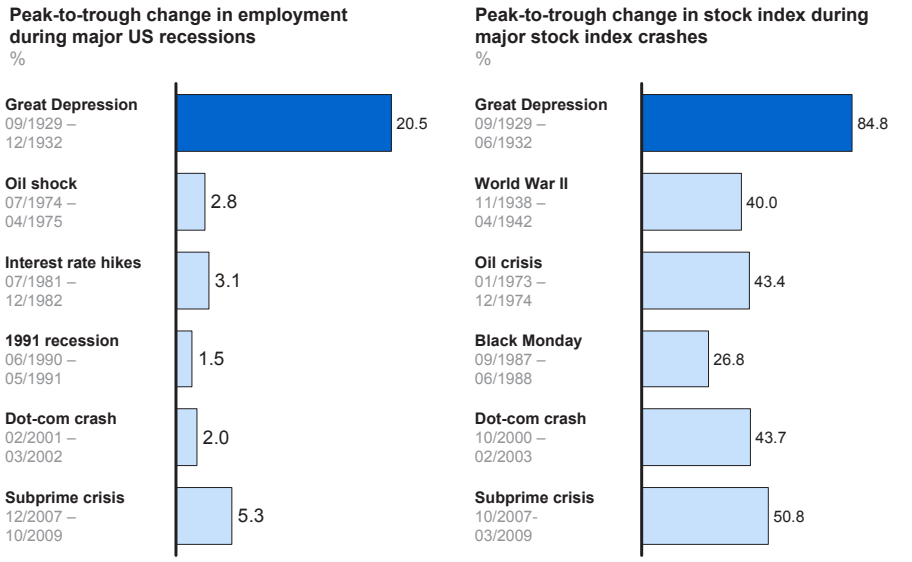
1. The US Great Depression, 1929–43

The Great Depression was the most severe financial crisis in modern times, resulting in a deleveraging process that stretched over more than a decade and fit three different archetypes—a phase of defaults, followed by belt-tightening, and eventually a wartime economic boom that caused the economy to grow out of debt.

The first phase of deleveraging from 1929 to 1933 was a rare instance in which the nominal stock of debt declined.[5] Total debt fell by $20 billion to $145 billion as households and businesses defaulted on their loans. However, GDP fell much faster, causing the nation's ratio of total debt to nominal GDP to *rise* from 160 percent to 258 percent. The US Federal Reserve's contractionary monetary policies of the time triggered severe deflation, which turned a postcrisis recession into the Depression. The US consumer price index fell 25.8 percent from 1929 to 1933. As prices fell, households stopped spending, banks failed or simply stopped lending, bankruptcies multiplied, unemployment soared, and overall economic activity nearly came to a standstill (Exhibit B.3). Real GDP dropped 26.7 percent during the period, and with deflation, nominal GDP fell by 46 percent. Defaults during this period soared: the default rate on urban mortgages reached around 50 percent by 1934. It was not until 1934, when GDP growth resumed, that the ratio of debt to GDP began to decline (Exhibit B.4).

Exhibit B.3

Employment and wealth losses in the Great Depression



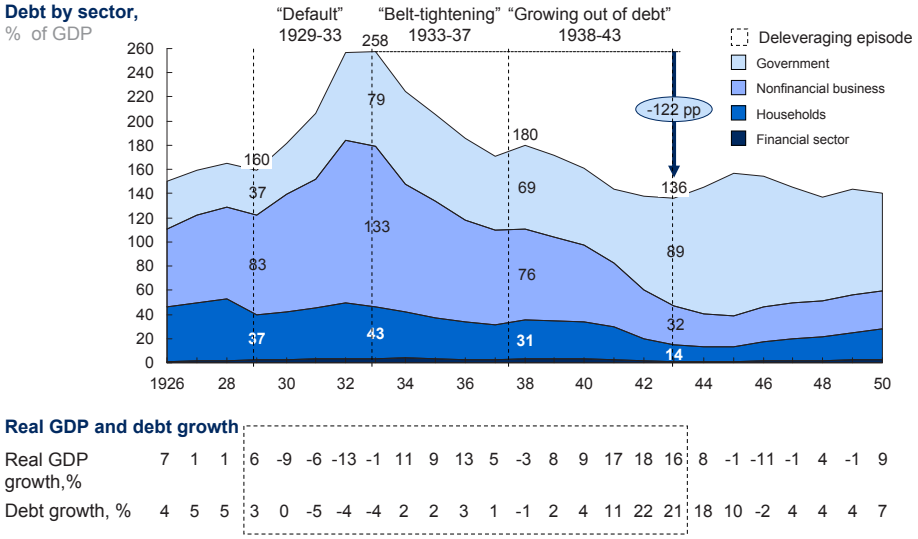
SOURCE: Bureau of Labor Statistics; McKinsey Global Institute

From 1933 to 1937, the economy deleveraged through austerity or belt-tightening. During this period, credit began to grow again but only very slowly, at just 1 to 3

5 In most deleveraging episodes, credit grows more slowly than GDP, reducing the ratio of debt to GDP, but the stock of debt does not decline.

Exhibit B.4

The Great Depression deleveraging occurred in 3 distinct phases: massive default, belt-tightening, and high growth



Real GDP and debt growth

Real GDP growth,%	7	1	1	6	-9	-6	-13	-1	11	9	13	5	-3	8	9	17	18	16	8	-1	-11	-1	4	-1	9
Debt growth, %	4	5	5	3	0	-5	-4	-4	2	2	3	1	-1	2	4	11	22	21	18	10	-2	4	4	4	7

SOURCE: Haver Analytics; Historical Statistics of the United States; Census Bureau; McKinsey Global Institute

percent per year in nominal terms. Expansionary monetary and fiscal policies ended deflation and spurred a very strong economic rebound in the mid-1930s. Real GDP, which had fallen for four years straight, rose by 11 percent in 1934, and kept rising rapidly through 1937. Unlike modern deleveraging episodes in Scandinavia and Asia, net exports played no material role in supporting GDP growth. Instead, private consumption and investment rebounded. With inflation revived, nominal GDP rose even faster. Thus, the debt-to-GDP ratio fell by 78 percentage points to 180 percent by 1937. Most of this drop came from deleveraging by nonfinancial businesses, but the government and households also continued to lower their debt-to-GDP levels.

The third phase of deleveraging, from 1938 through 1943, was driven by a wartime economic boom. Unfortunately, a poorly timed tightening of both monetary policy and fiscal policy caused a brief recession in 1938 and a small rise in the economy's debt-to-GDP level. Policy makers quickly reversed course and the recovery resumed in 1939, gaining momentum as the United States became increasingly involved in World War II. US real GDP grew by 16 percent or more per year in 1941 through 1943. The government's debt to GDP, not surprisingly, rose 20 percentage points to 89 percent to finance the war effort. But this was more than offset by continued deleveraging by households and nonfinancial corporations. Thus, from 1939 through 1943, total US debt to GDP fell 35 percentage points to 136 percent. This time, in contrast to deleveraging of the first phase, credit started growing rapidly, but GDP grew even faster, causing the ratio of debt relative to GDP to decline.

Economists have drawn many different lessons from the experience of the Depression in the United States.[6] For the purposes of this report, we see two lessons for deleveraging worth highlighting. First, government policy makers must be careful not to cut back on monetary or fiscal stimulus measures too soon, lest they snuff out a nascent recovery, as occurred in 1938. Second, the right government policies

6 See, for instance: Christina D. Romer, "*Lessons from the Great Depression for the Economic Recovery in 2009*," Presentation at the Brookings Institution, March 2009; and John Kenneth Galbraith, *The Great Crash of 1929*, Rev. ed., Boston: Houghton Mifflin Co., 1997 (original 1954).

