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### *Determination of the December 2007 Peak in Economic Activity*

The Business Cycle Dating Committee of the National Bureau of Economic Research met by conference call on Friday, November 28. The committee maintains a chronology of the beginning and ending dates (months and quarters) of U.S. recessions. The committee determined that a peak in economic activity occurred in the U.S. economy in December 2007. The peak marks the end of the expansion that began in November 2001 and the beginning of a recession. The expansion lasted 73 months; the previous expansion of the 1990s lasted 120 months.

A recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in production, employment, real income, and other indicators. A recession begins when the economy reaches a peak of activity and ends when the economy reaches its trough. Between trough and peak, the economy is in an expansion.

Because a recession is a broad contraction of the economy, not confined to one sector, the committee emphasizes economy-wide measures of economic activity. The committee believes that domestic production and employment are the primary conceptual measures of economic activity.

The committee views the payroll employment measure, which is based on a large survey of employers, as the most reliable comprehensive estimate of employment. This series reached a peak in December 2007 and has declined every month since then.

The committee believes that the two most reliable comprehensive estimates of aggregate domestic production are normally the quarterly estimate of real Gross Domestic Product and the quarterly estimate of real Gross Domestic Income, both produced by the Bureau of Economic Analysis. In concept, the two should be the same, because sales of products generate income for producers and workers equal to the value of the sales. However, because the measurement on the product and income sides proceeds somewhat independently, the two actual measures differ by a statistical discrepancy. The product-side estimates fell slightly in 2007Q4, rose slightly in 2008Q1, rose again in 2008Q2, and fell slightly in 2008Q3. The income-side estimates reached their peak in 2007Q3, fell slightly in 2007Q4 and 2008Q1, rose slightly in 2008Q2 to a level below its peak in 2007Q3, and fell again in 2008Q3. Thus, the currently available estimates of quarterly aggregate real domestic production do not speak clearly about the date of a peak in activity.

Other series considered by the committee—including real personal income less transfer payments, real manufacturing and wholesale-retail trade sales, industrial production, and employment estimates based on the household survey—all reached peaks between November 2007 and June 2008.

The committee determined that the decline in economic activity in 2008 met the standard for a recession, as set forth in the second paragraph of this document. All evidence other than the ambiguous movements of the quarterly product-side measure of domestic production confirmed that conclusion. Many of these indicators, including monthly data on the largest component of GDP, consumption, have declined sharply in recent months.

The committee's primary role is to maintain a monthly chronology of the business cycle. For this purpose, the committee mainly relies on monthly indicators. It also considers quarterly indicators and maintains a quarterly chronology. In its deliberations, the committee relied on a number of monthly and quarterly economic indicators published by government agencies. The Appendix to this announcement lists these indicators and their sources. The Appendix also describes the calculations required to reproduce the series that the NBER committee examined in its deliberations.

## **The Month of the Peak**

The committee identified December 2007 as the peak month, after determining that the subsequent decline in economic activity was large enough to qualify as a recession.

Payroll employment, the number of filled jobs in the economy based on the Bureau of Labor Statistics' large survey of employers, reached a peak in December 2007 and has declined in every month since then. An alternative measure of employment, measured by the BLS's household survey, reached a peak in November 2007, declined early in 2008, expanded temporarily in April to a level below its November 2007 peak, and has declined in every month since April 2008. For a discussion of the difference between payroll and household survey employment measures, see Mary Bowler and Teresa L. Morisi, "Understanding the Employment Measures from the CPS and CES Surveys," *Monthly Labor Review*, February 2006, pp. 23–38.

The committee uses real personal income less transfer payments from the Bureau of Economic Analysis as a monthly measure of output. The deduction of transfer payments places the data closer to the desired measure, real gross domestic income. To adjust personal income less transfer payments from nominal to real terms (that is, to remove the effects of price changes), the committee uses the deflator for gross domestic product. Because this deflator is only available quarterly, the committee interpolates the published series to approximate a monthly price index for GDP. The resulting monthly measure of real personal income less transfers is an imperfect measure of monthly real output because of definitional differences between personal income less transfers and gross national income and because we use the interpolated price index. Our measure of real personal income less transfers peaked in December 2007, displayed a zig-zag pattern from then until June 2008 at levels slightly below the December 2007 peak, and has generally declined since June.

