

# What Happens During Recessions, Crunches and Busts?

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**The views expressed in this paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. This paper describes research in progress by the author(s) and is issued to elicit comments and to further debate.**

**Abstract:** We provide a comprehensive empirical characterization of the linkages between key macroeconomic and financial variables around business and financial cycles for 21 OECD countries over the 1960-2007 period. In particular, we analyze the implications of 122 recessions, 112 (28) credit contraction (crunch) episodes, 114 (28) episodes of house price declines (busts), 234 (58) episodes of equity price declines (busts) and their various overlaps in these countries over the sample period. We document a rich set of stylized facts about the behavior of key macroeconomic and financial variables during these various events. Our results indicate that interactions between macroeconomic and financial variables can play major roles in determining the severity and duration of a recession. In particular, we show that recessions associated with credit crunches and house price busts are deeper and last longer than other recessions are. In light of our findings, we examine the implications of recent macroeconomic and financial developments in the United States for the future path of its economy.

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Key Words: Business Cycles, Recessions, Credit Crunches, Asset Prices, Busts

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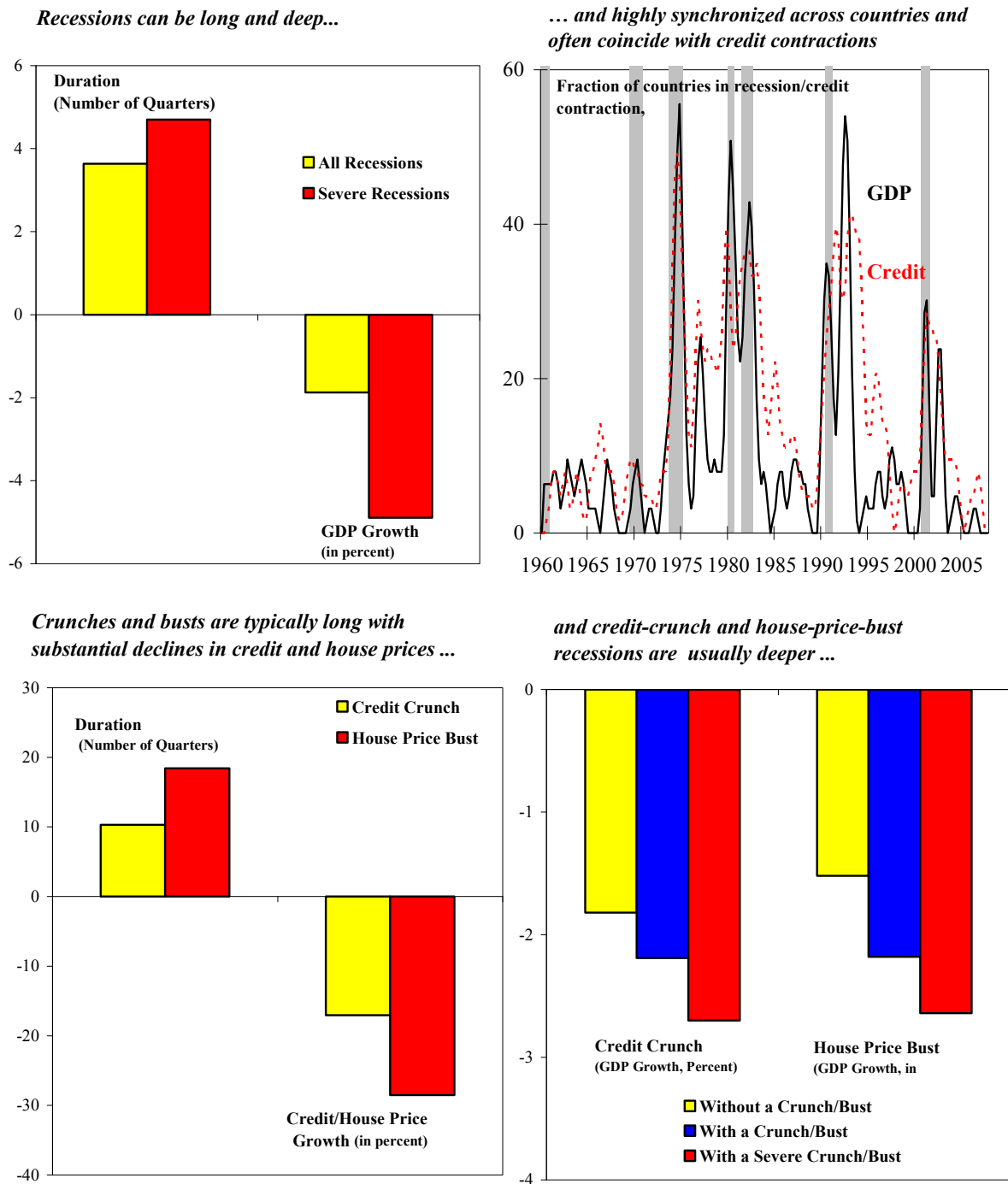
## Executive Summary

*Following the recent turmoil in financial markets associated with the sharp decline in house prices, a fierce debate has been raging on whether the United States might experience a recession in the coming months. Moreover, economic activity in some other major industrialized countries has also started to slow down, raising the possibility of wider spread recessions. These developments have highlighted a number of questions about the linkages between the real economy and the financial sector during recessions. Two specific questions often raised are: How do macroeconomic and financial variables behave around recessions, credit crunches and asset (house and equity) price busts? And are recessions associated with credit crunches and asset price busts different than other recessions? Insights gained from analysis of these questions can shed light on the possible future path of the U.S. and other economies.*

*In order to address these questions, we provide a comprehensive empirical characterization of the linkages between key macroeconomic and financial variables around business and financial cycles for 21 OECD countries over the 1960-2007 period. In particular, we analyze the implications of 122 recessions, 112 (28) credit contraction (crunch) episodes, 114 (28) episodes of house price declines (busts), and 234 (58) episodes of equity price declines (busts) for economic activity in these countries over the sample period. The main results are as follows:*

- The typical recession lasts almost 4 quarters and is associated with an output drop of roughly 2 percent (Figure A). While recessions have been becoming shorter and milder over time, they remain highly synchronized across countries. Most macroeconomic and financial variables exhibit procyclical behavior during recessions. Moreover, recessions tend to coincide with the episodes of contractions in domestic credit and declines in asset prices.
- The episodes of credit crunches, house price and equity price busts last much longer than recessions do. The dynamics of output, consumption and investment around these events are similar to those observed during recessions.
- 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. Recessions associated with housing busts and credit crunches are both deeper and longer-lasting than other recessions are.
- The considerable slowdown in U.S. output over the last few quarters is not atypical of the onset of previous recession episodes in the United States and other OECD countries (Figure B). However, recent declines in residential investment, house prices and credit are clearly sharper than those observed prior to most of earlier recessions. Moreover, rising inflationary pressures, in part due to the oil and other commodity price shocks, can further weaken economic activity. This suggests that, if a recession were to occur in the United States, its amplitude might be deeper and its duration longer than that of a typical recession.
- The hefty combination of expansionary fiscal and monetary policies already employed, and the relatively healthy balance sheets of non-financial corporations going into this slowdown, however, could mitigate the risk of an adverse outcome. As such, the current slowdown in the United States is an evolving case affected by multiple factors, and it is not clear whether it will eventually be a mid-cycle slowdown, or if a recession, how severe it will be.

**Figure A. What Do We Know about Recessions, Crunches and Busts?**

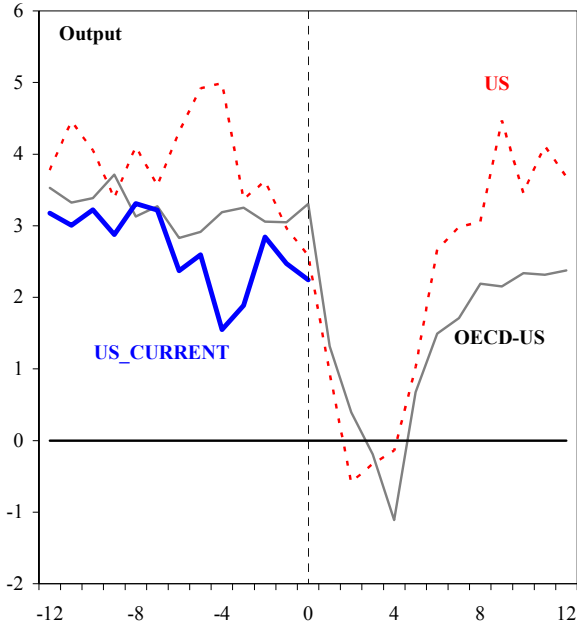


Notes: GDP growth refers to the percent change in the level of this variable during the recession period. Synchronization is the fraction of countries experiencing a recession/credit crunch at the same time.

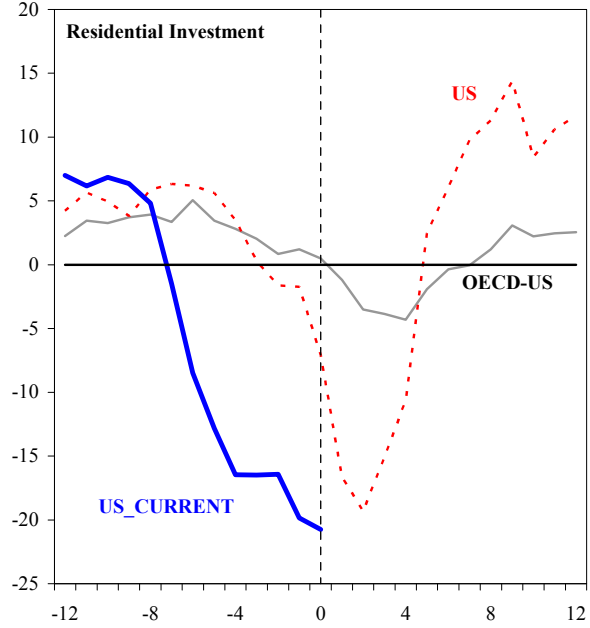
### Figure B. The Current U.S. Slowdown: An Evolving Case Study

(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)

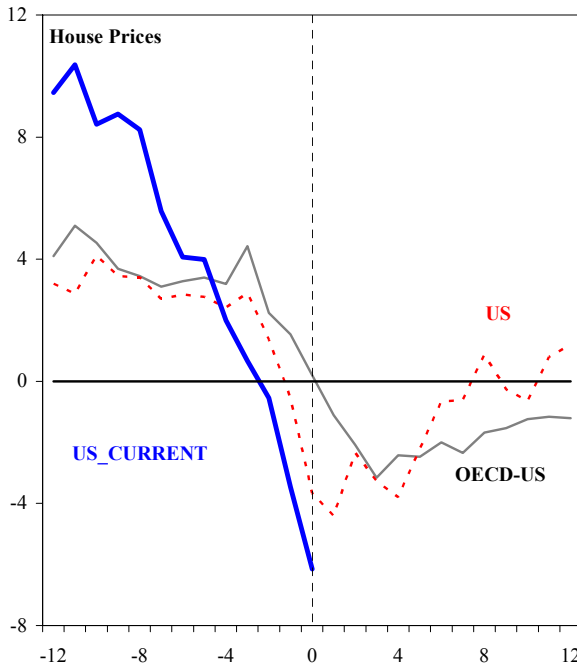
*Output slowdown is typical of the onset of previous recession episodes ...*



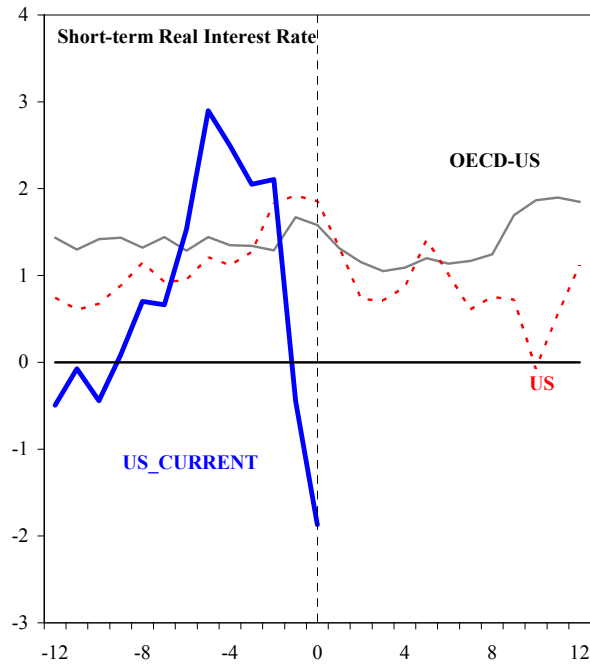
*Drop in residential investment is much sharper than observed ahead of past recessions ...*



*Decline in the growth of house prices is much larger than that seen prior to earlier recessions ...*



*Fall in real interest rates is also much more than observed in the onset of typical recessions ...*



Notes: The solid line denotes the current U.S. slowdown. The light solid line is the median of all recessions in OECD countries (except the United States) The dashed line is the median of all U.S. recessions. Zero is the quarter after which a recession begins (peak in the level of output). Inflation rate is the change in the level.

“If we do end up dating the recession as beginning at the end of last year,  
it could be a very long recession.”

Martin Feldstein, Member of the NBER Business Cycle Dating Committee, August 2008

“This is by far the worst financial crisis since the Great Depression...  
This will be the most severe U.S. recession in decades...”

Nouriel Roubini, Economist and Professor at New York University, July 2008

“... recessions that follow swings in asset prices are not necessarily longer, deeper,  
and associated with a greater fall in output and investment than other recessions...”

Roger W. Ferguson, Vice Chairman of the Federal Reserve Board, January 2005

## I. Introduction

Following the recent turmoil in financial markets associated with the sharp decline in house prices, a fierce debate has been raging on whether the United States might experience a recession in the coming months. Moreover, economic activity in some other major industrialized countries has also started to slow down, raising the possibility of wider spread recessions. These developments have highlighted a number of questions about the linkages between the real economy and the financial sector during recessions. Two specific questions that have often been raised in the context of this debate are: How do macroeconomic and financial variables behave around recessions, credit crunches and asset (house and equity) price busts? And are recessions associated with credit crunches and asset price busts different than other recessions? Insights gained from analysis of these questions can shed light on the possible future path of the U.S. and other economies.

In order to address these questions, we provide a comprehensive empirical characterization of the linkages between key macroeconomic and financial variables around business and financial cycles for 21 OECD countries over the 1960-2007 period. We first identify turning points in these variables using standard business cycle dating methods. We document 122 recessions, 112 credit contractions, 114 house price declines, and 234 equity price declines for these countries over the sample period. When recessions, credit contractions, house price and equity price declines fall into the top quartiles of all recessions, contractions and declines, we define them as severe recessions, credit crunches, house price busts and equity price busts, respectively. We then analyze the characteristics of these events — in terms of their duration and severity — and the behavior of major macroeconomic and financial variables around the various cycles.

With respect to the first question, we find that the typical recession lasts almost 4 quarters and is associated with an output drop (decline from peak to trough) of roughly 2 percent. Severe recessions are, by construction, much more costly, with a median decline of about 5 percent, and last a quarter longer. While typical recessions tend to result in a cumulative loss of around 3 percent, severe ones cost three times more. As one would expect, most macroeconomic and financial variables exhibit procyclical behavior during recessions. In addition, recessions are characterized by sharp declines in (residential) investment, industrial production, imports, and

housing and equity prices, modest declines in consumption and exports, and some decrease in employment rates. Two key policy related variables — short-term interest rates and fiscal expenditures — tend to behave countercyclical during recessions. Recessions tend to be highly synchronized across countries and often coincide with contractions in credit and declines in asset prices.

Our findings indicate that the episodes of credit crunches, house price and equity price busts last much longer than recessions do. For example, the average duration of a credit crunch is around 10 quarters while an asset price bust is usually even longer, with an average duration of 18 (12) quarters in the case of house (equity) price busts. The dynamics of the main components of domestic absorption around these events are similar to those observed during recessions. A much larger decline in the growth rate of investment compared with that of consumption is a feature of both recessions as well as credit crunches and house price busts. In particular, episodes of credit crunch and house price bust both lead to large declines in residential investment. There is also evidence that credit crunches and house price busts are more costly than equity price busts, as equity price busts are less consistently associated with real sector outcomes.

For the second question, we document the coincidence of recessions with credit crunches or asset price busts. 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. In terms of duration and severity, we find that recessions associated with housing busts and credit crunches are both deeper and longer-lasting than other recessions are. Differences in total output loss between events with severe crunches and busts and those without, typically amount to one percentage point, while the duration is more than one quarter longer in case of a housing bust. In terms of the behavior of key macroeconomic and financial variables, we find that residential investment tends to fall more sharply in recessions with housing busts and in those with credit crunches than in other recessions. Unemployment rates increase notably more in recessions with housing busts.

Although our main interest is the analysis of interactions between various financial and macroeconomic variables during recessions with or without credit crunches or asset price busts, we also consider recessions that coincide with oil price and inflation shocks. These recessions often lead to large output losses as well. Output drop, for example, is typically larger for those recessions associated with a major oil price shock than for those without, since consumption, residential investment and industrial production all register significantly larger declines. Recession outcomes associated with spikes in inflation — stagflationary recessions — are quite similar to those of recessions with oil price increases as they also witness a large decline in output. In general, these episodes are comparable to those recessions associated with crunches and busts.

In light of these findings, we analyze the implications of recent macroeconomic and financial developments in the United States for the possible future path of its economy. In particular, we compare the pattern of the ongoing U.S. slowdown with the dynamics of typical recessions in the United States and other OECD countries, with the latter comparison especially valuable since the United States has not experienced many of these relatively rare events. The comparison shows that the considerable slowdown in U.S. output over the last few quarters is not atypical of the

onset of previous recession episodes. However, the current decline in total investment, not surprisingly driven by a large drop in residential investment, is clearly sharper than that observed in a typical recession. And not only have house prices declined much more, but the credit contraction is also sharper than that observed during the onsets of most of earlier recessions.

These findings suggest that, if a recession were to occur in the U.S., its amplitude might be deeper and its duration longer than that of a typical recession. At the same time, however, the analysis shows that monetary policy response is presently much more aggressive than that observed in previous recessions. The hefty combination of expansionary fiscal and monetary policies already employed, combined with the relatively healthy balance sheets of non-financial corporations going into this slowdown, could therefore mitigate the risk of an adverse outcome. On the other hand, the persistent difficulties in credit and housing markets combined with rising inflationary pressures, in part due to the oil and other commodity price shocks, can further weaken economic activity while limiting policy options. As such, the current slowdown in the United States is an evolving case affected by a multitude of factors, and it is not clear whether this will eventually be a mid-cycle slowdown, or if a recession, how severe it will be.

Our study contributes to a large body of research analyzing the roles played by financial variables in explaining fluctuations in economic activity. Financial and macroeconomic variables closely interact through wealth and substitution effects, and through the impact they have on the balance sheets of firms and households (see, for instance, Blanchard and Fischer, 1989; and Obstfeld and Rogoff, 1999). In particular, asset prices can, by affecting household wealth, influence consumption, and by altering a firm's net worth and the market value of the capital stock relative to its replacement value, influence investment. Perhaps more importantly, the interactions between the financial sector and the real economy can be amplified through the financial accelerator and related mechanisms. According to these mechanisms, an increase in asset prices improves a firm's (or household's) net worth, enhancing its capacities to borrow, invest and spend. This process can in turn lead to further increases in asset prices and have general equilibrium effects.<sup>1</sup> Various empirical studies — both macro- and microeconomic — have been able to provide evidence for these channels.<sup>2</sup> This literature, however, largely analyzes the general procyclicality of financial and macroeconomic variables, and less so how interactions between financial and real economic variables vary during recessions, which is our focus.

We also contribute to a branch of the large literature on business cycles which aims to identify the turning points in macroeconomic and financial variables using various methodologies. The

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<sup>1</sup> Some of the seminal models with these general equilibrium dynamics include Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) followed by extensions of these models that also have dynamics which resemble Fisher's (1933) debt-deflation mechanism.

<sup>2</sup> For example, there is a large empirical literature analyzing the dynamics of business cycles, asset price fluctuations and credit cycles (Bernanke and Gertler, 1989; Borio, Furfine and Lowe, 2001). Early work using micro data (banks or corporations) includes Bernanke, Gertler and Gilchrist (1996) and Kashyap and Stein (2000). Recent work using micro data includes Chaney, Sraer, and Thesmar (2007) — using corporations' balance sheets, Dell'Ariccia, Igan and Laeven (2008) for the US subprime crisis — using households' housing finance decisions, and Jimenez, et. al. (2007) — using corporations' data matched with individual lending bank data.

classical methodology of dating business cycles we use here finds its roots in the pioneering work of Burns and Mitchell (1946) and has been widely used over the years (Harding and Pagan, 2006). Morsink, Helbling, and Tokarick (2002), for example, employ this methodology to analyze the main features of recessions and recoveries in a number of OECD countries.<sup>3</sup> Fewer studies have conducted cross-country analyses of cycles in asset prices identified by this method. One example is Helbling and Terrones (2003) which examine the implications of asset price booms and busts in a large set of industrial countries and conclude that house price busts are typically more costly than equity price busts are.<sup>4</sup>

Although the roles played by financial variables in business cycles have thus received much attention from various theoretical and empirical perspectives, most of these studies have considered the topics of business cycle, credit and asset prices independently (or in isolation). Furthermore, the links between real and financial variables during recessions have yet to be analyzed using a comprehensive dataset of a large number of countries over a long period of time. Besides analysis that was limited in number of cases<sup>5</sup> and some other, “case-type” studies of individual episodes, or studies that focused specifically on the behavior of real and financial variables surrounding financial crises, notably Reinhart and Rogoff (2008), to the best of our knowledge, there is no comprehensive empirical analysis of these links.

Our project thus fills two gaps in the literature. First, we examine the implications of episodes of recessions, credit crunches, house and equity price busts for a large set of macroeconomic and financial variables for a sizeable number of countries over a long period of time. Second, our study is the first detailed, cross-country empirical analysis addressing the implications of recessions when they coincide with certain types of financial market difficulties, including credit crunches, house price busts and equity price busts.

The paper is structured as follows. In section II, we briefly present the data and methodology we use. Next, we examine the basic characteristics of recessions. Then, we consider how the key macroeconomic and financial variables behave around the episodes of credit contractions (and crunches) and asset price declines (and busts) in section IV. We study the implications of recessions associated with crunches and asset price busts in section V. This is followed by a short discussion of the changes in policy variables during various episodes of recessions, crunches and busts in section VI. Section VII presents the main features of recessions to date in

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<sup>3</sup> Also using this methodology, Artis, Kontolemis, and Osborn (1997), Artis, Marcellino, Proietti (2002), Harding and Pagan (2002a), Cotis and Coppel (2005), and Hall and McDermott (2007) analyze the main features of business cycles, including cyclical phases and synchronization.

<sup>4</sup> Other such studies include Borio and McGuire (2004) and Pagan and Sossounov (2003). Terrones (2004) studies the synchronization of house prices and the interaction between housing markets and the real economy using dynamic factor models. Using various methodologies, Cardarelli, Monacelli, Rebucci, and Sala (2008) examine the interactions between house prices and business cycles in OECD countries.

<sup>5</sup> Ferguson (2005) considered, in the aftermath of the collapse of the internet bubble, the links between asset prices, credit and business cycles for three episodes with rapid asset price increases and credit expansions, followed by subsequent recessions: the United Kingdom in 1974, Japan in 1992, and the United States in 2001.



the United States. Section VIII considers the current U.S. slowdown in perspective. Section IX concludes.

## **II. Database and Methodology**

### **II.1. Database**

We construct a comprehensive database of macroeconomic, trade and financial variables for 21 OECD countries over the period 1960:1-2007:4, mostly from the IMF International Financial Statistics (IFS) and OECD Analytical Database. We focus our analysis on the following variables: output, consumption, investment, residential investment, non-residential investment, exports, imports, net exports, current account balance, industrial production, unemployment rate, and inflation rate. The quarterly time series of macroeconomic variables are seasonally adjusted and in constant prices.

The financial variables we consider are credit, house prices and equity prices. Credit series are obtained from the IFS and defined as claims on the private sector by deposit money banks. The main source for house prices is the Bank for International Settlements (BIS) and the main source for equity price indices is also IFS. All financial variables are in real terms by deflating by the respective country's consumer price index (CPI).

The “policy” variables we focus on are government consumption, as a proxy for fiscal policy, and short-term interest rates, as a proxy for monetary policy. The series for government consumption are obtained from the OECD Analytical Database. The short-term interest rates are from the IFS, Haver Analytics and Datastream. We consider the short-term interest rates both in nominal and real terms, with the nominal rates deflated using the CPI. Government consumption is also deflated using the CPI. We list the detailed sources and definitions of each of these variables in the Appendix I.

