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# The global financial crisis: How similar? How different? How costly?

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ABSTRACT

This paper provides a brief analysis of three major questions raised in the context of the recent global financial crisis. First, how similar is the crisis to previous episodes? We argue that the crisis featured some close similarities to earlier ones, including the presence of credit and asset price booms fueled by rapid debt accumulation. Second, how different is it from earlier episodes? We show that, as much as it displayed some similarities with previous cases, it also featured some significant differences, such as the explosion of opaque and complex financial instruments in a context of highly integrated global financial markets. Third, how costly are recessions that followed these types of crises? Although the latest episode took a very heavy toll on the real economy, we argue that this was not a surprising outcome. In particular, historical comparisons indicate that recessions associated with periods of deep financial disruptions result in much larger declines in real economic activity. We discuss the implications of these findings for economic and financial sector policies and future research.



## 1. Introduction

The global economy is recovering from the deepest recession in the post-World War II era. The global recession was triggered by a severe financial crisis in key advanced economies that coincided with the freezing of global financial markets and the collapse in global trade flows. While the crisis quickly resulted in deep recessions in a number of advanced economies, the emerging market and developing economies were also seriously affected, but the impact varied across regions and countries.

Although the process of global economic recovery is already underway, the nature and implications of the crisis have still been at the center of academic and policy discussions.[1] For example, there has been an intensive discussion about the similarities and differences between the latest crisis and the past episodes. Some commentators, especially in the media, argue that the latest crisis was different. Its root causes are thought to lie in the excessive global savings (a "savings glut"), flowing through a poorly regulated shadow banking system in the United States to its housing market (see Krugman, 2009). Some others claim that the idea of this crisis being different is misleading as an analysis of earlier crises presents remarkable similarities with the latest episode. In particular, excessive accumulation of debt, as it took place in various forms ahead of the latest crisis, was also a feature of previous crises (see Reinhart & Rogoff, 2009).

Another dimension of the ongoing discussions about the crisis has focused on its global spread and cost. The crisis originated in the United States, but it took place in a highly integrated global economy where the widespread use of sophisticated financial instruments along with massive international financial flows facilitated its rapid spread across markets and borders. Although it was not surprising that a global crisis led to a significant decline in global activity, the

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[1] A number of papers provide detailed discussions about the evolution of the crisis, see Borio (2008), Brunnermeier (2009), Calomiris (2009), Gorton (2009), and Shin (2009).

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extent and duration of this decline have been a major area of research. Recessions associated with the global financial crisis, while displaying similar patterns with previous recession episodes, reflect an unlikely confluence of factors. Specifically, current recessions are associated with serious financial disruptions, including credit crunches, house price busts, equity prices busts and outright banking crises, in some countries.

This paper provides a brief analysis of the nature and cost of the crisis to shed light on these issues. In particular, we address three major questions. First, how similar is the latest crisis to previous episodes? Second, how different is the crisis from earlier ones? Third, how costly are recessions coinciding with serious disruptions in financial markets? In Sections 2 and 3, we study the first two questions. Our basic conclusion is that the massive financial crisis that has gripped the global economy over the past 2 years is a result of a multitude of factors. Some of these factors are similar to those observed during the buildup to past financial crises, but some others are distinctly new. While ranking the relative contributions of these various factors is difficult, together we think that they help explain the latest episode's considerable scale and scope. Irrespective of these similarities or differences though, the crisis has been a very costly one for both real and financial sectors as we discuss in Sections 4 and 5.

How similar is the latest crisis to previous episodes? We examine the similarities in the buildup to the crisis and in the post-crisis busts in Section 2. The buildup to the financial crisis has four major features similar to earlier episodes: First, asset prices rapidly increased in a number of countries before the crisis. Second, a number of key economies experienced episodes of credit booms ahead of the crisis. Third, there was a dramatic expansion in a variety of marginal loans, particularly in the mortgage markets of several advanced economies, which together led to a sharp increase in systemic risk. Fourth, the regulation and supervision of financial institutions failed to keep up with developments. These factors combined sharply increased the risk of a financial crisis. As we present in Section 2, the succeeding bust has many similarities to past events as well.

How different is the latest crisis from previous crises episodes? As we present in Section 3, new dimensions played important roles in the severity and global scale of the crisis that included surprising disruptions and breakdowns of several markets in the fall of 2008. The crisis was different than previous ones in at least four new aspects. First, there was a widespread use of complex and opaque financial instruments. Second, the interconnectedness among financial markets, nationally and internationally, with the United States at the core, had increased in a short time period. Third, the degree of leverage of financial institutions accelerated sharply. Fourth, the household sector played a central role. These new elements combined to create unprecedented sell-offs in the fall of 2008 and resulted in the global financial crisis.

How costly is the latest episode? The global financial crisis resulted in recessions in almost all advanced countries. Most of these recessions were accompanied by credit crunches, house price busts, and outright financial crises. In Section 4, we provide an analysis of how recessions associated with credit crunches, house prices busts and financial crises differ from other recessions. Our results suggest that recessions with credit crunches or house price busts result in more costly macroeconomic outcomes than do those without such disruptions. When recessions are accompanied with financial crises, the costs are larger and much more pronounced for consumption and investment.

Section 5 presents the dynamics of the ongoing recession in the United States, the epicenter of the current crisis, and compares them with those of past recessions in advanced countries. We also provide a short discussion about the speed and extent of deterioration of activity in the United States. Our findings suggest that the current U.S. recession is clearly an outlier in many respects.

The financial crisis has taken a heavy toll on the real economy as evidenced by deep and long recessions in a number of advanced countries besides the United States. The cost of a recession is, of course, affected by a number of factors. Section 6 presents a brief discussion of these factors, discusses policy implications, and concludes.

## 2. The crisis: how similar?[2]

The buildup to the ongoing financial crisis has four features similar to earlier episodes: First, asset prices rapidly increased in a number of countries before the crisis. Second, a number of key economies experienced episodes of credit booms ahead of the crisis. Third, there was a dramatic expansion in a variety of marginal loans, particularly in the mortgage markets of several advanced economies, which together led to a sharp increase in systemic risk. Fourth, the regulation and supervision of financial institutions failed to keep up with developments.

### *2.1. Asset price booms*

The exuberant pattern of asset prices in the United States and other advanced countries prior to the current crisis is reminiscent of those observed in earlier major financial crises episodes in the post-war period. The overall size of the U.S. housing boom and its dynamics – including rising house prices in excess of 30 percent in the 5 years preceding the crisis and peaking six quarters prior to the beginning of the crisis – is remarkably similar to house price developments in the so-called Big Five banking crises episodes (Finland, 1991; Japan, 1992; Norway, 1987; Sweden, 1991; and Spain, 1977).[3]

[2] A number of papers examine the differences and similarities between the latest episode and past crises (see Furceri & Mourougane, 2009). Some parts of Sections 2 and 3 extend Claessens (2010) and Claessens, Dell'Ariccia, Igan, and Laeven (2010).

[3] Reinhart and Rogoff (2008) examine the run-up in housing prices in the United States before 2007 and "Big Five" crises in advanced countries and confirm significant increases in housing prices prior to financial crises, and marked declines in the year of crisis and in subsequent years. They note that the run-up in housing prices, though, prior to the U.S. 2007 crisis exceeds that of those prior to Big Five.

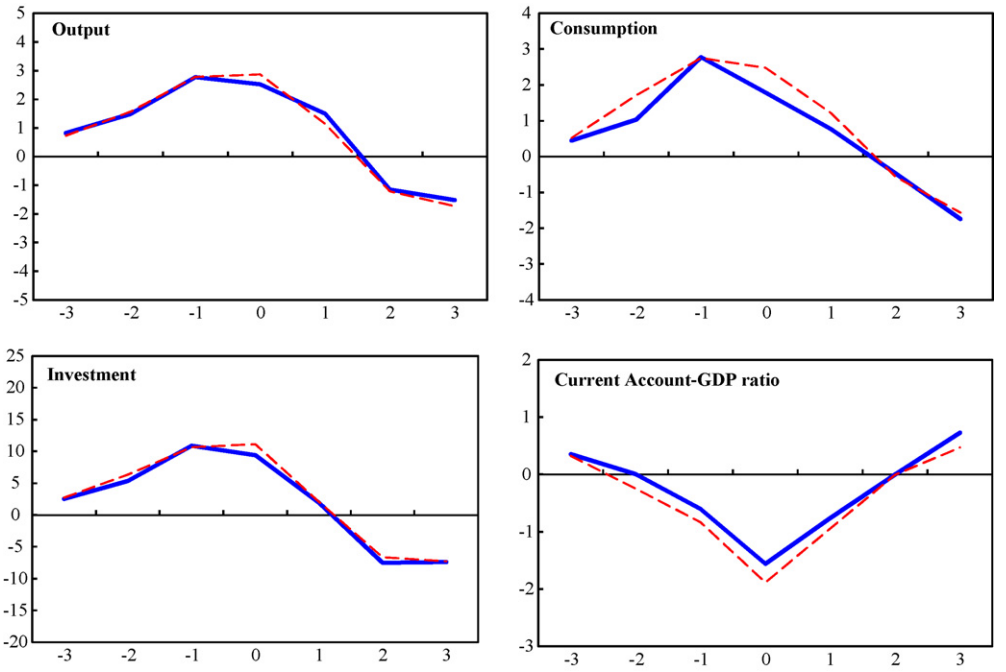


**Fig. 1.** Credit booms and macroeconomic variables (Cross-country means and medians of cyclical components). *Notes*: The solid (dashed) line represents the median (mean) of each variable around the time of a credit boom. Years in the *x*-axis. Peak in the cyclical component of per capita real credit at $t = 0$.

