

# Financial Stress and Economic Activity

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## Abstract

This paper briefly summarizes the results presented in Claessens, Köse and Terrones (2008a, 2008b) to provide a set of basic stylized facts about the linkages between macroeconomic and financial variables during recessions and episodes of financial stress, including the periods of credit crunches and asset (house and equity) price busts. The analysis employs a comprehensive database of key macroeconomic and financial variables for 21 OECD countries over the 1960-2007 period. The results indicate that recessions following periods of financial stress are often longer and deeper than other recessions are. The paper concludes with a short discussion of the implications of its findings for the current crisis.

**Keywords:** *Financial Stress, Economic Activity, Business Cycles.*

**JEL Classification:** *E32, E51, F42*

## Özet - Finansal Stres ve Ekonomik Aktivite

Makroekonomik ve finansal değişkenlerin, ekonomik durgunluk ve finansal stres dönemlerindeki hareketlerinin temel özelliklerini yansıtan bu makale, daha önce Claessens, Köse ve Terrones (2008a, 2008b)'de detaylı olarak anlatılmış olan sonuçların kısa bir özetini sunmaktadır. Finansal stress dönemleri, kredilerde daralma ve varlık fiyatlarında aşırı düşüşlerin olduğu periyotlarla örtüşmektedir. Analiz, Ekonomik İşbirliği ve Kalkınma Örgütü'nün üyesi olan 21 ülkenin 1960-2007 yılları arasındaki verileri kullanılarak yapılmıştır. Sonuçlar, finansal stres dönemlerini takip eden ekonomik durgunluk periyotlarının, diğer durgunluk dönemlerine göre, daha uzun ve daha derin olduğunu göstermektedir. Makalenin son bölümünde, ulaşılan sonuçların dünya ekonomisinin içinde bulunduğu krizle olan ilişkisi kısa olarak değerlendirilmiştir.

**Anahtar Kelimeler:** *Finansal Stres Dönemleri, Ekonomik Aktivite, İş Çevrimleri.*

**JEL Sınıflaması:** *E32, E51, F42*

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*The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.*

## 1. Introduction

Fierce discussions have been raging on the macroeconomic implications of the global financial crisis over the past year. During the initial stages of the crisis, some commentators argued that the spillovers from the financial crisis to the real economy would be limited while others claimed that the difficulties in housing and credit markets were probably the first signs of a protracted period of stagnation. The crisis has deepened over time and begun to take its toll on the real economy as activity in the United States and a number of other advanced countries has started to contract in recent months.

These developments have again vividly shown the strong linkages between the real economy and financial sector. In particular, one of the questions that has often been raised in the context of recent debates is: What are the macroeconomic implications of financial stress episodes? To address this question, we provide a summary of basic stylized facts about the linkages between macroeconomic and financial variables during recessions and episodes of financial stress, including the periods of credit crunches and asset (house and equity) price busts. In addition, we analyze whether (and how) recessions associated with credit crunches and asset price busts are different from other recessions.<sup>1</sup>

Although the roles played by financial variables in business cycles have been examined from various theoretical and empirical perspectives, most of the earlier studies in this literature have considered the topics of business cycle, credit and asset prices in isolation or independently. Moreover, existing studies have looked mostly at one country and/or a limited number of cases. We first provide a brief review of this literature. Then, we briefly describe our dataset, which covers a large sample of countries over a long period of time, and our empirical methodology. This is followed by a discussion of our main findings. We conclude with a short analysis of our findings in the context of the current crisis.

## 2. What do we know?

The question of how small shocks can lead to relatively large fluctuations in aggregate economic activity has preoccupied economists for a long time.<sup>2</sup> For the last two decades, much of the research and policy focus has been on the links between the real and financial variables. It has been found that initially small, real (or financial) sector shocks can be amplified through changes in financial markets, a phenomenon that has often been called “financial accelerator”. Theory has provided va-

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(1) This article is based on our presentation at the 2008 BRSA conference and summarizes some of the findings reported in Claessens, Köse and Terrones (2008a and 2008b).

(2) Business cycle analysis is a long-standing part of economics and one of the first reviews of this literature dates back to 1936 (see Hansen, Boddy and Langum, 1936). That paper already starts with: “It is, of course, quite impossible, within the scope of a brief article, to present any adequate analysis of the voluminous literature on business-cycle theory that has appeared in the last two years.”

rious ways of explaining this pattern and empirical research has documented some of the channels through which real and financial markets interact.