### **II.2. Methodology**

Much research has been devoted to the definition and measurement of business cycles (Harding and Pagan, 2006). Our study is based on the “classical” definition of a business cycle. We use this definition mainly because of its simplicity, but also because it constitutes the guiding principle of the National Bureau of Economic Research (NBER) in determining the turning points of U.S. business cycles. The definition itself goes back to the pioneering work of Burns and Mitchell (1946) who laid the methodological foundation for the analysis of business cycles in the United States. In particular, they define a cycle to “consist[s] of expansions occurring at about the same time in many economic activities, followed by similar general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration, business cycles vary from more than one year to ten or twelve years.” Following the spirit of this broad characterization of a business cycle, the NBER (2001) defines a recession as “a significant decline in activity spread across the economy, lasting more than a few months, visible in industrial production, employment, real

income, and wholesale-retail trade. A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its trough.”

The classical methodology focuses on changes in the level of economic activity to identify business cycles. One can of course also consider how economic activity fluctuates around a trend by employing a method that extracts the trend in activity and then identify a “growth cycle” (Stock and Watson, 1999). The classical methodology we employ, however, is particularly useful for our purposes since we are interested in business cycles in OECD countries where growth rates have been relatively low. This implies that growth recessions are small in size (and frequent), while level recessions are more pronounced, but fewer (Morsink, Helbling and Tokarick, 2002). Using the classical methodology also allows us to focus on a well-defined set of cyclical turning points rather than having to consider how the characterization of business cycle depends on the specific detrending method used.<sup>6</sup> The turning points identified by our methodology are also robust to the inclusion of newly available data (whereas new data can affect the estimated trend and thus the identification of a growth cycle).

The methodology we use 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 restricting the minimal duration of cycles and phases. In particular, we employ the algorithm introduced by Harding and Pagan (2002a), which extends the so called BB algorithm developed by Bry and Boschan (1971), to identify the cyclical turning points in the log-level of any series.<sup>7</sup> 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 that the minimum duration of the complete cycle and each phase must be at least five and two quarters, respectively.<sup>8</sup> Specifically, a peak is reached in a quarterly series  $y_t$  at time  $t$  if:

$$\{(y_t - y_{t-2}) > 0, (y_t - y_{t-1}) > 0\} \text{ and } \{(y_{t+2} - y_t) < 0, (y_{t+1} - y_t) < 0\}$$

Similarly, a cyclical trough is reached at time  $t$  if:

$$\{(y_t - y_{t-2}) < 0, (y_t - y_{t-1}) < 0\} \text{ and } \{(y_{t+2} - y_t) > 0, (y_{t+1} - y_t) > 0\}$$

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<sup>6</sup> There have been a large number of studies documenting that the features of growth cycles can depend on the detrending method used (Canova, 1998).

<sup>7</sup> The algorithm we employ is called the BBQ algorithm since it is applicable to quarterly data. The GAUSS code of this algorithm is available at [www.ncer.edu.au](http://www.ncer.edu.au). It is possible to employ a different algorithm, such as a Markov Switching (MS) model (Hamilton, 1989), to date the turning points. Harding and Pagan (2002b) compare this method with their BBQ algorithm and conclude that their algorithm is preferable because the MS model depends on the validity of the underlying statistical framework.

<sup>8</sup> In the case of asset prices, the constraint that the contraction phase last at least two quarters is ignored if the quarterly decline exceeds 20 percent. This is because asset prices can have much intra-quarter variations, making for large differences between peaks and troughs based on end-of-quarter data and those based on higher frequency data.

We employ this algorithm to identify cycles in a variety of macroeconomic and financial variables. Our main macroeconomic variable is output (GDP) which provides a broad measure of economic activity. Besides output, we also look at cycles in a number of macroeconomic variables, including consumption and investment. In terms of financial variables, we are interested in cycles in three variables: credit, house prices and equity prices.

The main characteristics of the phases are their duration and amplitude (Harding and Pagan, 2002a). Since we are mainly interested in examining contractions, we define these characteristics for contractions only. The duration of a contraction,  $D^c$ , is the number of quarters,  $k$ , between a peak and the next trough. The amplitude of a contraction,  $A^c$ , measures the change in  $y_t$  from a peak ( $y_0$ ) to the next trough ( $y_k$ ), i.e.,  $A^c = y_k - y_0$ . For output, we also consider another widely used measure, the cumulative loss. This measure combines information about the duration and amplitude of a phase to proxy the overall cost of a cyclical contraction, likely of particular interest to policy makers. The cumulative loss,  $F^c$ , during a contraction, with duration  $k$ , is then defined as:

$$F^c = \sum_{j=1}^k (y_j - y_0) - \frac{A^c}{2}.$$

We further classify recessions based on the extent of decline in output. In particular, we call recessions mild or severe if the peak-to-trough output drop falls into the bottom or top quartile of all output drops during recessions, respectively. Likewise, declines in asset prices and credit contractions are distinguished according to their severity. An equity (or house) price bust is defined as a peak-to-trough decline which falls into the top quartile of all equity (or house) price declines (Helbling and Terrones, 2003). And a credit crunch is defined as a peak-to-trough contraction in credit which falls into the top quartile of all credit contractions. We identify 122 recessions in output (30 of which are severe), 112 contractions (28 crunches) in credit, 114 declines (28 busts) in house prices, 234 declines (58 busts) in equity prices.

In line with the way we date events in general, we next use a simple “dating” rule regarding whether or not 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 coincidence) between the two events but does not imply a causal link.<sup>9</sup>

Among these events, 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

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<sup>9</sup> An example that “association” does not describe causality is when exogenous shocks cause a recession that otherwise would not have happened even when a credit crunch or asset price bust was already occurring.

(Figure 1 provides the Venn diagram of the associations of recessions, crunches and busts).<sup>10</sup> 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.

Our algorithm closely replicates the dates of U.S. business cycles as determined by the NBER Business Cycle Dating Committee. According to the NBER, the United States has experienced 7 recessions over the 1960-2007 period and our algorithm provides exact matches for 4 out of these 7 peak and trough dates and is only a quarter early in dating the remaining peaks and troughs. The remaining differences stem from the fact that the NBER uses monthly data for various activity indicators (including industrial production, employment, personal income net of transfer payments, and the volume of sales of the manufacturing and wholesale retail sectors), whereas we solely employ quarterly series on total output. Nevertheless, the main features of business cycles based on the turning points we identify are quite similar to those based on the NBER turning points. The average duration of U.S. business cycles based on our turning points, for example, is the same as that based on the NBER.

### **III. What Happens During Recessions?**

In this section, we first examine a set of basic stylized facts about recessions, including their duration, amplitude, and cumulative output loss, and how these features vary across countries. We then document how our main macroeconomic and financial variables typically change from peak to trough during a recession. This is followed by an analysis of the temporal behavior of these same variables around recessions. Last, we analyze the synchronization of recessions across countries.

#### **III.1. Basic features of recessions**

Table 1A presents the main characteristics of recessions for each country in our sample. Throughout the paper, we most often focus on medians because they are less affected by the presence of outliers in our sample. Wherever relevant, however, we also refer to means. A typical OECD country experienced about six recessions over the 1960-2007 period. There is no apparent pattern across countries in the number of recessions, but some countries do stand out. For example, Canada, Ireland, Japan, Norway and Sweden witnessed only 3 recessions during this period, while Italy and Switzerland had 9 recessions, and New Zealand 12, the most.<sup>11</sup> A

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<sup>10</sup> Overlaps of recessions with credit contractions and asset price declines are too widespread to expect large differences. The dates for these turning points and a list of overlapping episodes are available upon request.

<sup>11</sup> New Zealand has the highest number primarily because of its large exposure to terms-of-trade shocks. The dates of New Zealand's business cycles we report are largely consistent with those reported in Morsink, Helbling, and Tokarick (2001) which documents seven recessions over the 1973-2000 period. Hall and McDermott (2006), using unpublished output data, identify 9 recessions for New Zealand during the 1946:1-2005:4 period.

typical recession lasts about 4 quarters (one year) with relatively small variation across countries — the shortest recession is 3 quarters and the longest 7 quarters. The typical proportion of time spent in recession, defined as the fraction of quarters the economy is in recession over the full sample period, is some 10 percent over the 1960-2007 period.<sup>12</sup>

Next, we describe the severity of a recession using our two other metrics. The median (average) decline in output from peak to trough, the recession's amplitude, is about 1.9 (2.7) percent. It ranges from about 1 percent for the typical recession in Austria, Belgium, Ireland and Spain to more than 6 percent for those in Greece and New Zealand. The cumulative loss of a typical (median) recession is about 3 percent, but the average loss is about 6.4 percent since the distribution is skewed to the right (there is on average a small positive correlation (0.34) between duration and amplitude). This also shows that the overall loss can differ quite a bit from amplitude as durations vary. Country examples further illustrate this difference. For example, while the median amplitude of recessions in Finland and Sweden are not as large as those in Greece and New Zealand, recessions in Finland and Sweden have very large cumulative output losses (23 and 16 percent, respectively) since their recessions lasted long.

As mentioned, a recession is classified as a severe one when the peak-to-trough decline in output is in the top-quartile of all output declines during recessions, which means a peak-to-trough output decline below -3.2 percent. While many OECD countries, including Austria, Belgium, France, Ireland, Norway, Spain, and the United States, did not experience a severe recession in the sample period, most recessions in Greece and New Zealand were in this category. The 30 such recessions we document are typically five quarters long, more than a quarter longer than the average recession. They are, by construction, much more costly than other recessions with a median decline of about 5 percent, almost three times that of other recessions, and have a cumulative loss of about 10 percent, five times that of the other recessions. An extremely severe recession, in which the peak-to-trough decline in output exceeds 10 percent, is usually called a depression, of which there are 6 in our sample. The last such depression episode took place in Finland in the early 1990s with an output decline of 14 percent.<sup>13</sup>

As shown in Figure 2, over the entire period most recessions (75 percent) lasted less than 4 quarters, and most of these were also mild to moderate in depth, i.e., less than a 3.2 percent output decline. Of the 25 percent severe recessions in our sample, only 40 percent were long, i.e., lasted more than 5 quarters. There is also a pattern of recessions becoming shorter and milder over time, especially after the mid-1980s. In particular, the average duration of a recession fell by roughly half from 1973-1985 to 1986-2007. These patterns are in line with recent empirical

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<sup>12</sup> The proportion of time a country spends in recession relates of course closely to the number of recessions the country experienced (the correlation between the two is 0.9). The number and average duration of recessions have, however, a small negative correlation (-0.25) since some countries experienced many short recessions in relatively brief periods. For example, New Zealand had five short recessions during the 1970s and Japan witnessed its three recessions after 1993.

<sup>13</sup> The 6 depressions that occurred are: New Zealand (1966:4-1967:2); New Zealand (1974:3-1975:2); New Zealand (1976:4-1978:1); Switzerland (1974:2-1976:1); Greece (1973:4-1974:3); and Finland (1990:1-1993:2). See Kehoe and Prescott (2002) for a discussion of depressions in the 20<sup>th</sup> century.

work documenting a trend decline in output volatility in industrial countries, the so called “Great Moderation” phenomenon.<sup>14</sup>

### III.2. Macroeconomic and financial variables

We next examine how our main macroeconomic, trade and financial variables typically vary during a recession. Table 1B presents the peak-to-trough changes for these variables for all, severe and other recessions. We find the expected patterns in recessions, with differences between severe and other recessions often statistically significant. Severe and other recessions are statistically significantly different in terms of their durations, amplitude and cumulative output losses. In a severe recession, consumption typically drops by more than 1 percent, compared to almost no change in other recessions. The importance of investment for explaining the business cycle has been stressed for a long time, including in the seminal work by Kydland and Prescott (1982). Indeed, residential and total investment tend to decline by double digits in severe recessions, compared to a drop of about 4 percent in other recessions.

Recessions often also overlap with declines in international trade. Exports drop more in severe recessions compared to other recessions (and significantly so). As expected, imports fall, by six times more than exports in a typical recession and by close to 10 percent in severe recessions (statistical significantly more so than in other recessions). While both net exports and the current account balance register improvements during recessions, the changes are not statistical significantly different across the types of recessions.

The fall in industrial production tracks closely the drop in investment in all types of recessions and is larger than that of output. Recessions often coincide with an increase in the unemployment rate (in 90 percent of recessions). The unemployment rate typically rises three times as much in severe recessions than in other recessions. Inflation typically drops slightly (in 60 percent of all recessions), as expected given that demand is down often in recessions, but inflation does not seem to vary between the types of recessions, possibly as some severe recessions have been of the stagflation type (a recession combined with an acceleration in the rate of inflation).

Next, we examine the changes in our key financial variables during recessions. Although credit typically continues to grow, it does so only at about 1 percent, with its growth rate especially low in the initial stages of recessions. Credit growth does not vary, however, between severe and other recessions. Both house and equity prices typically contract in recessions, with larger declines in house prices in severe than in other recessions. Reflecting the generally more volatile nature of equity prices, the decline in equity prices is more than twice that of house prices, and the median equity price decreases by 17 percent in severe recessions, or some 12 percent more than in other recessions.

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<sup>14</sup> 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; Stock and Watson, 2003; and Bernanke, 2004).

### III.3. Dynamics of Recessions

We next turn to examine how the various macroeconomic, trade and financial variables behave around recessions (Figure 3). 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.<sup>15</sup> All panels include the median growth rate, i.e., the typical behavior, along with the top and bottom quartiles. As noted, according to our definition, the bottom quartile includes the severe recessions, while the top quartile contains the mild ones.

The pattern of output growth around a recession is as expected. Following the peak at date 0, output tends to register a negative annual growth rate after 3 quarters and the growth rate goes down to -1 percent at the end of the fourth quarter after the peak, while in severe recessions, the growth rate falls to -2 percent at that time. Although consumption does not decrease on a year-to-year basis in a typical recession, it does fall during the first year of a severe recession. Some macroeconomic variables naturally show signs of a slowdown before the recession starts. Both components of investment (residential and non-residential) show sharp declines in their growth rates before recessions, 2 to 3 quarters ahead of output. Moreover, both components of investment often register negative annual growth rates already in the first quarter of a recession, i.e., three quarters ahead of output, and their growth rates typically stay negative for up to 6 quarters. In severe recessions, recovery of the growth rate of investment can take up to three years, highlighting again the importance of investment over the business cycle.

In terms of trade variables, the growth rates of both exports and imports slow down in a recession, but that of imports much more. The growth rate of imports often tends to fall before the recession starts and can decline to -7 percent in the first year of a severe recession. While both net exports and the current account balance improve during a typical recession, the improvement in net exports is often earlier and more pronounced than that of the current account.

Industrial production shows typically a sharp decline in its growth rate before a recession starts. During the onset of recessions, inflation is typically still on an increasing path, and unemployment is already starting to rise. After the recession starts, however, the rate of inflation declines while the increase in the unemployment rate accelerates.

Credit growth also slows down, by some 2 to 3 percent before a recession starts, and then by another 2 percent over the recession period, typically not returning to pre-recession growth rates for at least three years after the recession started. Recessions are often also preceded by a slowdown in the growth rate of asset prices. In the first year of a typical recession, for example, house and equity prices decline on a year-to-year basis by 3 and 16 percent, respectively. While equity prices often start registering positive growth after about six quarters, house prices typically decline during the three years after the beginning of a recession.

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<sup>15</sup> 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.

### III.4. Synchronization of Recessions, Credit Contractions and Asset Price Declines

We next examine the synchronization of recessions, credit contractions and asset price declines across countries. Our synchronization measures are simply the fractions of countries experiencing the same event at the same time.<sup>16</sup> For recessions, Figure 4 shows how this fraction evolves over time along with the dates of recessions in the United States. The figure shows recessions bunching in about four periods during 1960–2007. First, a large fraction of countries went into a recession in the mid-1970s, shortly after the first oil price shock. The fraction 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 in the early 2000s to some degree. In the first three of these four periods, more than 50 percent of countries in our sample were in a recession at the same time. The peak episodes of highly synchronized recessions quickly followed each other in some instances, as shocks spilled from one country to the other. This was, for example, the case in the early 1990s because of the symmetric shocks hitting countries across major currency areas (see Morsink, Helbling and Tokarick, 2002).<sup>17</sup>

We document in the same way the synchronization of turning points in consumption and investment. A well known stylized fact of business cycles is that investment is much more volatile than output and consumption is somewhat less volatile than output (Backus, Kehoe and Kydland, 1995).<sup>18</sup> In our sample, indeed, investment declines in three-fourth of all recessions while consumption contracts in only half of all recessions. Consistent with these observations, the fraction of countries experiencing a period of investment (consumption) contraction at any time is much higher (lower) than that of those experiencing recessions. And, while investment contractions are highly synchronized, consumption contractions are much less so. These results are consistent with recent findings suggesting that common factors play a much larger role in explaining fluctuations in investment in OECD countries than they do in consumption (Kose, Otrok and Prasad, 2008).<sup>19</sup>

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<sup>16</sup> Recent research has typically relied on three main measures of synchronization. The first is bilateral output correlations, which capture co-movements in output fluctuations of two countries. The second is the share of output variances that can be attributed to synthetic (unobservable) common factors, as in Kose, Otrok and Prasad (2008). The third one is the concordance statistic (Harding and Pagan, 2002a), which measures the synchronization of turning points.

<sup>17</sup> Kose, Otrok and Whiteman (2003) 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.

<sup>18</sup> For a detailed analysis of such stylized facts for a large set of countries, see Kose, Prasad and Terrones (2003a, 2003b)

<sup>19</sup> We also analyze the synchronization of turning points in industrial production, exports and imports. As expected, the proportion of countries experiencing a contraction in industrial production is very closely correlated with that going through a recessionary period. The results indicate that synchronized recessions have particularly adverse effects on global trade flows as evidenced by the higher fraction of countries experiencing contractions in their exports and imports than those witnessing recessions.



Recessions tend to coincide with contractions in domestic credit and declines in asset prices, as documented in section III.3. This also shows up in the fraction of countries experiencing recessions around the world being highly correlated with the fractions of those going through credit contractions or bear asset markets (Figure 5). In particular, credit contractions are closely associated with recessions. House price declines are also highly synchronized across countries, despite the fact that housing is the quintessential nontradable asset, and the degree of synchronization rises especially during recession episodes.<sup>20</sup> Equity prices exhibit the highest degree of synchronization reflecting the extensive integration of financial markets. However, the popular saying that “*Wall Street has predicted seven of the past five recessions*” resonates here as the fraction of countries experiencing bear equity markets frequently exceeds the fraction of countries in a recession.

#### **IV. What Happens During Credit Contractions and Asset Price Declines?**

In this section, we study the main features of the episodes of credit contractions and declines in the prices of housing and equity in our sample. As we explained in section II, credit contractions and asset price declines that fall into the top quartile of all credit contractions and asset price declines are classified as credit crunches and asset price busts, respectively. When the peak-to-trough decline in credit exceeds 9.5 percent, it is called a crunch episode, and when the decline in house (equity) price is larger than 14.3 (38.7) percent, it qualifies as a house (equity) price bust. In the following sub-sections, we first document the basic stylized facts of each of these contraction/crunch and decline/bust events and then examine the temporal patterns of various macroeconomic and financial variables around crunch and bust episodes.

##### **IV.1. Credit Contractions**

Table 2A shows the main features of credit contractions and crunches for each country in our sample. There are 112 (28) credit contraction (crunch) episodes. A typical OECD country went through about 6 credit contractions, but there is much variation across countries. Germany, the Netherlands, and Spain witnessed few contractions while Greece, New Zealand and Portugal had the highest number. Austria, France, Germany and Switzerland never experienced a credit crunch episode during the 1960-2007 period, but the other countries in our sample had at least one. The median (average) credit contraction episode lasts 4 (6) quarters. Credit crunches last typically twice as long, 8 quarters, and are statistically significantly longer than non-crunch contraction episodes. Credit contractions usually mean some 4 percent decline in credit from peak to trough. In case of crunches, the decline in credit is 17 percent, significantly more than during the non-crunch episodes.

While output growth slows down, especially early on in a credit contraction or crunch episode (as we show next), output typically is higher at the end than at the beginning of these episodes (Table 2B). The increase in output during contractions and crunches is not surprising since these episodes do not always fully overlap with recessions and last twice as long as recessions do.

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<sup>20</sup> Terrones (2004) shows that house prices are procyclical, rising in economic expansions and falling in recessions, and that house prices tend to move together across countries.

Output also expands significantly more during crunches than during other contractions, probably because the typical duration of crunch episodes is 4 quarters longer than contraction ones. Still, the average growth rate of output in credit contraction (crunch) periods is half of that observed during non-credit contraction periods.

Credit contractions have especially strong negative effects on investment. In particular, credit contractions (crunches) are typically associated with declines in residential investment of about 1 (6) percent over the period when credit contracts. The unemployment rate is typically flat during a credit contraction, but increases significantly during a credit crunch episode, primarily because of job losses early on in these episodes when economic activity also declines. With respect to other financial variables, house prices typically decline significantly more during credit crunches, by some 10 percent versus 1 percent in the typical non-crunch episode. While equity prices usually also decline somewhat during credit contractions, prices actually increase over the credit crunch episodes, perhaps anticipating a recovery from the deeper credit slump and the longer duration of these episodes.

We now examine how the various macroeconomic and financial variables behave around credit crunches (Figure 6). As for recessions, 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 of credit expansion. All panels include the median growth rates, i.e., the typical behavior, along with the top and bottom quartiles. As before, the bottom quartile delineates the worst 25 percent of all credit crunches and the top quartile the best 25 percent.

Output growth typically starts declining two quarters before the beginning of a credit crunch and goes down by 2 percentage points after the fifth quarter. Although output growth typically does not become negative on a year-to-year basis in a credit crunch, it does so in at least one-quarter of the episodes as evidenced by the bottom quartile. In a typical credit crunch, the year-on-year growth rate in consumption goes down as well and can fall to -2 percent in about five quarters in some crunch episodes. As expected, investment weakens before the credit crunch starts. In particular, residential investment typically starts to slow down much before the crunch period starts and actually registers negative growth rates one quarter ahead of the start of the episode. Growth rates of total investment and residential investment typically stay negative for up to 8 quarters. Moreover, investment can take up to three years and residential investment even longer to recover in some episodes of credit crunches. Inflation is on an increasing path and unemployment is already starting to rise prior to the start of a credit crunch, but as activity slows down after the beginning of the credit contraction, the rate of inflation declines and the increase in unemployment accelerates.

Credit crunches are generally preceded by increases in the growth rate of real credit, but most often accompanied by slowdowns in asset prices. The median real credit growth is 5 to 6 percent just before the peak of credit expansion is reached and then slows down sharply over the crunch period, by more than 10 percent, reaching a typically negative growth rate of 6 percent and not returning to positive growth until 2½ years after the credit crunch started. The rapid decline in credit during this period reflects both lower demand, e.g., decreases in investment opportunities, but also a fall in supply due to bank capital shortfalls and other supply side effects. The figure shows the clear spillover effects of a credit crunch on house and equity prices. In particular,

house prices decline on a year-to-year basis in the first year of a typical credit crunch and continue to decline for at least three years after the beginning of a crunch episode. Equity prices often decline before a credit crunch starts and further weaken during the first year, but then stage a recovery.

#### **IV.2. Episodes of Declines in House Prices**

Table 3A shows the main features of house price declines and busts for each country in our sample. There are 114 (28) episodes of house price decline (bust) implying that a typical country experienced around 6 episodes. Australia and Canada had the largest number (9) of decline episodes while Greece had only 1. While the majority of countries had at least one house price bust over the 1960-2007 period, Australia, Belgium, Germany, Greece, Portugal, the United Kingdom, and the United States did not witness any. The typical episode of a decline in house prices lasts 6 quarters, but housing busts usually last more than 16 quarters. While the typical house price decline is only 6 percent, due to some very large declines in the sample, the average decline is 11 percent. During a house price bust, prices decline by about 29 percent typically.

As for credit contractions, output typically still expands during episodes of house price decline (Table 3B). As in case of credit contractions, this mainly reflects that house price declines last a long time during which output still expands, albeit at a low (quarterly) rate, about one-fifth of that in periods without crunches. There is, however, a significantly adverse impact of house price declines on investment (and its components) which is much larger than that in credit contractions. During periods of house price declines (busts), residential investment registers a median drop of 4 (12) percent and an average drop of 6 (16) percent. Total investment also goes down typically, by about 8 percent. While the unemployment rate usually records a statistically significant increase during bust episodes relative to non-bust ones, inflation typically is much lower during periods of house price busts, by some 3 percent. Credit still expands over the episodes of house price declines, but at a slower rate than normal, and equity prices do not change much. These findings indicate that house price busts have a particularly strong links with the real economy.