Real manufacturing and wholesale-retail trade sales from the Census Department is another monthly indicator of output. It is an imperfect measure of the production of goods and services for at least three reasons. First, it covers only goods and not services. Second, it does not deduct the sales of imported goods. Because the real value of imports declined substantially over the relevant period, the measure understates the growth of output. Third, the government does not publish a price index corresponding to the coverage of the measure. The committee uses the same interpolated GDP deflator as discussed above. Real manufacturing and wholesale-retail trade sales reached a well-defined peak in June 2008.

The last monthly measure of production is the Federal Reserve Board's index of industrial production. This measure has quite restricted coverage—it includes manufacturing, mining, and utilities but excludes all services and government. Industrial production peaked in January 2008, fell through May 2008, rose slightly in June and July, and then fell substantially from July to September. It rose somewhat in October with the resumption of oil production disturbed by hurricanes in the previous month. The October value of the industrial production index remained a substantial 4.7 percent below its value in January 2008.

The committee noted that the behavior of the quarterly estimates of aggregate production was not inconsistent with a peak in late 2007. The income-side estimate of output reached its peak in the third quarter of 2007. The product-side estimate reached a temporary peak in the same quarter, but rose to a higher level in the second quarter of 2008.

## The Quarter of the Peak

The committee determined that the peak quarter of economic activity was the fourth quarter of 2007. When the monthly peak occurs in the last month of a quarter, the NBER's long-standing procedures dates the quarterly peak either in the quarter containing the monthly peak or in the subsequent quarter. Thus, the committee could have dated the quarterly peak in 2008Q1 if it had determined that economic activity was higher in that quarter than in 2007Q4. However, the committee determined that this was not the case. Most notably, both payroll employment and the income-side estimate of domestic production were lower in 2008Q1 than in 2007Q4, and the product-side estimate of domestic production was only slightly higher. The committee found that the peak quarter was the one containing the peak month, 2007Q4.

## Further Comments

This announcement was originally posted on December 1, 2008 and then revised on December 11, 2008. In the December 1, 2008 version, we deflated manufacturing and trade sales by the interpolated GDP deflator. In this version we use the real sales from the Bureau of Economic Analysis. The source appears in the appendix. This change did not have any effect on our determination of the peak date.

Although the indicators described above are the most important measures considered by the NBER in developing its business cycle chronology, there is no fixed rule about which other measures may contribute information to the process in any particular episode.

Committee members participating in the decision were: Robert Hall, Stanford University (chair); Martin Feldstein, Harvard University and NBER President Emeritus; Jeffrey Frankel, Harvard University; Robert Gordon, Northwestern University; James Poterba, MIT and NBER President; David Romer, University of California, Berkeley; and Victor Zarnowitz, the Conference Board. Christina Romer of the University of California, Berkeley, resigned from the committee on November 25, 2008, and did not participate in its deliberations of November 28.

For more information, see the FAQs below and also see <http://www.nber.org/cycles.html>.

### FAQs

**Q: The financial press often states the definition of a recession as two consecutive quarters of decline in real GDP. How does that relate to the NBER's recession dating procedure?**

**A:** Most of the recessions identified by our procedures do consist of two or more quarters of declining real GDP, but not all of them. As an example, the last recession, in 2001, did not include two consecutive quarters of decline. As of the date of the committee's meeting, the economy had not yet experienced two consecutive quarters of decline.

**Q: Why doesn't the committee accept the two-quarter definition?**

**A:** The committee's procedure for identifying turning points differs from the two-quarter rule in a number of ways. First, we do not identify economic activity solely with real GDP, but use a range of indicators. Second, we place considerable emphasis on monthly indicators in arriving at a monthly chronology. Third, we consider the depth of the decline in economic activity. Recall that our definition includes the phrase, "a significant decline in activity. Fourth, in examining the behavior of domestic production, we consider not only the conventional product-side GDP estimates, but also the conceptually equivalent income-side GDI estimates. The differences between these two sets of estimates were particularly evident in 2007 and 2008.