For example, financial and macroeconomic variables closely interact through wealth and substitution effects, and through the impact on the balance sheets of firms and households. Asset (house and equity) prices will exert a direct influence on the real economy by affecting the net worth of their owners. Households who hold assets become richer during an asset-price boom and will normally increase their consumption spending because of wealth effects. In addition, higher net worth will release (to varying degrees) some households' financing constraints and allow them to increase spending through more borrowing.

Similarly, asset prices also affect corporate balance sheets, with effects on firms' access to external financing. Rising prices for assets and generally increased prospects in the upswing of a business cycle raise the net worth of companies. The value of the assets that a borrower owns, especially property, plants and equipment, is an important determinant of his or her creditworthiness. Collateral that carries a higher value provides the lender with a high recovery rate in the event of a default and foreclosure on a secured debt, which makes lending less risky and more generously available. Moreover, in the context of information asymmetries and principal agent issues, a higher net worth reduces moral hazard concerns, allowing lenders to provide more financing.<sup>3</sup>

These effects can operate at the individual firm (and household) level, but because of firms' (and households') interactions in real and financial markets, they can also create economy-wide effects that can take on dynamic, procyclical patterns. Important models with these general equilibrium dynamics include Kiyotaki and Moore (1997) and Bernanke and Gertler (1989), followed by many others that also have dynamics which resemble Fisher's (1933) debt-deflation idea. In a nutshell, the idea can be summarized as follows: During an asset-price boom, the creditworthiness of borrowers rises, banks and other financial intermediaries become more willing to lend, and the interest rates at which borrowers can borrow decline because of lower risk spreads and moderation in the extent of principal agent problems. Business investment increases as firms take advantage of the relatively lower interest rates they face and the relaxation of their financing constraints. Moreover, as asset prices rise, households may increase their spending.

The models have also shown that this process in turn can create further increases in asset values, triggering another round of economy-wide relaxation of financing constraints and increased (investment) spending. It thereby creates a cycle of repeated increases in asset prices, investment, and output, i.e., the expansion pha-

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<sup>(3)</sup> These results follow from a variety of corporate finance, principal agent models such as Townsend (1979), Greenwald, Stiglitz and Weiss (1984), Kiyotaki and Moore (1997), and Myers and Majluf (1984) (for a review of these models, see Tirole (2006)).

se of a business cycle. Conversely, as asset prices fall—due to a (small) shock, financial or real—these general equilibrium interactions trigger rounds of reduced lending, less investment and spending, lower assets prices, and thereby depressing output, i.e., the contraction phase of the business cycle.

There is also a large empirical literature analyzing the dynamics of business cycles, asset price fluctuations and credit cycles. Studies using micro data (banks or corporations) include Bernanke, Gertler and Gilchrist (1996) and Kashyap and Stein (2000). Other such studies include Borio and McGuire (2004) and Pagan and Sosounov (2003). Terrones (2004) studies the synchronization of house prices and the interaction between housing markets and the real economy using dynamic factor models. Few studies to date, however, have investigated the empirical patterns in business cycles, asset price fluctuations and credit cycles across a large sample of countries and over a long period. To undertake such an investigation, we turn next to the database and methodology we use.

### **3. Database and Measurement**

We employ a comprehensive database of key macroeconomic and financial variables for 21 OECD countries over the 1960-2007 period. The data are mostly quarterly series 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 emerging markets and developing countries would mean using annual data, a frequency at which detecting business cycles is much more challenging.

Before analyzing recessions and their interactions with credit crunches and asset price busts, it is necessary to determine the dates of these events. This calls for a methodology to define and measure cycles in various economic and financial variables. One approach is to consider how each of these variables fluctuates around its steady trend rate of growth. However, the trend growth rate can change over time with the addition of new observations, making it difficult to pin down turning points of cycles.

Instead, the methodology we employ focuses on changes in the levels of variables to identify cycles (see Harding and Pagan, 2002). 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 climbs a peak of activity and ends as the economy reaches its trough. It requires that the minimum duration of the complete cycle and its recovery and recession phases must be at least five and two quarters, respectively. Moreover, the methodology closely replicates the dates of U.S. business cycles as determined by the NBER.