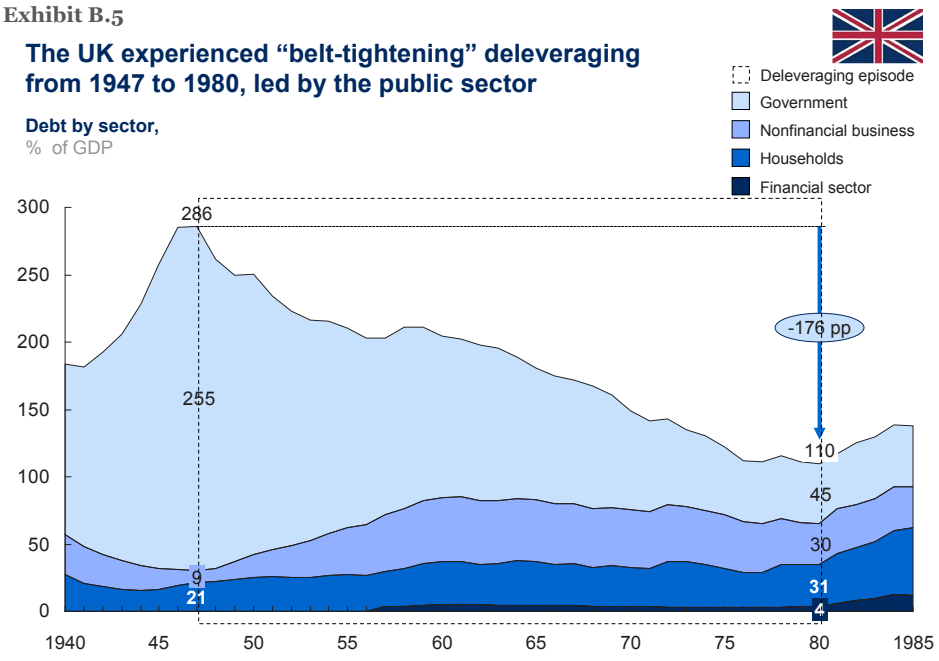
are also critical to maintaining public confidence so that deflation will not occur. If households and businesses think deflation is a real possibility, they will hold off on spending and investment, possibly causing deflation to take hold and economic activity to fall off, which causes debt-to-GDP ratios to soar. The policy mistakes that caused deflation in the early 1930s and a recession in 1938 prolonged the Depression and made the deleveraging process that much more painful.

2. United Kingdom, 1947–80

After World War II, UK policy makers faced the challenge of repaying the large national debt accrued during the war. By reducing the fiscal deficit and slowing the growth of nominal credit, the UK economy underwent a three-decade period of significant deleveraging through the belt-tightening archetype. Total debt relative to GDP declined from 286 percent in 1947 to 110 percent by 1980 (Exhibit B.5). Among the deleveraging episodes in our sample, the UK case is notable both for the duration and magnitude of the deleveraging. And as in many belt-tightening episodes, moderately high inflation over some periods also played a role.

Exhibit B.5

The UK experienced "belt-tightening" deleveraging from 1947 to 1980, led by the public sector

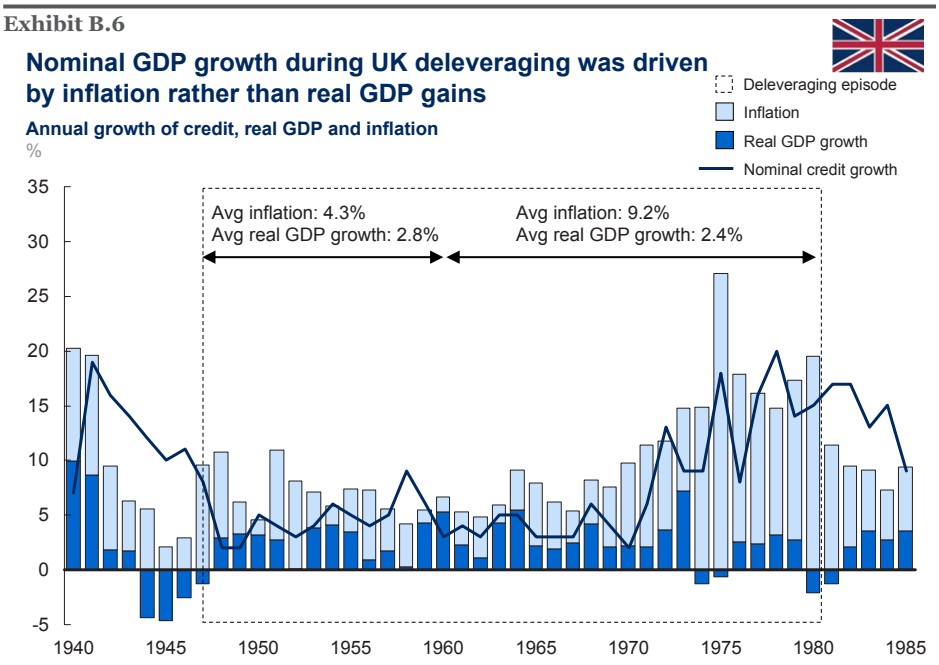


SOURCE: HM treasury, Office of national statistics, McKinsey Global Institute analysis

Real economic growth during this period of deleveraging was relatively slow (Exhibit B.6) and the United Kingdom underperformed relative to its peers. For instance, annual real GDP growth averaged 2.6 percent over 1948 to 1980 in the United Kingdom, compared with 3.7 percent in the United States over the same period and compared with 2.9 percent in the United Kingdom over 1981–2000. While many factors can be linked to this period of lackluster economic performance, the burden of high government debt certainly contributed to the economy's underperformance. By suppressing the growth and efficient allocation of credit, and by necessitating high levels of taxation, the burden of high government debt weighed on the UK economy.

Deleveraging occurred solely in the government sector, with public debt declining from 255 percentage points of GDP to 45 points over the period. A strict schedule of repayments imposed by creditors after the war forced the UK government onto a prolonged path of fiscal austerity. Balanced budgets, facilitated by a rapid drop

Exhibit B.6



SOURCE: McKinsey Global Institute

in spending and maintenance of wartime tax rates, resulted in a stabilization of the level of nominal debt. Meanwhile, nominal GDP growth rose quickly because of moderately high inflation. As a result, the ratio of debt to GDP fell over time.

Private sector debt grew rapidly in the decade after the war, even as the ratio of total debt to GDP fell. The easing of wartime restrictions on investment, consumption, and credit allocation spurred robust private debt growth from 1948 through 1960, causing a rebound in demand for housing, consumer durables, and capital investments. Banks were flush with deposits during this period, as high taxation rates increased the attractiveness of tax-free savings instruments such as bank deposits and building society shares. Nonfinancial business debt relative to GDP rose from 9 percent in 1947 to 30 percent in 1960, while household debt to GDP increased from 21 percent to 31 percent.

The private credit expansion slowed between 1960 and 1980, keeping pace with nominal GDP growth. High inflation was a significant problem during this period because of a combination of higher commodity prices, poor management practices, inflexible labor markets, and strong unions, leading to low productivity in many sectors of the economy. Policy makers responded by restraining private sector credit growth in an attempt to reduce private demand and inflation. Inflation also enabled deleveraging, as it eroded the real value of the existing stock of debt and dampened the supply of credit from banks. The impact of high inflation and government controls in the financial sector, combined with a more general economic malaise, severely restricted private sector debt growth.