The housing price boom in the United States ahead of the current crisis was, however, unusual both in its strength and duration. Sharp increases in house prices were also a common feature in other countries now hard-hit by the current crisis, including the United Kingdom, Iceland, and many East European countries. This synchronicity of house price increases across countries before the crisis may have been surprising considering that housing is the quintessential nontradable asset. However, other analysis shows that such highly synchronized episodes were not uncommon in the past (see Claessens, Kose, & Terrones, 2009). During the latest period, in contrast, house price booms were partly fueled by low (short and long-term) interest rates resulting from abundant global liquidity and large demand for safe assets (Caballero, 2009).

### 2.2. Credit booms

The prolonged credit expansion in the run-up to the crisis was also similar to other episodes. Recent research documents the main features of episodes of unusually sharp expansions in real credit that often ended in crisis (see Mendoza & Terrones, 2008). Credit booms generally coincide with large cyclical fluctuations in economic activity—with real output, consumption, and investment rising above trend during the buildup phase of credit booms and falling below trend in the unwinding phase (see Fig. 1). In the upswing, the current account tends to deteriorate, often accompanied by a surge in private capital inflows. Increases in house prices and the real exchange rate often accompany such credit booms. At least for advanced countries, however, credit booms are not always associated with surges in inflation. Credit booms in these countries are also more likely when preceded by a period of gains in total factor productivity (TFP) or financial sector reforms.[4]

Interestingly, most of these were also the features of the credit boom that took place in the United States, the United Kingdom, Spain, Iceland and some other advanced countries ahead of the current crisis. However, unlike the current crisis, credit booms in the advanced economies were only occasionally associated with currency and banking crises. Indeed, advanced economies experiencing credit booms were more likely to have currency crises than banking crises. This risky pattern was also not limited to advanced countries, but extended to varying degrees to several emerging market countries caught in the current storm. In the run-up to the crisis, credit aggregates grew very fast in several Eastern European countries and often fueled real estate booms.

As in past episodes, international financial integration helped facilitate some of these trends (see Cardarelli, Kose, & Elekdag, 2010). Specifically, large capital inflows were associated with acceleration of GDP growths and for many countries, with credit expansion. In addition, output growths were accompanied by large swings in aggregate demand and in the current account balance, with a strong deterioration of the current account during the inflow period (see Fig. 2).

[4] Indeed, 40 percent of the credit booms in these countries followed large TFP gains, 33 percent followed significant financial sector reform, and 27 percent followed large capital inflows.

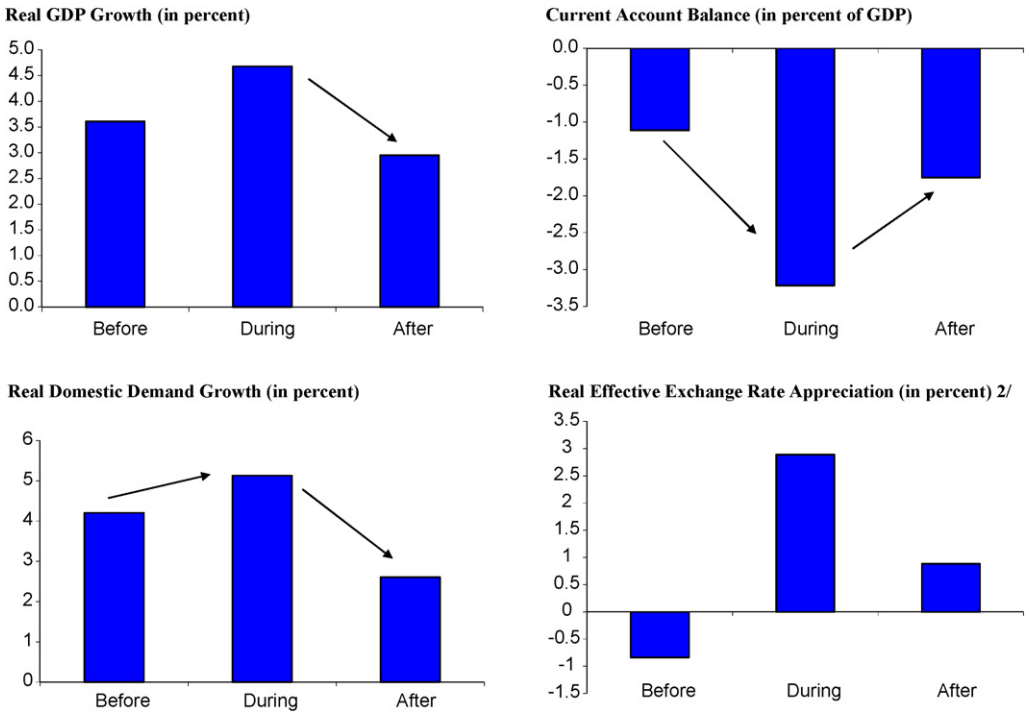


**Fig. 2.** Selected macroeconomic variables in periods surrounding large capital inflows. *Notes*: Median across all completed episodes. "Before" denotes averages of the macrovariables in the 2 years before the episodes. "After" denotes averages of the macrovariables in the 2 years after the episodes. The arrows indicates that the difference between medians is significant at a 10 percent level or better. For example, in the top left panel, the average real GDP growth in the 2 years after the episode is statistically significantly different from the average real GDP growth during the episodes. Nominal effective exchange rate appreciation is the cumulative change within periods.

### 2.3. Marginal loans and systemic risk

The rapid growth of credit was often directed towards households and resulted in sharply increased household leverage. The boom in household credit was associated with the creation of marginal assets whose viability relied on continued favorable conditions. In the United States (and to some extent the United Kingdom), a large portion of the mortgage expansion consisted of loans extended to subprime borrowers—households with limited credit and short employment histories. Debt servicing and repayment were, hence, vulnerable to economic downturns and changes in credit and monetary conditions. This maximized default correlations across loans, generating portfolios highly exposed to declines in house prices, confirmed ex-post through the large non-performing loans when house prices declined.[5]

A similar pattern led to large portions of domestic credit denominated in foreign currency, particularly in emerging Europe. Large foreign currency exposures in the corporate and financial sectors had been a common feature in the Asian crisis. In the current crisis, in several eastern European economies large portions of domestic credit (including to households) are denominated in foreign currency (Euros, Swiss francs, and yen) (see Árvai, Driessen, & Ötker, 2009). While lower interest rates relative to local currency increased affordability, borrowers' ability to service loans and creditworthiness depended on continued exchange rate stability. As with U.S. subprime loans, this meant high default risk correlations across loans and systemic exposure to macroeconomic shocks.

On the back of buoyant housing and corporate financing markets, derivative markets in many forms expanded greatly. In particular, favorable conditions spurred the emergence of large-scale derivative markets, such as mortgage-backed securities and collateralized debt obligations with payoffs that depended in complex ways on underlying asset prices. The pricing of these instruments was often based on a continuation of increasing house prices that facilitated the refinancing of underlying mortgages. The corporate credit default swap market also expanded dramatically on the back of favorable spreads and low volatility.

[5] Mayer, Pence, and Sherlund (2009) document that mortgage defaults and delinquencies are particularly concentrated among borrowers whose mortgages are classified as subprime or near prime. They report that many such borrowers put down small or no down payments when they purchased their homes, and were likely to have negative equity in their homes when house prices fell. This implies that they often were unable to sell before the bank sells it through foreclosure.

### 2.4. Regulation and supervision

Episodes of large credit expansion have reflected not only macroeconomic conditions, but also various structural deficiencies, such as explicit or implicit government guarantees, herding behavior by investors, reduced lending standards, excessive competition, and information asymmetries. They have also been associated with rapid financial liberalization, and poorly supervised and unregulated financial innovation.

Evidence indeed shows that past crises often followed credit expansions triggered by financial liberalization not accompanied by necessary regulatory and prudential reforms (see Demirguc-Kunt & Detragiache, 1998). Moreover, imbalances often resulted from poorly sequenced regulatory reforms. Underdeveloped domestic financial systems were often unable to intermediate large capital inflows in the wake of capital account liberalizations. Poorly designed financial reforms and deficient supervision often led to currency and maturity mismatches and to large and concentrated credit risks.

In the run-up to the latest crisis, although perhaps in more subtle forms, regulatory approaches to and supervisory oversight of financial innovation were insufficient. As in previous crises, but this time in advanced countries, finance companies, merchant banks, investment banks and off-balance sheet vehicles of commercial banks operated – to varying degrees – outside banking regulations. However, as this "shadow banking system" provided increasingly important avenues for intermediation, it grew without adequate oversight and led to systemic risks. Unhealthy turf competition between various supervisory agencies in some countries and conflict of interest problems of rating agencies exacerbated problems. Regulators also underestimated the conflict of interests and information problems associated with the originate-to-distribute model.[6] Not only did this harm consumers of financial services, but it also created the potential for a chain reaction leading to systemic risk.

### 2.5. Dynamics of the bust

As in earlier crises, the increase in asset prices, rapid growth of credit combined with poor lending practices, increase in systemic risk and failures in regulation and supervision created many vulnerabilities. While only a small number of credit booms end up in a banking crisis – about one-quarter of all asset price booms end in busts (Helbling & Terrones, 2003) – the probability of a crisis increases with a boom (Dell'Ariccia, Barajas, & Levchenko, 2008). More generally, research documenting the main features of these types of credit booms highlights the strong association with subsequent busts (see Mendoza & Terrones, 2008). Furthermore, the larger the size and duration of a boom episode, the greater the likelihood it results in a crisis. The mechanisms linking credit booms to crises include increases in leverage of borrowers (and lenders) and a decline in lending standards. In the U.S. episode, both channels were indeed at work (Dell'Ariccia, Igan, & Laeven, 2008).