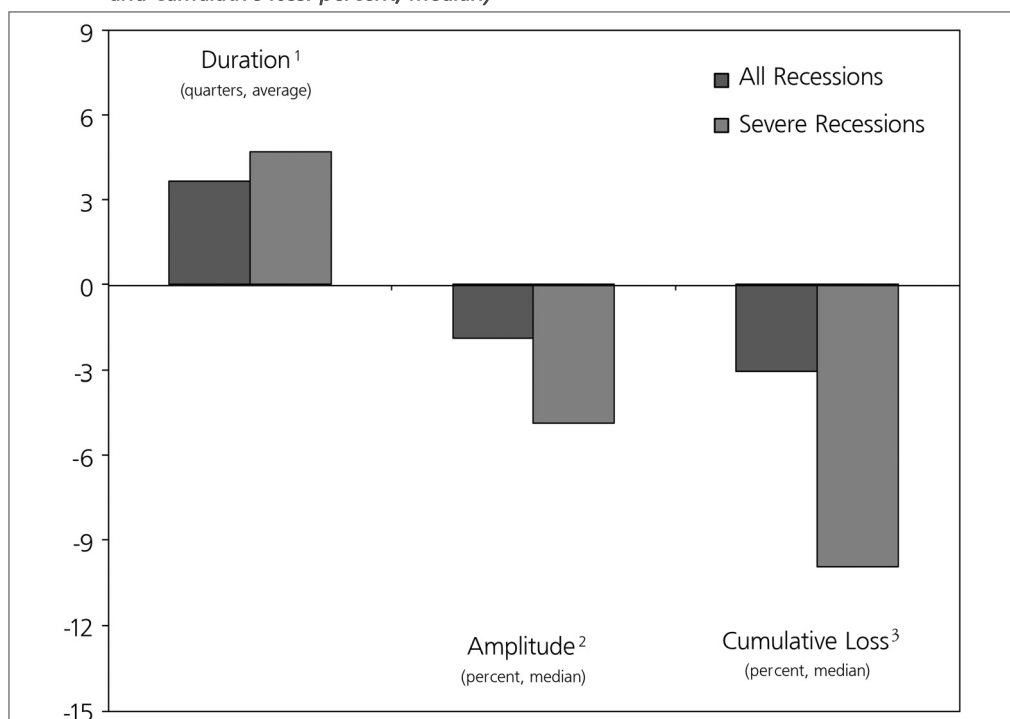
With the help of this methodology, we first identify cycles in output (GDP) which provides a broad measure of economic activity. Besides for output, we also determine cycles in three financial variables: credit, house prices and equity prices. All of

these variables are in real terms, i.e., they are adjusted to eliminate the effects of inflation. After identifying cyclical turning points, we examine the main features of output recessions, credit contractions and declines in asset prices.

#### 4. Recessions, Severe Recessions and Depressions

We identify 122 recessions implying that a typical OECD country experienced about six recessions over 1960-2007. As shown in Figure 1, a recession on average lasts about 4 quarters (one 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 that 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.

**Figure 1: Recessions: Duration, Amplitude and Cumulative Los** (*duration: quarters, average; amplitude and cumulative loss: percent, median*)



Notes: 1 Duration refers to the number of quarters between the peak and trough of a recession.  
 2 Amplitude is the change in GDP between the peak and trough of a recession.  
 3 Cumulative loss is the total output loss between the peak and trough of a recession.

We classify a recession as a severe one when the peak-to-trough decline in output is in the top-quartile of all output declines during recessions. These recessions tend to be more than a quarter longer than the average recession. They are, by construction,

much more costly with a median output decline of almost three times that of typical recessions. An extremely severe recession, in which the peak-to-trough fall in output exceeds 10 percent, is often called a depression, of which there are five in our sample. The last such depression episode was in Finland in the early 1990s with an output decline of roughly 13 percent and which lasted more than three years.

Financial markets often go through a period of stress around recessions as economic activity contracts. Both house and equity prices typically decline before and during a recession reflecting the procyclical nature of asset prices. The decline in equity prices is more than twice that of house prices during these periods, showing the more volatile behavior of equity markets. Although credit continues to expand typically, its growth rate is usually much lower, especially during the onset of recessions.