During much of this period, the United Kingdom had an overvalued exchange rate. Sterling was set at $4.03 under Bretton Woods. The UK government progressively devalued the currency during the 1950s and 1960s, but not at a pace sufficient to maintain the United Kingdom's competitiveness given its high inflation rates. The United Kingdom suffered a major currency crisis in the mid-1970s, when international investors lost confidence in the government's ability to control its fiscal position. By 1980, Sterling had fallen to $2.32, and by 1985 to $1.28. The overvalued exchange

rate limited the United Kingdom's ability to grow net exports to support GDP growth during deleveraging.

The United Kingdom's deleveraging experience from 1947 through 1980 demonstrates how governments can deleverage over long periods of time through belt-tightening. The economic cost however, was lower real GDP growth, which had a significant human cost in terms of living standards.

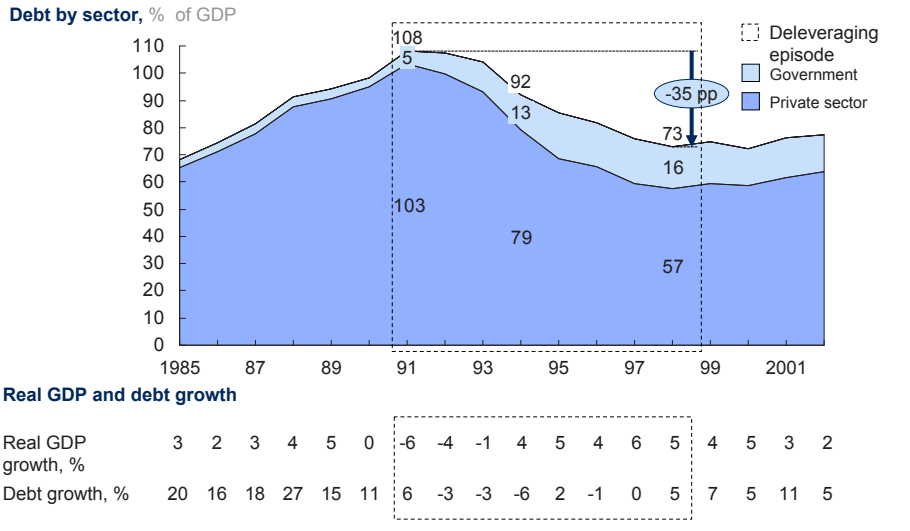
3. Finland, 1991–98

Finland's experience represents a classic example of a credit-fueled asset bubble followed by a crash, and deleveraging through the "belt-tightening" archetype. This episode also illustrates how a financial crisis and deleveraging can occur even in countries with relatively modest levels of debt to GDP. Finland's crisis began in the early 1990s, after its ratio debt to GDP peaked at 108 percent of GDP—a level far below that of the most leveraged major economies today. The crisis and subsequent recession were severe nonetheless. A key element of Finland's deleveraging process was the government's aggressive response to the crisis, which boosted net exports and laid the foundation for a strong economic recovery.

Finland's credit boom began in the 1980s when the government moved to liberalize the country's financial system. New measures, phased in over time, relaxed interest rate controls, allowed variable-rate loans, loosened mortgage lending requirements, and opened the doors to foreign borrowing by corporations and households. Finland's total credit grew at a 15 percent compound annual rate from 1986 to 1991, causing its debt-to-GDP ratio to rise by 44 percent, from 75 percent of GDP to 108 percent (Exhibit B.7).

Exhibit B.7

Finland experienced "belt-tightening" deleveraging in the 1990s, led by the private sector



Real GDP and debt growth

Real GDP growth, %	3	2	3	4	5	0	-6	-4	-1	4	5	4	6	5	4	5	3	2
Debt growth, %	20	16	18	27	15	11	6	-3	-3	-6	2	-1	0	5	7	5	11	5

SOURCE: International Monetary Fund; McKinsey Global Institute Capital Markets database; European Commission Economic Paper 350, *The great financial crisis in Finland and Sweden,* Dec 08

Rapid credit growth resulted in asset bubbles in both real estate and equity markets. Finnish home prices rose 80 percent during the late 1980s, while equity prices tripled.

But the rapid expansion of credit and the monetary base eventually sparked inflation. This eroded Finland's export competitiveness. At the same time, the disintegration

of the Soviet Union curtailed Finland's exports. Finland's current account deficit soared, prompting the Finnish central bank to dramatically tighten monetary policy in 1990. The real short-term interest rate went from 2 percent to 12 percent in two years. Household and nonfinancial corporate borrowers with variable loans were hit hard, and their real debts increased as asset prices began to fall. House prices fell by 50 percent, and the Helsinki stock market index declined by 70 percent.[7] Defaults soared, creating credit losses for the banking system. The economy fell into a deep recession from the third quarter of 1990 through the second quarter of 1993. GDP declined by 13.3 percent during the period, while the unemployment rate soared from 5 percent to 18 percent. This episode, often called a depression, was much worse than the current US recession so far, in which real GDP has declined by 3.7 percent and unemployment has risen to 10 percent.

The deleveraging period in Finland began in 1991, more than one year after GDP peaked, and lasted until 1998. Total debt to GDP fell by almost a third, to 73 percent. In the early years, Finland's stock of nominal credit shrank. Households saved more and paid down debt, and nonfinancial corporations increased net saving by sharply reducing investment. Some debt was erased as bankruptcies soared. Overall private debt to GDP fell from 103 percent to 57 percent during these years.

Finland's public debt more than doubled between 1991 and 1994, from 5 percent of GDP to 13 percent, as the government moved aggressively to stabilize the financial system and the economy. The Finnish government guaranteed bank deposits and took stakes in financial corporations at risk of bankruptcy. Finland's currency at the time, the markka, declined in real terms by 27 percent in those years, which led to a surge in net exports.[8] These actions succeeded in fueling a strong economic rebound. This resulted in the second phase of deleveraging, from 1994 through 1998, in which credit started to grow again haltingly, but the economy grew much faster—causing the ratio of debt to GDP to fall. Finland's economic growth in this period was driven primarily by rising exports; real domestic demand recovered slowly and did not return to its precrisis level until 1999 (Exhibit B.8). Overall, the nation's debt-to-GDP ratio fell by 16 percentage points in the first phase of deleveraging, and by a bit more, 19 points, in the second phase. Another positive effect during this deleveraging process was a swing in Finland's trade balance from a precrisis deficit to a considerable postcrisis surplus.

Among the lessons of Finland's experience was the critical role played by the government's policy response. It proved key to restoring confidence, reviving private investment, and generating the economic rebound that made the deleveraging process much easier in the later years. Public debt continued to grow throughout the deleveraging period, although it was only 5 percent of the size of private debt at the start of the crisis. In addition, Finland demonstrates the important role that exports can play in supporting GDP growth while private consumption and investment decline during deleveraging.

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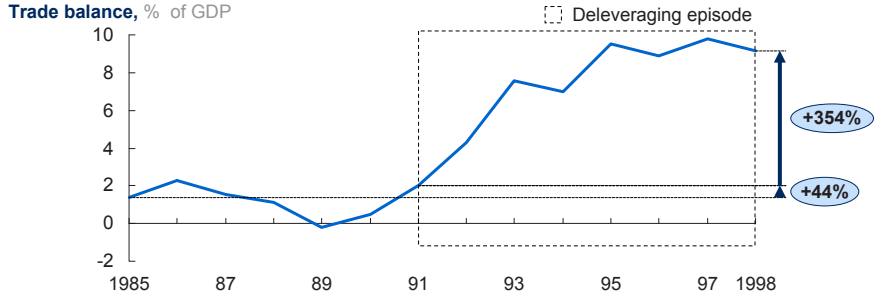
7 See Jaakko Kiander and Pentti Vartia, "Lessons from the crisis in Finland and Sweden in the 1990s," Conference on the Aftermath of the Financial Crisis, Austrian National Bank, Vienna, November 5-6, 2009.