Figure 7 presents the dynamics of the key macroeconomic and financial variables around the periods of house price busts. Although the output slowdown in a house price bust is more gradual than that in a credit crunch, house price busts are otherwise quite similar to credit crunches. The slowdown in output starts at the time of the house price bust and is associated with a slowdown in consumption growth. Investment declines largely occur after the onset of the house price decline and involve drops in both residential and nonresidential investment. Although residential investment declines less sharp after the first year of the beginning of a house price bust than of a credit crunch, the recovery of residential investment takes much longer in house price busts.

After a few quarters, and following a run-up, inflation typically experiences a sharp decline and unemployment starts to rise after about two years as the impact of the house price decline is felt. As noted, house prices remain on the decline for long periods during a bust episode, typically much more than three years. While equity prices start falling before the onset, they usually begin

to recover within two years of a house price bust. Credit growth experiences a large slowdown and does not return to the pre-bust levels for at least three years.

### **IV.3. Episodes of Declines in Equity Prices**

Table 4A presents the main features of equity price declines and busts for each country in our sample. There are many more episodes, 234 (58), of declines (busts) in equity than in house prices. In a typical country, there were around 11 (3) episodes of equity declines (busts). Episodes of declines vary quite a bit in terms of duration and amplitude across countries, but they typically last 5 quarters and are associated with a price drop of 27 percent. Equity busts, however, typically last 10 quarters and result in a 50 percent price decline.

As in the cases of credit contractions and house price declines, while output and consumption also continue to grow during the episodes of equity price declines, they do so at lower rates than typical (Table 4B). However, different than for credit contractions and house price declines, there is no decline in investment over the episodes of equity price declines. While unemployment picks up a little bit, the rate of inflation does not change much during periods of equity price declines. Credit still registers an expansion and house prices typically increase between the peak and trough of the equity price decline episodes. In sum, equity price declines appear somewhat less related to the real economy than credit contractions or house prices declines.

The weak connection between the dynamics of equity prices and economic activity is also reflected in the behavior of the main macroeconomic variables (Figure 8). The growth rate of output slows down, but this usually starts only three quarters after the beginning of the equity bust and is much more limited, with the level of output typically not experiencing a decline. The extent of slowdown in consumption growth associated with an equity price bust is also delayed — until after one year or so, and is weaker than that observed during credit crunches and house price busts. The decline in investment growth follows with a relatively long lag the start of the equity price bust — only after 3 to 4 quarters does investment growth slow down. There is no difference in the declines of residential versus non-residential investment. Inflation typically remains elevated and unemployment experiences only a very small increase after an equity price bust.

The fall in equity prices itself is a sharp and prolonged one as prices do not start to recover within the three year period following the start of the bust. Credit growth experiences a delayed slowdown as well, only to pick up somewhat after two years. Interestingly, there appears to be also a lag in terms of the effect of equity price declines on house prices, since house price growth rates typically start to decline only after one year, becoming negative after two years.

These findings suggest that the temporal dynamics of the main components of domestic absorption after credit crunches and asset price busts resemble the behavior they exhibit during recessions. For example, the much larger decline in the growth rate of investment compared with that of consumption is a feature of recessions as well, as documented in the previous section. The sharper falls in consumption following house price busts than following equity price busts is consistent with the result that recessions associated with house price busts are more costly than those associated with equity price busts, as we are about to show in the next section.

## **V. What Happens When Recessions Are Associated with Busts and Crunches?**

We now analyze the features of those recessions associated (or not) with credit crunches, house price busts and equity price busts, respectively. As we explained in section II, 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. To provide a sense of distributions, we also examine the features of recessions coinciding with severe credit crunches/asset price busts. These severe crunch/bust episodes consist of the top 12.5 percent of all credit contractions/asset price declines. We also consider how the outcomes of recessions vary when they are associated with sharp increases in the oil price or the rate of inflation.

### **V.1. Recessions Associated with Credit Crunches**

Table 5 presents the main features of recessions associated with or without credit crunches. The average duration of a recession associated with a (severe) credit crunch slightly exceeds that without a crunch, but the difference between the two sets of recessions is not statistically significant. Interestingly, recessions ended before their corresponding credit crunch episodes completed in all except four recessions. There is typically a larger output decline in those recessions associated with a credit crunch compared to other recessions, -2.19 versus -1.82 percent, or a 0.4 percent difference (although this is not statistically significant). For recessions with a severe credit crunch though, the difference in output decline is larger, 0.9 percent, and statistically significant. The cumulative output loss of recessions associated with (severe) crunches is typically significantly larger than those without crunches. In particular, the average (median) cumulative loss of a recession associated with a severe crunch is two times that without a crunch. Recessions with crunches are generally associated with greater slowdowns in consumption, investment, industrial production, employment, exports and imports, compared to those recessions without crunches. Except for industrial production, however, these differences are not significant.

Credit, by construction, registers much larger (and statistically significant) declines in recessions with crunches than those without crunches (Dell' Ariccia and Garibaldi, 2005). House prices also fall statistically significantly more in recessions with crunches than those without. This might stem from the high sensitivity of housing activity to credit conditions (Kiyotaki and Moore, 1997; Mendoza and Terrones, 2008). In contrast, equity prices actually decrease less in recessions with crunches and even record increases in recessions with severe crunches. This may reflect that equity prices decline more in the onset of recessions and that markets anticipated the recovery in these types of recessions.

### **V.2. Recessions Associated with House Price Busts**

There are a number of statistically significant differences between recessions coinciding with house price busts and those without busts (Table 6). In particular, recessions associated with house price busts are on average over a quarter longer than those without busts. Moreover, output declines (corresponding cumulative losses) are typically much larger in recessions with busts, 2.7 (3.7) percent versus 1.5 (2.3) percent in those without busts. These sizeable differences

extend to other macroeconomic variables, including consumption, investment and unemployment rate. For example, although consumption typically does not decrease much in recessions (documented in section III.1), there is a statistically significant decline in consumption in recessions with house price busts and in case of severe busts a more than 1 percent decline. This decline likely reflects the substantial wealth effects of housing.<sup>21</sup> These findings collectively suggest that recessions with house price bust result in more adverse outcomes than do those without such busts.

In terms of trade variables, there are also substantial differences between recessions coinciding with house price busts and other types of recessions. In part reflecting the substantial decline in domestic demand, and thus imports, along with an increase in exports, both net exports and the current account balance improve significantly more in recessions with house price busts. In terms of financial outcomes, by construction, house prices fall much more in recessions with housing busts (by some 6 percent more), but credit growth also contracts more, by some 3 percent, with both differences statistically significant. Equity prices show declines during all types of recessions, but less so during recessions with housing busts — again, as markets may already be pricing in a recovery (these differences are, however, not statistically significant). These comparisons collectively suggest that the more adverse effects of a recession with a (severe) house price bust arise in part due to credit contractions, possibly stemming from distress in the financial sector, in turn leading to a considerable reduction in consumption and (residential) investment.

### **V.3. Recessions Associated with Equity Price Busts**

Although recessions associated with equity price busts tend to be longer and deeper than those without equity busts, these differences are not statistically significant (Table 7). This could reflect that equity price busts have a less tight relationship with developments in the real economy compared to credit crunches and house price busts. Nevertheless, nonresidential and total investment, and industrial production fall significantly more in recessions with equity price busts vis-à-vis recessions without equity busts. Imports also decline significantly more and net exports improve much more in recessions with than without equity price busts.

With respect to financial variables, differences are, by construction, pronounced for equity prices, typically a 12 percent greater drop in equity price bust recessions. There is also a pattern of house prices declining 3 percent more in recessions with severe equity price busts. Overall, these comparisons confirm that, while in normal times declines in equity prices are not necessarily associated with large changes in output, when they take place at the same time as recessions, such declines tend to coincide with substantial movements in both real and financial variables.

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<sup>21</sup> Housing wealth is often found to have a larger effect on consumption than financial assets wealth does. Carrol, Otsuka and Slacalek (2006) report that the propensity to consume from a \$1 increase in housing wealth ranges between 2 (short-run) and 9 (long-run) cents, twice as large as that estimated for equity wealth.

#### V.4. Recessions Associated with Increases in Oil Prices and Inflation

Recessions are caused by a number of factors and have been associated with a multitude of economic outcomes. While we do not aim to address here the causes of recessions, a number of studies have examined the implications of sharp fluctuations in oil prices for the behavior of various macroeconomic variables around recessions (Blanchard and Galí, 2007).<sup>22</sup> Another widely studied issue has been the link between recession outcomes and the behavior of inflation. In particular, it has been argued that there are large differences between stagflationary recessions — recessionary periods accompanied by a pick up in inflation rates — and other recessions (Blanchard, 2005).<sup>23</sup>

We therefore briefly analyze whether the outcomes of a recession vary depending on whether it coincides with a large increase in the price of oil or a sizeable increase in inflation. Using our standard demarcation of event spaces, we call an oil price increase an oil price shock (major oil price shock) if the (real) oil price rise is in the top quartile (12.5 percent) of all price increases. We also differentiate changes in the rate of inflation during the recession periods into those that fall in the top quartile of all changes and others.

The differences between recessions that coincided with oil price shocks and those without appear to be significant for several key macroeconomic variables (Table 8). The output drop is significantly larger for those recessions associated with a major oil price shock, 2.6 percent versus 1.8 percent for those recessions without an oil price increase. Likewise, consumption, residential investment and industrial production all register significantly larger declines during recessions associated with oil price shocks. Both imports and exports fall significantly during these types of recessions coinciding with oil price shocks, but the changes in equity and house prices are not much different than those of recessions without jumps in oil prices. While the rate of inflation declines in a typical recession, recessions coinciding with oil price shocks are accompanied by significantly higher inflation rates, suggesting these are mainly recessions of the stagflation type.

In several respects, recession outcomes associated with spikes in inflation are quite similar to those of recessions with oil price increases (Table 9). For example, these stagflationary recessions also witness a significantly larger decline in output and, by construction, a much larger jump in the rate of inflation compared to those recessions without a large pick up in inflation. While equity prices go down significantly more in recessions with large increases in

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<sup>22</sup> The relationship between oil price and economic fluctuations arises not just because of trade shocks. Some, for example, argue that recessions that have followed an oil price shock were primarily a result of contractionary monetary policies employed to curb inflationary effects (Bernanke, Gertler, and Watson, 1997).

<sup>23</sup> Two principal explanations offered for why stagflation occurs are unfavorable supply shocks, such as an increase in the price of oil, and inappropriate policies, such as excessively loose monetary policy or excessive regulation of goods markets and labor markets. Both explanations have been offered in analyses of the global stagflation of the 1970s which began with a sharp rise in oil prices, but then continued as central banks used excessively accommodative monetary policy to counteract the resulting recession, causing a wage-price spiral.

inflation rate, the changes in other financial variables are not statistically significantly different from those in recessions without an acceleration in inflation.<sup>24</sup>

### V.5. Summary

So, when associated with a credit crunch or asset price bust, which type of recession is the most painful? To facilitate such a comparison, Table 10A provides the duration, amplitude and cumulative loss for each type of recession, lines A-C. The answer depends in part on the metric used to measure the cost of recessions. If we use the amplitude of the output decline as the relevant metric, then recessions with credit crunches appear to be as costly as recessions with house price busts, and both are slightly more costly than recessions with equity price busts. However, if the cumulative loss measure is the relevant metric, then recessions associated with credit crunches are more painful than recessions with house price busts. Recessions with equity price busts are the least costly ones on this metric. Regardless of the metric used, recessions associated with severe credit crunches rank as the most costly among recessions associated with a credit crunch or (severe) asset price bust.

For comparison, also included in the table are the groups of recessions associated with or not a (severe) oil price (line D) or inflation shock (line E), and all recessions, split by severity (line F). We can thus broaden the question which type of recessions is the most painful by comparing recessions with credit contractions and asset prices declines to those recessions associated with oil price shocks or increases in inflation and to the overall sample of (severe) recessions. The results show that on most metrics, recessions that overlap at the same time with either a credit crunch or a house price bust compare in severity with recessions associated with oil price shocks and are only slightly less severe than recessions associated with increases in inflation. The group of severe recessions still exceeds in severity, however, recessions that overlap at the same time with either a credit crunch or a house price bust.

We also provide a summary table of the episodes of credit contractions, house prices declines and equity price declines (Table 10B). In terms of duration, the episodes of declines and busts of house prices last longer than credit contractions/crunches or equity price declines/busts. While less persistent than house price declines, drops in equity prices are much larger. In particular, a typical episode of house price decline (bust) leads to a 6 (29) percent drop in house prices, while an episode of equity price decline (bust) tends to result in a 27 (50) percent fall in equity prices. Both credit contractions and especially house price busts have adverse effects on the growth rate

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<sup>24</sup> We also examined whether or not the simultaneous occurrence of a currency or banking crises makes a difference as to the nature of recessions. While there are some expected differences, e.g., the length of a recession when there is also a banking or currency crisis is typically longer, very few of these differences are statistically significant. One notable statistically significant difference, however, is that residential investment falls more during recessions that overlap with banking crises, which may not surprise. The details of these results are available from the authors upon request. Reinhart and Rogoff (2008) examine economic developments around financial crises in more detail.



of residential investment (6 and 12 percent drop respectively), while this is not the case in the case of equity price declines.<sup>25</sup>

## VI. Policy Responses During Recessions, Crunches and Busts

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 operations, changes in exchange rate management practices, structural reforms etc. To keep matters manageable, and for the sake of comparability across the diverse set of countries and events under consideration, this section briefly discusses only two narrow aspects of policy responses: monetary policies, proxied by changes in (short-term) interest rates, and fiscal policies, captured by changes in government consumption. Although we are well aware of the problems in associating these variables to the rather broad concepts of fiscal and monetary policies, we do think that this exercise can be useful to see general patterns across different types of recessions.

Table 11 reports the medians of peak-to-trough changes in short-term nominal and real rates and real government consumption for the nine different events (combinations) we have studied in the previous sections. Policy responses vary across the type of events under consideration 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. Moreover, these policies appear to be more accommodative when the episodes are severe recessions, credit crunches and asset price busts. In episodes involving credit crunches, house price and equity price busts, government consumption rises significantly more than in other contraction and bust episodes. This suggests a more aggressive countercyclical fiscal policy at work in recessions with credit crunches, possibly because monetary policy can be less effective in these circumstances. During house price busts, the decline in nominal interest rates is also statistically significantly larger than those episodes without house price busts. However, other differences are not statistically significant. For example, while government consumption increases more in severe recessions than it does in other recessions, the difference is not statistically significant.

With respect to recessionary episodes coinciding with crunches and busts, while most of the changes in policy responses across recessions associated with different types of financial market difficulties are intuitively appealing, they are not statistically significant. The only significant difference is for government consumption during recessions with credit crunches since its growth rate increases is twice that in recessions without crunches.

We also examine whether policy responses are different depending on if recessions overlap with oil price shocks or with large increases in inflation. We find that the drops in short-term real interest rates are larger in recessions with oil price shocks as well as in those with a jump in inflation, with differences statistically significant. At the same time, the nominal short-term interest rate increases in the case of recessions with a large increase in inflation, that is

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<sup>25</sup> We also study the implications of recessions associated with a trilogy of credit crunches, house price and equity price busts at the same time. There are only four such recessions, however, and it is not possible to claim that these events have statistically significant differences relative to others we examined.

statistically significant. This opposite pattern of real interest rate declines and, although smaller, nominal interest rate increases reflects that during these episodes of stagflationary recessions, nominal interest rate increases did not keep up with inflation increases.

## **VII. What Happens During Recessions in the United States?**

We now turn to an analysis of the main features of past U.S. recessions, credit contractions and asset price declines.<sup>26</sup> First, we examine the basic stylized facts of past U.S. recessions and then compare them with those in other G-7 and OECD countries. We next consider the main features of the past episodes of credit contractions and asset price declines in the United States.

### **VII.1. Basic Stylized Facts and History of U.S. Recessions**

The United States has experienced seven recessions over the 1960-2007 period, none of which were severe. Table 12A presents the main features of these recessions. The typical recession lasted 3 quarters, with the longest two (1969:3 and 1973:4) 5 quarters. The peak-to-trough output decline was on average 1.7 percent, with the worst single recession, 1973:4, having a 3 percent decline. The average cumulative loss of U.S. recessions was more than 3 percent, with the largest roughly 7 percent for the 1973:4 recession. Taking the 1980:1 and 1981:3 recessions together as a double dip recession, however, makes it the longest and deepest recession in the United States since 1960, with a total output drop of 5 percent and cumulative loss of 11 percent over 6 quarters. In contrast, the most recent recession (2000:4) has been the mildest one to date, with only a 0.17 percent decline (Nordhaus, 2002).

There is a large literature analyzing the roles played by various factors in explaining recessions in the United States, but this research has not been able to produce definitive results (Zarnowitz, 1998; Hall, 2007).<sup>27</sup> Although some argue that oil prices have often played a role in triggering recessionary episodes, the causes of each of the recessions in the United States, to the extent that these can be identified, have varied.<sup>28</sup> With the help of the patterns in our main macroeconomic, trade and financial variables, we briefly review the events surrounding each U.S. recession, relying on earlier studies to capture the broader context of each recession.

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<sup>26</sup> There is a vast literature on the business cycles in the United States (see, for instance, the book edited by Gordon, 1986, and the surveys by Zarnowitz, 1985, and Stock and Watson, 1999, and references therein). Our interest in this paper, however, is to examine the nature of macro-financial linkages around recessions, a topic that has been under-researched.

<sup>27</sup> The sources of business cycles have traditionally been a topic of intense discussion. While some economists argue that cycles are originated by changes in economic policy, some others claim that the main sources of business cycles are productivity shocks. In a recent paper, Crucini, Kose and Otrok (2008) examine the roles played by various shocks, including shocks to productivity, fiscal policy, monetary policy, terms of trade and oil, in explaining international business cycles.

<sup>28</sup> The relation between fluctuations in oil prices and economic activity has been a subject of intense research. Hamilton (2005) claims that nine out of ten modern recessions in the United States have been preceded by an oil price shock.

Both the 1960:1 and 1969:3 recessions were preceded by periods of tight monetary policy (Romer, 1999). Although in the first recession it was followed by an easing in the second half of 1960, since at the same time, fiscal policy was being tightened, there were no automatic stabilizers, exacerbating the recession. The 1969:3 recession was preceded by a period of high growth and accelerating inflation. Fiscal policy had been quite procyclical, in part related to the Vietnam War. Monetary policy became more contractionary and a belated effort to raise fiscal revenues, along with a reduction in military expenditures leading to a decline in overall government consumption, contributed to the recession in 1969.

The 1973:4 recession was associated with the first major oil price shock, as prices shot up from \$2.6/barrel in 1973 to \$11/barrel in 1975. The recession was the start of a prolonged period of low output growth and high inflation, i.e., stagflation, as well as substantially higher unemployment. While the rate of unemployment during U.S. recessions typically rises by 1.8 percent, it increased by 3.4 percent in this recession. Moreover, this was the only recession with a substantial increase in the inflation rate, 2.7 percent, a reduction in profits and an equity price bust (Zarnowitz, 1999).

The double dip 1980-81 recession has been widely associated with the tight monetary policies of the Federal Reserve to reduce the high inflation rate at the time. Inflation had reached 11 percent on an annual basis in 1980:4 and the Fed funds rate was raised from about 10.5 to 17.5 percent between 1979:3 and 1980:2. Oil prices increased, from \$13/barrel in early 1979 to \$37/barrel in 1981:3. The combination of high interest rates and rising oil prices led to a drop of 40 percent in residential investment over these two recessions, almost four times larger than the typical decline. As we report later, these recessions were also associated with falls in house and equity prices and a crunch in credit markets.

Several explanations have been proposed for the 1990:3 recession: the tighter monetary policies employed in 1989; the invasion of Kuwait by Iraq in 1990 and the subsequent oil price increase; the decline in consumer and business confidence; and the lingering effects of the Savings and Loan crisis combined with general stresses in the U.S. banking system. Indeed, this recession coincided with a credit crunch — according to our definition — that started in 1989:3 and lasted 14 quarters, the longest of all U.S. credit contractions. Other evidence suggests the most likely source to be a “consumption shock,” that is a contraction in consumption not explained by its fundamentals (Blanchard, 1993).<sup>29</sup>

Lastly, the very mild 2000:4 recession has mainly been associated with the decline in non-residential investment — by about 6.5 percent — following the sharp fall in equity prices in early 2000 after the collapse of the internet bubble. While the decline in equity prices was only 8 percent during the three quarters of the recession itself, the cumulative fall in equity prices starting before and lasting much after the recession was 40 percent. The oil price, which had declined from \$20/barrel in 1996 to \$10/barrel in 1998, was another factor since it rose to \$34/barrel in late 2000.

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<sup>29</sup> For other potential explanations of the sources of the 1990-1991 recession, see Hall (1993) and Hansen and Prescott (1993). Bernanke and Lown (1991), find no support for the credit crunch hypothesis.

## VII.2 How Different are U.S. Recessions from Other Recessions?

When we compare the general features of U.S. recessions with those in other G-7 and OECD countries, we see similarities in terms of duration, amplitude and cumulative loss (Tables 12A-C). Moreover, most U.S. macroeconomic, trade and financial variables follow procyclical patterns similar to those in other recessions. A main difference, however, is the much larger fall in residential investment: typical three to four times larger than that in other countries. This, together with the observation that residential investment is a good leading indicator of a U.S. recession, lends support to the statement that “housing is the business cycle in the United States” (Leamer, 2007).

In terms of external adjustment, both net exports and the current account balance show small improvements in most US recessions, quite similar to other recessions. However, while exports tend to increase slightly during U.S. recessions, they decline in other recessions. In the two globally highly synchronized recessions, 1981:3 and 2000:4, exports also contracted sharply in the United States as economic activity was also weak elsewhere. Imports decline in most U.S. recessions, typical by about 6 percent. While industrial production drops more during U.S. recessions than in other OECD countries, the drop compares with that in G-7 countries. Similarly, the increase in the U.S. unemployment rate is somewhat more pronounced. Unemployment rose by less than 1 percentage points in the last two recessions, however, reflecting the observation that “modern” U.S. recessions take place without a substantial increase in job losses (Hall, 2007).

House prices declines are somewhat less and equity prices declines slightly more pronounced during U.S. recessions than during those in other countries. However, unlike the typical low, but still positive increase in credit growth in other countries, credit tends to contract during U.S. recessions. These general patterns hide some differences, such as the 1973:4 recession, when house prices, equity prices and credit declined by 3.8, 35 and 4 percent, respectively. During the 2000:4 recession, when equity prices went down by 8.5 percent, however, house prices actually increased by 4 percent and real credit remained unchanged. Overall, the 1973 recession clearly stands out with a unique combination of a sharp output drop, large asset price declines and a credit contraction.

In terms of policy responses, both monetary and fiscal policies were typically used slightly more forcefully during recessions in the United States than in OECD economies. There are differences though among U.S. recessions. While the typical decline in the real interest rate was some 1.6 percent, in the 1973:4 recession the drop was 3.8 percent. And while government consumption typically rose, by some 2.2 percent, in the 1969:3 recession it fell by 1.8 percent.<sup>30</sup>

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<sup>30</sup> Romer and Romer (1994) also find evidence that monetary policy in the United States typically becomes expansive as economic activity moves from peak to trough. They note that the evidence on fiscal policy—which is proxied by the ratio of the full employment surplus to potential GDP—is, however, more mixed.

### **VII.3. Basic Stylized Facts on Credit Contractions and Asset Price Declines**

There are only 5 episodes of credit contractions in the United States, but two of these contractions, 1979:3 and 1989:3, are credit crunches, i.e., in the top quartile of all contractions in our sample (Table 13A). Both these credit crunches lasted more than three years and overlapped with recessions. In general, credit contractions are worse in the United States, with a typical decline and average duration almost twice that in other countries. Both equity and house prices decline more during U.S. credit contractions than during other countries'. While U.S. output grows on average during credit contractions, industrial production declines. Residential investment substantially declines, on average by 13 percent, roughly twice the average in OECD countries. In sum, credit contractions in the U.S. appear to be more closely related to the real economy and the evolution of the housing market than those in other countries (Bayoumi and Melander, 2008).