Recessions have been becoming shorter and milder over time, especially after the mid-1980s. In particular, the amplitude of a typical recession fell by roughly half from 1973-1985 to 1986-2007. These patterns are in line with recent empirical work documenting a trend decline in output volatility in industrial countries, the so-called “Great Moderation” phenomenon.<sup>4</sup>

## 5. Credit Crunches and Asset Price Busts

We classify credit contractions and declines in asset prices according to their severity. In particular, we define a credit crunch as a peak-to-trough contraction in credit that is in the top quartile of all credit contractions. Likewise, an equity (or house) price bust is a peak-to-trough decline that falls into the top quartile of all equity (or house) price declines. With these definitions, we identify 112 contractions (28 crunches) in credit, 114 declines (28 busts) in house prices, and 234 declines (58 busts) in equity prices.

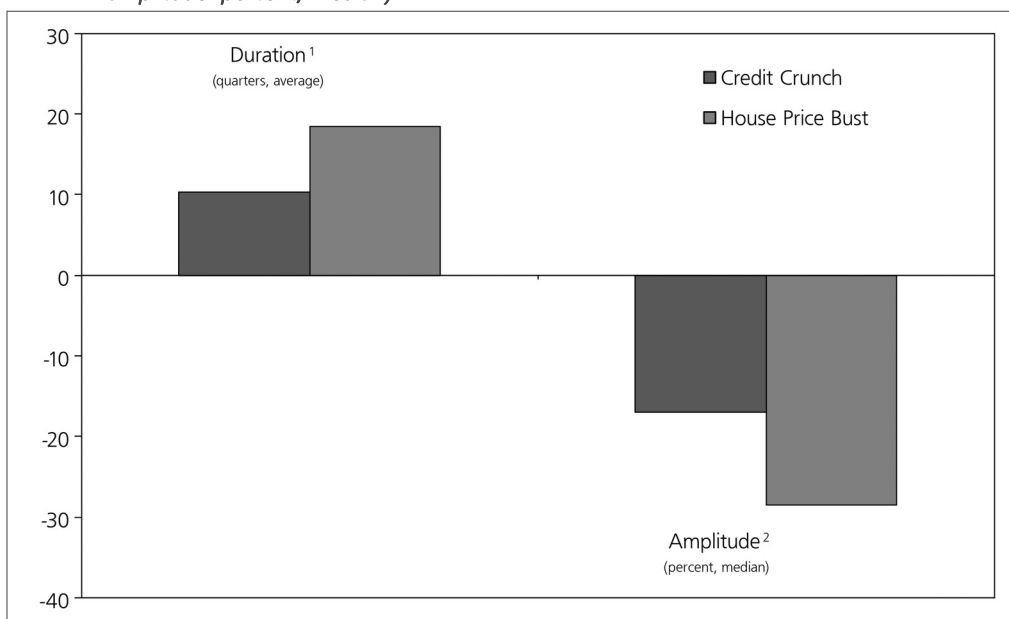
The episodes of credit crunches and housing busts are often long and deep (see Figure 2). While a credit contraction episode last on average around 6 quarters, a credit crunch typically lasts a year longer. Credit contractions usually mean some 4 percent decrease in credit from peak to trough while, in case of crunches, the fall is typically more than four times larger than that of a credit decline. Housing busts tend to last even longer than credit crunches. 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.

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(4) Explanations for this decrease are many, ranging from “the new economy” driven changes to the use of effective monetary policy during the recent period (see Blanchard and Simon, 2001; and Stock and Watson, 2003).

If they are not followed by recessions, the episodes of crunches and busts are not necessarily associated with declines in output. In fact, although output growth slows down especially during the early stages of credit crunches and house price busts, output often expands at the end of these episodes. The eventual increase in output during crunches and busts is not surprising since these episodes do not always fully overlap with recessions and last twice as long as recessions do. Still, the average growth rate of output in such episodes is much lower than that observed during more tranquil periods in credit and housing markets.

**Figure 2: Credit Crunches and Asset Price Busts: Duration and Amplitude** (*duration: quarters, average; amplitude: percent, median*)



Notes: 1 Duration refers to the number of quarters between the peak and trough of a credit crunch or a house price bust.

2 Amplitude is the change in credit volume or house price between the peak and trough of a credit crunch or a house price bust, respectively.