8 During this period, foreign bank lending went from positive inflows to negative outflows, reflecting foreign lenders withdrawing credit from Finland. This pattern of volatile foreign lending was repeated in all of the Southeast Asian nations hit by the 1997 financial crisis. See Martin Baily, Diana Farrell, and Susan Lund, "The color of hot money," *Foreign Affairs*, March/April 2000, Volume 79, Number 2.

Exhibit B.8

The deleveraging in Finland was driven by a surge in net exports



Evolution of components of GDP, % change

	Upswing 1985-90	Crisis 1990-93	Recovery 1993-98
Private consumption	19.6%	-11.0%	21.4%
Public consumption	17.5%	-6.6%	12.1%
Private investments	27.8%	-47.0%	47.6%
Exports	10.2%	19.3%	61.6%
Imports	33.0%	-11.8%	56.1%
GDP	**17.7%**	**-13.3%**	**25.7%**

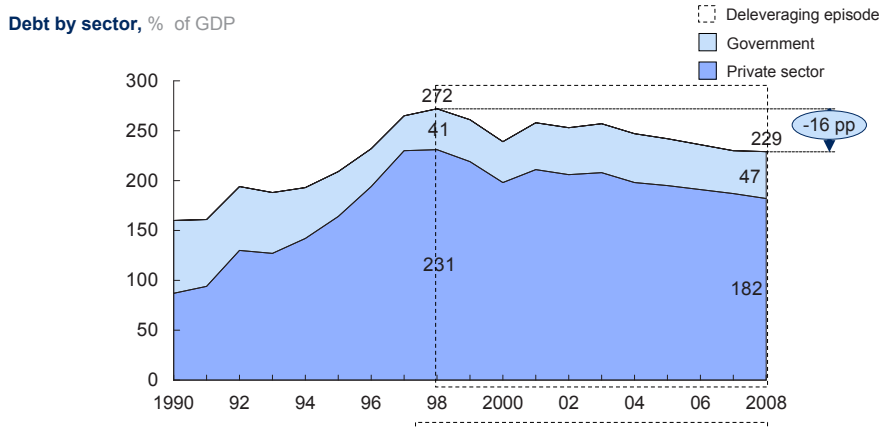
SOURCE: International Monetary Fund, McKinsey Global Institute Capital Markets database, European Commission Economic Paper 350, *The great financial crisis in Finland and Sweden,* Dec 08

4. Malaysia, 1998–2008

Malaysia provides an example of a decade of sustained, gradual deleveraging according to the "belt-tightening" archetype. Malaysia's deleveraging episode began after the Asian financial crisis of 1997–98. The following slowdown in credit growth and rebound in economic growth, chiefly due to rising net exports, brought Malaysia's debt-to-GDP level down from a peak of 272 percent in 1998 to 229 percent in 2008 (Exhibit B.9). Malaysia's deleveraging process was not as dramatic and painful as Finland's, as it was achieved instead by allowing only modest credit growth even as real GDP growth rebounded.

Exhibit B.9

The deleveraging of the private sector in Malaysia started in 1998 and is still ongoing at a slow pace



Real GDP and debt growth

Real GDP growth, %	9	10	9	10	9	10	10	7	-7	6	9	1	5	6	7	5	6	6	5
Debt growth, %	4	14	34	11	16	23	26	27	3	2	8	7	6	11	9	8	7	9	15

SOURCE: International Monetary Fund; Bank of Malaysia; Haver Analytics; McKinsey Global Institute

Government actions to liberalize Malaysia's financial system in the late 1980s and early 1990s led to a large influx of foreign capital. Private sector borrowing grew rapidly, averaging a 30 percent growth rate from 1990 to 1997. Much of the credit came from smaller regional banks and finance companies and went into real estate, sparking a commercial property bubble. Malaysia's nascent equity market tripled in value over the period. The collapse of the Thai baht and ensuing financial crisis caused investors to scrutinize Malaysia's position as well, and its currency, the ringgit, also depreciated sharply. This triggered a banking crisis and economic recession in 1998. Nonperforming loans soared to between 25 and 35 percent of banking system assets. Real estate prices fell by 19 percent, and the stock market lost more than two-thirds of its value. GDP swung from a 7 percent increase in 1997 to a 7 percent contraction in 1998.

The Malaysian government instituted several measures that stabilized the financial and economic sectors. First, the government lowered interest rates and bank reserve requirements to encourage credit and prevent more defaults on variable-rate loans. Second, the government established an asset management company to assume bad debts of banks and placed blanket guarantees on deposits, while the financial sector was restructured through mergers, recapitalization, and nationalizations. Finally, the government imposed capital controls limiting international trade in the ringgit and Malaysian assets and fixed the exchange rate to the US dollar. The latter measure was defended as necessary to prevent the country from defaulting on foreign debt and to allow the central bank to control interest rates without worry of foreign capital flow responses.

Unlike Finland, the stock of debt did not decline in Malaysia. Instead, credit growth fell sharply from annual rates in the 20 percent range during the credit bubble to a low of 2 percent in 1999. The Malaysian government encouraged a revival of credit growth after the crisis by lowering the banks' capital reserve requirements and encouraging them to lend, which helped increase private spending. But the government also oversaw a major restructuring of the financial sector, with the number of finance companies falling from 39 to just 10. In addition, the government forced consolidation of two insolvent banks assets that accounted for 14 percent of banking system assets. This sharply slowed the precrisis rate of debt growth, with credit expanding at a more modest pace of around 8 percent per year from 1998 to 2008.

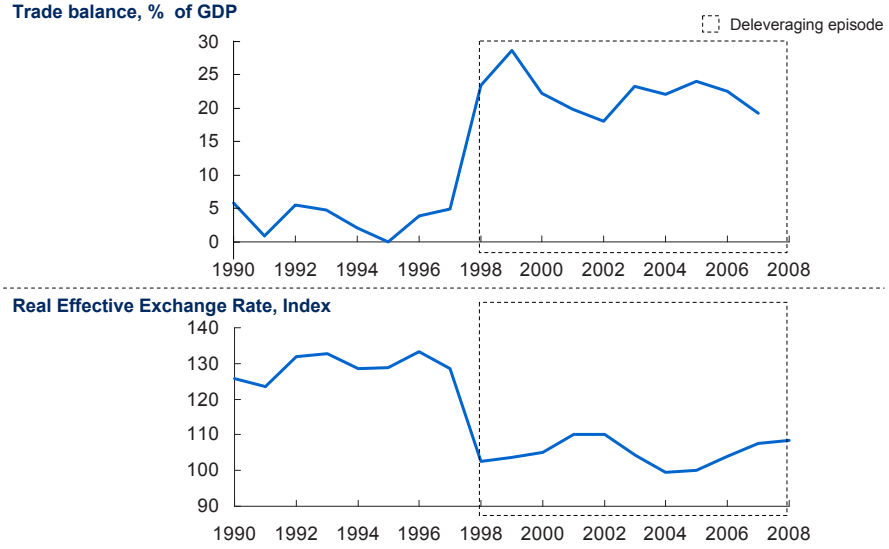
GDP growth was supported during deleveraging by an increase in net exports (Exhibit B.10). Malaysia's trade surplus jumped from below 5 percent in 1996 to above 20 percent in 1998, where it has stayed almost continuously since. Real GDP growth rebounded to an average pace of 6 percent per year since 1999. As a result, the Malaysian private sector debt has shrunk from 231 percent of GDP in 1998 to 182 percent in 2008, driven almost entirely by financial institutions and nonfinancial corporations.[9]

Malaysia demonstrates the possibility of slow, sustained deleveraging over time through a classic belt-tightening approach. In this case, both credit growth and GDP growth resumed, but at slower paces than before the crisis. Net exports played an important role in supporting GDP growth, as in Finland.