When asset booms turn into busts, significant output losses often entail. The outcome depends on the nature of the asset booms, with important differences between housing price busts and equity busts (see Claessens et al., 2009). First, the magnitude of the asset price fall during a bust depends on the size of the run-up in prices before the bust. But price corrections during housing price busts are smaller than those observed during equity price busts. This reflects in part the lower volatility and liquidity in housing markets. Second, the association between booms and busts is stronger for housing than for equity prices. The implied probability of a housing price boom being followed by a bust is about 40 percent. Third, housing price busts last longer than equity price busts do. Moreover, the output loss associated with a typical housing price bust is twice as large as that associated with an equity price bust.

Fourth, bank-based financial systems suffer larger output losses than market-based financial systems during housing price busts, while market-based systems tend to suffer larger output losses than bank-based systems during equity price busts (see Helbling & Terrones, 2003). This is consistent with the high exposure of banks to real estate lending, and the larger importance of equities in household's assets in market-based systems. Lastly, both equity and house price busts are often synchronized across countries, but the degree of synchronization in equity price busts is particularly high. This time, however, the downturn in house prices has been highly synchronized across countries, with implications for global economic activity. Indeed, most advanced countries have been in recession for at least a year (see Kose, Loungani, & Terrones, 2010).

The degree of international financial integration before the crisis also affects the bust. Cardarelli et al. (2010) examine developments subsequent to surges in private capital inflows for a group of emerging market countries and open advanced economies over the past two decades. After a capital inflows period, growth can drop significantly. In fact, average GDP growth in the 2 years after episodes that end abruptly tends to be about 3 percentage points lower than during the episode, and about 1 percentage point lower than during the 2 years before the episode (see Fig. 2). Past episodes characterized by a sharper post-inflow decline in GDP growth tend to be those with a faster acceleration in domestic demand, a sharper rise in inflation, and a larger real appreciation during the inflow period (see Fig. 3).

The surge in capital inflows also appears to be associated with a real effective exchange rate appreciation. Hence, the sharper post-inflow decline in GDP growth seems to be associated with persistent, expansionary capital inflows, which compound external imbalances and sow the seeds of the eventual sharp reversal. There is then also often a sharp reversal in the current account. The end of the inflow episodes typically entailed a sharp reversal of non-FDI flows, while FDI proved much more resilient. This has indeed been the pattern in several Eastern European countries during the latest crisis.

[6] Gorton (2009) describes the trend towards the originate-to-distribute model and explains how it led to a decline in lending standards. He claims that banks increasingly financed their asset holdings with shorter maturity instruments, which left them particularly exposed to dry-up in funding liquidity.

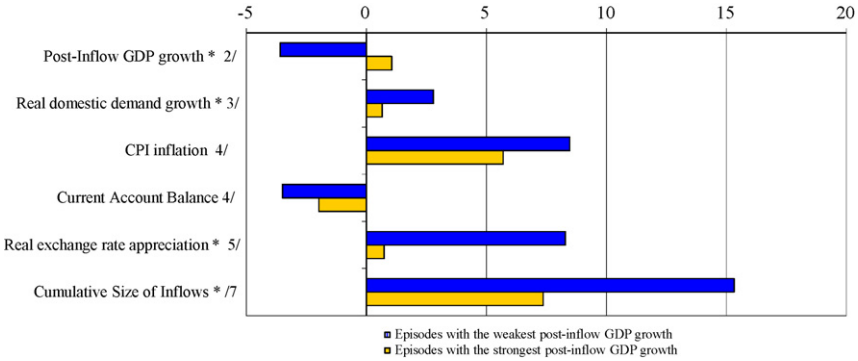


**Fig. 3.** Large capital inflows: post-inflow GDP growth and selected macroeconomic variables (1).
*Notes*: (1) Values reported are medians for the two groups of episodes. Episodes with the weakest (strongest) post-inflow GDP growth are those with above (below) median difference between average GDP growth in the 2 years after the episode and the average during the episodes. The asterisk (*) indicates that the difference between medians is significant at a 10 percent level or better. (2) In percent. Average real GDP growth in the 2 years after the episodes less average during episodes. (3) In percent. Average during episodes minus average in the 2 years before the episode. (4) In percent, but current account balance in percent of GDP. Average during episodes. (5) In percent. Cumulative change during episodes. (6) In percent. Average deviations from the (Hodrick–Prescott filter determined) trend of real government noninterest expenditure during the episodes minus the average in the 2 years before the episode. (7) In percent of GDP.

As often before, poor crisis management played an important role in aggravating the financial crisis. For instance, similar to past episodes, it was difficult to get ahead of a fast evolving situation to contain the financial turmoil and reduce its impact on the real economy (see Cecchetti, 2009). The chronology of the crisis (see Calomiris, 2009; Gorton, 2009) shows how events and market developments did trigger and condition specific subsequent developments and policy responses, that, in retrospect at least, probably made the crisis more severe (see Taylor, 2009). The focus of authorities typically remained primarily on the liquidity and insolvency of individual institutions, rather than on the resilience of the whole financial system. Incomplete information and partial assessments of the serious financial problems led to ad-hoc and piecemeal interventions, which created at times further disruptions and loss of confidence among creditors and investors. This meant an underestimation of the probability and costs of systemic risk in many countries as was the case in many countries.

At the international level, insufficient coordination among regulators and supervisors and the absence of clear procedures for the resolution of global financial institutions has been a long standing problem. In this crisis especially, they hindered efforts to prevent and contain the impact and transmission of the crisis (see Claessens, 2009). As clearly demonstrated by the failures of Lehman Brothers and some Icelandic banks (among many others), countries could not deal with large, complex, globally active financial institutions on their own, as these institutions affect many markets and countries. Various government interventions, although necessary and often unavoidable, led to unintended effects on other countries, creating large distortions in international capital flows and financial intermediation. Overall, the lack of global agreements on tools for intervention made the crisis worse.

## 3. The crisis: how different?

New dimensions played important roles in the severity and global scale of the ongoing crisis – particularly, with respect to its transmission and amplification – that included surprising disruptions and breakdowns of several markets in the fall of 2008. The crisis was different than the previous ones in at least four new aspects. First, there was a widespread use of complex and opaque financial instruments. Second, the interconnectedness among financial markets, nationally and internationally, with the United States at the core, had increased in a short time period. Third, the degree of leverage of financial institutions accelerated sharply. Fourth, the household sector played a central role. These new elements combined to create unprecedented sell-offs in the fall of 2008 and resulted in the global financial crisis.

### *3.1. Increased opaqueness*

Securitization spurred by the use of innovative (but complex) financial instruments was a critical element of the credit expansion, particularly mortgage credit, in the United States. Securitization – a long standing practice for prime loans conforming to the underwriting standards of Government Sponsored Agencies (GSEs) – changed in scope in the last decade, with more than 70 percent of non-conforming mortgages in the United States being securitized by 2007, up from less than 35 percent in 2000 (see Ashcraft & Schuermann, 2007). Other assets were increasingly packaged as well and cash-flow streams from securities were further separated and tranched into other securities (CDOs, etc.) (see Blanchard, 2009).

The increased recourse to securitization and the expansion of the originate-and-distribute model exacerbated agency problems (see Furceri & Mourougane, 2009). The progressive expansion of more opaque and complex securities and the increasing delinking between borrowers and lenders worsened agency problems. Risk assignments became increasingly unclear and incentives for due diligence decreased, leading to insufficient monitoring of loan originators and an emphasis on

boosting volumes to generate fees. The distribution model led to widespread reliance on ratings for the pricing of credit risks, with investors often unable or unwilling to themselves fully assess underlying values and risks.

As discussed in Mishkin (2009), the quality of balance sheets of households and firms is a key element of the financial accelerator mechanism, because some of the assets of each borrower may serve as collateral to its liabilities which helps mitigate the problem of asymmetric information. In the case of a default, the lender can take title to the borrower's collateral and recover some or all of the value of the loan. In a macroeconomic downturn, however, the value of many forms of collateral diminishes. This in turn exacerbates the impact of frictions in credit markets and reinforces the propagation of adverse feedback loop.

### 3.2. Financial integration and interconnectedness

Financial integration has increased dramatically over the past two decades. Capital account openness and financial market reforms have led to massive increases in cross-border gross positions, especially among OECD countries. There has also been an increasing presence of foreign intermediaries in several banking systems, including in many emerging markets (see Goldberg, 2009). As a result, international risk sharing, and competition and efficiency have increased, but so has the risk of rapid spread of financial shocks across borders. Indeed, several emerging markets have experienced sudden stops in this period.

A number of recent studies show that financial integration can result in indirect and catalytic growth benefits (Kose, Prasad, Rogoff, & Wei, 2009). Far more important than the direct growth effects of access to more capital is the potential for capital flows to generate collateral benefits (so-called because they may not be countries' primary motivations for undertaking financial integration). In particular, a growing number of studies show that financial openness can promote development of the domestic financial sector, impose discipline on macroeconomic policies, generate efficiency gains among domestic firms by exposing them to competition from foreign entrants, and unleash forces that result in better government and corporate governance. These collateral benefits could enhance efficiency and, by extension, total factor productivity growth (see Kose, Prasad, Rogoff, & Wei, 2010).

However, the current financial crisis serves as a reminder of the risks of financial integration for both advanced and emerging countries (Obstfeld, 2009). Specifically, increasing interconnectedness of financial institutions and markets, and more highly correlated financial risks, intensified cross-border spillovers early on through many channels—including liquidity pressures, a global sell-off in equities (particularly, financial stocks), and depletion of bank capital. The sheer size of the U.S. financial market and its central role as investment destination contributed to the spreading of the crisis. Any shock to the U.S. financial markets is bound to have global effects. U.S. financial assets represent about 31 percent of global financial assets and the U.S. dollar share in reserve currency assets is about 62 percent. In recent years especially, U.S. financial assets were perceived to offer the combination of safety and liquidity attractive for private and public investors alike.