Although there has been no house price bust in the United States since 1970, there were seven episodes of house price declines, with a typical decline of 2 percent and an average duration of 6 quarters, thus shorter and less deep than those in other countries (Table 13B). Two house price declines overlap with recessions: the large decline starting in 1979:1, of 15 percent which lasted 14 quarters, overlapped with the 1980-81 recession, and the 1989:4 decline that lasted 7 quarters, extended into the 1990:3 recession. While on average both output and industrial production grew during house price declines, there is a significant fall in residential investment, about 9 percent, more than twice that in OECD countries. Credit also declined in four out of seven episodes of U.S. house price declines. These findings confirm again that house price declines closely relate to the U.S. real economy and financial markets (Leamer, 2007; Mishkin, 2007).

Table 13C shows that there have been 14 episodes of declines in U.S. equity prices since 1960, lasting on average 5 quarters with a drop of 21 percent. However, only one, 1972:4, is an equity price bust with a 65 percent contraction in equity prices which lasted 8 quarters. While some others lasted longer, up to 14-15 quarters, their price decline was smaller. Three episodes of equity price declines, 1972:4, 1978:3, and 1999:3, overlapped with U.S. recessions. As for house price declines, both output and industrial production on average grew — at 2.9 and 2.4 percent respectively, but residential investment tended to contract during equity price declines. House prices generally do not decline during equity price declines nor does credit register negative growth. In other words, equity prices declines in the United States appear much less related to the real economy than house prices and even much less than credit contractions do.

### **VIII. An Evolving Case Study: The Current U.S. Slowdown**

As we mentioned in the introduction, an intensive debate has been going on about whether the United States might experience a recession in the coming months. What are the insights we gained from our study of various types of recessions, crunches and busts for this debate? This section attempts to answer this question. We first examine whether the pattern of the current slowdown in the United States is similar (or not) to that observed during the onset of a typical U.S. or OECD recession. We then consider some alternative scenarios involving different types of recessions, including the episodes of credit-crunch-recessions and housing-bust recessions, and analyze how the lessons learned from these can be applied to the current U.S. case. The

latter comparisons are especially valuable since the United States has not experienced many of these relatively rare events.

### **VIII.1. Current U.S. Slowdown and Previous Recessions: Any Similarities?**

The most obvious comparison is to review current macroeconomic developments in the United States against the medians of all previous recessions in the United States and those in other OECD countries in our sample, assuming the United States reached a cyclical peak at the end of the first quarter of 2008, which of course needs not be the case.<sup>31</sup> Figure 9 provide the year-on-year growth rates of various salient macroeconomic and financial variables for this comparison. There has been a considerable slowdown in the growth rate of output in the United States over the last few quarters, with growth recently actually somewhat below typical if this were the onset phase of an U.S. or other OECD country recession. Both consumption and industrial production also exhibit lower than typical, albeit still positive rate of growth during the current slowdown. There has been a sharper decline in total investment growth than typical in the onset to a recession, with now some 6 quarters of negative real growth. This reflects, not surprisingly, especially the sharp drop in residential investment with 8 successive quarters of negative annual growth, with the decline in 2008:1 running at 20 percent. In this respect, the current episode is clearly a sharper slowdown than those typically observed in the onset of past U.S. or other OECD recessions. Although nonresidential investment continues to record positive growth, this variable appears to be a lagging indicator, since its growth rate typically does not change much prior to U.S. recessions.

With respect to trade, exports show currently growth above typical in the onset of a recession — possibly reflecting the depreciation of the U.S. dollar and still robust global growth — which has helped keep overall U.S. output growth up. At the same time, however, imports are at their typical path of a slowdown prior to a recession (although, if it were not for the high oil prices, a sharper decline in imports might have occurred). Reflecting, however, long-standing global imbalances, the U.S. net exports and the current account balance display a much larger deficit today than typically observed during the onset of past episodes (see, for instance, Obstfeld and Rogoff, 2007). Another notable difference is that there has been a sharp pickup in inflation, more so than in other episodes, but this might be in part because inflation has started from a lower level than typical before a recession. The unemployment rate has been edging up consistent with the typical onset phase of a recession.

In terms of credit growth, there are some differences between the current slowdown in the United States and the onset of a typical U.S. or other OECD recession.<sup>32</sup> Until a few quarters ago,

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<sup>31</sup> Recently released preliminary figures indicate GDP increased at an annual rate of 1.9 percent in the second quarter of 2008 (that is, from the first quarter to the second quarter), according to advance estimates released by the Bureau of Economic Analysis. In the first quarter, real GDP increased 0.9 percent. Since we do not have all the data series for the second quarter, we make the end of the first quarter our peak date.

<sup>32</sup> The measure of credit we use to describe the current case for the United States is the sum of the claims on the private sector by deposit banks and those by other financial institutions (both from IFS). For our cross-country analysis, we use only claims on the private sector by deposit banks as our measure of credit  
(continued)

growth in credit extension was rapid, above that typical in the onset of past, especially U.S. recessions. The overall pattern of credit growth, however, was itself affected by the financial turmoil over the past year and the role of commercial banks in financial intermediation, especially in securitization.<sup>33</sup> In 2007:1, there was a largely involuntary expansion in commercial bank loans as conduits, associated with sub-prime lending and other securitization activities, were bailed out or absorbed by banks and previously agreed lines of credit were activated (IMF, 2008). This led to the growth in credit from banks to continue to increase in 2007.

Looking at the financial system's balance sheet as a whole, however, reveals that financial assets to the corporate sector had already shrank in the last quarter of 2007, for the first time since the last credit crunch in the early 1990s (IMF, 2008). In other words, contracting assets of nonbank affiliates — asset-backed security issuers and broker-dealers — more than offset the largely involuntary expansion in commercial bank loans. Other, more up to date indicators, such as spreads and senior lending officers' surveys, also make clear that recent developments in the financial sector continue to restrain credit availability effectively to both the non-financial corporate sector and consumers. As such, there has been a de-facto contraction in available credit for some time now. And indeed annual credit growth dropped sharply in 2008:1, as shown in the figure.

In terms of asset prices, there has been a much stronger decline in the growth rate of house prices than is typical in the onset of a U.S. or other OECD recessions — with house prices now declining for 3 quarters. This mirrors, of course, the sharp slowdown in residential investment. While large equity price appreciations were observed until a few quarters ago, a pattern not usually seen in the run-up to a recession, this has quickly reversed itself recently, with the speed at which equity prices have decelerated much sharper than typically observed in the onset of a recession. Although somewhat later than typical, equity prices declined on an annual basis in 2008:1 and have fallen further since then (not shown in the figure).

## **VIII.2. Current U.S. Slowdown and Previous Crunches and Busts: Any Similarities?**

These comparisons suggest that, while the current slowdown may share some features with the onsets of typical U.S. and OECD recession, it is worse in some dimensions, particularly in terms of speed of credit contraction, drop in residential investment and decline in house prices. We therefore also compare the developments in credit and housing markets in the United States to date to those in the past episodes of credit contractions and house price declines. Tables 2B and 3B showed that such credit contraction (crunch) and house price decline (bust) episodes on average lasted 6 (10) and 8 (18) quarters, respectively. If these statistics, based on a large number of episodes, provide any guidance, they suggest that the adjustments of credit and housing markets in the United States are only in the early stages relative to historical norms and might still take a long time. The earlier episodes suggest that the process of adjustment in the United States might persist in the coming months with further difficulties in credit markets and

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since this variable is available for all countries in our sample whereas data on claims on the private sector by other financial institutions is not.

<sup>33</sup> For a general summary of what has happened since the beginning of the current financial crisis, see, among others, Borio, 2008; Buiter, 2008; and Goodhart, 2008.

drops in house prices. This could bode consequently poor for the path of overall output, which, as we showed, falls more in recessions associated with credit crunches and house price busts than in recessions without such events.

### **VIII.3. Summary: Is The Glass Half Full or Half Empty?**

These comparisons, and what we discussed in the previous sub-section, are indications that if a recession were to occur in the coming months in the United States, that its depth might be less shallow and its duration longer than that of a normal recession. At the same time, this outlook is affected by many other factors, important among which are the policy responses and the rising inflation pressures due to the recent oil price shock. The monetary policy response appears to be more aggressive relative to earlier episodes since the real interest rate has declined much more and earlier than typical around a recession. Similarly, fiscal policy has been quite expansionary for some time as reflected by the higher growth rate in government consumption.

The hefty combination of expansionary monetary and fiscal policies already employed, combined with the relatively healthy balance sheets of non-financial corporations going into this slowdown, could therefore mitigate the possibility, depth and duration of an adverse outcome. On the other hand, the difficulties in credit and housing markets combined with rising inflationary pressures as a result of the oil and other commodity price shocks can further weaken economic activity while limiting policy options. As such, the current slowdown in the United States is an evolving case with a multitude of factors, and it is not clear whether this will eventually be a mid-cycle slowdown, or if a recession, how severe it will be.

## **IX. Conclusion**

Our analysis of the interactions between macroeconomic and financial variables around various episodes of business and financial cycles suggests that these linkages play key roles in determining the severity and duration of recessions. In particular, recessions associated with credit crunches and house price busts are deeper and last longer than other recessions do. The durations of credit crunches and house price busts tend to be longer than those of typical recessions, while the dynamics of the main components of domestic absorption around these events are similar to those observed during recessions. Credit crunches and house price busts are more costly than equity price busts are, and equity price busts appear to be less consistently associated with real sector outcomes.

In light of these findings, we examine the prospective implications of recent macroeconomic and financial developments in the United States and conclude that there are indications that the current slowdown in U.S. output is not atypical of the onset of previous recession episodes. Yet at the same time, the sharp decline in total investment (mainly driven by a large drop in residential investment), the drop in house prices and, to lesser extent, the credit contraction suggest that the slow down is more severe than in a typical onset of a recession. This suggests that, if a recession were to occur in the United States, its amplitude might be deeper and its duration longer than that of a typical recession.



However, the hefty combination of expansionary monetary and fiscal policies already employed could mitigate the risk of an adverse outcome. Nevertheless, the persistent difficulties in credit and housing markets combined with rising inflationary pressures due to the oil and other commodity price shocks can further weaken economic activity while limiting policy options. As such, the current slowdown in the United States is an evolving case affected by a multitude of factors, and it is not clear whether this will eventually be a mid-cycle slowdown, or if a recession, how severe it will be.

While our broad cross-country study sheds much new light on the implications of recessions, crunches, and busts, it does come with its caveats. Being an event study, no causal inferences are made (or intended) as to how recessions come about, whether financial variables affect macroeconomic outcomes or vice-versa, and how policies affect economic and financial outcomes. Moreover, an important caveat to our prospective analysis for the United States is that initial conditions, external developments in terms of both demand and supply, and policy responses will affect the path the economy may follow. Furthermore, while business cycles have not disappeared, due to a number of factors they have changed over time. As such, the future path of the U.S. economy can well differ from that typically followed in past U.S. and other recessions.

Our analysis also made clear that more work is needed to get a better grasp of the important macroeconomic and financial linkages so as to be better informed on how to adjust policies and institutional environments, and to make better forecasts on the shape of economic outcomes. For instance, our analysis did not yet explore the channels through which financial and real variables interact. As noted by a diverse set of theoretical studies, besides general wealth and substitution effects, financial variables will impact the balance sheets of financial institutions, firms and households, and thereby affect the extension of credit and thus the real economy. While there has been some empirical work documenting the importance of these channels in normal times, little is known about how they operate in a recession, which could include Fisherian deflations.

This points to a future research agenda. One additional approach to shed more light on the channels would be to use individual firm data for a similarly large sample of countries. For instance, we plan to examine the evolution of firm financial variables, especially credit use, inventory and liquidity, by classes of firms, including firm size, degree of leverage and other measures capturing the likely degree of firms being financially constrained. This will allow one to investigate whether firms that are more dependent on external finance are hit harder during recessions with credit contractions and housing busts than during normal recessions.

Other future research can focus on alternative metrics of economic activity, such as various measures of output gap, studying whether there are different patterns in recessions associated with financial stress or crisis episodes, and how the various types of recessions interact with global and emerging market cycles. Lastly, it would be useful to expand the sample of countries by including emerging market economies to examine the global dimensions of recessions.

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## Appendix: Database

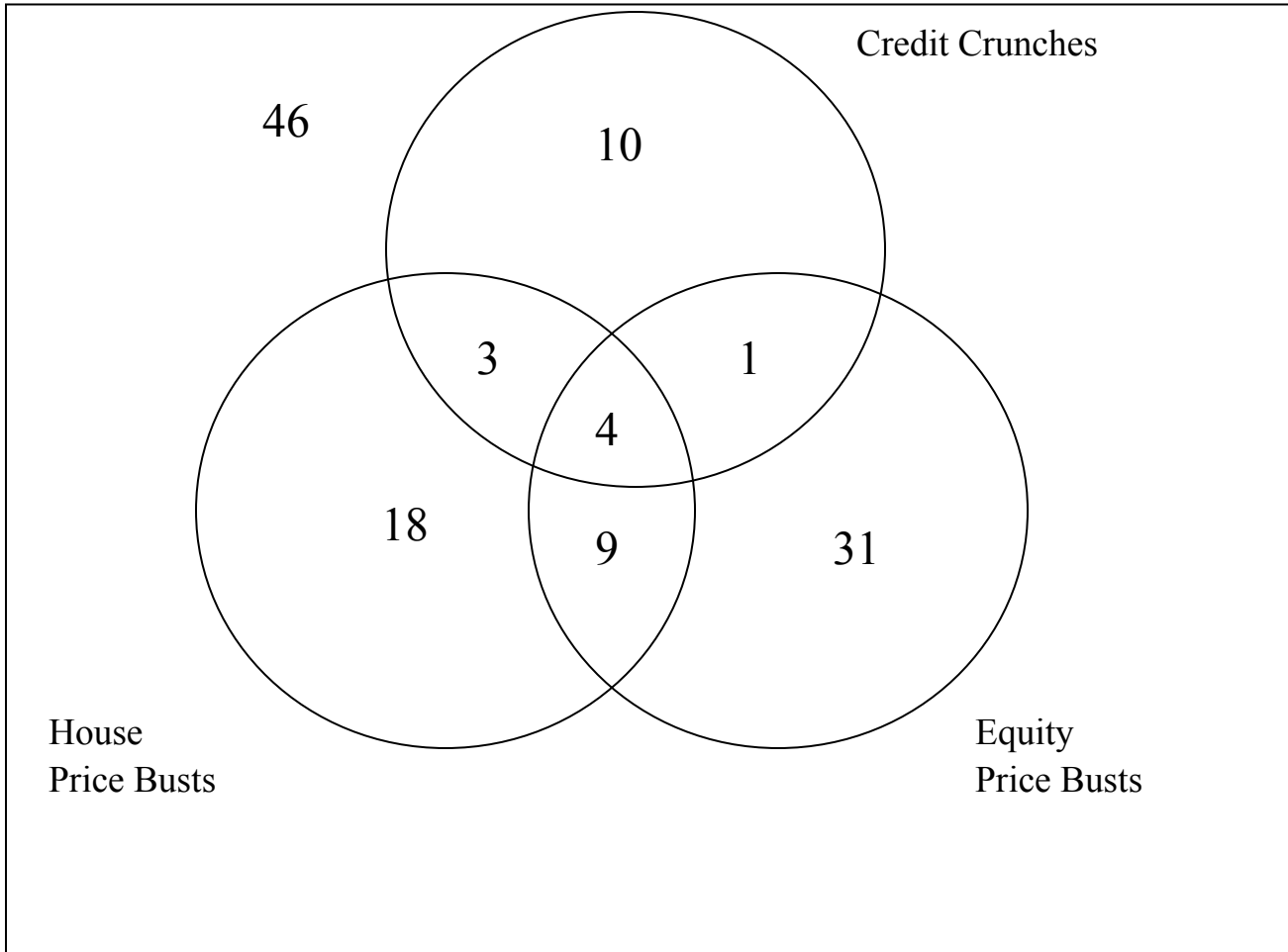
Variable	Variable Definition	Source
Output	Gross domestic product, volume; 1960:1-2007:4 (except Portugal: 1988:1-2007:4)	OECD
Consumption	Private final consumption expenditure, volume; 1960:1-2007:4	OECD
Government Consumption	Government final consumption expenditure, volume; 1960:1-2007:4 (except Spain: 1961:1-2007:4)	OECD
Investment	Gross fixed capital formation, volume; 1960:1-2007:4	OECD
Residential FCF	Private residential fixed capital formation, volume; 1960:1-2007:4 (except Canada: 1961:1-2007:4, France: 1963:1-2007:4, New Zealand: 1961:3-2007:4, Portugal: 1988:1-2007:4)	OECD
Nonresidential FCF	Private nonresidential fixed capital formation, volume; 1960:1-2007:4 (except Canada: 1961:1-2007:4, France: 1963:1-2007:4, UK: 1962:1-2007:4, Denmark: 1971:1-2007:4, New Zealand: 1961:3-2007:4, Norway: 1962:1-2007:4, Portugal: 1988:1-2007:4, Switzerland: 1961:1-2007:4)	OECD
Total FCF	Private total fixed capital formation, volume; 1960:1-2007:4 (except Canada: 1961:1-2007:4, Denmark: 1971:1-2007:4, France: 1963:1-2007:4, New Zealand: 1961:3-2007:4, Norway: 1962:1-2007:4, Portugal: 1977:1-2007:4, Spain: 1964:1-2007:4, Switzerland: 1961:1-2007:4, UK: 1962:1-2007:4)	OECD
Industrial Production	Industrial production; 1960:1-2007:4 Generally, the coverage of industrial production indices comprises mining and quarrying, manufacturing and electricity, and gas and water, according to the UN international Standard Industrial Classification (ISIC). For most of OECD countries, the data are sourced from the OECD database.	IFS
Exports	Exports of good and services, volume; 1960:1-2007:4	OECD
Imports	Imports of good and services, volume; 1960:1-2007:4	OECD
Export Prices	Export unit values; 1960:1-2007:4 (except Portugal: 1983:1-2007:4, Switzerland: 1961:1-2007:4) Indices for Unit Value of Exports are Laspeyres, with weights derived from the data for transactions.	IFS
Import Prices	Import unit values; 1960:1-2007:4 (except Belgium: 1993:1-2007:4, France: 1989:4-2007:4, Greece: 1961:1-2007:4, Switzerland: 1961:1-2007:4) Indices for Unit Value of Exports are Laspeyres, with weights derived from the data for transactions.	IFS
Net Export-GDP ratio	Net exports/GDP; 1960:1-2007:4 (except France: 1963:1-2007:4)	Both net exports and GDP are from OECD.
Current Account - GDP Ratio	Current account balances/GDP; 1960:1-2007:4 (except Austria: 1970:1-2007:4, Belgium: 1975:1-2007:4, Denmark: 1988:1-2007:4, Finland: 1975:1-2007:4, France: 1975:1-2007:4, Germany: 1971:1-2007:4, Greece: 1975:1-2007:4, Ireland: 1975:1-2007:4, Italy: 1971:1-2007:4, Japan: 1968:1-2007:4, Netherlands: 1967:1-2007:4, New Zealand: 1971:1-2007:4, Norway: 1975:1-2007:1, Portugal: 1975:1-2007:4, Spain: 1975:1-2007:4, Sweden: 1975:1-2007:4, Switzerland: 1972:1-2007:4)	(1) Current account balances are from OECD and GDS; (2) GDP is from OECD.



Variable	Variable Definition	Source
NEER	Nominal effective exchange rate; 1960:1-2007:4 A nominal effective exchange rate index represents the ratio (expressed on the base 2000=100) of an index of a currency's period-average exchange rate to a weighted geometric average of exchange rates for the currencies of selected countries and the euro area.	IFS
REER	Real effective exchange rate; 1980:1-2007:4 A real effective exchange rate index represents a nominal effective exchange rate index adjusted for relative movements in national price or cost indicators of the home country, selected countries, and the euro area.	IFS
House Prices	Nominal house prices deflated using CPI (BIS data only); 1970:1-2007:4 (except Austria: 1986:3-2007:4, Belgium: 1988:1-2007:4, Greece: 1993:4-2007:4, Portugal: 1988:1-2007:4, Spain: 1971:1-2007:4)	OECD and BIS (Austria, Belgium, Greece and Portugal)
Stock Prices	Share Price (Index) deflated using Consumer Price Index; 1960:1-2007:4 1960:1-2007:4 (except Denmark: 1970:1-2007:4, Greece: 1994:1-2007:4, New Zealand: 1961:1-2007:4, Portugal: 1988:1-2007:4, Spain: 1961:1-2007:4) Indices shown for Share Prices generally relate to common shares of companies traded on national or foreign stock exchanges. All reported indices are adjusted for changes in quoted nominal capital of companies. Indices are, in general, base-weighted arithmetic averages with market value of outstanding shares as weights.	Both Share Price (Index) and Consumer Price Index are from IFS.
Real Credit	Nominal credit deflated using Consumer Price Index; 1960:1-2007:4 (except Italy: 1970:1-2007:4, UK: 1963:1-2007:4, Spain:1972:1-2007:4, Sweden: 1969:4-2007:4, Switzerland: 1964:1-2007:4) Nominal credit from IFS is generally titled "Claims on Private Sector", "Claims on Other Resident Sector", etc. Nominal credit from Datastream is generally titled "Loans to Resident Private Sector", "Lending to Enterprises and Individuals", etc.	(1) Nominal credit is from IFS and Datastream; (2) Consumer Price Index is from IFS.
Short-term Real Interest Rate	Treasury bill rate deflated using inflate rate; 1960:1-2007:4 Treasury Bill Rate is the rate at which short-term securities are issued or traded in the market.	(1) Short-term nominal interest rate is from IFS; (2) Inflation rate is the annual growth rate of CPI (from IFS).
Long-term Real Interest Rate	Government bond yield deflated using inflate rate; 1960:1-2007:4 Government Bond Yield refers to one or more series representing yields to maturity of government bonds or other bonds that would indicate longer -term rates.	(1) Long-term nominal interest rate is from IFS; (2) Inflation rate is the annual growth rate of CPI (from IFS).
Unemployment Rate	Unemployment rate; 1960:1-2007:4 The unemployment rate is the ratio of number of persons unemployed and the number of persons in the labour force. The labour force is the sum of the numbers of persons employed and unemployed. The criteria for a person to be considered as unemployed or employed are defined by the ILO guidelines.	OECD, GDS, HAVER, DATASTREAM and BLOOMBERG
Inflation Rate	Inflation rate; 1960:1-2007:4 Inflation rate is calculated as $[CPI(\text{quarter } i, \text{ year } t) / CPI(\text{quarter } i, \text{ year } t-1) - 1] * 100$ , where $i=1,2,3,4$ .	CPI is from IFS.

**Figure 1. Associations between Recessions, Crunches and Busts**  
*(number of events in each event category)*

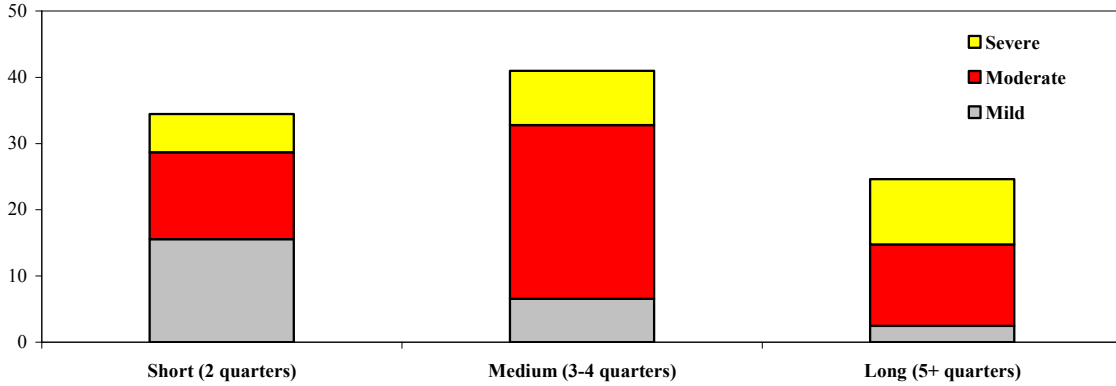
Recessions



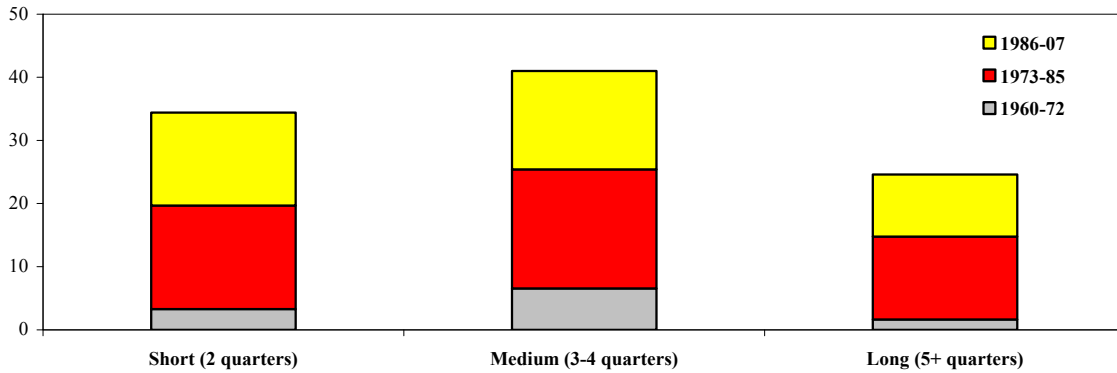
Notes: The rectangle shows the distribution of 122 recession episodes in the sample into those associated with crunches and busts (76) and those associated with none (46). Out of 122 recessions, 18 are associated with credit crunches, 34 are with house price busts, and 45 are with equity price busts. 46 recessions are not associated with either a crunch or bust episode.