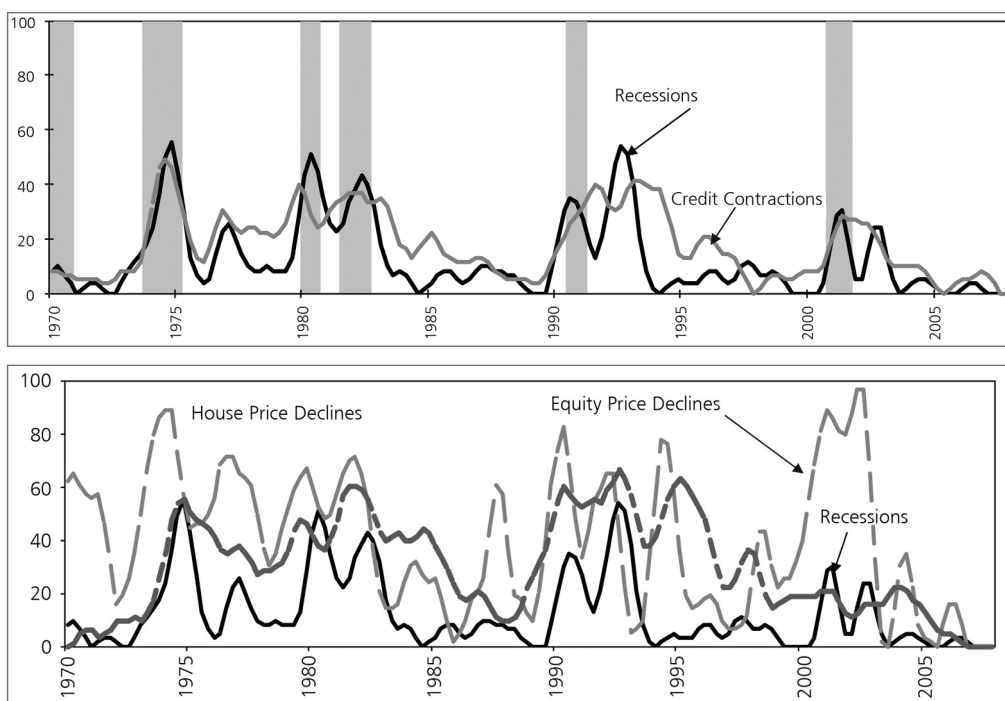
Moreover, both credit crunches and house price busts are associated with significant declines in investment. In particular, credit crunches tend to coincide with a decline in residential investment of about 6 percent while house price busts are accompanied by an about twice as large drop. The unemployment rate increases significantly, especially during the early stages of these episodes as economic activity starts to soften.

Equity price declines vary quite a bit in terms of their duration and amplitude across episodes, but they on average last 7 quarters and are associated with a price drop of 27 percent. Equity busts, however, tend to last 12 quarters and result in a 50 percent decline in prices. These episodes appear somewhat less related to the real economy than credit contractions or house prices declines.

## 6. Synchronization of Real and Financial Cycles

Recessions tend to remain highly synchronized across countries. Figure 3 presents the fractions of countries experiencing the same event in the same quarter and thus shows the evolution of the synchronization of recessions and credit contractions. Recessions can be quite contagious, as shown by the fact that recessions in the OECD countries bunch in four periods during 1960–2007.<sup>5</sup> This coincidence is because the episodes of synchronized recessions often coincide with common shocks. A large fraction of countries went into a recession in the mid-1970s, shortly after the first oil price shock. The proportion of countries in recession also rose during the second oil price shock and the period of highly synchronized contractionary monetary policies across major industrial economies in the early 1980s. In the early 1990s, recessions were again highly synchronized around the world, and to some degree in the early 2000s following the burst of the global dot-com bubble. Not surprisingly, the episodes of highly synchronized recessions mostly overlap with the recessionary periods in the United States.

**Figure 3: Synchronization of Real and Financial Cycles** (*fraction of countries, percent*)



Notes: Shaded bars indicate periods of U.S. recessions. Synchronization is measured by the fraction of countries experiencing a recession or a credit contraction/asset price decline at the same time.

(5) Kose, Otrok and Whiteman (2008) examine the degree of synchronization of G-7 business cycles using a dynamic factor model. They report that a common factor, on average, explains a larger share of the business cycle variation in G-7 countries since the mid-1980s compared to 1960–1972. For a detailed analysis of the volatility and comovement properties of business cycles for a large set of countries, see Kose, Prasad and Terrones (2003).