The crisis also triggered an unwinding of imbalances in other countries. In part because of closer international financial integration, benign financial and macroeconomic conditions – notably, low interest rates and narrower risk spreads – had occurred on a global basis and asset price booms developed in many economies. However, for similar reasons, the busts came in a highly synchronized manner as well, in more intense and different ways compared to previous crises.

### 3.3. The role of leverage

The buildup of an unusually high degree of leverage of financial institutions and borrowers contributed to the propagation of shocks (see Brunnermeier, 2009). Leverage increased sharply in the financial sector, directly at commercial banks in Europe, and through the shadow banking system and the rising share of investment banks and non-deposit-taking institutions in the U.S. The leverage buildup among households especially differed from previous crises. In the run-up to Japan's real estate crisis, for example, while the household debt-to-income ratio increased sharply, measures of households' leverage (the household debt-to-assets ratio) declined, suggesting that Japanese homeowners built equity in their properties as real estate prices soared.

This high leverage limited the system's ability to absorb even small losses and contributed to the rapid decline in confidence and increase in counterparty risk early on in the crisis. Loan-to-income values larger than in the past left households highly exposed to shocks, while at the same time high loan-to-value mortgages caused even moderate declines in house prices to push many households into negative equity. In the financial sector, high leverage meant that initial liquidity concerns quickly gave way to solvency worries. The buildup in leverage (including rising household indebtedness) was not restricted to advanced economies.

### 3.4. The role of households

Problems in the household sector have played a more prominent role in this crisis than in previous crises. Most previous episodes of financial distress stemmed from problems in the official sector (e.g., Latin America's debt crisis of the 1980s) or the corporate sector (e.g., the Asian crisis). The current crisis, however, largely originates from overextended households, in particular with respect to subprime mortgage loans. While aggregate credit growth in the United States was less pronounced than in previous episodes, reflecting slower corporate credit expansion and the securitization of mortgages, the growth of household debt was excessive. Credit to households rose rapidly after 2000, driven largely by mortgages outstanding, with interest rates below historical averages and financial innovation contributing to an increase in outstanding household debt.

Despite low interest rates, debt service relative to disposable income reached a historical high. The increased leverage left households vulnerable to decline in house prices, a tightening in credit conditions and a slowdown in economic activity. Similar patterns existed in several current crisis countries.

Household balance sheet vulnerabilities also built up in other advanced economies and several emerging markets. Household debt-to-income ratios also rose sharply in several Western European countries (most notable in the U.K., Spain, and Ireland). In several emerging markets, household credit expanded rapidly as well, leading to sharp increases in leverage and vulnerabilities. As real estate prices decline, this adversely affected the quality of loan portfolios and put financial intermediaries at risk, especially in markets, where values had grown rapidly. This rapid growth of household debt had major implications for the transmission of the crisis from the financial to the real sector and complicated the resolution mechanisms and policy responses.

### *3.5. The old and new elements combined in causing the crisis*

The various new elements combined with those factors observed in more "traditional" boom and bust cycles resulted in an unprecedented financial crisis. In the United States, a vicious cycle of rising foreclosures, falling home values and disappearing securitization markets quickly developed. Vulnerable cohorts of borrowers became increasingly susceptible to rising interest rates and falling home values, and could no longer refinance their mortgages, leading to higher monthly payments, rising delinquencies and default rates.

A wave of finance company failures – suddenly no longer able to securitize subprime mortgages – led to a virtual breakdown in mortgage origination and more abrupt adjustment in prices. Adverse feedback loops – of rising foreclosures placing additional downward pressures on house prices – started. With U.S. house prices declining on a national basis for the first time since the Depression era, many heavily-indebted borrowers confronted with substantial negative home equity faced incentives to "walk away."

Tightening standards for new mortgages and consumer credit led to a sharp compression in consumer spending that compounded already difficult situations in the real sector. With households' savings and net assets already at historical low, financial constraints imposed by financial institutions under stress directly translated into reduced consumer spending, leading to initially localized, but gradually spreading cycles of declines in corporate sector profitability, increases in layoffs and unemployment, slowing economies and resulting in more foreclosures (see Furceri & Mourougane, 2009).

While initial recapitalizations were relatively large and rapid (including through participation of Sovereign Wealth Funds), they were limited to only a few banks and increasingly fell short of losses. As financial institutions incurred large losses and wrote-down illiquid securities, solvency concerns across markets fueled a process of rapid deleveraging and forced asset sales. Mark-to-market rules forced further deleveraging and fire sales. Hedge funds – facing financing constraints and redemption pressures – further fuelled this rapid unwinding process. This led to further asset price declines, prompting distressed asset sales, rising recapitalization needs, and resulting in further loss of confidence, resulting in a near melt down in October 2008.

During the fall of 2008, increased balance-sheet opaqueness and reliance on wholesale funding increased systemic fragility (Gorton & Metrick, 2009). Once U.S. house prices began to decline and defaults began to rise (affecting the expected value of the assets underlying MBS and CDOs), the complexity of instruments undermined price discovery and led to market illiquidity and a freeze in the securitization activity. The increased opaqueness of balance sheets (including due to the widespread recourse to off-balance sheet instruments) made it difficult to separate healthy from unhealthy institutions. The resulting adverse selection problems contributed to the freezing of the interbank markets and forced further sales of securities to raise funds. The increased centrality and systemic importance in many countries of highly leveraged, under-regulated intermediaries relying on wholesale and short-term funding exacerbated problems.

Housing market vulnerabilities also came home to roost in several countries, notably Europe. In the U.K. mortgage lenders came under intense pressure—beginning in the fall of 2007 with a bank run on Northern Rock, which had been heavily reliant on interbank markets – rather than deposits – for funding. Large pressures also hit Iceland, Hungary and the Baltic countries where imbalances were more pronounced. The increased connections and simultaneous buildup of systemic risks across multiple countries made the management of shocks more complex, especially in light of institutional deficiencies in many countries—including the inability to resolve quickly large, cross-border financial institutions, and led to a rapid spreading of turmoil globally.

Mortgage-backed securities and other U.S. originated instruments were widely held by institutions in other advanced economies and the official sector in several emerging markets. Through these direct exposures and associated funding problems, spillovers quickly surfaced among European banks, including Germany (IKB, July 2007) and France (BNP Paribas' money market fund, August 2007). As troubled intermediaries hit by losses and scrambling for liquidity were forced to sell other assets and cut lending, the crisis gradually spread to other markets and institutions through "common lender effects."

Emerging markets – especially those who had heavily relied on external financing, and paradoxically those with more liquid markets – were affected through capital account and bank funding pressures. Amid global deleveraging, heightened investor risk aversion, and repatriation of funds, many emerging economies suddenly found foreign funding sources increasingly scarce and were confronted with sudden stops or reversals of capital flows. In addition, emerging market corporations faced much higher borrowing costs, limited opportunity to issue equity, and few alternative sources of financing. While official financing filled some of the gaps, a number of emerging markets had to make rapid adjustments, leading to real economic dislocations.

As the crisis is still an ongoing one, it is premature to undertake a detailed analysis of its implications for the broader debate on the costs and benefits of international financial integration (see Kose, Prasad, et al., 2010). Nevertheless, there are two preliminary observations that are pertinent. First, the differential effects of the crisis across countries confirm that it is not just financial openness, but a country's structural features and its pre-crisis policy choices that have determined the crisis' overall impact on a country. Second, outflows of capital triggered by the crisis have not led to a resurgence of capital controls in emerging market economies.

## 4. Recessions and financial market turmoil: how costly?

The global financial crisis has resulted in recessions in almost all advanced countries. As we discuss in the previous sections, most of these recessions are accompanied by credit crunches or house price busts. This raises two specific questions about recessions associated with disruptions in credit and housing markets: How do recessions associated with credit crunches or house prices busts differ from other recessions? And are recessions coinciding with financial crises more costly and longer than other recessions?

Building on earlier research (see Claessens et al., 2009; Claessens, Kose, & Terrones, 2010), we analyze the features of recession episodes that coincide with disruptions in credit or housing markets. We also examine the implications of recessions associated with financial crisis episodes to complement and expand on other recent studies focusing on the parallels between the latest financial crisis and past crises (see Reinhart & Rogoff, 2008, 2009).[7]

In this section, we first briefly describe our database and methodology. Next, we discuss the characteristics of recessions associated with credit crunches or house price busts compared to other types of recessions. This follows with an analysis of recession episodes coinciding with financial crises and comparison of the implications of such episodes with those from recessions without a crisis.

### 4.1. Database and methodology

We employ a comprehensive database of key macroeconomic and financial variables for 21 OECD countries over the 1960–2007 period. The data are quarterly series mostly from the OECD Analytical Database and the IMF IFS Database. The advantages of using main OECD countries are the frequency and good quality of data. Doing this for a large sample of emerging markets and developing countries would mean using annual data, a frequency at which detecting business cycles is much more challenging.[8] The quarterly time series of macroeconomic variables are seasonally adjusted, whenever necessary, and in constant prices. The financial variables we consider are credit, house prices and equity prices. All financial variables are converted into real terms by deflating them by the respective country's consumer price index (CPI).

Before analyzing recessions and their interactions with financial crises, it is necessary to determine the dates of these events. The methodology we employ focuses on changes in the levels of variables to identify cycles. This is consistent with the guiding principles of the National Bureau of Economic Research (NBER), which is the unofficial arbiter of U.S. business cycles. This methodology assumes that a recession begins just after the economy reaches a peak and ends as the economy reaches a trough. The methodology determines the peaks and troughs of any given series by first searching for maxima and minima over a given period of time. It then selects pairs of adjacent, locally absolute maxima and minima that meet certain censoring rules requiring a certain minimal duration of cycles and phases.