**Q: Has the committee shifted toward a procedure that determines the dates of peaks and troughs mainly on the basis of employment?**

**A.** We have not shifted toward employment. Rather, as our announcement explains, we found a clear signal in employment and a mixed one in the various measures of GDP, including especially real GDI, so we picked the peak month on the basis of the clear signal, as well as our consideration of output and other measures. In the two previous recessions, the peak and trough months of employment differed from the business cycle peak and trough months chosen by the committee. In some cases, the difference was only a month; in the case of the most recent recession, however, the trough in employment occurred 21 months after the November 2001 trough date chosen by the committee.

**Q: Isn't a recession a period of diminished economic activity?**

**A:** It's more accurate to say that a recession--the way we use the word--is a period of *diminishing* activity rather than *diminished* activity. We identify a month when the economy reached a peak of activity and a later month when the economy reached a trough. The time in between is a recession, a period when economic activity is contracting. The following period is an expansion.

**Q: How do the movements of unemployment claims inform the Bureau's thinking?**

**A:** A bulge in jobless claims would appear to forecast declining employment and rising unemployment, but we do not use the initial claims numbers in our discussions, partly because there is a lot of week-to-week noise in the series.

**Q: What about the unemployment rate?**

**A:** Unemployment is generally a lagging indicator, particularly after the trough in economic activity determined by the NBER. For instance, the unemployment rate peaked 15 months after the NBER trough month in the 1990-91 recession and 19 months after the NBER trough month in the 2001 recession. The unemployment rate (which the committee does not use) tends to lag behind employment (which the committee *does* use) on account of variations in labor-force participation.

**Q: Is the expansion of real GDP (as measured using the product-side estimates) in the first quarter of 2008 consistent with the identification of a recession starting in December 2007?**

**A:** The committee considers a range of indicators of economic activity, and many of them suggest declining activity in the first quarter of the current calendar year. These include payroll employment and the income-side estimates of domestic production.

**Q: In December 2007, was there a clear peak in economic activity or was there a flat period around that time?**

**A:** The committee found that economic activity measured by production was close to flat from roughly September 2007 to roughly June 2008, while activity measured by employment reached a clear peak in December 2007. The committee judged that the weight of the evidence suggested that the peak occurred in December 2007.

**Q: Are there estimates of monthly real GDP?**

**A:** Yes. Macroeconomic Advisers, a consulting firm, prepares estimates of monthly real GDP. Many of the ingredients of the quarterly GDP figures are published at a monthly frequency by the Bureau of Economic Analysis. Macroeconomic Advisers aggregates them, and then uses a statistical procedure to adjust the monthly estimates for each quarter to make them consistent with the Commerce Department's official quarterly figure. The monthly GDP numbers are fairly noisy and are subject to considerable revision. Estimated monthly real GDP reached one peak in January 2008 and another, higher peak in June 2008.

**Q: Has the committee ever changed a cycle date?**

**A:** In the past, the NBER has made some small changes to cycle dates, most recently in 1975. No changes have occurred since 1978 when the Business Cycle Dating Committee was formed. The committee would change the date of a recent peak or trough if it concluded that the date it had chosen was incorrect.

**Q: Typically, how long after the beginning of a recession does the BCDC declare that a recession has started? After the end of the recession?**

**A:** Anywhere from 6 to 18 months. The committee waits long enough so that the existence of a recession is not at all in doubt. It waits until it can assign an accurate date.

**Q: Does the NBER keep a record of when it announced the determination of the dates of peaks and troughs prior to those given in the Bureau's website?**

**A:** The Business Cycle Dating Committee was created in 1978, and since then there has been a formal process of announcing the NBER determination of a peak or trough in economic activity. Those announcement dates were: June 3, 1980; July 8, 1981; January 6, 1982; July 8, 1983; April 25, 1991; December 22, 1992; November 26, 2001; July 17, 2003; and December 1, 2008. During the period 1961-1978, the U.S. Department of Commerce embraced the NBER turning points as the official record of U.S. business cycle activity, but the NBER made no formal announcements when it determined the dates of turning points. There was an informal notification process between the NBER researchers and the Commerce Department, followed by publication of turning point dates in Commerce Department publications.