9 Malaysia, unlike the other economies we examined closely, does not provide data allowing for a more detailed breakdown of private sector debt by households, financial institutions, and nonfinancial corporations.

Exhibit B.10

Malaysia's GDP growth was supported by rising exports after devaluation of the currency



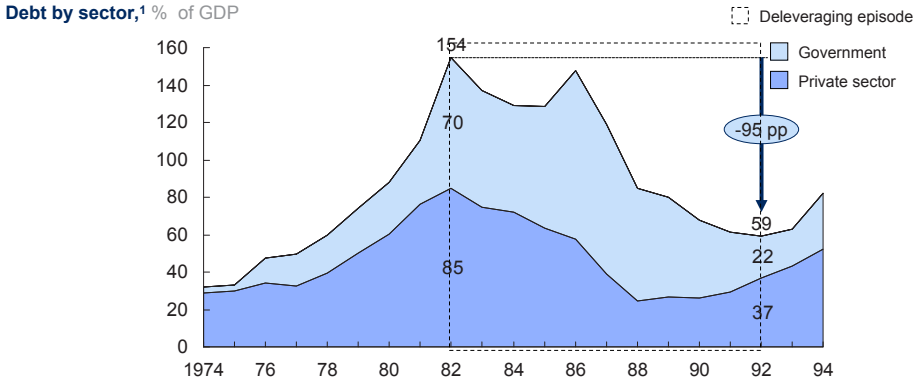
SOURCE: International Monetary Fund; Bank of Malaysia; Haver Analytics; McKinsey Global Institute

5. Mexico, 1982–92

Mexico's sovereign default in 1982 triggered significant deleveraging through the "massive default" archetype. Like many crises over this period, banking, currency, and inflation crises accompanied the Mexican sovereign debt default. The scale of deleveraging in Mexico was dramatic: the ratio of total debt to GDP fell from 154 percent in 1982 to 59 percent in 1992—a decline of two-thirds (Exhibit B.11). Both the public and private sectors deleveraged during this period: government debt to GDP dropped from 70 percent to 22 percent, while private debt to GDP fell from 85 to 37 percent of GDP (hitting a low point of 24 percent in 1988). Real GDP growth remained weak during deleveraging, averaging just 1.6 percent annually over a period some have termed "the lost decade."

Exhibit B.11

Mexico defaulted on its government debt in 1982, leading to 10 years of deleveraging



Real GDP and debt growth

Real GDP growth,%	6	6	4	4	9	10	9	9	-1	-4	3	2	-4	2	1	4	5	4	4	2	4
Debt growth, %	19	13	66	62	52	63	74	72	123	62	55	60	91	97	54	25	13	16	15	19	48
Inflation, %	24	15	16	29	17	18	26	28	59	102	66	58	86	132	114	20	27	23	16	10	7

1 Some figures do not sum due to rounding.

SOURCE: International Monetary Fund; Bank of Mexico; Haver Analytics; McKinsey Global Institute

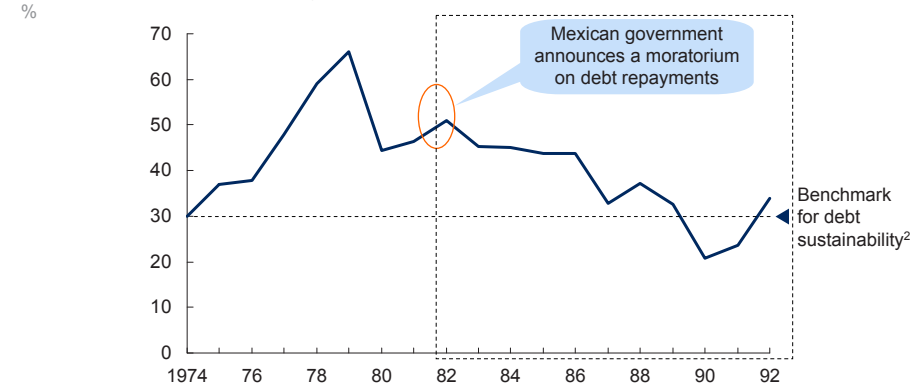
By the late 1970s, spurred by high oil prices, the Mexican economy was experiencing robust growth with average real GDP growth of 7.2 percent per year over 1972-81. After several major oil finds in 1976, Mexico's borrowing accelerated, mostly to build the country's oil industry infrastructure. A significant source of funding was through US and other foreign commercial banks, which provided loans largely denominated in US dollars (Exhibit B.12). This lending was fueled in part by the recycling of surplus funds from other oil-exporting countries: they provided deposits to major developed market banks, which in turn loaned the funds to emerging market governments, particularly in Latin America. Both government and private sector borrowing climbed in Mexico, with total debt to GDP rising from 31 percent in 1975 to 110 percent in 1981. Government debt increased from 1 percent to 34 percent of GDP, while private sector credit grew from 30 percent to 76 percent of GDP over the period.

Mexico's external debt rose from $16 billion in 1975 to $86 billion in 1982, tripling in real terms. The external debt, equal to 50 percent of GDP, required debt service payments worth 51 percent of exports—very high by international standards (Exhibit B.12). Adding to the vulnerability of its external position, much of Mexico's external debt was dollar-denominated and pegged to short-term interest rates, such as the six-month London interbank offered rate. In 1982 several factors combined to trigger Mexico's external debt crisis. Falling oil prices in the early 1980s dampened an important source of Mexican exports and foreign exchange. Simultaneously, US interest rates rose dramatically as the Federal Reserve fought to combat inflation. In August 1982, the government suspended payments on its external debt and a balance of payments crisis ensued, which forced the devaluation of the peso. As the economy entered a deep recession, aggregate debt-to-GDP levels peaked at 154 percent.

Exhibit B.12

Prior to Mexico's sovereign default in 1982, its external debt service burden was rising

Mexican external debt service payments[1] relative to exports



External debt										
% of total debt	53	58	61	40	34	43	53	64	69	52
% of GDP	19	27	35	29	50	54	78	54	40	31

1 Debt service payments include principal and interest payments on long-term debt, interest paid on short-term debt, and repayments to the IMF.
2 See, for instance, Chapter 5, *History of the eighties – Lessons for the Future*, FDIC.
SOURCE: International Monetary Fund; Haver Analytics; McKinsey Global Institute

In the wake of the debt crisis, both capital inflows and domestic credit expansion slowed dramatically in real terms. Nominal GDP grew rapidly as inflation soared with the devaluation of the peso. By 1987 inflation peaked at 132 percent, having averaged 19 percent in the years preceding the crisis. Fixed investment fell sharply as interest rates rose, exacerbating the recession and leading to a weak recovery in real GDP

over subsequent years. From 1983 to 1992, real annual GDP growth averaged just 1.9 percent, compared with 7.2 percent in the ten years prior to the crisis. Strong nominal GDP growth, combined with weak credit growth resulted in significant overall deleveraging, with total debt to GDP falling to 59 percent by 1992. The deleveraging was widespread, with both the private sector and government sector each accounting for half of total deleveraging.