In particular, we employ the algorithm introduced by Harding and Pagan (2002), which extends the so-called BB algorithm developed by Bry and Boschan (1971), to identify the cyclical turning points in the *log-level* of a series. A complete cycle goes from one peak to the next peak with its two phases, the contraction phase (from peak to trough) and the expansion phase (from trough to peak). The algorithm requires the minimum duration of the complete cycle and each phase to be at least five and two quarters, respectively. This methodology closely replicates the dates of U.S. business cycles as determined by the NBER.

With this methodology, we first identify cycles in output (GDP) which provides a broad measure of economic activity for our 21 OECD countries. We identify 122 recessions, implying that a typical OECD country experienced about six recessions over 1960–2007. A recession on average lasts about 4 quarters (1 year) with substantial variation across episodes—the shortest recession is 2 quarters and the longest 13 quarters. The typical decline in output from peak to trough, the recession's amplitude, tends to be about 2 percent. For recessions, we also compute a measure of cumulative loss, which combines information about both the duration and amplitude, to proxy the overall cost of a recession. The cumulative loss of a recession is typically about 3 percent of GDP, but this number varies quite a bit across episodes.

Using the same methodology, we determine the periods of declines in (real) credit and house prices. Our main focus is on those disruptions in credit or housing markets characterized by a peak to trough decline which falls into the top quartile of all credit or house price declines. We call these episodes credit crunches and house price busts, respectively. We identify 113 contractions (28 crunches) in credit and 114 declines (28 busts) in house prices.

[7] Reinhart and Rogoff (2008) focus on the so-called Big Five financial crisis episodes which include Finland (1990–1993), Japan (1993), Norway (1988), Spain (1978–1979), and Sweden (1990–1993). These crises took a long time to resolve and all led to substantial fiscal costs.

[8] Hong, Lee, and Tang (2010) examine the impact of shocks in 21 industrial-mostly OECD-countries on 21 developing Asian economies using annual data. They show that developing Asian (OECD) countries on average are in recession about 13 (8.5) percent of the time, and each recession lasted around 1.6 (1.3) years, with a cumulative loss of around 12 (2.6) percent. Work is underway, however, to collect quarterly data for emerging markets.

The episodes of credit crunches and housing busts tend to be long and deep. While a credit contraction episode typically last about 6 quarters, a credit crunch lasts a year longer. Credit contractions typically mean some 4 percent decrease in credit from peak to trough while, in case of crunches, the fall is more than three times larger than that of a credit decline. Housing busts tend to last even longer than credit crunches do. The typical episode of a decline in house prices is around 9 quarters long whereas a housing bust usually persists twice as long. A typical house price decline is only 6 percent, but prices tend to fall down by five times as much during a house price bust.

We next use a simple "dating" rule to determine whether or not a specific recession is associated with a credit crunch or house price bust period. If a recession episode starts at the same time or after the beginning of an ongoing credit crunch or house price bust, we consider the recession to be associated with the respective credit crunch or asset price bust. This rule, by definition, basically describes a "timing" association (or coincidence) between the two events but does not imply a causal link. With this rule, we identify 48 recession episodes associated with at least a credit crunch or house price bust. Out of these 48 episodes, there are 33 episodes associated with house prices busts and 21 with credit crunches.

Since we are also interested in the features of recessions associated with financial crises, we need to identify the relevant crisis episodes in our sample of advanced countries. Following the same logic we employ above, Terrones, Scott, and Kannan (2009) identify whether or not a specific recession is associated with a financial crisis. They define financial crises as episodes during which there is widespread disruption to financial institutions and the functioning of financial markets. If a recession episode starts at the same time or after the beginning of an ongoing financial crisis, they call that recession to be associated with the respective crisis. They report that using this rule 15 recession episodes are associated with financial crises for our sample of countries.[9]

### 4.2. Recessions associated with disruptions in credit or housing markets

Recessions associated with disruptions in credit or housing markets are simply different than other recessions without such disruptions. To analyze these differences, we first focus on the main characteristics of recessions: their duration and amplitude (Harding & Pagan, 2002). The duration of a recession, $D^c$, is the number of quarters, $k$, between a peak and the next trough. The amplitude of a recession, $A^c$, measures the change in $y_t$ from a peak ($y_0$) to the next trough ($y_k$), i.e., $A^c = y_k - y_0$. We also consider another widely used measure, the cumulative loss, to analyze the adverse impact of recessions on output. This measure combines information about the duration and amplitude of a phase to proxy the overall cost of a recession. To provide a sense of distribution, we also examine the features of recessions coinciding with severe credit crunches or house price busts. These severe crunch/bust episodes consist of the top 12.5 percent of all credit contractions or house price declines (or the top half of all credit crunches or house price busts). There are 6 recessions accompanied with both a house price bust and credit crunch. 26 recessions coincide with severe credit crunches or severe house price busts.[10]

There are a number of statistically significant differences between recessions coinciding with credit crunches or house price busts and those without (Table 1). In particular, recessions associated with such episodes are on average over a quarter longer than those without busts (4.3 quarters vs. 3.2 quarters). Moreover, output declines (and corresponding cumulative losses) are typically much larger in recessions with crunches or busts, 2.5 (4.8) percent vs. 1.6 (2.3) percent in those without crunches or busts.

These sizeable differences also extend to the other macroeconomic variables, including consumption, investment and the unemployment rate. For example, although consumption typically does not contract much in recessions, there is a statistically significant decline in consumption in recessions associated with credit crunches or house price busts, and in case of severe crunches and busts a 1 percentage points greater decline. The large fall likely reflects the substantial adverse effects of the lack of credit and erosion of housing wealth on consumption during these episodes. These findings indicate that recessions with credit crunches or house price busts result in more costly macroeconomic outcomes than do those without such disruptions. This is consistent with a large body of literature suggesting that credit and housing market developments play an important role in driving business cycles (Leamer, 2007; Mendoza & Terrones, 2008).

In terms of trade variables, there are also substantial differences between the recessions coinciding with crunches or busts and other types of recessions. In part reflecting the substantial decline in domestic demand, imports fall more in recessions with credit crunches or with house price busts. Along with an increase in exports, both the net exports and the current account balance improve significantly more in recessions with such financial shocks.

With respect to financial outcomes, by construction, credit contracts and house prices fall much more in recessions with credit crunches or housing busts. In particular, while credit continues to grow, albeit at a slower rate, during recessions without severe credit market problems, it contracts by around 1.6 percent during recessions coinciding with crunches or busts. House prices tend to register a fall of roughly 6 percent during these episodes. Equity prices also decline during these types of recessions.

[9] The recession episodes associated with financial crises are following: Australia, 1990:Q2–1991:Q2; Denmark, 1987:Q1–1988:Q2; Finland, 1990:Q2–1993:Q2*; France, 1992:Q2–1993:Q3; Germany, 1980:Q2–1980:Q4; Greece, 1992:Q2–1993:Q1; Italy, 1992:Q2–1993:Q3; Japan, 1993:Q2–1993:Q4*; Japan, 1997:Q2–1999:Q1; New Zealand, 1986:Q4–1987:Q4; Norway, 1988:Q2–1988:Q4*; Spain, 1978:Q3–1979:Q1*; Sweden, 1990:Q2–1993:Q1*; United Kingdom, 1973:Q3–1974:Q1; United Kingdom, 1990:Q3–1991:Q3. *Denotes the "Big Five" financial crises in Reinhart and Rogoff (2008, 2009) who provide a detailed history of these and other crises episodes.

[10] Our sample includes 20 recessions associated with a severe house price bust and 11 recessions associated with a severe credit crunch.

**Table 1**
Recessions associated with house price busts or credit crunches (percent change unless otherwise indicated).

| | Median values | | | Mean values | | |
|---|---|---|---|---|---|---|
| | Without busts and crunches | With busts or crunches | With severe busts or crunches | Without busts and crunches | With busts or crunches | With severe busts or crunches |
| A. Output | | | | | | |
| Duration[a] | 3.00 | 3** | 3** | 3.20 | 4.31*** | 4.5** |
| Amplitude | −1.56 | −2.54*** | −2.64** | −1.98 | −3.64*** | −4.13** |
| Cumulative loss | −2.30 | −4.8** | −5.23** | −3.67 | −10.6*** | −14.17*** |
| B. Components of output | | | | | | |
| Consumption | 0.27 | −0.64** | −0.88 | 0.41 | −1.05*** | −1.16*** |
| Total investment | −3.45 | −6.07** | −6.07 | −4.33 | −8.4** | −8.46* |
| Residential investment | −1.96 | −6.85** | −7.52* | −4.13 | −10.63*** | −12.5*** |
| Non-residential investment | −2.85 | −4.31 | −4.44 | −3.95 | −6.87 | −6.51 |
| Exports | −0.77 | 0.5 | 0.67 | −0.85 | −0.57 | 0.25 |
| Imports | −2.87 | −5.27 | −5.3 | −2.98 | −6.08* | −6.49* |
| Net export (% of GDP)[b] | 0.39 | 1.2*** | 1.29** | 0.24 | 1.57*** | 1.58** |
| Current account (% of GDP)[b] | 0.17 | 0.92** | 0.63* | 0.17 | 1.15** | 1.2* |
| C. Other macroeconomic variables | | | | | | |
| Industrial production | −3.97 | −4.79 | −5.31 | −3.80 | −4.29 | −4.78 |
| Unemployment rate[b] | 0.47 | 1.18** | 1.16 | 0.80 | 1.74*** | 1.77*** |
| Inflation rate[b] | −0.10 | −0.63 | −0.33 | −0.16 | −0.44 | −0.12 |
| D. Financial variables | | | | | | |
| House prices | −0.24 | −5.96*** | −6.3*** | −0.02 | −8.44*** | −10.13*** |
| Equity prices | −8.85 | −0.58* | −2.63 | −6.79 | −0.48* | −0.4 |
| Credit | 2.24 | −1.64*** | −2.06*** | 3.44 | −2.5*** | −3.17*** |

*Notes*: A severe house price bust or credit crunch is a bust or crunch in the top half of all busts or crunches. In each cell, the mean (median) change in the respective variable from peak to trough of recessions associated with house price busts or credit crunches is reported, unless otherwise indicated.