These synchronization patterns repeat themselves when we consider the coincidence of recessions and the periods of financial stress across countries. Indeed, recessions often coincide with contractions in domestic credit and declines in asset prices. In particular, the fraction of countries experiencing recessions around the world is highly correlated with that of those going through credit contractions. House price declines are also highly synchronized across countries, despite the fact that housing is essentially a nontradable asset. This reflects the important role played by global financial factors, including common movements in national interest rates, in driving house price fluctuations. Equity prices exhibit the highest degree of synchronization likely because of the high financial integration of equity markets. However, the popular saying that *“Wall Street has predicted seven of the past five recessions”* resonates in these findings as the fraction of countries experiencing bear equity markets frequently exceeds the fraction of countries in a recession.

## **7. Recessions, Crunches and Busts**

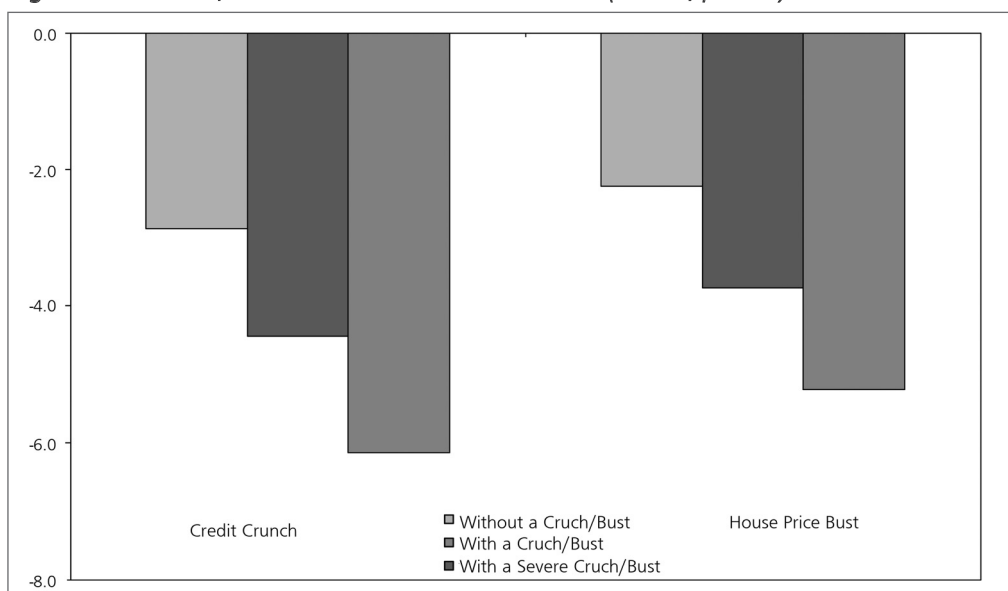
Difficulties in financial markets can prolong and deepen recessions through a variety of theoretical channels. For example, sharp declines in asset prices can reduce firms’ and households’ net worth, limiting their capacities to borrow, invest and spend. This process can in turn lead to further drops in asset prices amplifying the adverse effects of financial stress on economic activity. Banks and other financial institutions might be forced to restrict their lending activities as their capital base diminishes during the episodes of credit crunches leading to protracted and deeper recessions.

Are recessions associated with crunches and busts indeed worse than other recessions? To answer this question, we first use a simple “dating” rule to determine whether a specific recession is associated with a credit crunch or asset price bust. In particular, if a recession episode starts at the same time or after the beginning of an ongoing credit crunch or asset 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 simply a coincidence, between the two events but does not imply a causal link one or the other way.

Among the episodes of recessions, crunches and busts, there is a considerable overlap, since there are 18, 34 and 45 recession episodes associated with credit crunches, house price busts and equity price busts, respectively. In other words, in about one out of six recessions, there is also a credit crunch underway and in about one out of four recessions also a house price bust. Equity price busts overlap for about one-third of recession episodes.

Recessions associated with credit crunches and house price busts result in more adverse outcomes than recessions without such events do. The average duration of a recession associated with a credit crunch or house price bust slightly exceeds that without a crunch or bust. There is typically a larger output decline in those recessions associated with crunches or busts compared to other recessions. Moreover, as Figure 4 shows, cumulative output losses of recessions accompanied by crunches and busts tend to be significantly larger than those without them.