**Figure 2. Recessions: Duration and Amplitude**  
*(share of total sample, percent)*

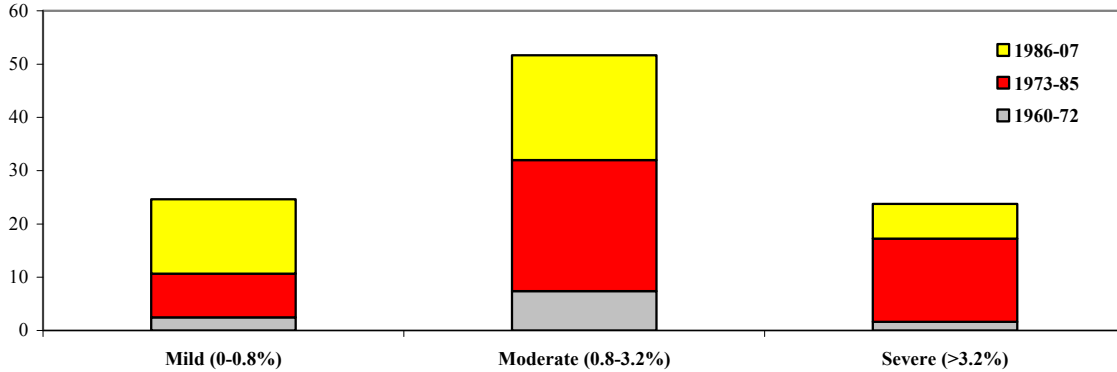
**A. Duration and Amplitude: Full Period (1960:1-2007:4)**



**B. Duration: Sub-periods**



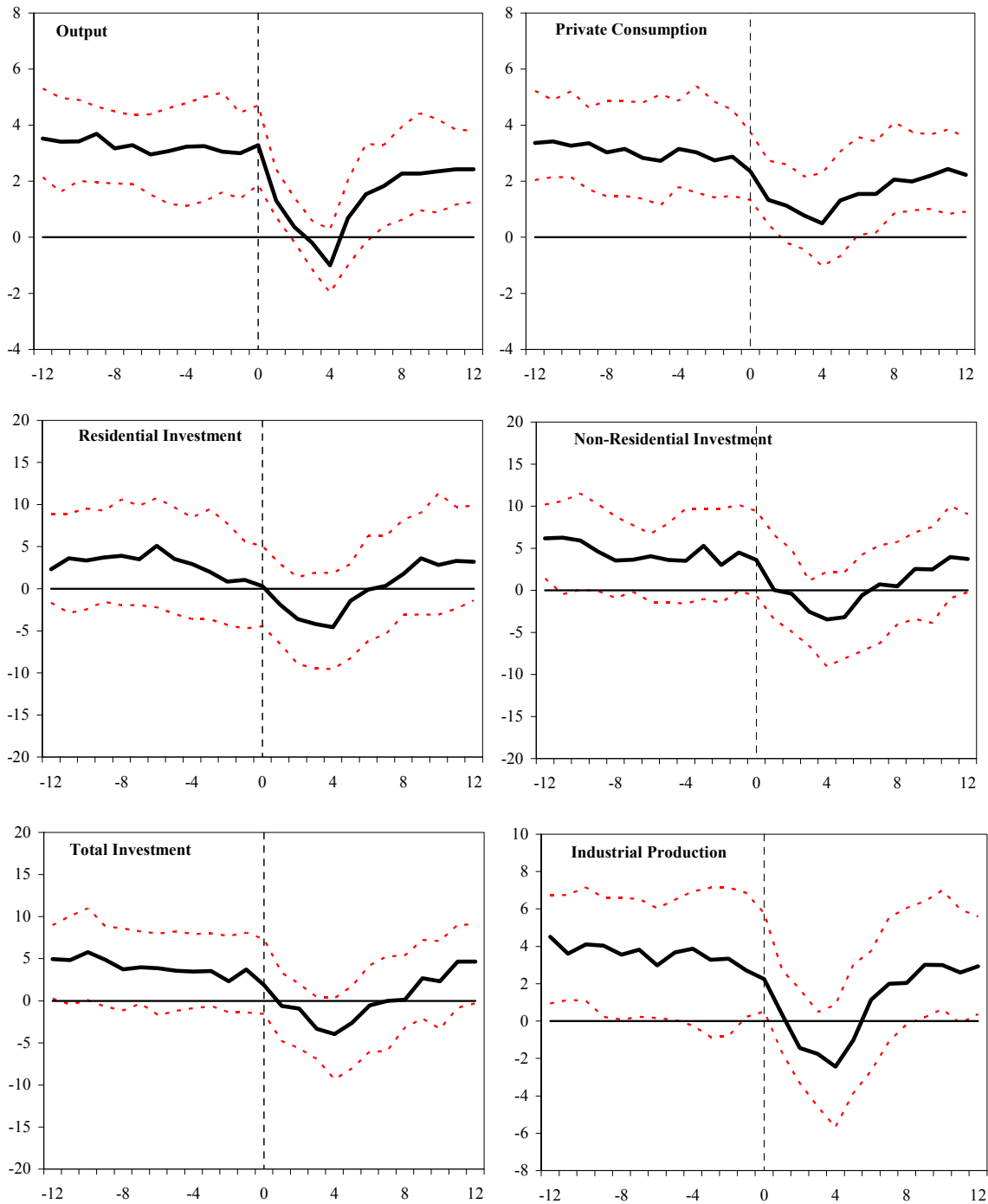
**C. Amplitude: Sub-periods**



Notes: Share of total number of recessions falling in particular categories. Duration is the number of quarters from a peak to the next trough. Amplitude is the percent change in output from a peak to the next trough.

### Figure 3. Recessions in OECD Countries

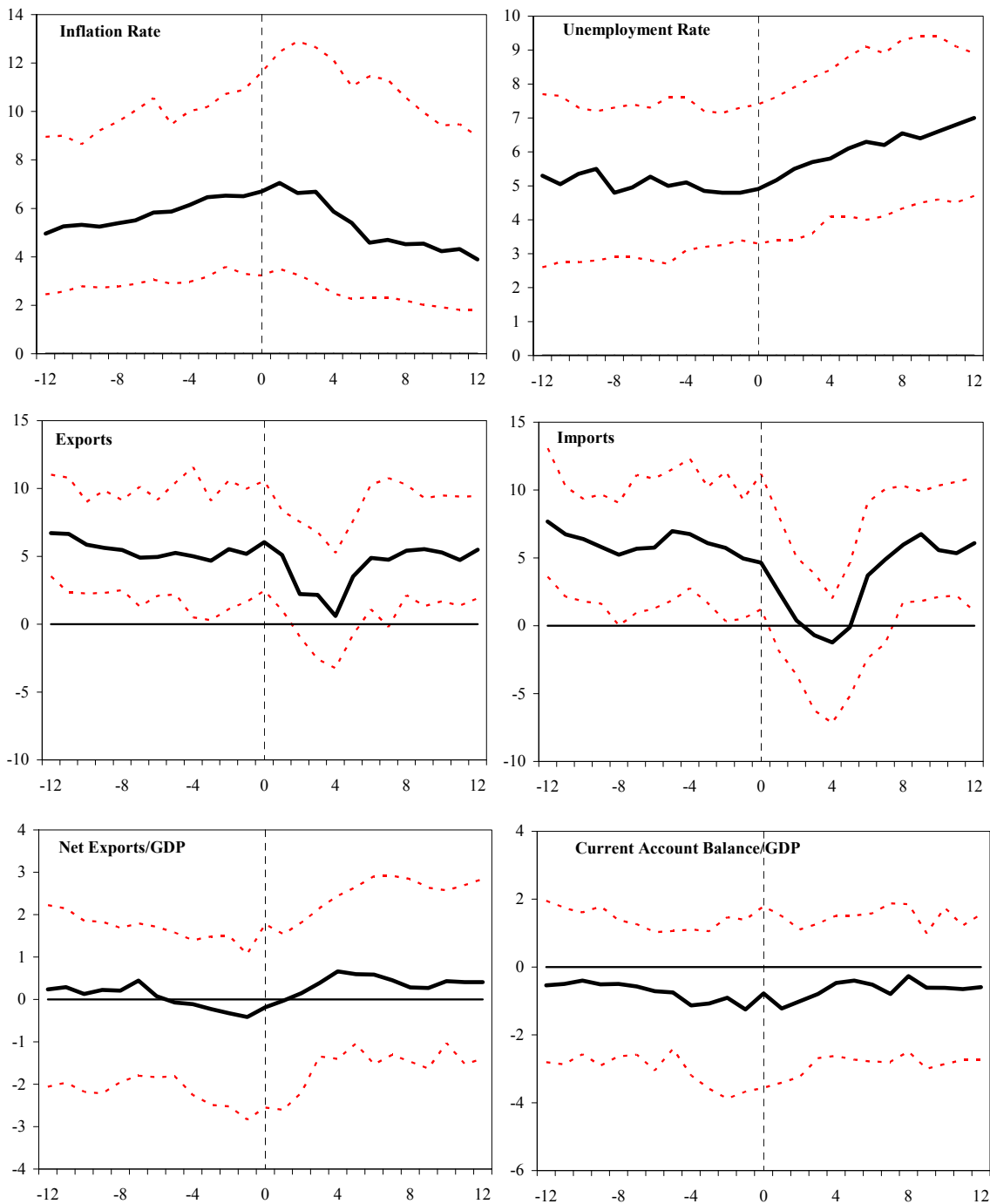
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a recession begins (peak in the level of output).

### Figure 3. Recessions in OECD Countries (continued)

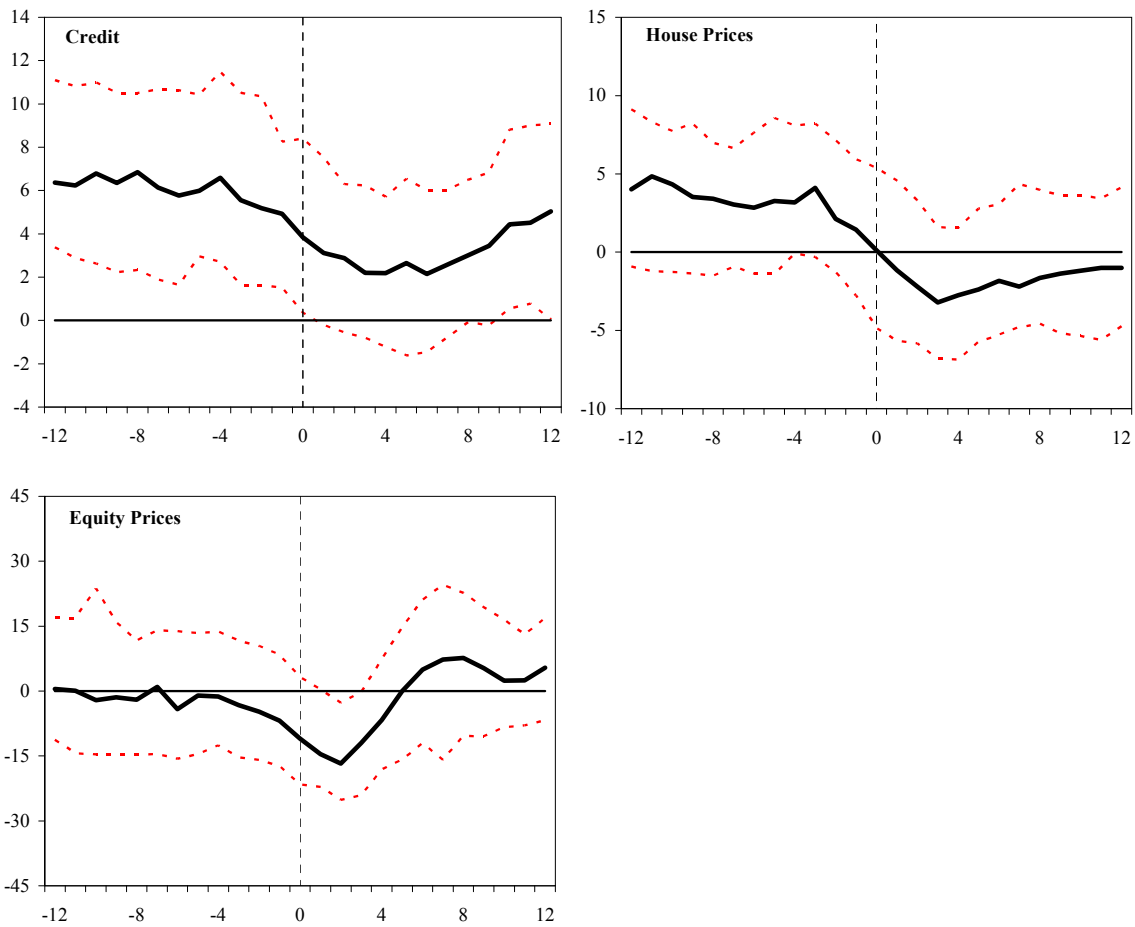
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a recession begins (peak in the level of output). Inflation (unemployment) rate is the change in the level of respective variable. Net exports/GDP and Current Account Balance/GDP correspond to the change in the levels of these variables.

### Figure 3. Recessions in OECD Countries (continued)

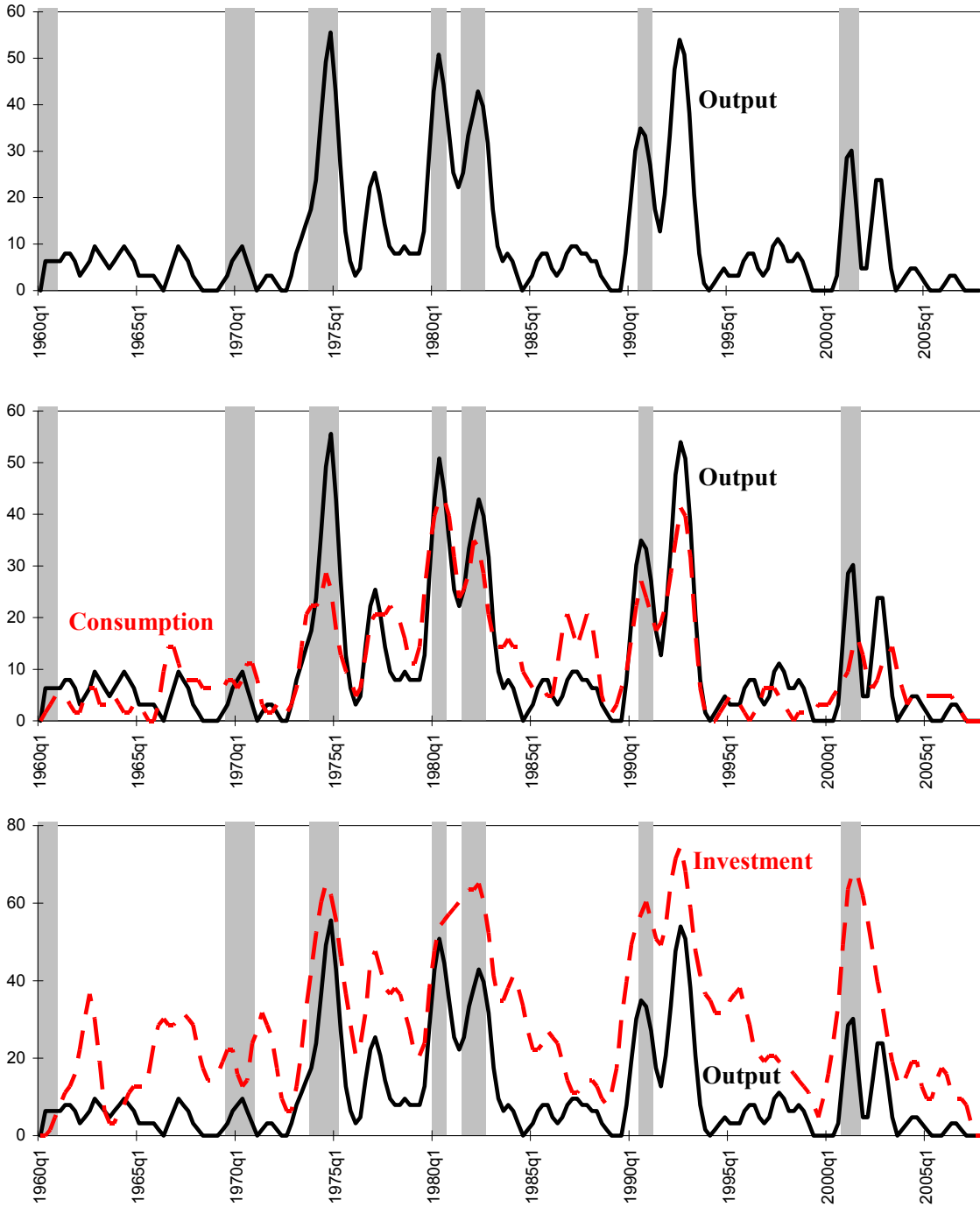
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a recession begins (peak in the level of output).

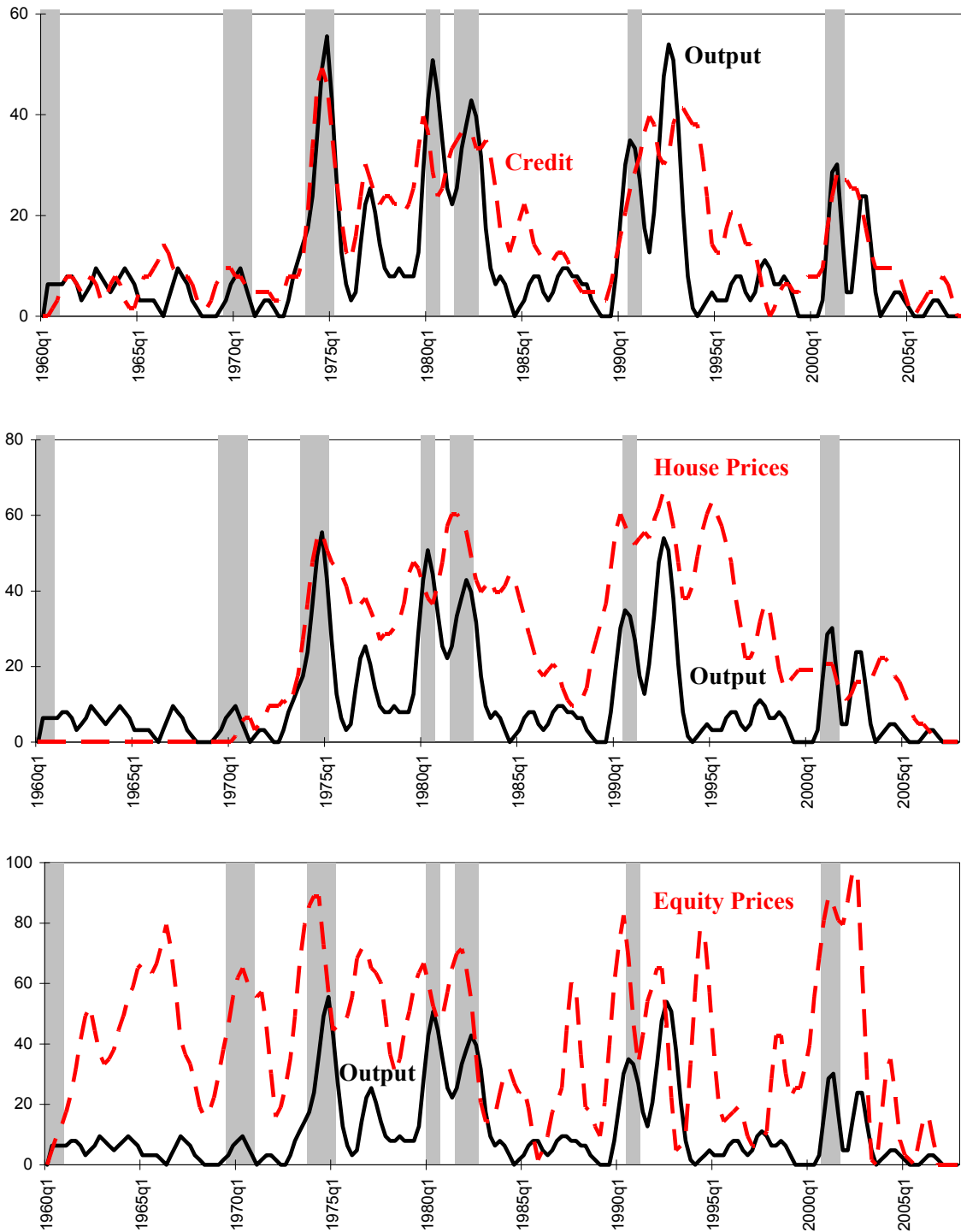
### Figure 4. Synchronization of Recessions

(Share of countries experiencing recessionary episodes of output, consumption and investment, percent)



Notes: Share of countries experiencing recessions in output, consumption and investment. Shaded bars indicate periods of U.S. recessions.

**Figure 5. Synchronization of Credit Contractions and Asset Price Declines**  
*(Share of countries experiencing credit contractions or asset price declines, percent)*

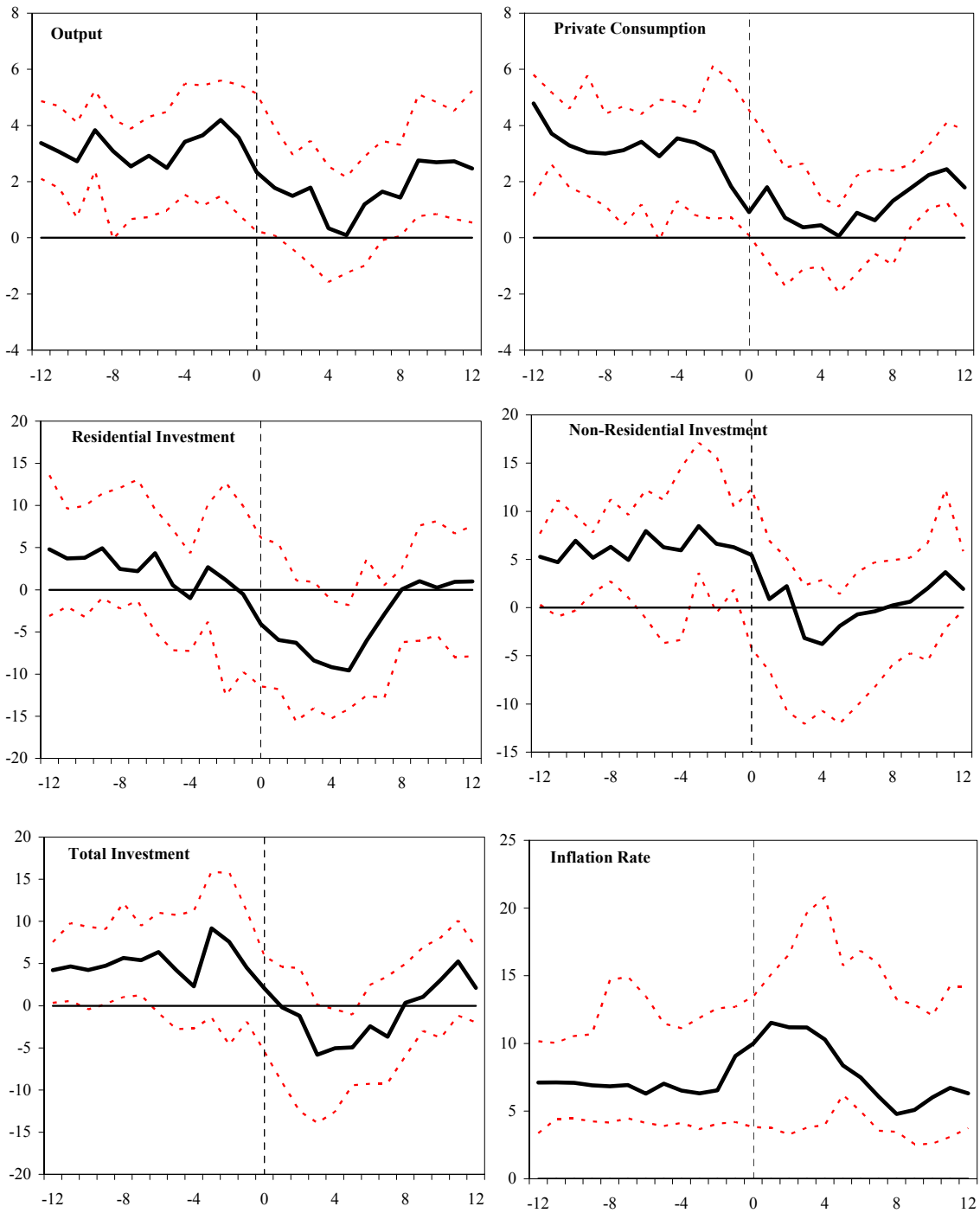


Notes: Share of countries experiencing episodes of credit contractions, house price declines and equity price declines. Shaded bars indicate periods of U.S. recessions.