[a] Number of quarters.

[b] Change in the levels.

* Indicate that the difference between means (medians) of recessions with house price busts or credit crunches and recessions without house price busts or credit crunches is significant at the 10 percent.

** Indicate that the difference between means (medians) of recessions with house price busts or credit crunches and recessions without house price busts or credit crunches is significant at the 5 percent.

*** Indicate that the difference between means (medians) of recessions with house price busts or credit crunches and recessions without house price busts or credit crunches is significant at the 1 percent levels.

We also examine the lags between the start of a credit crunch and the beginning of the corresponding recession. If a recession is associated with a credit crunch, it typically starts 3 quarters after the onset of the credit crunch. Since credit crunches last longer than recessions do, the latter tend to end 2 quarters before their corresponding credit crunch episodes. These findings suggest that the phenomenon of "creditless recoveries" is not specific to sudden stop episodes observed in emerging markets (see Calvo, Izquierdo, & Talvi, 2006) but is also a feature of business cycles in industrial countries.

Similar to those recessions associated with credit crunches, recessions associated with house price busts tend to begin 3 quarters after the start of their respective house price busts. However, they end 9 quarters ahead of the corresponding house price busts because house price busts typically last three times longer than recessions do. Moreover, when a recession is associated with a house price bust, residential investment stays depressed for a prolonged period of time and typically recovers only 3–5 quarters after the end of that recession.

These observations imply that recessions can end, and recoveries start, without a revival in credit growth and improvements in asset prices. This raises a natural question: What drives recoveries after recessions associated with credit crunches and house price busts? There could be several explanations. First, not all forms of demand depend on the availability of credit. In particular, consumption is typically the most important contributor to output growth during recoveries. Investment (especially non-residential) recovers only with a lag, with the contribution of fixed investment growth to recovery often relatively small. Since consumption can be less credit-intensive, a recovery could start without financial markets' stress being overcome. Second, firms and households may be able to get external financing from sources other than commercial banks. These sources are not captured in the aggregate credit series we focus on. Thirdly, there can be a switch from more to less credit-intensive sectors in such a way that overall credit does not expand, yet, because of productivity gains, output increases. The aggregate data we use hide such reallocations of credit across sectors, including between corporations and households that vary in their "credit-intensity".

### *4.3. Recessions associated with financial crises*

We now turn our attention to the characteristics of recessions associated with financial crises. Some of these episodes also coincide with asset price busts or credit crunches. Table 2 presents our findings, also comparing the changes in the main

**Table 2**
Recessions associated with financial crises (percent change unless otherwise indicated).

| | Median values | | | Mean values | | |
|---|---|---|---|---|---|---|
| | Without crises | With crises | With severe crises | Without crises | With crises | With severe crises |
| A. Output | | | | | | |
| Duration[a] | 3.00 | 5*** | 3* | 3.36 | 5.67** | 6.80 |
| Amplitude | −1.80 | −2.52 | −2.76 | −2.54 | −3.28 | −4.64 |
| Cumulative loss | −2.64 | −4.9*** | −4.90 | −5.24 | −14.68 | −27.20 |
| B. Components of output | | | | | | |
| Consumption | 0.14 | −2.03*** | −3.09 | 0.14 | −2.33** | −3.61 |
| Total investment | −3.82 | −10.44* | −11.09 | −5.12 | −11.56 | −18.65 |
| Residential investment | −3.67 | −10.98*** | −12.27 | −5.69 | −13.24* | −17.27 |
| Non-residential investment | −3.52 | −9.78 | −17.44 | −4.34 | −10.27 | −19.78 |
| Exports | −0.80 | 2.74** | 3.68 | −1.34 | 3.5** | 4.09 |
| Imports | −3.75 | −6.50 | −3.52 | −4.25 | −3.84 | −4.06 |
| Net export (% of GDP)[b] | 0.56 | 1.14 | 0.18 | 0.70 | 1.17 | 1.32 |
| Current account (% of GDP)[b] | 0.46 | 0.79 | 0.41 | 0.53 | 0.72 | 0.32 |
| C. Other macroeconomic variables | | | | | | |
| Industrial production | −3.92 | −5.66 | −2.79 | −3.92 | −4.47 | −3.07 |
| Unemployment rate[b] | 0.56 | 1.38** | 4.66** | 0.94 | 2.54 | 5.83 |
| Inflation rate[b] | −0.20 | −1.06*** | −4.13** | −0.04 | −1.97** | −3.15* |
| D. Financial variables | | | | | | |
| House prices | −1.84 | −4.97** | −6.21** | −2.68 | −8.68 | −16.60 |
| Equity prices | −5.28 | −9.78 | −17.16 | −3.81 | −8.74 | −8.26 |
| Credit | 0.78 | −0.16 | −2.29** | 1.03 | 1.31 | −5.76 |

*Notes*: A severe crisis refers to one of the Big Five crises. In each cell, the mean (median) change in the respective variable from peak to trough of recessions associated with financial crises is reported, unless otherwise indicated.

[a] Number of quarters.

[b] Change in level.

* Indicate that the difference between means (medians) of recessions with financial crises and recessions without financial crises is significant at the 10 percent.

** Indicate that the difference between means (medians) of recessions with financial crises and recessions without financial crises is significant at the 5 percent.

*** Indicate that the difference between means (medians) of recessions with financial crises and recessions without financial crises is significant at the 1 percent.

macroeconomic and financial variables during recessions associated with crisis episodes and other recessions. Following Reinhart and Rogoff (2009), we study the implications of the Big Five financial crises separately. The statistics associated with those recessions reported under the column "with severe crises".

The average duration of a recession associated with a (severe) financial crisis exceeds that without a crisis by two (three) quarters. There is typically a larger output decline in recessions associated with crises compared to other recessions, −2.5 percent vs. −1.8 percent, or a 0.7 percentage points difference (although this is not statistically significant). For recessions with a severe crisis, the difference in output decline is even larger, 0.9 percentage points, but is also statistically insignificant.

The cumulative output loss of recessions associated with a (severe) crisis is typically significantly larger than those without. In particular, the median cumulative loss of a recession associated with a crisis is roughly two times that of a recession without a crisis. Recessions with a crisis are generally associated with greater contractions in consumption, investment, industrial production, employment, exports and imports, compared to those recessions without a crisis. These differences are significant for most variables. Recessions associated with financial crises often coincide with a rapid acceleration of the rate of unemployment. In particular, the increase in unemployment during recessions associated with severe financial crises almost eight times larger than those recessions without crises. This suggests that the welfare costs of recessions with financial crises are much larger.

Credit, almost by construction, registers much larger (and statistically significant) declines in recessions with severe financial crises than those without. House prices also fall statistically significantly more in recessions with crises than those without. This might stem from the high sensitivity of housing activity to credit conditions. Equity prices also decrease much more in recessions with crises.

### 4.4. Dynamics of recessions associated with financial crises

We next turn to examine how the various macroeconomic and financial variables behave around recessions associated with crises compared to recessions which do not coincide with crises episodes (Fig. 4). We focus on patterns in the year-on-year growth in each variable over a 6-year window—12 quarters before and 12 quarters after a peak. All panels include the median growth rate, i.e., the typical behavior, of events under consideration. As we noted above, our sample includes 15 recessions associated with financial crises and 107 other recession episodes.