**Figure 4: Recessions, Crunches and Busts: Cumulative Loss (median, percent)**



Notes: Cumulative loss is the total amount of GDP lost between the peak and trough of a recession.

Why are recessions associated with crunches and busts longer and deeper? During recessions coinciding with the episodes of crunches and busts, consumption and investment usually display sharper downturns leading to a more pronounced decline in output. For example, the decline in consumption during recessions associated with house price busts is typically two times larger than that in recessions without busts. The large fall in consumption likely reflects the substantial wealth effects stemming from housing busts. Moreover, the rate of unemployment typically registers a larger increase during recessions accompanied with crunches and busts.

Although recessions associated with equity price busts tend to be longer and deeper than those without busts, these differences are not statistically significant. This could reflect that equity price busts have a less tight relationship with developments in the real economy compared to how credit crunches and house price busts do.

How long after a period of financial stress does a recession start? Of course, not all episodes of financial stress end in a recession, but when this happens, it typically takes 4 to 5 quarters for a recession to begin after the onset of a credit crunch or a housing bust. Although they start later, recessions often end two to nine quarters before credit or house prices bottom out, respectively. These findings suggest that the phenomenon of “creditless recoveries” can be a feature of business cycles in industrial countries, similar to the recoveries from sudden stop episodes observed in emerging markets.

## **8. Recessions, Oil Price Shocks and Inflation**

As the synchronized nature of recessions has shown, it is hard to think about recessions without analyzing the role of oil prices. Moreover, inflation has been present in some past bouts of recessions as well. These issues are highly topical again today as oil prices have risen substantially in recent years and inflation rates have been much higher around the globe. Referring to the severe recessions of the 1970s, some commentators have claimed that the combination of sharp increases in oil prices followed by recent slowdown in activity together with the acceleration in inflation could be the harbinger of a future period of stagflation, i.e., a recessionary episode with a pick up in inflation.

We therefore ask what happens when recessions coincide with a jump in oil prices and/or a surge in inflation. The short answer is that these types of recessions are generally more costly than those without sharp movements in oil prices or inflation. In particular, the decline in output is typically greater for those recessions associated with spikes in oil prices. Moreover, consumption, residential investment and industrial production often contract substantially during recessions overlapping with jumps in oil prices. Likewise, periods of stagflation tend to be associated with much larger cumulative output losses than those recessions with no acceleration in inflation.

## **9. Policy Responses**

There are many ways in which policy makers can respond to a recession, credit crunch or asset price bust, including, besides monetary and fiscal policies, interventions in the financial and corporate sectors, quasi-fiscal and fiscal operations—such as asset management corporations, changes in exchange rate management practices, and structural reforms. To keep matters manageable, and for the sake of comparability across the diverse set of countries and events under consideration, we simply focus on how monetary and fiscal policies are conducted during a recession, credit crunch or asset price bust.

Policy responses vary considerably across the types of events as well as depending on the severity of these events. Both monetary and fiscal policies tend to be countercyclical during recessions, credit contractions and asset price declines. In addition, these policies appear to be more accommodative during the episodes of severe recessions, credit crunches and asset price busts. In recession episodes associated with crunches and busts, government consumption rises significantly more than in other contraction and bust episodes. This suggests a more aggressive countercyclical fiscal policy at work during these periods, possibly because monetary policy is less effective in these circumstances.

### **10. Implications for the Current Crisis**

The global financial crisis has brought many advanced countries to the brink of synchronized recessions in recent months. How long will the difficulties in credit and housing markets continue? And how long and how deep will the recessions in major advanced countries following the crisis be? If past experience offers any guidance, our findings suggest that corrections in credit and housing markets, which are at the core of the current financial crisis, could last anywhere from two to four years. Past experience also indicates that recessions would be longer and deeper as they take place in the context of simultaneous credit crunches and asset price busts. Nevertheless, the nature of a recession in a particular country can be shaped by many factors—including the financial health of its firms, banks, and households prior to the recession and what policy measures authorities employ to mitigate its adverse effects.

The global economy has been going through one of the most severe financial crises in decades. This is an evolving case affected by a number of factors. Continued decisive policy actions at both the national and global levels could help meet its evolving challenges. The evidence we report here informs the ongoing debate about the potential macroeconomic implications of the crisis.

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