By 1990, robust economic growth had returned to Mexico driven by a recovery in credit availability and strong export growth. Once again, however, external debt grew as Mexico began to borrow heavily from abroad. Triggered by disruptions in the political environment, Mexico slipped into another debt crisis in 1994.

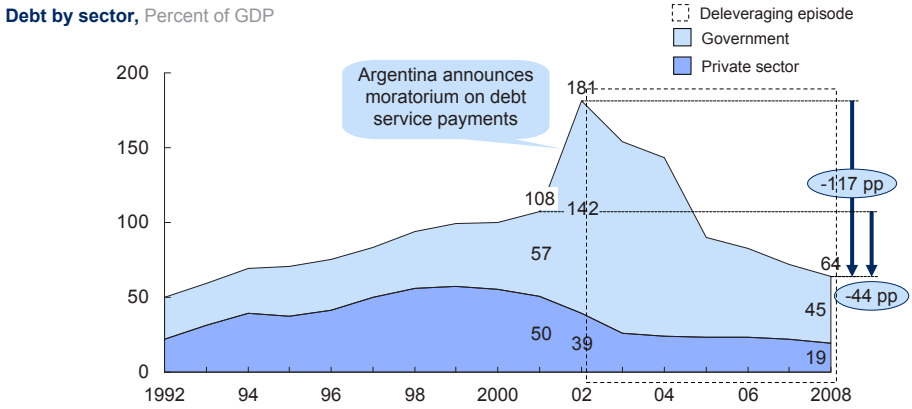
Mexico's deleveraging episode illustrates the dangers of mismatches in the currency and maturity structure of debt financing. Despite levels of government debt that were low (34 percent of GDP) by developed markets standards, the Mexican government became overwhelmed as creditors' fears quickly spiraled into debt crises. Mexico's experience also illustrates how government defaults can lead to inflation and banking crises, which may further dampen credit by suppressing the supply of private credit from domestic sources.

6. Argentina, 2002–08

Argentina is an example of deleveraging through the "massive default" archetype. It is also a case in which the nominal stock of debt declined. Like Finland, the Argentine episode also illustrates how deleveraging can occur even when total debt levels in the economy are not very high. Argentina's public debt was just 57 percent of GDP, much of it denominated in US dollars, when the government defaulted in 2001. This sparked a sharp currency devaluation and deep recession, causing the ratio of public debt to GDP to jump to 142 percentage points. Since then, both the public sector and private sector debt has declined significantly (Exhibit B.13) as the country was cut off from international capital markets.

Exhibit B.13

Argentina's sovereign default triggered substantial deleveraging



Real GDP and debt growth

Real GDP growth,%	10	6	6	-3	6	8	4	-3	-1	-4	-11	9	9	9	8	9	7
Debt growth, %	22	24	26	2	13	18	15	0	1	2	96	2	11	-26	13	8	14

SOURCE: International Monetary Fund; Bank of Argentina; Haver Analytics; McKinsey Global Institute

In retrospect, the seeds of instability began in 1991, when the Argentine government decided to fight hyperinflation by permanently pegging its currency, the peso, to the US dollar. Under this system, called "convertibility," the central bank guaranteed that one peso was worth $1 and that the exchange rate would not change. Citizens used the two currencies interchangeably, often borrowing in dollars even though salaries were paid in pesos. The initial result was a period of relative economic stability and strong real GDP growth, which averaged 6 percent a year from 1991 to 1998. The country's debt relative to GDP doubled during these years as credit expanded to fuel growth, reaching 100 percent of GDP by 1999, primarily because of rising private sector borrowing.

However, the fatal flaw of the currency peg was that the peso rose along with the dollar, which appreciated rapidly the late 1990s as the US economy boomed, the dot-com craze peaked, and the Asian financial crisis of 1997–98 sent money flowing into the safety of US Treasuries. The peso became increasingly overvalued, hurting Argentina's exports and industry. But the country clung to the currency peg for many reasons, including the fact that a devaluation would make it much more difficult for all Argentines—the government, businesses, and households— to service their dollar loans.

By the late 1990s, the currency peg was becoming increasingly untenable. As the contagion from the Asian crisis spread, Russia defaulted on part of its public debt in 1998, causing international investors to shift their money out of many emerging markets. The turmoil spread to Brazil, forcing it to devalue its currency in 1999. This attracted foreign investors away from Argentina to Brazil, and further depressed Argentina's exports—33 percent of Argentina's trade was with Brazil.

As Argentina's economy fell into recession in 1999, private sector debt to GDP started falling and government borrowing picked up. Investors' concerns about the country's ability to service its debt started to increase as well, causing interest rates to rise, which deepened the recession. As conditions worsened, Argentines started pulling their savings out of banks and transferring them abroad—a trend that accelerated into a full-fledged bank run in late 2001. The government responded by imposing strict limits on bank withdrawals and transfers, crippling many households' and businesses' ability to pay their bills. The economy was seizing up. The IMF refused to disburse additional funds. On December 30, 2001, Argentina's government announced it would suspend payments on its foreign debt, initiating one of the largest sovereign default ever recorded. Four days later, the government abandoned the currency peg, sending the peso into a sharp devaluation.

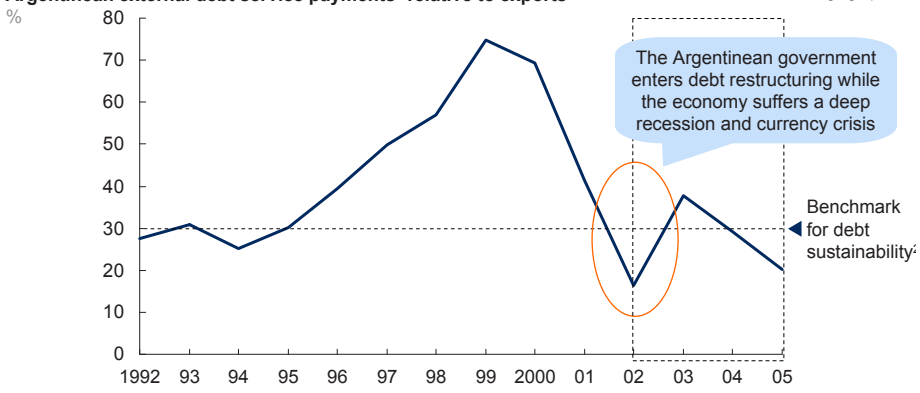
With Argentina's currency depreciating, the cost of servicing dollar-denominated debt soared (Exhibit B.14). The economy contracted by 11 percent, and the value of Argentina's debt relative to GDP soared to 181 percent in 2002. The economy has been deleveraging ever since. The government announced an offer to creditors to exchange bonds for just one-quarter of their face value in 2005—an offer that three-quarters of creditors accepted. Public debt has fallen from 142 percent of GDP in 2002 to 45 percent in 2008. But the government default hurt private borrowers as well. Private sector debt to GDP also shrank over the same period, from 39 percent of GDP to 19 percent, through defaults and reductions in bank lending.