### Figure 6. Credit Crunches in OECD Countries

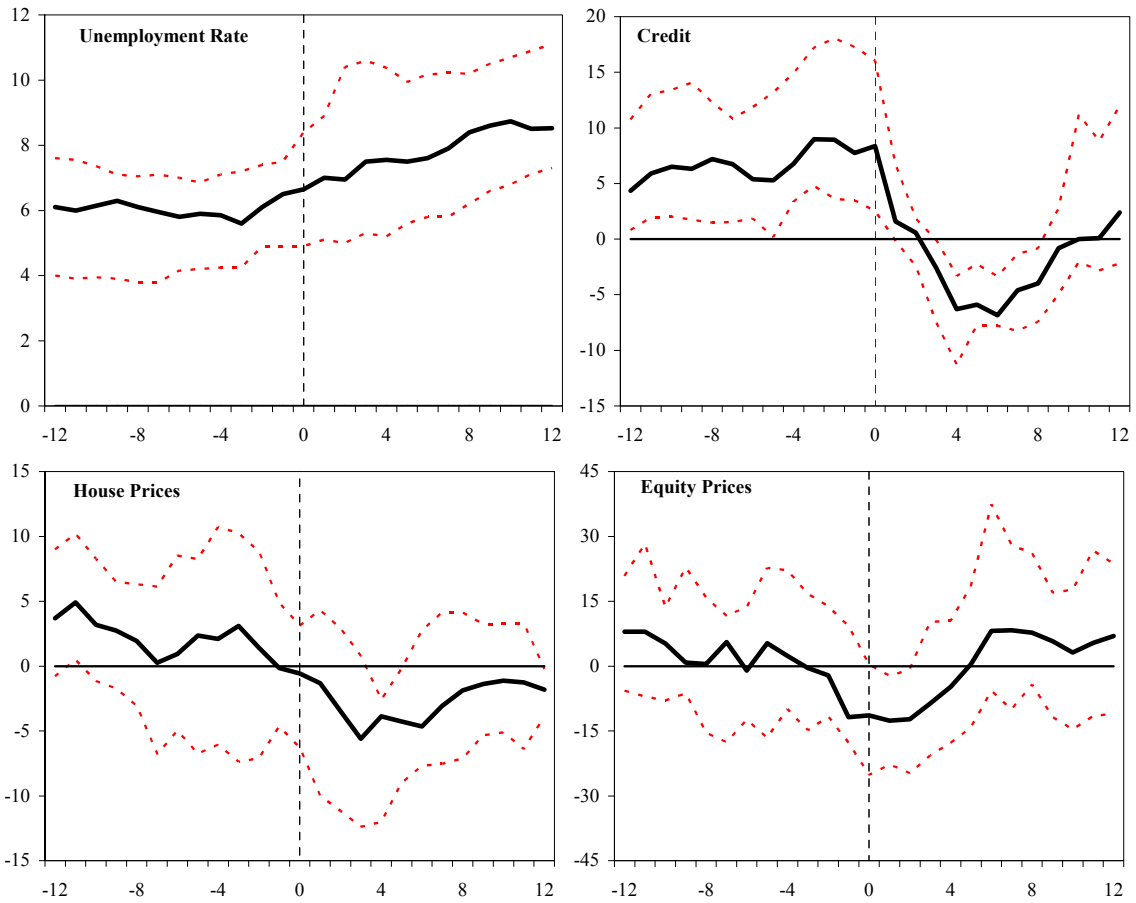
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a crunch begins (peak in the level of credit). Inflation rate is the change in the level.

### Figure 6. Credit Crunches in OECD Countries (continued)

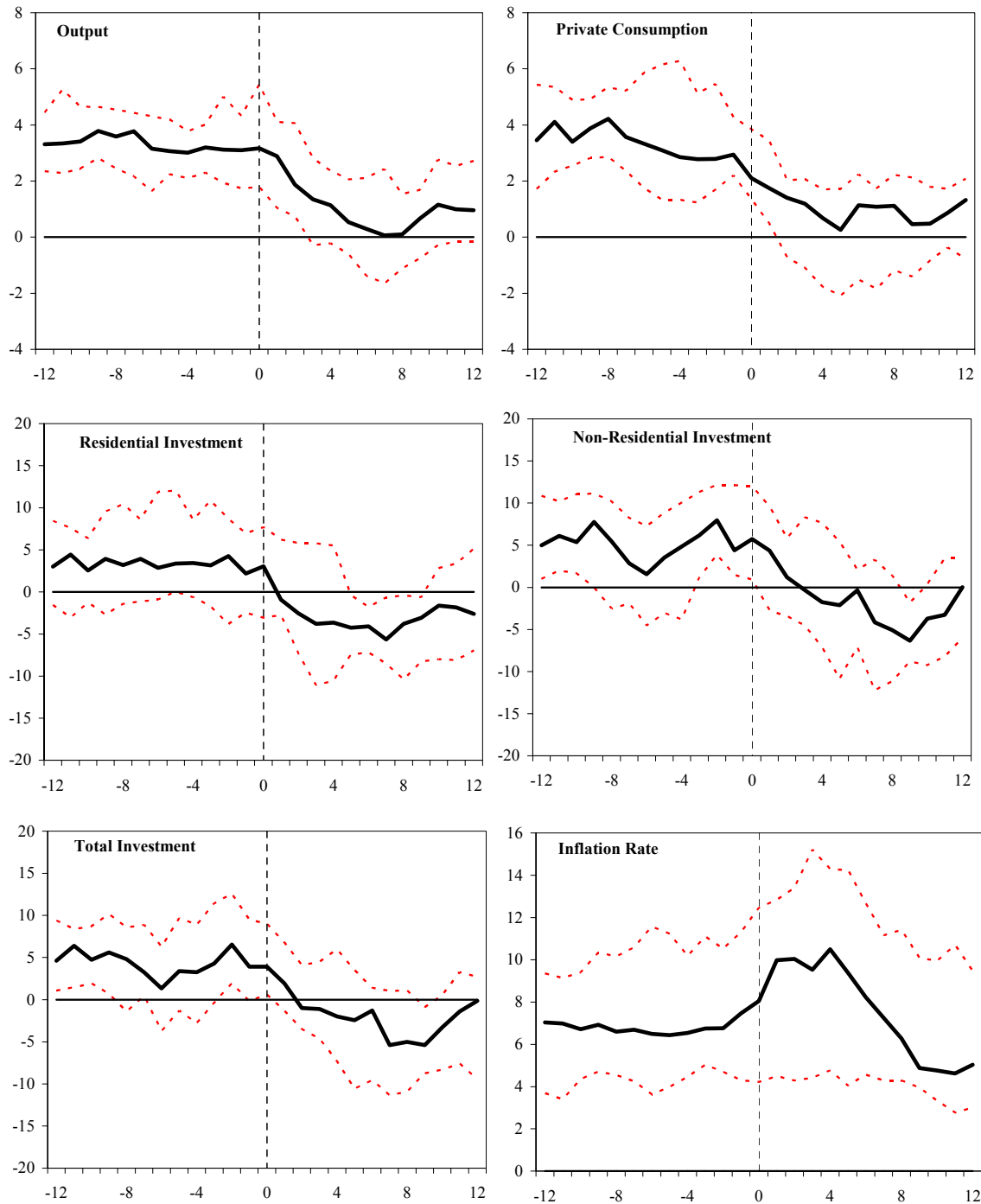
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a crunch begins (peak in the level of credit). Unemployment rate is the change in the level.

### Figure 7. House Price Busts in OECD Countries

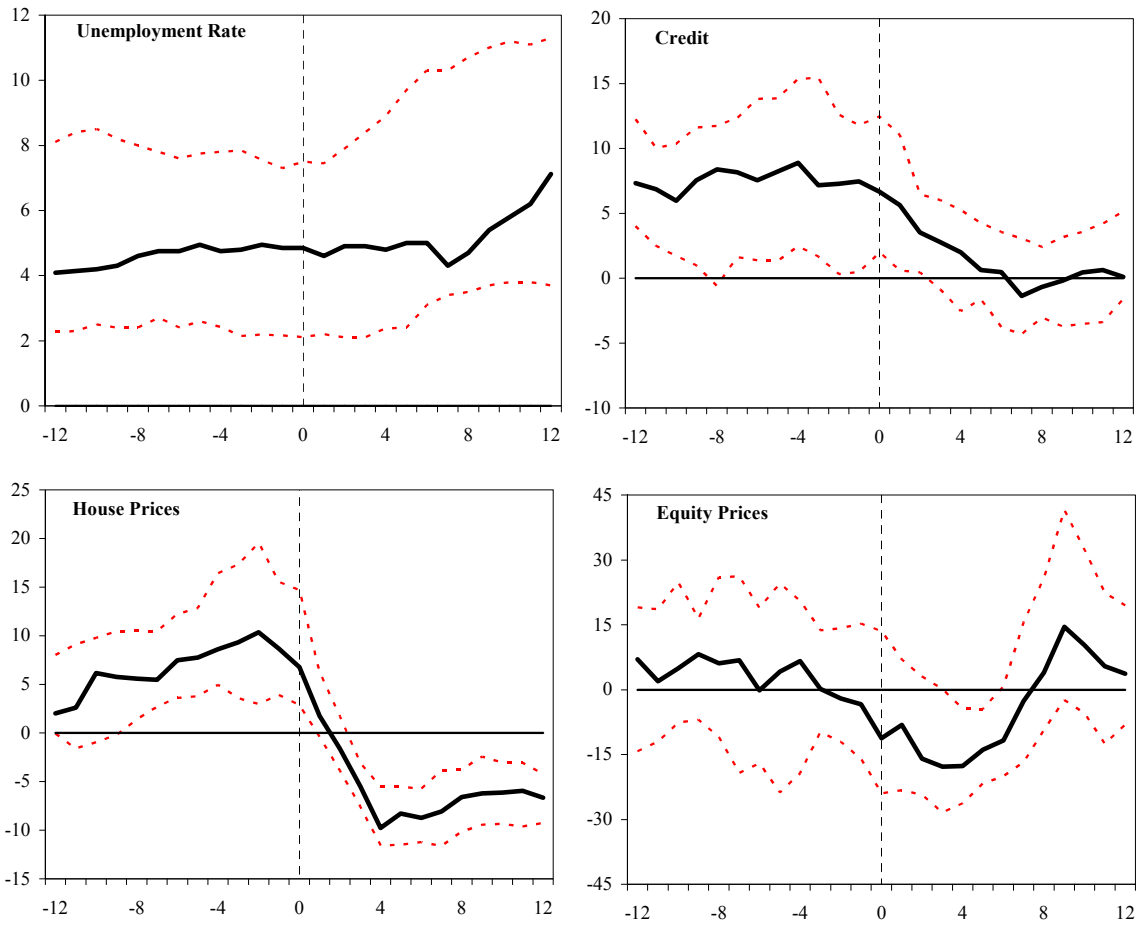
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a bust begins (peak in the level of house price). Inflation rate is the change in the level.

### Figure 7. House Price Busts in OECD Countries (continued)

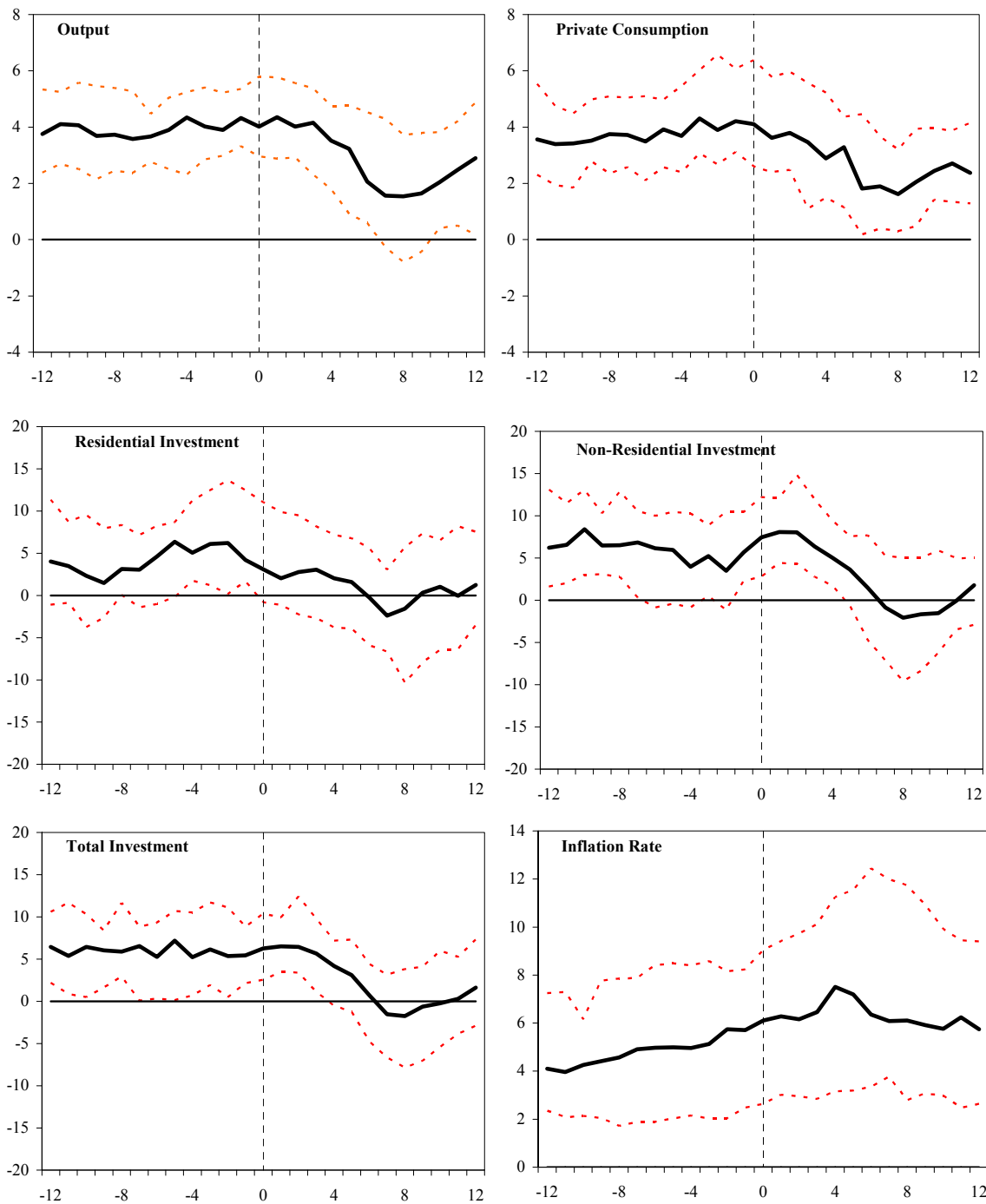
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a bust begins (peak in the level of house price). Unemployment rate is the change in the level.

### Figure 8. Equity Price Busts in OECD Countries

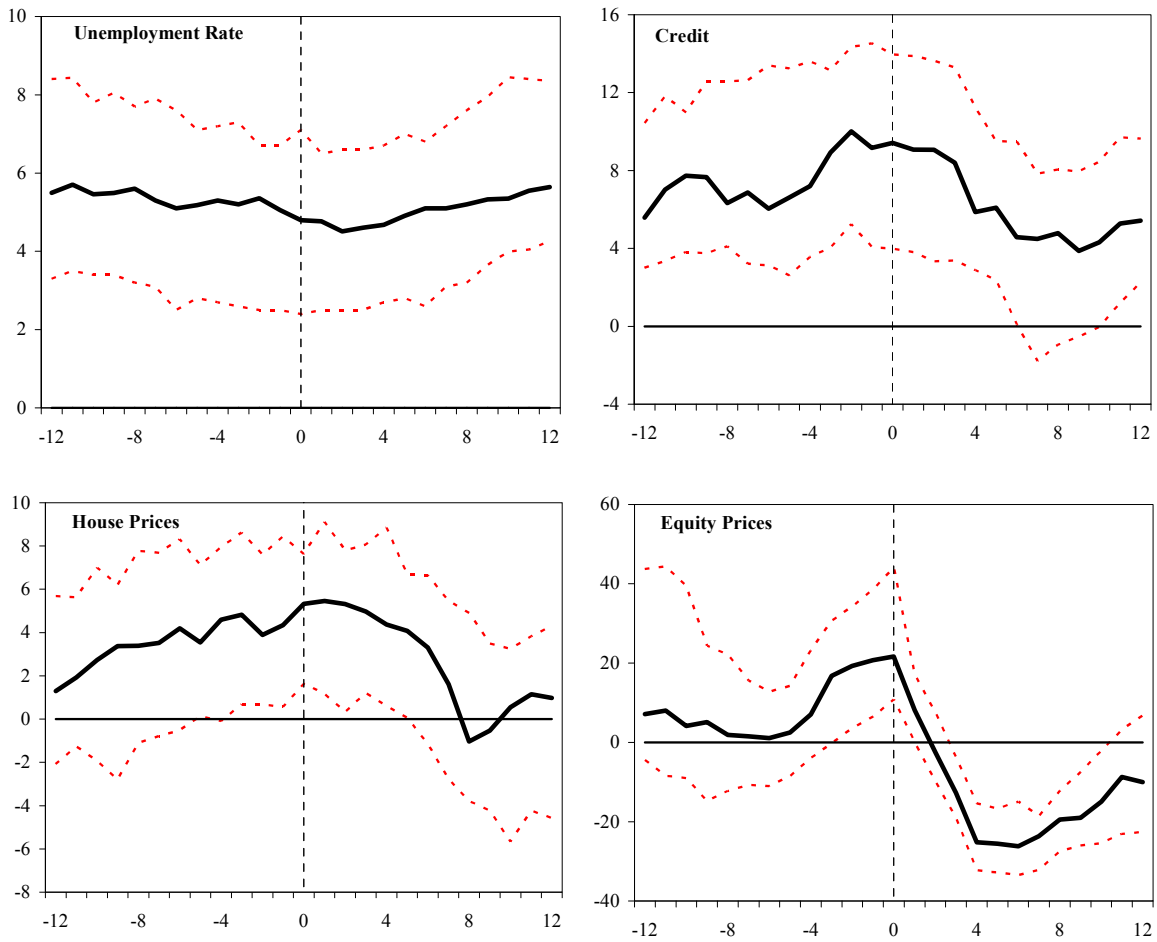
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a bust begins (peak in the level of equity price). Inflation rate is the change in the level.

### Figure 8. Equity Price Busts in OECD Countries (continued)

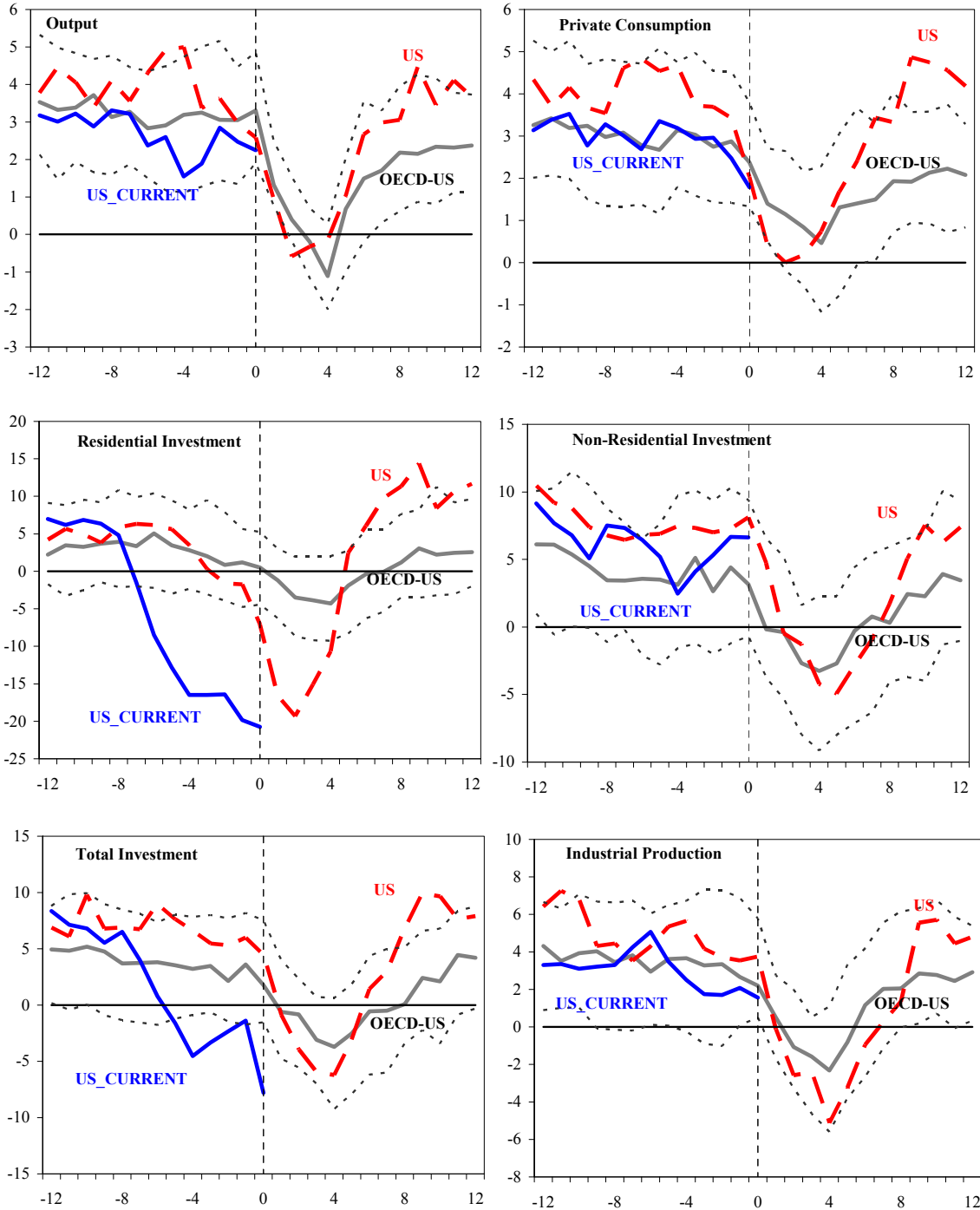
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the median of all observations while the dotted lines correspond to upper and lower quartiles. Zero is the quarter after which a bust begins (peak in the level of equity price). Unemployment rate is the change in the level.