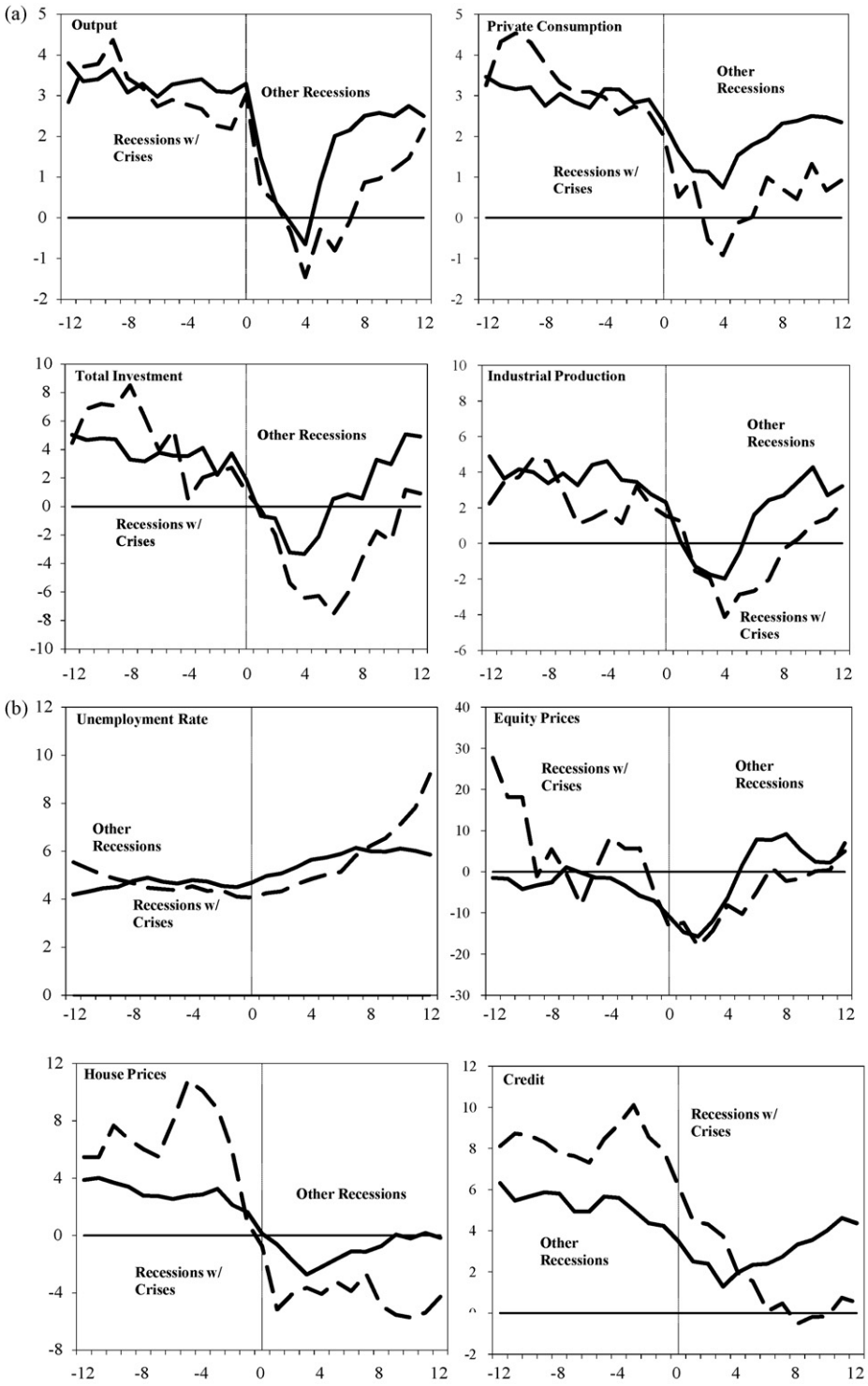


**Fig. 4.** (a) Recessions and financial crises (percent change from a year earlier; zero denotes peak; *x*-axis quarter). *Notes*: The solid line denotes recessions not associated with financial crises, while the dotted line represents those recessions associated with financial crises. Zero is the quarter after which a recession begins (peak in the level of output). (b) Recessions and financial crises (percent change from a year earlier; zero denotes peak; *x*-axis quarter). *Notes*: The solid line denotes recessions not associated with financial crises, while the dotted line represents those recessions associated with financial crises. Zero is the quarter after which a recession begins (peak in the level of output).

The pattern of output growth around these recessions is as expected. Output registers a larger decline and it takes a longer time to recover during recessions associated with financial crises than for other recessions. Consumption, investment and industrial production also follow similar patterns. It is interesting that in recessions without crises the growth rate of consumption slows down but does not fall below zero. In contrast, consumption contracts during recessions associated with financial crises. In recessions without a crisis, investment tends take 5–6 quarters to expand again on annual basis, but it often takes up to 10 quarters to do so during a recession accompanied with a crisis. Industrial production also exhibits a protracted period of contraction during recessions with crises. The rate of unemployment continues to rise up to 3 years after the recession starts when it is combined with a financial crisis.

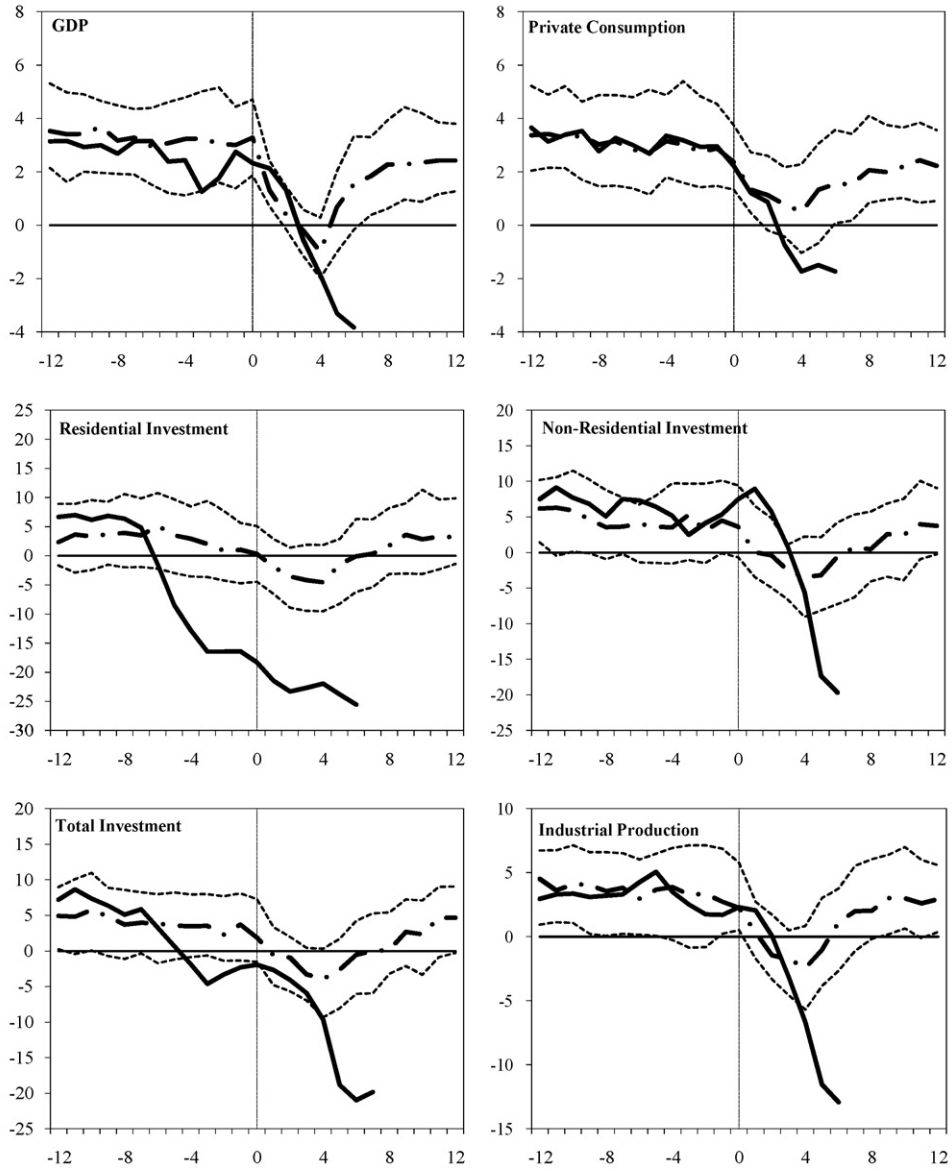


**Fig. 5.** (a) Recessions in OECD & current US recession (percent change from a year earlier; zero denotes peak; *x*-axis quarter). *Notes*: The solid line denotes the current recession with 2007:4 as $t = 0$. The thick dotted line denotes the median of all observations while the thin dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a recession begins (peak in the level of output). Inflation rate, unemployment rate, net exports/GDP, and current account balance are the levels of the respective variable in percent. The date of the latest observation for the United States is 2009:2 (for total investment and unemployment it is 2009:3). (b) Recessions in OECD & current US recession (percent change from a year earlier; zero denotes peak; *x*-axis quarter). *Notes*: The solid line denotes the current recession with 2007:4 as $t = 0$. The thick dotted line denotes the median of all observations while the thin dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a recession begins (peak in the level of output). Inflation rate, unemployment rate, net exports/GDP, and current account balance are the levels of the respective variable in percent. The date of the latest observation for the United States is 2009:2 (for total investment and unemployment it is 2009:3).