The process was undeniably painful—both inflation and unemployment rose above 20 percent in 2002. But by 2003, the lower peso was spurring exports and tourism, causing the economy to expand again. Helped as well by the commodity boom that began in 2002, Argentina's GDP growth has averaged just above 8 percent a year

Exhibit B.14

Argentina had a large foreign currency debt, which became unsustainable after devaluation

Argentinean external debt service payments[1] relative to exports



External debt															
% of total debt	N/A	N/A	60	46	42	54	54	52	50	50	50	51	85	81	75	79
% of GDP	46	36	30	28	30	39	42	44	48	51	51	57	153	132	113	71

1 Debt service payments include principal and interest payments on long-term debt, interest paid on short-term debt, and repayments to the IMF.
2 See for, instance, Chapter 5, *History of the eighties – Lessons for the Future*, FDIC.

SOURCE: Haver Analytics; International Monetary Fund; McKinsey Global Institute

since then. Beyond the export industries, however, lack of credit has constrained investment. At just 64 percent of GDP, Argentina's level of debt is much below that of the fast-growing developing economies. Consumers, small businesses, and even some large domestic companies are credit-constrained.

Like Mexico, Argentina illustrates the risks of foreign currency debt coupled with an unsustainable currency valuation. It also demonstrates the pain to private borrowers in the event of a sovereign default. And it reflects the fact that, in determining sustainability, the level of debt matters less than the ability to service the debt. While default is surely one way to deleverage, the human costs show it is a path that is best to avoid.

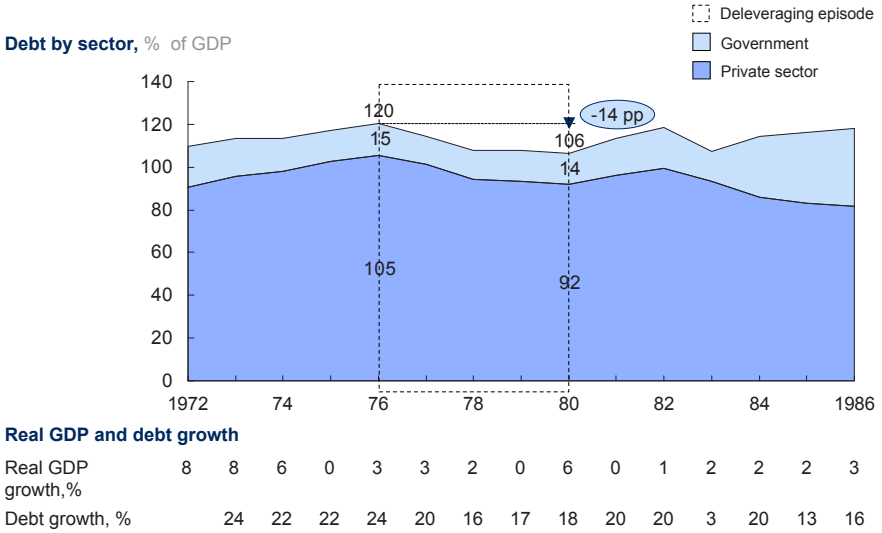
7. Spain, 1976–80

Spain's experience in the post-Franco years is an example of deleveraging through high inflation. It is also a case in which deleveraging was accompanied by—not caused by—a banking crisis. The country's debt-to-GDP ratio fell from 120 percent in 1976 to 106 percent in 1980. The deleveraging occurred almost completely in the private sector, which reduced its debt relative to GDP from 105 percent to 92 percent over that period (Exhibit B.15).

As in many mature economies in the late 1970s, Spain's inflation rate rose from a combination of factors, including loose monetary policy and soaring oil prices. General Francisco Franco's death in November 1975 left a power vacuum in Spain. The country adopted expansionary monetary policies, causing inflation to rise from an average of 13 percent a year from 1972 through 1975 to a peak of 25 percent in 1977 (Exhibit B.16). After that, monetary policy and was tightened and inflation brought down to 16 percent by 1980. But inflation boosted Spain's nominal GDP growth, which increased from 19 percent per year from 1972 through 1975 to 21 percent per year from 1976 through 1980.

Exhibit B.15

Spain experienced deleveraging through inflation during its transition to democracy from 1976 to 1980



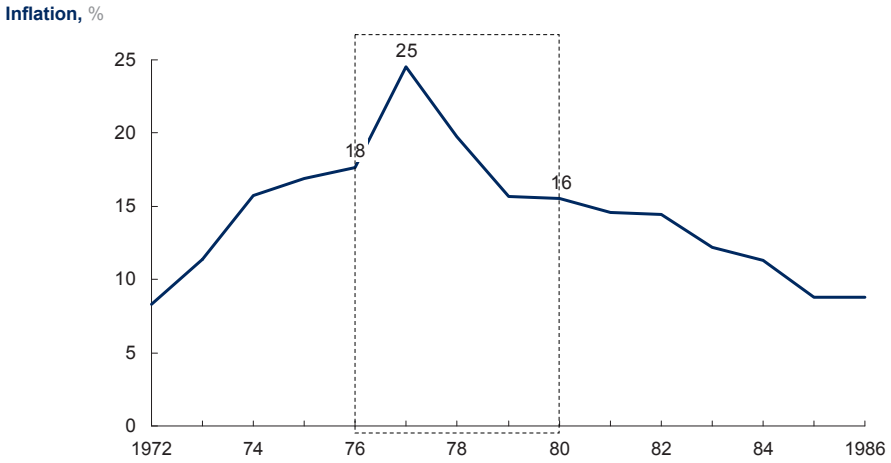
Real GDP and debt growth

Real GDP growth,%	8	8	6	0	3	3	2	0	6	0	1	2	2	2	3
Debt growth, %		24	22	22	24	20	16	17	18	20	20	3	20	13	16

SOURCE: International Monetary Fund; Bank of Spain; Haver Analytics; McKinsey Global Institute

Exhibit B.16

Spain's inflation rate peaked in 1977 at 25 percent



SOURCE: International Monetary Fund; Bank of Argentina; Haver Analytics; McKinsey Global Institute

At the same time, the country experienced a major banking crisis. From 1978 to 1983, the government rescued, consolidated, or nationalized 52 of the country's 100 banks, representing 20 percent of deposits.[10] Credit growth slowed during the deleveraging between 1976 and 1980, falling from 23 percent in the early 1970s to 19 percent during deleveraging.

The Spanish episode illustrates how inflation can enable deleveraging, but also the real cost to the economy and investment. Several other mature economies also

10 See Carmen Reinhart and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2009.

experienced deleveraging in the wake of the oil shocks of the 1970s. In Italy, for example, the inflation rate jumped from the low single digits in the early 1970s to an average of 17 percent from 1974 to 1977. Its ratio of debt to GDP declined from 240 percent in 1975 to 181 percent in 1981. Like Spain, deleveraging occurred in Italy's private sector.

C. EPISODES OF DELEVERAGING THAT DID NOT FOLLOW A FINANCIAL CRISIS

We have until this point focused on deleveraging episodes that followed financial crises, due to their greater relevance for today. While such episodes represent more than two-thirds of our sample, we find 13 other episodes of deleveraging that occurred without any crisis. These episodes are interesting in their own right as, in many cases, deleveraging was undertaken voluntarily and the economic impact of deleveraging can be assessed more clearly without the additional stresses caused by financial crises. Following our earlier methodology, we segment the sample into the same archetypes and find that seven of these 13 episodes fit our "belt-tightening" archetype, four the "high inflation" archetypes, and two the "growing of out debt" archetype. There were no episodes of "massive default" without a financial crisis. We examine each archetype in turn.