**Q: When the BCDC says that the recession began in December, is there a specific date in December?**

**A:** The committee identifies the month when the peak occurred, without taking a stand on the date in the month. Thus, December 2007 is both the month when the recession began and the month when the expansion ended.

**Q: Does the NBER identify depressions as well as recessions in its chronology?**

**A:** The NBER does not separately identify depressions. The NBER business cycle chronology identifies the dates of peaks and troughs in economic activity. We refer to the period between a peak and a trough as a contraction or a recession, and the period between the trough and the peak as an expansion. The term depression is often used to refer to a particularly severe period of economic weakness. Some economists use it to refer only to the portion of these periods when economic activity is declining. The more common use, however, also encompasses the time until economic activity has returned to close to normal levels. The most recent episode in the United States that is generally regarded as a depression occurred in the 1930s. The NBER determined that the peak in economic activity occurred in August 1929, and the trough in March 1933. The NBER identified a second peak in May 1937 and a trough in June 1938. Both the contraction starting in 1929 and that starting in 1937 were very severe; the one starting in 1929 is widely acknowledged to have been the worst in history. According to the Bureau of Economic Analysis, real GDP declined 27 percent between 1929 and 1933, roughly ten times as much as in the worst postwar recession. If the term Great Depression is used to mean the period of exceptional decline in economic activity, it refers to the period from August 1929 to March 1933. If it is used to also include the period until economic activity had returned to approximately normal levels, most economists would judge that it ended sometime in 1940 or 1941. However, just as the NBER does not define the term depression or identify depressions, there is no formal NBER definition or dating of the Great Depression.

**Q: When did the NBER first establish its business cycle dates?**

**A:** The NBER was founded in 1920, and published its first business cycle dates in 1929.

**Q: When was your committee first formed?**

**A:** When Martin Feldstein became president of the NBER in 1978. Robert Hall has chaired the committee since its inception.

**Q: How is the committee's membership determined?**

**A:** The President of the NBER appoints the members, who include directors of the macro-related programs of the NBER plus other members with specialties in business-cycle research.

**Q: How long does the committee expect the recession to last?**

**A:** The committee does not forecast.

**Q: Why did the committee not declare the end of the recession when in met on April 8, 2010 even though, as it noted in its announcement, most indicators have turned up?**

**A:** The committee does not judge in real time. Rather, once all the relevant data are in and the early revisions have occurred, it looks back on history and determines in what month the economy reached bottom and began to expand again. The committee also has to guard against the possibility, even if very small, that what seems to be the beginning of an expansion is actually just an interruption in a longer contraction.

## Appendix: Data Sources and Calculations

| <i>Indicator</i>                            | <i>Source and method</i>  |
|---|---|
| Industrial production                       | FRB index B50001  |
| Quarterly real GDP                          | BEA Table 1.1.6, line 1   |
| Quarterly real gross domestic income, GDI   | BEA Table 1.10, line 1, divided by BEA Table 1.1.9, line 1  |
| Monthly real personal income less transfers | BEA Table 2.6, line 1 less line 14, both deflated by a monthly interpolation (see below) of BEA Table 1.1.9, line 1 |
| Monthly payroll employment                  | BLS Series CES0000000001  |
| Monthly household employment                | BLS Series LNS12000000  |
| Monthly real manufacturing and trade sales  | Census series tbtsla, adjusted, total business, deflated by monthly interpolation of BEA Table 1.1.9, line 1        |

### Websites:

Federal Reserve Board industrial production index:

[http://www.federalreserve.gov/releases/g17/iphist/iphist\\_sa.txt](http://www.federalreserve.gov/releases/g17/iphist/iphist_sa.txt)

Bureau of Economic Analysis, U.S. Department of Commerce:

<http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=N>

BLS payroll survey: <http://data.bls.gov/cgi-bin/surveymost?ce>

BLS household survey: <http://data.bls.gov/cgi-bin/surveymost?ln>

Census data on manufacturing and trade sales: <http://www.census.gov/mtis/www/data/text/mtis-sales.txt>

### Interpolation of GDP deflator:

The value of the index in the first month of the quarter is one third of the past quarter's value plus two-thirds of the current quarter's value. In the second month, it is the quarter's value. In the third month, it is two-thirds of the quarter's value plus one third of the next quarter's value.

(revised December 11, 2008)