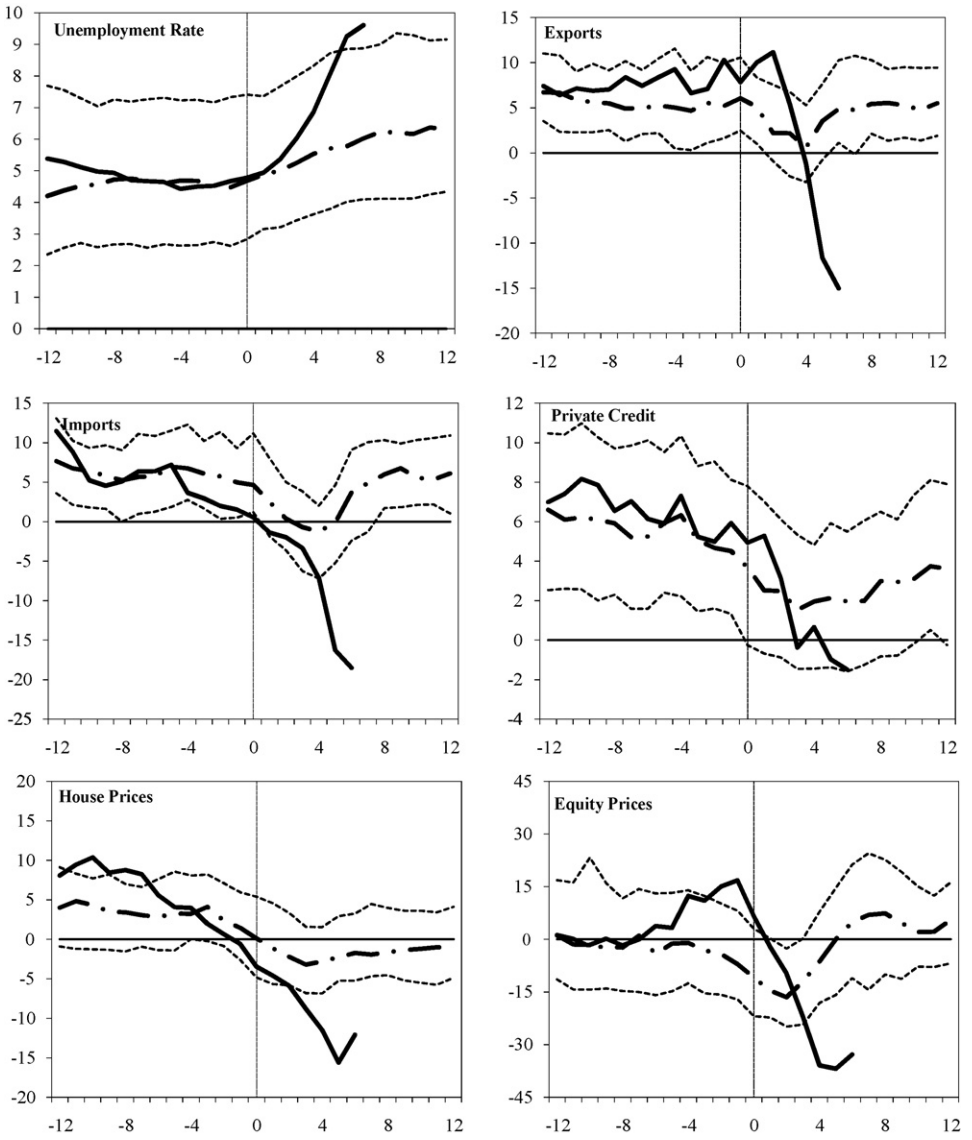


Fig. 5. (*Continued*).

In terms of financial variables, the growth rate of credit slows down in a typical recession whereas credit contracts somewhat during recessions associated with crises. House prices also decline more sharply during recessions with crises. Before recessions associated with crises, both credit and house prices tend to grow at much higher rates than they do before other recessions, confirming the boom-bust cycles in these variables discussed in the previous section. Equity prices take a longer time to recover during recessions accompanied with crises.

## 5. An anatomy of ongoing recessions

As noted in the previous section, the majority of advanced economies in our sample have been in recession since the late 2007 (or early 2008). How similar or different are these ongoing recessions to the earlier ones? In this section, we address this question using the latest data available. We pay particular attention to the recession dynamics in the United States, the epicenter of the current crisis.

We study the behavior of key macroeconomic and financial variables as we did in the earlier section. We focus on patterns in the year-on-year growth in each variable over a 6-year window—12 quarters before and 12 quarters after a peak (Fig. 5).[11]

[11] We focus on year-on-year changes in the growth rates since quarter-to-quarter changes can be quite volatile and provide a noisy presentation of recession dynamics.

All panels include the median year-on-year growth rate of these variables for all 122 recessions in 21 OECD countries in our sample, along with their upper and lower quartile bands. These bands allow us to gauge the likelihood of various outcomes, with the lower band representing worse than typical ones. Overlaid on each chart is also information for the current U.S. recession.

The current U.S. recession is clearly an outlier in many respects. First, confirming the severity of the ongoing recession, output has registered a rate of growth below the median of the lower quartile of previous recession episodes after five quarters since the beginning of the recessions. Second, private sector demand also exhibits lower than typical growth. In particular, private consumption growth in the United States has fallen below the lower quartile band as households have tried to cope with the sharp wealth losses in their wealth and rebuilt their balance sheets. Investment growth has declined sharper than typical, reflecting the collapse in residential investment. The collapse in U.S. residential investment growth has been exceptional reflecting the bust in house prices and disruptions in credit markets.

Third, industrial production has registered a much sharper decline than that of the lower quartile of all recessions. This suggests that the manufacturing cycle this time has been more severe than in the past owing in part to the sharp decline in durable consumption. Moreover, unemployment has already climbed above the upper quartile of earlier episodes. The steep increase in unemployment reflects the sharp downsizing in many sectors of the U.S. economy, particularly in the financial sector.

With respect to asset prices, the current recession is also quite different than the previous ones. Although the decline in U.S. house prices is as steep as those observed during the Big Five episodes discussed previously, there has been a much sharper decline in the growth rate of house prices than is typical in the OECD recessions. This is related, of course, to the sharp drop in residential investment. While equity prices had increased until a few quarters before the recession began, a pattern not usually seen in the run-up to a recession, this has quickly reversed itself and equity prices have registered sharper than typical declines observed in the previous recessions. While house and equity prices have started to rebound in recent months, they are still well below their pre-crisis highs.

Credit growth also started to slow down before the onset of the recession as the signs of financial stress began to emerge. This is another piece of evidence showing the negative feedback between asset prices, credit, and domestic demand, which, as discussed in the previous section, is common in severe recessions associated with financial crises. The growth rates of exports and imports have collapsed as the forces of recession have become more intense over the past six quarters. This observation is related to the highly synchronized nature of national recessions.

Another important feature of the ongoing recessions is their global reach. Kose, Prasad, et al. (2010) analyze the implications of three previous global recessions (1975, 1982, and 1991) and compare these with the ongoing one. They define a global recession as a contraction in world real per capita gross domestic product (GDP) accompanied by a broad decline in various other measures of global economic activity. They report that the current global recession easily qualifies as the most severe of the four global recessions: output – depending on the measure – is projected to fall between four and six times as much as it did on average in the three other global recessions, and unemployment is likely to increase twice as much. The collapse in world trade this year dwarfs that in past global recessions. Moreover, no previous global recession has had so many countries in a state of recession simultaneously, both in the advanced economies and developing countries.

## 6. Conclusions

We provided a brief analysis of the three central questions about the global financial crisis. First, how similar is the most recent crisis to the previous episodes? We argue that the latest crisis featured some close similarities to the earlier ones, including the presence of credit and asset price booms fueled by rapid debt accumulation in a number of advanced countries. Second, how different is the most recent crisis from the earlier episodes? Our response is that as much similarity as the latest crisis has with the earlier episodes, it also features some significant differences, such as in the explosion of opaque and complex financial instruments, in highly integrated global financial markets. Third, how costly are the recessions that followed the crisis? To answer this question, we first examined whether recessions associated with financial market disruptions or outright financial crises are much more damaging than other "normal" recessions. Our findings indicate that the recessions in the former group result in much larger declines in economic activity and tend to last much longer. We also considered the depth of the current recession in the United States and examined its severity in light of the earlier recession episodes in a large sample of OECD countries. We argue that the latest recession is indeed an outlier in a number of respects.

In addition to the issues we discussed in this paper, the global financial crisis and associated recessions have also led to an extensive discussion about the ability of macroeconomic and financial sector policies in mitigating the costs stemming from such episodes. The cost of a recession is, of course, affected by a number of factors. First, changes in credit and asset prices can have important implications for the severity of the recession. Second, prevailing economic conditions at the onset of a recession, such as global economic conditions and oil prices/can also be associated with different recession outcomes. Third, countercyclical macroeconomic and financial sector policies might mitigate the cost of a recession.

While some observers argue that these policies can help moderate recessions, some others claim that they can worsen the recession outcomes. Recent work, however, suggests that discretionary monetary and fiscal policies could help reduce the duration of recessions in the advanced economies (see Terrones et al., 2009). In particular, there is evidence that discretionary monetary policy is associated with shorter recessions while fiscal policy does not have a significant impact on the duration of recessions. By contrast, in the case of recessions associated with financial crises, expansionary discretionary

fiscal policies tend to shorten the duration of recessions. This finding is consistent with evidence that fiscal policy is particularly effective when agents face tighter liquidity constraints.

The evidence on the effects of policies on the amplitude of a recession is, however, less robust. Claessens et al. (2009) report that fiscal and monetary policy does not seem to have a significant impact on the depth of recessions. This finding could reflect several potential factors, including the coarse nature of the fiscal and monetary policy proxies they employ; lags on the policy effects, particularly with regard to fiscal policy; and several instances in which procyclical policies were in place to fight inflation. In summary, the evidence on the effectiveness of countercyclical policies during recessions is at best mixed, indicating a fertile ground for future research.

The crisis has also provided important lessons about financial sector policies. In particular, it has exposed flaws in the pre-crisis regulatory framework and has shown the limits of policy measures in dealing with financial meltdowns. Although many elements of existing regulatory frameworks remain valid, the crisis forces us to think about the future architecture of regulatory policies. While improvements in micro-prudential regulations are needed to reduce financial markets' procyclicality, rules calling for well capitalized and transparent banks adhering to sound accounting standards are still critical. The crisis does make clear, however, that a greater coordination between macroeconomic and financial policy is needed. Prudential regulation has to acquire a more macro, system-wide, dimension. The global nature of the financial crisis has also shown that financially integrated markets have benefits, but also risks, with large real economic consequences. It has shown that the international financial architecture is still far from institutionally matching the closely integrated financial systems.

The crisis has also had major financial and economic repercussions for emerging markets and developing countries, even though many of them were innocent bystanders. Some of these countries benefited from their improved fundamentals as they were better able to tackle the adverse effects of the crisis on their economies. Short-term policy responses, involving more accommodative fiscal and monetary policies and better restructuring frameworks put in place were more effective than they were in earlier periods. However, the crisis has also highlighted some specific financial sector reform challenges for emerging markets and developing countries.

Although there are a number of lessons for macroeconomic policy and regulation of financial sector, there remain many areas where further policy research would be useful. These include competition policy for a more stable financial system, integration of macroeconomic and financial policy choices, approaches to consumer protection in financial services, and resolution of the political economy pressures regarding financial deregulation, financial openness, and financial crises.

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