Belt-tightening

In most of these cases, reductions in government debt relative to GDP drove the deleveraging. In many cases this reduction in government debt was driven by a policy choice by the central government to reduce its outstanding debt burden. For instance, prior to joining the euro monetary union, Belgium reduced its government debt substantially, from 73 percent of GDP in 1997 to 31 percent in 2004. The Belgium government managed this deleveraging through a dramatic reduction in fiscal deficits, achieving a balanced budget in 2000 compared with a deficit of over 8 percent of GDP just eight years earlier. Ireland had a similar experience from 1988 to 1994, reducing its government debt by a third through a dramatic improvement in fiscal balances. The Irish budget deficit fell from more than 10 percent of GDP in 1985 to 2 percent of GDP in 1994.

Canada 1998–2005—Belt-tightening through fiscal spending cuts

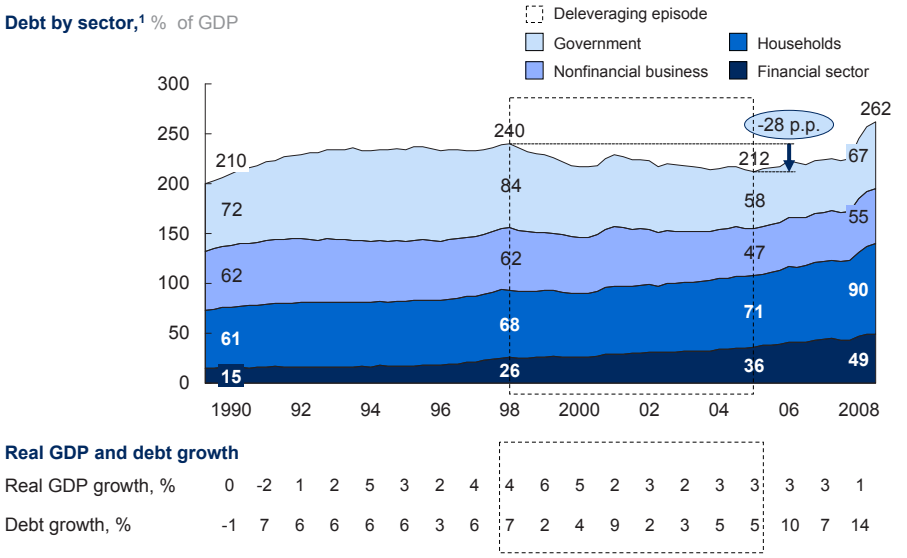
With many countries today projected to greatly increase their government debt, it is instructive to analyze one episode of sovereign deleveraging in more detail. Between 1998 and 2005, Canada deleveraged significantly, driven by the public sector, with total debt to GDP dropping from 240 percent to 212 percent (Exhibit B.17). Real economic growth remained strong during this period, averaging 3.4 percent annually compared with 3 percent before the start of deleveraging. With strong economic growth and a gradual reduction in credit, Canada's deleveraging case appears to be one of the most successful in our sample.

In 1998, Canada's debt stood at 240 percent of GDP, up from 196 percent a decade earlier. Government debt stood at 84 percent of GDP, of which federal debt accounted for slightly greater than half. Canadian public debt had remained consistently high since the 1980s but started to climb rapidly in the 1990s to finance rising pension and health care costs. Government debt rose from 72 percent of GDP in 1990 to a peak of 94 percent in the first quarter of 1996.

Federal government debt accounted for most of the deleveraging, dropping by 20 percentage points over the period, while state and provincial debt also fell

Exhibit B.17

Canada's overall economy deleveraged from 1998 to 2005



Real GDP and debt growth

Real GDP growth, %	0	-2	1	2	5	3	2	4	4	6	5	2	3	2	3	3	3	3	1
Debt growth, %	-1	7	6	6	6	6	3	6	7	2	4	9	2	3	5	5	10	7	14

1 Some figures do not sum due to rounding.
SOURCE: International Monetary Fund; Haver Analytics; McKinsey Global Institute

by 6 percentage points. Much of the drop in federal debt was attributable to the budget deficit reduction policies of Paul Martin, first as finance minister and later as prime minister. These included measures that cut business and farm subsidies, commercialized public spending programs, imposed user charges, and scaled back most government spending programs (including health care, education, welfare, and defense)–eliminating some 55,000 government jobs. Together, these actions reduced government spending by 10 percentage points of GDP. In 1993, Canada's budget deficit was equal to 8 percent of GDP; by 1997, the federal budget was balanced and the government had begun to reduce the nominal amount of federal debt outstanding.

In the aftermath of the 2001 dot-com collapse, nonfinancial businesses debt fell, dropping from 62 percent of GDP in 1998 to 47 percent in 2005. While low interest rates and continued economic growth provided little incentive for corporations to deleverage, prior overinvestment in the telecoms and IT sectors ended, resulting in deleveraging of the nonfinancial corporate sector. In contrast, household and financial sector debt combined grew from 94 percent of GDP to 107 percent during the period. Household debt, in particular, grew faster after 2003 as Canadian house prices began to rise.

Canada's deleveraging episode provides a model for countries with highly indebted governments today. The key requirement was the political will to force through unpopular government spending cuts. With mature market governments today projected to accumulate the largest debt burdens since World War II, Canada's experience in sovereign debt reduction is instructive.

High inflation

Four countries have experienced significant deleveraging as a result of high inflation: Italy from 1975 to 1981, Nigeria from 1986 to 1991, Paraguay from 1983 to 1987, and Portugal from 1983 to 1990. In each case, nominal GDP growth surged as inflation rose, exceeding 20 percent annually in every case and more than 50 percent in some. The scale of deleveraging was largest in Nigeria, where debt relative to GDP fell to

less than half its level before the episode. The high inflation and deleveraging did not come without a cost—in all cases, the rate of real economic growth was less than before deleveraging.

Growing out of debt

We find two episodes of the "growing out of debt" archetype—Egypt from 1975 to 1979, and Nigeria from 1968 to 1971. Egypt experienced a rapid acceleration of GDP growth because of a "peace dividend" after the Yom Kippur War; real GDP rose by an average 13 percent annually over 1976–79. Rapid GDP growth, combined with a decline in government spending, helped drive government debt down from 28 percent of GDP to 20 percent. The decline in government debt reduced total debt from 46 percent of GDP to 40 percent over the period.

In 1968, Nigeria began a short period of deleveraging, with total debt falling by half from 15 percent of GDP to 8 percent by 1971. As in Egypt, rapid real GDP growth was the primary driver of this deleveraging, with an average annual growth rate of 56 percent over the three-year period. This growth came as the economy rebounded strongly after a severe recession in 1967 and 1968.

Table 2.5 lists deleveraging episodes that did not follow a financial crisis.

Table 2.5 - Historic deleveraging episodes that did not follow a financial crisis

	Deleveraging period			Total debt/GDP			
Country	Start	End	Financial crisis	Start, %	End, %	Relative change, %	Absolute change, percentage points of GDP
"Growing out of debt"							
Egypt	1975	1979	no	46	40	-14	-6
Nigeria	1968	1971	no	15	8	-48	-7
"High inflation"							
Italy	1975	1981	no	240	181	-25	-59
Nigeria	1986	1991	no	43	18	-58	-25
Paraguay	1983	1987	no	19	13	-31	-6
Portugal	1983	1990	no	106	70	-34	-36
"Belt-tightening"							
Belgium	1997	2004	no	150	98	-34	-52
Canada	1998	2005	no	242	217	-10	-25
Chile	2002	2006	no	135	102	-25	-33
Egypt	2002	2007	no	91	78	-14	-13
Ireland	1988	1994	no	183	145	-21	-38
Nigeria	2001	2005	no	49	30	-38	-19
Switzerland	1969	1974	no	135	101	-25	-34

Source: International Monetary Fund; C. Reinhart and K. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*; McKinsey Global Institute

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