### Figure 9. Current U.S. Slowdown

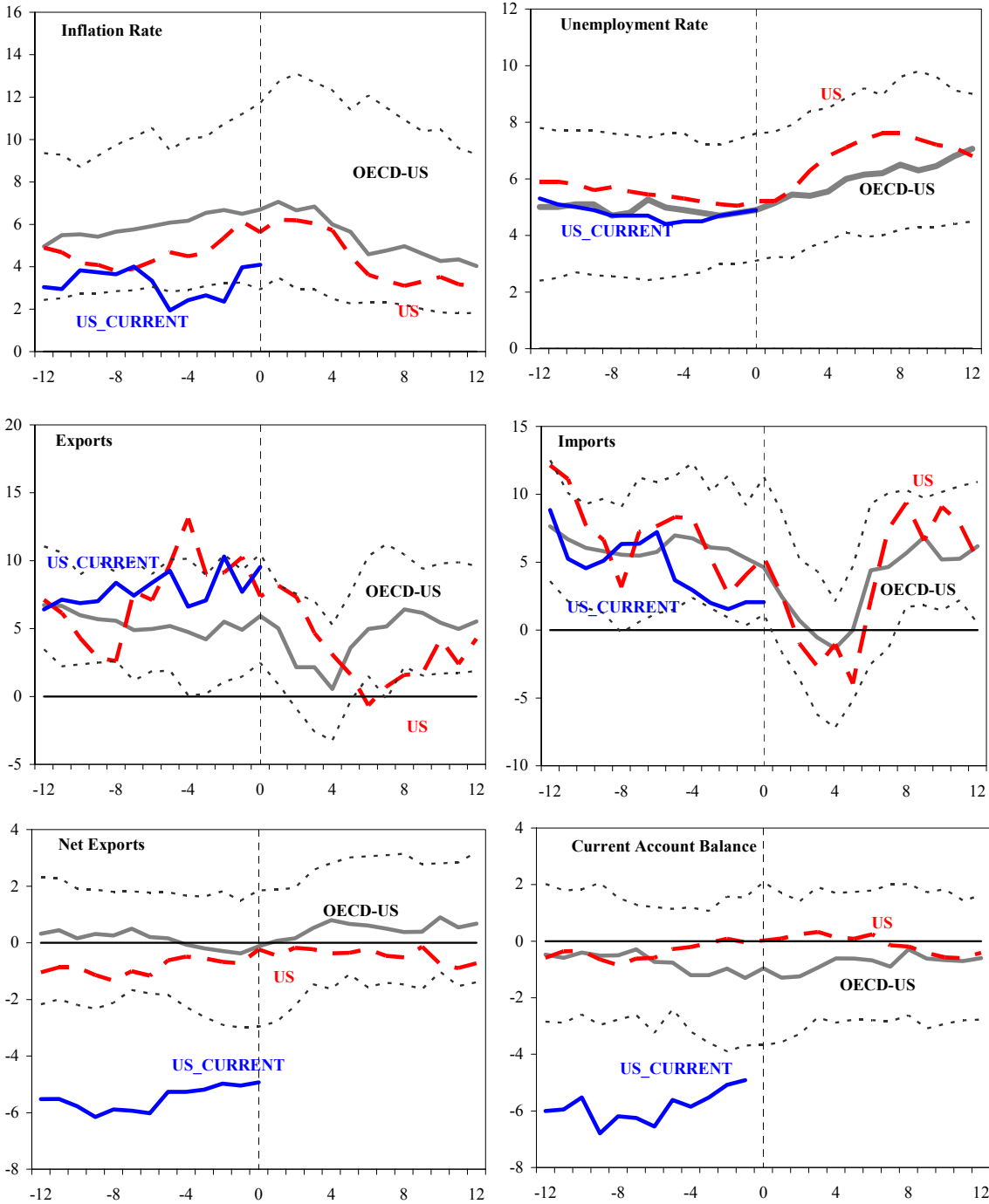
(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the current U.S. slowdown. The light solid line is median of all recessions in OECD countries (except the United States) while the dotted lines correspond to upper and lower quartiles of these recessions. The dashed line is the median of all U.S. recessions. Zero is the quarter after which a recession begins (peak in the level of output).

### Figure 9. Current U.S. Slowdown (continued)

(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)

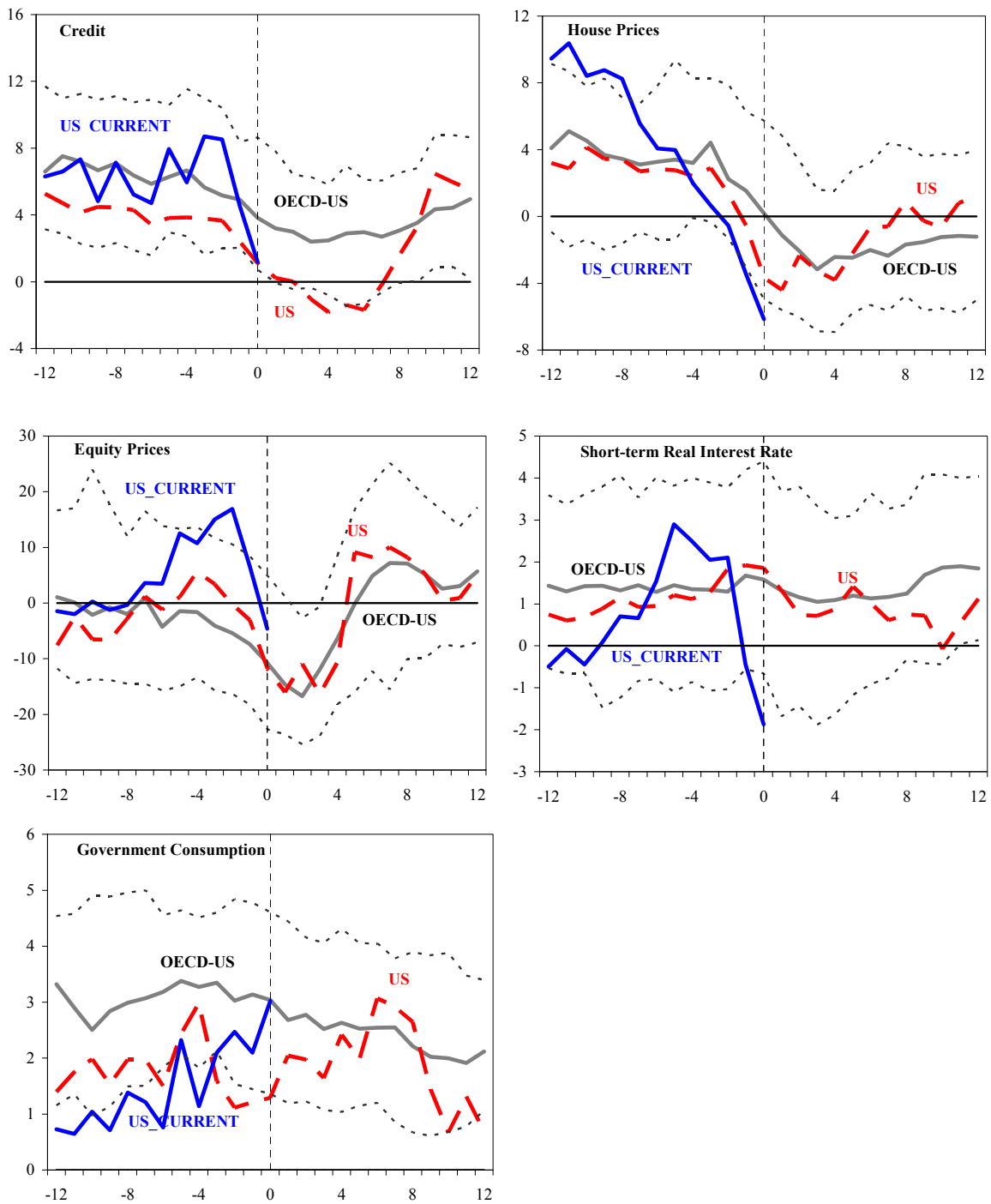


Notes: The solid line denotes the current U.S. slowdown. The light solid line is median of all recessions in OECD countries (except the United States) while the dotted lines correspond to upper and lower quartiles of these recessions. The dashed line is the median of all U.S. recessions. Zero is the quarter after which a recession begins (peak in the level of output). Inflation (unemployment) rate is the change in the level of respective variable. Net exports/GDP and Current Account Balance/GDP correspond to the change in the levels of these variables.



**Figure 9. Current U.S. Slowdown (continued)**

(Percent change from a year earlier unless otherwise noted; zero denotes peak; x-axis in quarters)



Notes: The solid line denotes the current U.S. slowdown. The light solid line is median of all recessions in OECD countries (except the United States) while the dotted lines correspond to upper and lower quartiles of these recessions. The dashed line is the median of all U.S. recessions. Zero is the quarter after which a recession begins (peak in the level of output). Short-term interest rate is the change in the level.

**Table 1.A. Recessions: Summary Statistics**

Country	All Recessions					Severe Recessions			
	Number of Recessions	Duration	Proportion of time in Recession	Amplitude	Cumulative Loss	Number of Recessions	Duration	Amplitude	Cumulative Loss
<b>G-7</b>									
Canada	3	4.00	0.06	-2.84	-6.45	2	5.00	-4.13	-9.50
France	4	3.50	0.07	-1.27	-2.57	...	...	...	...
Germany	8	3.25	0.13	-1.41	-2.56	1	4.00	-3.37	-4.90
Italy	9	3.11	0.15	-1.34	-2.67	1	3.00	-3.84	-7.94
Japan	3	4.67	0.07	-2.38	-7.39	1	8.00	-3.35	-15.38
United Kingdom	5	4.20	0.11	-3.11	-8.44	2	5.00	-4.77	-13.42
United States	7	3.43	0.12	-1.67	-3.16	...	...	...	...
<b>Other</b>									
Australia	7	3.43	0.12	-1.65	-3.50	1	7.00	-3.89	-12.70
Austria	6	2.50	0.08	-1.08	-1.60	...	...	...	...
Belgium	7	2.86	0.10	-1.00	-1.53	...	...	...	...
Denmark	7	4.14	0.15	-1.76	-4.11	1	7.00	-3.17	-9.58
Finland	5	4.60	0.12	-3.93	-22.51	1	13.00	-12.75	-102.76
Greece	8	3.50	0.15	-6.45	-11.83	6	3.67	-7.87	-14.63
Ireland	3	2.67	0.04	-0.90	-1.41	...	...	...	...
Netherlands	5	4.00	0.10	-2.20	-0.82	2	2.50	-3.37	-4.32
New Zealand	12	3.83	0.24	-5.94	-14.74	9	3.11	-7.31	-12.04
Norway	3	2.67	0.04	-1.99	-2.99	...	...	...	...
Portugal	4	4.50	0.09	-3.38	-6.68	1	5.00	-6.03	-12.19
Spain	4	3.00	0.06	-1.12	-2.76	...	...	...	...
Sweden	3	7.33	0.11	-3.87	-15.17	1	12.00	-5.64	-24.23
Switzerland	9	3.56	0.17	-2.28	-6.86	1	7.00	-9.81	-42.81
<b>Country Group</b>									
<b>OECD</b>									
Median	5.00	3.00	0.11	-1.87	-3.04	1.00	4.00	-4.89	-9.94
Mean	5.81	3.64	0.11	-2.63	-6.40	2.14	4.70	-6.31	-16.10
<b>G-7</b>									
Median	5.00	3.00	0.11	-1.59	-2.99	1.00	4.00	-3.46	-7.94
Mean	5.57	3.56	0.10	-1.83	-4.12	1.40	5.00	-4.05	-10.58
<b>Other</b>									
Median	5.50	3.00	0.11	-2.01	-3.08	1.00	4.00	-6.03	-10.29
Mean	5.93	3.67	0.11	-3.01	-7.47	2.56	4.61	-7.00	-17.79

Notes: Country-specific data are means. Country-group data are means/medians. Duration is the number of quarters between a peak and the next trough. Amplitude is the percent change in output from a peak to the next trough. The cumulative loss combines information about the duration and amplitude to measure the overall cost of a recession and is expressed in percent.

**Table 1.B. Recessions: Summary Statistics**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Recessions	Severe Recessions	Other Recessions	All Recessions	Severe Recessions	Other Recessions
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	4***	3.00	3.64	4.7**	3.29
Amplitude	-1.87	-4.89***	-1.33	-2.63	-6.31***	-1.43
Cumulative Loss	-3.04	-9.94***	-2.05	-6.40	-16.1***	-1.43
<b>B. Components of Output</b>						
Consumption	-0.07	-1.19*	0.05	-0.16	-1.21*	0.18
Total Investment	-4.15	-9.73**	-3.65	-5.93	-11.35**	-4.19
Residential Investment	-4.08	-12.6***	-2.56	-6.64	-15.52***	-3.78
Non-residential Investment	-3.63	-7.38*	-3.19	-5.10	-9.11*	-3.78
Exports	-0.65	-4.11***	0.50	-0.74	-6.33***	1.08
Imports	-3.82	-9.18***	-2.58	-4.20	-9.41**	-2.50
Net Export (% of GDP) <sup>2/</sup>	0.62	1.61	0.48	0.76	0.79	0.75
Current Account (% of GDP) <sup>2/</sup>	0.47	0.98	0.45	0.56	0.70	0.51
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-4.14	-7.01***	-2.89	-3.99	-7.35***	-3.07
Unemployment Rate <sup>2/</sup>	0.60	1.7***	0.50	1.10	2.88**	0.77
Inflation Rate <sup>2/</sup>	-0.29	0.01	-0.31	-0.27	-0.13	-0.32
<b>D. Financial Variables</b>						
House Prices	-2.31	-4.53	-2.00	-3.57	-7.15*	-2.49
Equity Prices	-5.49	-15.64***	-5.07	-4.25	-13.55**	-1.85
Credit	0.99	0.89	0.99	1.66	1.95	1.57

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of severe recessions and other recessions is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 2.A. Credit Contractions: Basic Statistics**

Country	Credit Contractions				Credit Crunches		
	Number of Contractions	Duration	Proportion of time in Contraction	Amplitude	Number of Contractions	Duration	Amplitude
<b>G-7</b>							
Canada	6	3.33	0.10	-5.31	2	4.50	-10.40
France	5	4.80	0.12	-5.42	...	...	...
Germany	3	7.67	0.12	-2.20	...	...	...
Italy	6	6.00	0.19	-5.89	1	15.00	-11.87
Japan	5	7.80	0.20	-4.61	1	25.00	-11.24
United Kingdom	7	3.29	0.12	-9.12	2	4.00	-21.36
United States	5	7.80	0.20	-8.03	2	13.50	-15.11
<b>Other</b>							
Australia	5	3.40	0.09	-6.02	1	8.00	-20.17
Austria	...	...	...	...	...	...	...
Belgium	6	5.33	0.17	-4.73	1	13.00	-13.32
Denmark	6	8.67	0.27	-11.82	3	14.33	-19.42
Finland	4	8.25	0.17	-10.23	1	22.00	-33.91
Greece	8	4.50	0.19	-7.17	2	6.00	-13.97
Ireland	5	6.00	0.16	-9.52	1	5.00	-13.71
Netherlands	2	4.50	0.05	-10.54	1	7.00	-20.79
New Zealand	8	5.13	0.21	-10.14	4	6.25	-17.21
Norway	4	4.00	0.08	-4.38	1	8.00	-13.80
Portugal	8	5.50	0.23	-8.51	2	8.00	-22.03
Spain	3	9.67	0.15	-7.40	1	11.00	-9.52
Sweden	7	6.71	0.24	-8.71	1	24.00	-39.55
Switzerland	7	4.43	0.16	-3.07	...	...	...
<b>Country Group</b>							
<b>OECD</b>							
Median	5.50	4.00	0.16	-4.22	1.00	8.00	-17.03
Mean	5.50	5.65	0.15	-7.23	1.59	10.30	-17.80
<b>G-7</b>							
Median	5.00	4.00	0.12	-4.12	2.00	10.00	-11.86
Mean	5.29	5.51	0.15	-6.16	1.60	10.50	-14.60
<b>Other</b>							
Median	6.00	4.00	0.16	-4.54	1.00	8.00	-17.12
Mean	5.62	5.71	0.15	-7.78	1.58	10.21	-19.15

Notes: Country-specific data are means. Country-group data are means/medians. Duration is the number of quarters between a peak and the next trough. Amplitude is the percent change in output from a peak to the next trough.

**Table 2.B. Credit Contractions: Summary Statistics**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Contractions	Credit Crunches	Other Contractions	All Contractions	Credit Crunches	Other Contractions
<b>A. Credit</b>						
Duration <sup>1/</sup>	4.00	8***	3.00	5.65	10.3***	4.13
Amplitude	-4.22	-17.03***	-3.40	-7.23	-17.8***	-3.79
<b>B. Macroeconomic Variables</b>						
Output	1.82	2.64**	1.58	2.19	3.6*	1.73
Consumption	1.18	1.49	1.15	1.34	1.75	1.21
Total Investment	-0.70	-5.63***	0.19	-2.17	-6.67**	-0.73
Residential Investment	-1.39	-5.92**	-0.09	-4.69	-13.22**	-1.96
Non-residential Investment	0.02	-2.51*	0.21	-0.74	-3.16	0.04
Unemployment Rate <sup>2/</sup>	0.37	1.65***	0.20	0.92	2.01**	0.59
Inflation Rate <sup>2/</sup>	0.08	-0.37	0.23	0.77	-0.09	1.05
<b>C. Other Financial Variables</b>						
House Prices	-1.98	-10.28**	-0.85	-3.46	-9.07**	-1.58
Equity Prices	-2.65	6.28**	-5.93	-1.12	15.02*	-6.28

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of credit crunches and other contractions is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 3.A. House Price Declines: Basic Statistics**

Country	House Price Declines				House Price Busts		
	Number of Declines	Duration	Proportion of time in Decline	Amplitude	Number of Declines	Duration	Amplitude
<b>G-7</b>							
Canada	9	6.00	0.28	-7.82	1	16.00	-20.80
France	3	13.33	0.21	-12.85	2	18.50	-18.13
Germany	7	7.57	0.27	-4.52	...	...	...
Italy	7	8.86	0.32	-15.09	3	14.00	-24.66
Japan	3	26.33	0.41	-25.04	2	38.50	-37.20
United Kingdom	4	11.25	0.23	-19.24	2	16.50	-30.25
United States	7	6.00	0.22	-4.62	...	...	...
<b>Other</b>							
Australia	9	6.56	0.31	-6.75	...	...	...
Austria	3	13.67	0.21	-12.63	2	17.00	-16.75
Belgium	2	3.00	0.03	-1.67	...	...	...
Denmark	5	10.80	0.28	-18.15	2	21.50	-36.23
Finland	6	9.00	0.28	-16.33	2	18.50	-40.00
Greece	1	3.00	0.02	-3.37	...	...	...
Ireland	8	4.75	0.20	-7.66	2	10.00	-16.86
Netherlands	5	6.80	0.18	-12.54	1	18.00	-47.17
New Zealand	6	8.83	0.27	-9.79	1	25.00	-37.83
Norway	5	11.40	0.30	-12.53	1	25.00	-40.48
Portugal	5	7.00	0.18	-4.93	...	...	...
Spain	6	7.67	0.24	-12.62	2	13.00	-24.85
Sweden	6	8.50	0.26	-12.93	2	16.00	-31.02
Switzerland	7	8.57	0.31	-11.90	3	17.00	-25.07
<b>Country Group</b>							
<b>OECD</b>							
Median	6.00	6.00	0.26	-5.99	2.00	16.50	-28.52
Mean	5.43	8.47	0.24	-10.80	1.87	18.43	-28.50
<b>G-7</b>							
Median	7.00	6.00	0.27	-6.81	2.00	16.00	-26.43
Mean	5.71	9.38	0.28	-10.77	2.00	20.50	-26.59
<b>Other</b>							
Median	5.50	5.50	0.25	-5.45	2.00	17.00	-29.61
Mean	5.29	7.99	0.22	-10.82	1.80	17.28	-29.56

Notes: Country-specific data are means. Country-group data are means/medians. Duration is the number of quarters between a peak and the next trough. Amplitude is the percent change in output from a peak to the next trough.

**Table 3.B. House Price Declines: Summary Statistics**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Declines	House Price Busts	Other Declines	All Declines	House Price Busts	Other Declines
<b>A. House Prices</b>						
Duration <sup>1/</sup>	6.00	16.5***	4.00	8.47	18.43***	5.23
Amplitude	-5.99	-28.52***	-4.14	-10.80	-28.5***	-5.04
<b>B. Macroeconomic Variables</b>						
Output	2.78	5.97***	2.46	3.24	4.84	2.72
Consumption	2.34	3.77	2.21	2.79	3.53	2.56
Total Investment	0.72	-8.36***	2.22	-0.58	-7.98***	1.82
Residential Investment	-4.08	-11.55***	-0.96	-6.31	-16.4***	-2.99
Non-residential Investment	2.00	-7.79***	2.72	1.85	-4.22**	3.85
Unemployment Rate <sup>2/</sup>	0.50	2.65***	0.30	1.11	3.15***	0.50
Inflation Rate <sup>2/</sup>	0.02	-3.05***	0.22	-0.49	-2.9***	0.30
<b>C. Other Financial Variables</b>						
Equity Prices	0.30	-1.90	0.30	7.34	23.33	2.14
Credit	3.93	2.11	4.23	4.96	4.58	5.08

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of house price busts and other declines is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 4.A. Equity Price Declines: Basic Statistics**

Country	Equity Price Declines				Equity Price Busts		
	Number of Declines	Duration	Proportion of time in Decline	Amplitude	Number of Declines	Duration	Amplitude
<b>G-7</b>							
Canada	16	4.25	0.35	-20.85	2	6.50	-44.13
France	11	6.64	0.38	-32.30	5	10.80	-48.40
Germany	14	6.71	0.49	-25.59	2	11.00	-53.33
Italy	10	10.70	0.55	-41.84	7	12.57	-53.02
Japan	15	5.93	0.46	-24.58	3	12.00	-45.02
United Kingdom	15	5.27	0.41	-22.61	2	12.50	-60.80
United States	14	5.21	0.38	-20.42	1	8.00	-47.90
<b>Other</b>							
Australia	13	5.69	0.38	-25.60	3	7.00	-48.92
Austria	9	14.67	0.68	-28.38	2	30.00	-58.13
Belgium	14	6.14	0.45	-23.50	3	9.00	-43.35
Denmark	10	5.90	0.31	-29.82	3	10.67	-48.45
Finland	8	8.75	0.36	-36.91	3	17.33	-61.16
Greece	3	6.00	0.09	-30.39	1	13.00	-74.42
Ireland	11	7.00	0.40	-35.29	4	9.25	-55.36
Netherlands	11	6.00	0.34	-28.50	3	10.33	-50.04
New Zealand	10	7.70	0.40	-31.10	3	12.33	-61.69
Norway	12	6.50	0.40	-33.75	2	6.50	-52.64
Portugal	4	9.00	0.19	-43.18	2	12.00	-61.17
Spain	13	7.77	0.52	-25.93	1	28.00	-90.24
Sweden	10	8.00	0.41	-29.96	2	5.50	-41.45
Switzerland	11	7.18	0.41	-31.31	4	12.75	-55.30
<b>Country Group</b>							
<b>OECD</b>							
Median	11.00	5.00	0.40	-26.58	3.00	10.00	-50.27
Mean	11.14	6.91	0.40	-28.34	2.76	11.78	-53.23
<b>G-7</b>							
Median	14.00	5.00	0.41	-23.63	2.00	10.00	-47.75
Mean	13.57	6.14	0.43	-25.89	3.14	11.18	-50.57
<b>Other</b>							
Median	10.50	5.00	0.40	-29.58	3.00	9.50	-53.16
Mean	9.93	7.43	0.38	-30.02	2.57	12.14	-54.86

Notes: Country-specific data are means. Country-group data are means/medians. Duration is the number of quarters between a peak and the next trough. Amplitude is the percent change in output from a peak to the next trough.



**Table 4.B. Equity Price Declines: Summary Statistics**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	All Declines	Equity Price Busts	Other Declines	All Declines	Equity Price Busts	Other Declines
<b>A. Equity Prices</b>						
Duration <sup>1/</sup>	5.00	10***	4.00	6.91	11.78***	5.30
Amplitude	-26.58	-50.27***	-19.80	-28.34	-53.23***	-20.14
<b>C. Macroeconomic Variables</b>						
Output	3.40	4.44***	3.03	4.99	7.37**	4.20
Consumption	2.59	4.15***	2.33	4.61	6.92**	3.86
Total Investment	3.54	0.56**	4.04	3.79	1.03*	4.69
Residential Investment	2.93	1.61	3.03	2.56	-0.31	3.47
Non-residential Investment	4.24	2.69	4.58	4.86	2.79	5.52
Unemployment Rate <sup>2/</sup>	0.10	0.7***	0.00	0.30	1.14***	0.04
Inflation Rate <sup>2/</sup>	0.29	0.41	0.21	0.64	1.10	0.49
<b>B. Other Financial Variables</b>						
House Prices	1.25	4.66	0.84	1.98	3.76	1.33
Credit	5.15	9.62***	4.46	9.66	17.16***	7.23

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of equity price busts and other declines is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 5. Recessions Associated with Credit Crunches**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Crunches	With Crunches	With Severe Crunches	Without Crunches	With Crunches	With Severe Crunches
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	3.00	3.00	3.64	3.78	4.33
Amplitude	-1.82	-2.19	-2.7*	-2.47	-3.71	-4.05
Cumulative Loss	-2.87	-4.44*	-6.15**	-6.05	-8.85	-12.38
<b>B. Components of Output</b>						
Consumption	-0.04	-0.41	-0.58	-0.19	-0.16	0.79
Total Investment	-3.98	-4.97	-3.83	-5.90	-5.61	-4.70
Residential Investment	-3.72	-7.42	-8.16	-6.38	-8.92	-10.04
Non-residential Investment	-3.58	-4.25	-1.66	-5.12	-4.00	-1.40
Exports	-0.53	-1.82	-1.13	-0.65	-2.22	-2.01
Imports	-3.64	-4.53	-5.23	-3.81	-6.08	-7.07
Net Export (% of GDP) <sup>2/</sup>	0.48	1.06	1.17	0.67	1.10	1.48
Current Account (% of GDP) <sup>2/</sup>	0.45	0.88	1.39	0.57	0.42	1.65
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-4.02	-5.68	-6.48**	-3.84	-5.30	-6.58**
Unemployment Rate <sup>2/</sup>	0.55	0.90	1.00	1.14	0.89	0.83
Inflation Rate <sup>2/</sup>	-0.31	-0.33	0.53	-0.38	0.20	0.79
<b>D. Financial Variables</b>						
House Prices	-1.82	-4.04**	-4.88	-3.08	-6.38	-8.11
Equity Prices	-6.28	-2.47	7.88**	-4.50	-1.19	6.78**
Credit	1.54	-4.25***	-4.85***	2.82	-4.9***	-5.73**

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of recessions with credit crunches and recessions without credit crunches is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 6. Recessions Associated with House Price Busts**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Busts	With Busts	With Severe Busts	Without Busts	With Busts	With Severe Busts
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	3.00	3.00	3.20	4.47**	4.6**
Amplitude	-1.52	-2.18	-2.64**	-1.98	-3.16*	-4.05**
Cumulative Loss	-2.25	-3.74***	-5.23***	-3.53	-10.38**	-13.9*
<b>B. Components of Output</b>						
Consumption	0.09	-0.73***	-1.16***	0.14	-1.68***	-2.25***
Total Investment	-3.98	-6.92*	-6.92	-4.65	-9.24**	-9.59
Residential Investment	-2.68	-6.64**	-7.47**	-4.74	-10.92**	-13.65**
Non-residential Investment	-3.65	-6.82*	-6.82	-4.04	-8.75*	-7.83
Exports	-1.09	0.66*	0.67	-1.02	0.96*	1.20
Imports	-2.55	-5.27	-5.3*	-2.18	-5.29*	-6.13**
Net Export (% of GDP) <sup>2/</sup>	0.39	1.29***	1.29**	0.06	1.52***	1.48**
Current Account (% of GDP) <sup>2/</sup>	0.01	0.7**	0.6*	0.01	1.24**	1.23**
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-4.55	-4.21	-4.99	-4.20	-4.21	-4.73
Unemployment Rate <sup>2/</sup>	0.50	1.3**	1.24**	0.78	1.82*	1.78
Inflation Rate <sup>2/</sup>	-0.27	-0.73	-0.59	-0.35	-0.86	-0.14
<b>D. Financial Variables</b>						
House Prices	-0.82	-6.28***	-7.05***	-0.32	-9.39***	-11.17***
Equity Prices	-7.12	-2.13	-5.58	-6.62	-0.47	-1.54
Credit	2.42	-0.5***	-0.94***	3.62	-2.3***	-3.07***

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of recessions with house price busts and recessions without house price busts is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 7. Recessions Associated with Equity Price Busts**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Busts	With Busts	With Severe Busts	Without Busts	With Busts	With Severe Busts
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	3.00	3.00	3.48	3.82	3.61
Amplitude	-1.63	-1.98	-2.05	-2.00	-2.79	-3.16
Cumulative Loss	-2.64	-3.08	-3.20	-4.67	-7.83	-9.36
<b>B. Components of Output</b>						
Consumption	-0.05	-0.09	-0.27	0.23	-0.89**	-1.33**
Total Investment	-3.17	-6.17**	-6.12*	-3.72	-9.02***	-9.07**
Residential Investment	-3.74	-5.21	-5.57	-4.55	-9.8**	-9.41
Non-residential Investment	-3.19	-5.18**	-4.95*	-3.04	-8.56**	-9.04**
Exports	0.48	-0.80	0.76	0.48	0.11	1.28
Imports	-0.53	-5.29***	-5.44***	-0.97	-6.35***	-6.79***
Net Export (% of GDP) <sup>2/</sup>	0.39	1.36**	1.63***	0.15	1.34**	1.74***
Current Account (% of GDP) <sup>2/</sup>	0.48	0.41	0.83	0.19	0.98	1.35*
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-3.79	-5.06**	-4.75*	-3.24	-5.3**	-5.14**
Unemployment Rate <sup>2/</sup>	0.60	0.60	0.60	0.97	1.33	1.06
Inflation Rate <sup>2/</sup>	-0.32	-0.32	-0.55	-0.35	-0.53	-0.46
<b>D. Financial Variables</b>						
House Prices	-1.93	-3.17	-4.97**	-2.14	-5.53*	-6.85*
Equity Prices	-0.80	-13.05***	-11.52***	1.21	-12.39***	-8.89***
Credit	1.06	1.00	1.39	2.63	0.2*	1.10

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of recessions with equity price busts and recessions without equity price busts is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 8. Recessions Associated with Oil Price Shocks**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Oil Shocks	With Oil Shocks	With Severe Oil Shocks	Without Oil Shocks	With Oil Shocks	With Severe Oil Shocks
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	3.00	3.00	3.67	3.62	3.91
Amplitude	-1.78	-2.05	-2.57**	-2.38	-2.91	-3.52*
Cumulative Loss	-2.94	-3.14	-4.23**	-5.42	-7.44	-9.32*
<b>B. Components of Output</b>						
Consumption	0.19	-0.24*	-0.54**	0.40	-0.73**	-1**
Total Investment	-3.19	-5.16	-6.17	-4.69	-7.24	-8.92**
Residential Investment	-2.90	-5.64	-6.53**	-3.62	-9.42**	-11.97**
Non-residential Investment	-2.85	-4.35	-5.67	-4.42	-6.05	-7.42
Exports	0.07	-1.26	-1.43*	0.16	-2.16	-2.66*
Imports	-3.35	-4.77*	-6.47***	-2.07	-6.01**	-7.83**
Net Export (% of GDP) <sup>2/</sup>	0.75	0.45	1.17	0.77	0.66	0.98
Current Account (% of GDP) <sup>2/</sup>	0.50	0.35	0.28	0.58	0.42	0.39
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-3.55	-4.25**	-5.71***	-3.01	-4.82**	-5.73***
Unemployment Rate <sup>2/</sup>	0.60	0.55	0.90	1.05	1.15	1.45
Inflation Rate <sup>2/</sup>	-0.90	0.29***	0.53***	-0.88	0.37**	0.44**
<b>D. Financial Variables</b>						
House Prices	-2.93	-1.83	-3.09	-2.73	-4.26	-5.97
Equity Prices	-5.48	-4.56	-5.30	-3.94	-4.36	-5.19
Credit	0.93	1.07	0.52	2.63	0.77	0.16

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of recessions with oil shocks and recessions without oil shocks is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 9. Recessions Associated with Inflation Shocks**  
(Percent change unless otherwise indicated)

	Median Values			Mean Values		
	Without Inflation Shocks	With Inflation Shocks	With Severe Inflation Shocks	Without Inflation Shocks	With Inflation Shocks	With Severe Inflation Shocks
<b>A. Output</b>						
Duration <sup>1/</sup>	3.00	3.00	3.00	3.55	3.90	3.33
Amplitude	-1.63	-2.76***	-3.1***	-2.37	-3.42*	-4.69**
Cumulative Loss	-2.52	-5.54***	-6.23***	-5.87	-8.03*	-7.01**
<b>B. Components of Output</b>						
Consumption	-0.01	-0.27	-1.00	-0.14	-0.24	-0.96
Total Investment	-4.78	-1.39	-0.99**	-6.50	-4.01	-2.49
Residential Investment	-3.84	-5.54	-3.27	-6.36	-7.57	-3.50
Non-residential Investment	-4.34	-0.54**	1.63***	-6.20	-1.25**	0.27**
Exports	-0.67	-0.53	-1.48	-0.67	-0.96	-4.74
Imports	-3.98	-3.44	-4.85	-4.47	-3.36	-4.70
Net Export (% of GDP) <sup>2/</sup>	0.58	0.68	-0.78*	0.86	0.44	-0.72
Current Account (% of GDP) <sup>2/</sup>	0.47	0.57	0.35	0.53	0.64	0.21
<b>C. Other Macroeconomic Variables</b>						
Industrial Production	-4.15	-3.79	-7.36	-3.85	-4.50	-5.47
Unemployment Rate <sup>2/</sup>	0.60	0.40	0.20	1.09	1.14	0.51
Inflation Rate <sup>2/</sup>	-0.77	2.27***	4.12***	-1.36	3.07***	4.77***
<b>D. Financial Variables</b>						
House Prices	-1.93	-4.60	-4.02	-3.16	-5.08	-4.65
Equity Prices	-3.69	-11.91**	-8.41	-2.26	-10.84**	-10.61
Credit	1.19	0.32	0.32	2.24	-0.16	-1.06

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of recessions with inflation shocks and recessions without inflation shocks is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in the levels.

**Table 10.A. Various Types of Recessions: Summary Statistics**

Events	Duration <sup>1/</sup> (Mean)	Amplitude <sup>2/</sup> (Median)	Cumulative Loss <sup>2/</sup> (Median)
A. Recessions without Credit Crunches	3.64	-1.82	-2.87
Recessions with Credit Crunches	3.78	-2.19	-4.44*
Recessions with Severe Credit Crunches	4.33	-2.7*	-6.15**
B. Recessions without House Price Busts	3.20	-1.52	-2.25
Recessions with House Price Busts	4.47	-2.18	-3.74***
Recessions with Severe House Price Busts	4.60	-2.64**	-5.23***
C. Recessions without Equity Price Busts	3.48	-1.63	-2.64
Recessions with Equity Price Busts	3.82	-1.98	-3.08
Recessions with Severe Equity Price Busts	3.61	-2.05	-3.20
D. Recessions without Oil Price Shocks	3.67	-1.78	-2.94
Recessions with Oil Price Shocks	3.62	-2.05	-3.14
Recessions with Severe Oil Price Shocks	3.91	-2.57**	-4.23**
E. Recessions without Inflation Shocks	3.55	-1.63	-2.52
Recessions with Inflation Shocks	3.90	-2.76***	-5.54***
Recessions with Severe Inflation Shocks	3.33	-3.1***	-6.23***
F. Recessions	3.64	-1.87	-3.04
Severe Recessions	4.7**	-4.89***	-9.94***
Non-severe Recessions	3.29	-1.33	-2.05

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of severe recessions and other recessions is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Percent change.

**Table 10.B. Contractions and Declines: Summary Statistics**

Events	Duration <sup>1/</sup> (Mean)	Amplitude <sup>2/</sup> (Median)	Residential Investment <sup>2/</sup> (Median)
A. Credit Contractions	5.65	-4.22	-1.39
Credit Crunches	10.3***	-17.03***	-5.92**
Other Credit Contractions	4.13	-3.40	-0.09
B. House Price Declines	8.47	-5.99	-4.08
House Price Busts	18.43***	-28.52***	-11.55***
Other House Price Declines	5.23	-4.14	-0.96
C. Equity Price Declines	6.91	-26.58	2.93
Equity Price Busts	11.78***	-50.27***	1.61
Other Equity Price Declines	5.30	-19.80	3.03

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of crunches/busts and other contractions/declines is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Percent change.



**Table 11. Change in Policy Variables**  
(Recessions, Credit Contractions and Asset Price Declines; Medians)

Events	Short-Term Nominal Interest Rate <sup>1/</sup>	Short-Term Real Interest Rate <sup>2/</sup>	Government Consumption <sup>3/</sup>
A. Recessions	-0.79	-0.70	1.79
Severe Recessions	0.00	-1.11	2.16
Other Recessions	-0.94	-0.66	1.61
B. Credit Contractions	-0.28	-1.03	3.04
Credit Crunches	-1.50	-0.09	6.33***
Other Credit Contractions	0.00	-1.32	2.38
C. House Price Declines	-0.70	-0.64	3.39
House Price Busts	-3.16***	0.21	9.07***
Other House Price Declines	-0.20	-0.80	2.59
D. Equity Price Declines	0.09	-0.10	3.65
Equity Price Busts	0.28	-0.57	7.72***
Other Equity Price Declines	0.07	0.07	2.93
E. Recessions without Credit Crunches	-0.87	-0.67	1.60
Recessions with Credit Crunches	-0.84	-0.78	3.84***
Recessions with Severe Credit Crunches	-0.73	-0.79	4.57***
F. Recessions without House Price Busts	-0.91	-0.76	1.70
Recessions with House Price Busts	-1.21	-0.64	1.95
Recessions with Severe House Price Busts	-1.04	-0.78	2.12
G. Recessions without Equity Price Busts	-0.80	-0.67	1.49
Recessions with Equity Price Busts	-1.04	-0.77	2.14
Recessions with Severe Equity Price Busts	-0.95	-0.71	2.16
H. Recessions without Oil Price Shocks	-0.79	-0.61	1.85
Recessions with Oil Price Shocks	-0.76	-0.82*	1.53
Recessions with Severe Oil Price Shocks	-0.95	-1.11**	2.14
I. Recessions without Inflation Shocks	-1.03	-0.27	1.73
Recessions with Inflation Shocks	0***	-2.17***	2.30
Recessions with Severe Inflation Shocks	0**	-3.98***	1.44

Notes: The symbols \*, \*\*, and \*\*\* indicate that the difference between means (medians) of crunches/busts and other contractions/declines is significant at the 10 percent, 5 percent, and 1 percent levels, respectively.

<sup>1/</sup> Treasury bill interest rate. Change in levels.

<sup>2/</sup> Ex-post real interest rate. Deflated with each country CPI. Change in levels.

<sup>3/</sup> Percent change.

**Table 12.A. Recessions in the United States: Output (GDP) and its Components**  
(Percent change unless otherwise indicated)

Recession Date	Output		Components of Output										Current Account <sup>2/</sup> (% of GDP)
	Duration <sup>1/</sup>	Amplitude	Cumulative Loss	Consumption	Total Investment	Residential Investment	Non-Residential Investment	Exports	Imports	Net Exports <sup>2/</sup> (% of GDP)			
1960:1-1960:4	3	-1.64	-1.67	0.95	-5.02	-11.13	-1.51	5.73	-6.91	0.60	0.58		
1969:3-1970:4	5	-0.64	-1.46	2.46	-3.27	0.92	-4.91	9.63	1.88	0.21	0.07		
1973:4-1975:1	5	-3.10	-6.53	-1.00	-16.27	-30.17	-10.11	3.86	-10.95	0.43	0.13		
1980:1-1980:3	2	-2.18	-3.14	-1.28	-7.81	-17.11	-4.37	1.66	-13.96	1.51	1.13		
1981:3-1982:3	4	-2.71	-7.91	0.74	-9.37	-18.35	-6.85	-7.59	2.86	-0.67	-0.76		
1990:3-1991:1	2	-1.26	-1.39	-1.29	-6.17	-11.16	-4.44	1.46	-5.17	0.64	2.15		
2000:4-2001:3	3	-0.17	-0.02	1.62	-4.00	2.38	-6.30	-9.14	-6.47	0.49	0.84		
Median	3.00	-1.64	-1.67	0.74	-6.17	-11.16	-4.91	1.66	-6.47	0.49	0.58		
Mean	3.43	-1.67	-3.16	0.32	-7.42	-12.09	-5.50	0.80	-5.53	0.46	0.59		
Memo items:													
G7													
Median	3.00	-1.59	-2.99	-0.05	-6.17	-2.90	-5.61	-2.13	-5.17	0.43	0.60		
Mean	3.56	-1.83	-4.12	-0.30	-6.43	-6.03	-6.27	-0.84	-5.08	0.75	0.82		
OECD													
Median	3.00	-1.87	-3.04	-0.07	-4.15	-4.08	-3.63	-0.65	-3.82	0.62	0.47		
Mean	3.64	-2.63	-6.40	-0.16	-5.93	-6.64	-5.10	-0.74	-4.20	0.76	0.56		

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in levels.

**Table 12.B. Recessions in the United States: Other Macroeconomic and Financial Variables**  
(Percent change unless otherwise indicated)

Recession Date	Duration <sup>1/</sup>	Other Macroeconomic Variables			Financial Variables		
		Industrial Production	Unemployment Rate <sup>2/</sup>	Inflation Rate	House Prices	Equity Prices	Credit
1960:1-1960:4	3	-6.11	1.10	-0.05	...	-6.71	3.98
1969:3-1970:4	5	-5.99	2.20	0.01	...	-11.93	0.32
1973:4-1975:1	5	-11.08	3.40	2.65	-3.75	-29.51	-3.79
1980:1-1980:3	2	-5.68	1.40	-1.37	-0.86	4.45	-4.44
1981:3-1982:3	4	-6.80	2.50	-5.06	-3.91	-11.03	-2.45
1990:3-1991:1	2	-3.38	0.90	-0.25	-1.93	0.04	-4.06
2000:4-2001:3	3	-4.17	0.90	-0.73	4.01	-8.13	-0.03
Median	3.00	-5.99	1.40	-0.25	-1.93	-8.13	-2.45
Mean	3.43	-6.17	1.77	-0.69	-1.29	-8.97	-1.50
Memo items:							
G7							
Median	3.00	-5.42	0.80	-0.36	-6.71	-2.06	1.13
Mean	3.56	-5.38	1.07	-0.31	-5.81	-2.57	0.98
OECD							
Median	3.00	-4.14	0.60	-0.29	-5.49	-2.31	0.99
Mean	3.64	-3.99	1.10	-0.27	-4.25	-3.57	1.66

<sup>1/</sup> Number of quarters.

<sup>2/</sup> Change in levels.

**Table 12.C. Recessions in the United States: Policy Variables**

(Percent change unless otherwise indicated)

Recession Date	Duration <sup>1/</sup>	Short-Term Nominal Interest Rate <sup>2/</sup>	Short-Term Real Interest Rate <sup>2/</sup>	Government Consumption
1960:1-1960:4	3	-1.58	-1.51	4.01
1969:3-1970:4	5	-1.69	-1.61	-1.76
1973:4-1975:1	5	-1.59	-3.80	3.65
1980:1-1980:3	2	-4.23	-2.54	0.68
1981:3-1982:3	4	-5.38	-0.11	2.42
1990:3-1991:1	2	-1.44	-1.13	1.83
2000:4-2001:3	3	-2.77	-1.97	2.28
Median	3.00	-1.69	-1.61	2.28
Mean	3.43	-2.67	-1.81	1.87
Memo items:				
G7				
Median	3.00	-1.52	-0.97	2.14
Mean	3.56	-1.69	-1.26	2.03
OECD				
Median	3.00	-0.79	-0.70	1.79
Mean	3.64	-1.03	-0.71	2.22

<sup>1/</sup> Number of quarters.<sup>2/</sup> Change in levels.

**Table 13.A. Credit Contractions in the United States**

(Percent change unless otherwise indicated)

Recession Date	Duration <sup>1/</sup>	Credit	Equity Prices	House Prices	Output	Residential Investment	Unemployment Rate <sup>2/</sup>	Inflation Rate <sup>2/</sup>
1969:4-1970:2	2	-1.08	-14.83	...	0.02	-6.48	1.20	0.23
1974:2-1975:3	5	-6.61	-11.41	-3.83	-0.16	-13.91	3.30	-1.87
1979:3-1982:4	13	-11.86	-11.21	-11.94	0.01	-37.96	4.80	-7.21
1989:3-1993:1	14	-18.36	10.68	-7.81	6.37	-1.37	1.90	-1.48
2001:1-2002:2	5	-2.24	-7.88	6.42	1.58	5.74	1.60	-2.10
Median	5.00	-6.61	-11.21	-5.82	0.02	-6.48	1.90	-1.87
Mean	7.80	-8.03	-6.93	-4.29	1.56	-10.79	2.56	-2.48
Memo items:								
G7								
Median	4.00	-4.12	-0.94	-3.37	1.42	-1.13	0.50	0.07
Mean	5.51	-6.16	-0.13	-2.42	1.73	-2.26	0.85	0.49
OECD								
Median	4.00	-4.22	-2.65	-1.98	1.82	-1.39	0.37	0.08
Mean	5.65	-7.23	-1.12	-3.46	2.19	-4.69	0.92	0.77

<sup>1/</sup> Number of quarters.<sup>2/</sup> Change in levels.

**Table 13.B. House Price Declines in the United States**

(Percent change unless otherwise indicated)

Recession Date	Duration <sup>1/</sup>	House Prices	Equity Prices	Credit	Output	Residential Investment	Unemployment Rate <sup>2/</sup>	Inflation Rate <sup>2/</sup>
1973:4-1975:3	7	-5.86	-21.26	-6.00	-0.74	-23.70	3.70	0.32
1979:1-1982:3	14	-13.80	-27.69	-11.37	0.73	-43.94	4.00	-4.02
1983:1-1984:1	4	-0.84	4.58	7.33	8.49	31.68	-2.50	0.86
1989:4-1991:3	7	-6.72	2.74	-11.52	1.28	-13.23	1.50	-0.72
1992:1-1993:1	4	-2.04	0.43	-5.38	3.20	8.11	-0.20	0.33
1994:1-1995:1	4	-2.09	-0.26	5.84	3.35	-1.28	-1.10	0.32
1996:1-1996:3	2	-0.98	2.57	1.91	2.49	3.93	-0.20	0.20
Median	4.00	-2.09	0.43	-5.38	2.49	-1.28	-0.20	0.32
Mean	6.00	-4.62	-5.56	-2.74	2.69	-5.49	0.74	-0.39
Memo items:								
G7								
Median	6.00	-6.81	2.66	2.76	3.08	-3.97	0.65	-0.44
Mean	9.38	-10.77	14.42	3.37	3.88	-5.16	1.01	-1.28
OECD								
Median	6.00	-5.99	0.30	3.93	2.78	-4.08	0.50	0.02
Mean	8.47	-10.80	7.34	4.96	3.24	-6.31	1.11	-0.49

<sup>1/</sup> Number of quarters.<sup>2/</sup> Change in levels.

**Table 13.C. Equity Price Declines in the United States**

(Percent change unless otherwise indicated)

Date	Duration <sup>1/</sup>	Equity Prices	House Prices	Credit	Output	Residential Investment	Unemployment Rate <sup>2/</sup>	Inflation Rate <sup>2/</sup>
1961:4-1962:3	3	-18.27	...	7.25	3.86	4.90	-0.60	0.47
1966:1-1966:4	3	-19.65	...	2.06	1.82	-20.35	-0.20	1.15
1967:3-1968:1	2	-7.54	...	1.80	2.83	6.47	-0.10	0.95
1968:4-1970:2	6	-31.36	...	2.10	2.03	-11.89	1.40	1.34
1971:2-1971:4	2	-8.46	2.53	4.71	1.08	8.99	0.10	-0.92
1972:4-1974:4	8	-47.90	-0.61	5.83	2.15	-33.43	1.30	8.67
1976:2-1978:1	7	-30.39	8.04	13.18	6.63	25.87	-1.30	0.50
1978:3-1982:2	15	-33.82	-9.84	-9.03	2.65	-45.27	3.40	-1.18
1983:4-1984:2	2	-11.07	0.32	5.68	3.71	4.68	-1.00	1.02
1987:3-1988:1	2	-23.63	1.19	2.09	2.24	-1.69	-0.30	-0.22
1990:2-1990:4	2	-12.56	-3.49	-4.44	-0.75	-10.89	0.80	1.64
1992:2-1992:4	2	-4.12	-0.27	-1.99	2.09	3.64	-0.20	-0.05
1999:3-2003:1	14	-31.90	16.25	11.16	6.56	8.91	1.70	0.52
2004:1-2005:2	5	-5.20	12.26	10.37	3.89	10.34	-0.60	1.16
Median	3.00	-18.96	0.75	3.40	2.45	4.16	-0.15	0.74
Mean	5.21	-20.42	2.64	3.63	2.91	-3.55	0.31	1.08
Memo items:								
G7								
Median	5.00	-23.63	0.41	5.13	3.30	1.68	0.00	0.00
Mean	6.14	-25.89	2.70	8.82	4.78	1.75	0.00	0.00
OECD								
Median	5.00	-26.58	1.25	5.15	3.40	2.93	0.00	0.00
Mean	6.91	-28.34	1.98	9.66	4.99	2.56	0.00	0.00

<sup>1/</sup> Number of quarters.<sup>2/</sup> Change in levels.