

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

January 2008

The primary metals leading index fell sharply in December, and its 6-month smoothed growth rate fell further into negative territory. The growth rate is indicating that activity in the U.S. primary metals industry will likely slow in the near term. The metals price leading index growth rate increased in November, suggesting an increase in some metals price growth in the near term.

The primary aluminum and the aluminum mill products indexes are suspended because of discontinued availability of industry-specific historical data. The USGS will continue to calculate the steel and copper composite indexes.

The **primary metals leading index** declined 1.7% to 147.5 in December from a revised 150.0 in November, and its 6-month smoothed growth rate fell to -6.9% from a downwardly revised -3.9% in November. The 6-month smoothed growth rate is a compound annual rate that measures the near-term trend. Normally, a growth rate above +1.0% signals an upward trend for future growth in metals activity, while a growth rate below -1.0% indicates a downward trend. For an explanation of these indexes and a definition of the primary metals industry, [see page 10](#).

The JOC-ECRI metals price index growth rate continued to decline in December and slid into negative territory. It contributed -1.2 percentage points to the net decrease in the primary metals leading index. The Institute for Supply Management's PMI also declined in December. It fell below the threshold that indicates a decrease in future U.S. manufacturing activity and contributed -0.8 percentage points to the primary metals leading index. A slightly shorter average workweek in primary metals establishments in December contributed -0.5 percentage points. In contrast, an uptick in the stock price index combining construction and farm machinery companies and industrial machinery companies made the only positive contribution, 0.7 percentage points, to the leading index. Only four of the leading index's eight components were available for the December index calculation. The primary metals leading index will likely be revised next month when the remaining four components become available.

The slowdown in the U.S. manufacturing sector and the turbulent housing construction sector has limited domestic metals demand. The outlook for slower economic growth in many other industri-

alized countries also has had a negative impact on metals demand. However, robust growth in emerging Asian economies, particularly China, imposes high metals demand offsetting weaker growth of other countries. Growth in U.S. primary metals industry activity will likely slow in the months directly ahead.

The **steel leading index** decreased 0.9% to 118.8 in November, the latest month for which it is available, from a revised 119.9 in October. Its 6-month smoothed growth rate decreased to -3.4% from a revised -1.6% in October. A dip in the S&P stock price index for steel companies and the declining growth rate of the inflation-adjusted M2 money supply had the strongest negative pulls on the steel leading index. Meanwhile, the indicators that posted gains increased only slightly. The steel leading index growth rate continues to decline and is pointing to a downturn in the U.S. steel industry in the near future.

The **copper leading index** decreased 0.5% in November to 124.1 from 124.7 in October, and its growth rate fell to -3.2% from a revised -2.3% in October. Four of its six indicators decreased in November, with the largest negative contribution coming from a drop in the price of copper. The only significant positive contribution was from added overtime hours in copper rolling, drawing, extruding, and alloying facilities. Longer working hours are usually used to make up for fewer production workers employed. The copper leading index growth rate has been negative for 4 consecutive months, and it is suggesting that growth in U.S. copper industry activity could continue to slow in the near term.

Metals Price Growth Possible Despite U.S. Growth Slowdown

The **metals price leading index** increased 0.7% in November to 107.9 from a revised 107.2 in October. November is the latest month for which it is available. Its 6-month smoothed growth rate rose to 4.0% in November from a revised 3.0% in October. The growth rate of the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar, which has been rising since the beginning of 2007, accounted for most of the net increase in the leading index. It contributed 0.7 percentage points. The contribution from the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products rounded up to 0.1 percentage point. In contrast, the yield spread between the U.S. 10-year Treasury Note and the federal funds rate held the leading index back 0.2 percentage points. The fourth index component, the growth rate of the Economic Cycle Research Institute's (ECRI) 18-Country Long Leading Index, was only available through October. It has been

generally decreasing since early 2005 and rested at zero in October, suggesting flat or possibly declining growth for most global economies in the near future. The ECRI 18-Country Long Leading Index signals changes in the growth of economic activity in major industrialized countries about 5 months in advance.

The growth rate of the inflation-adjusted value of inventories of U.S. nonferrous metal products, which is an indicator of metals supply, increased slightly in November. However, this indicator, which usually moves inversely with the price of metals, is still in negative territory. This along with the positive metals price leading index growth rate suggests that metal price growth could pick up in the near future.

The business cycle and inventories are only two factors in metals price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, foreign exchange rates, geopolitical instability, and production costs.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

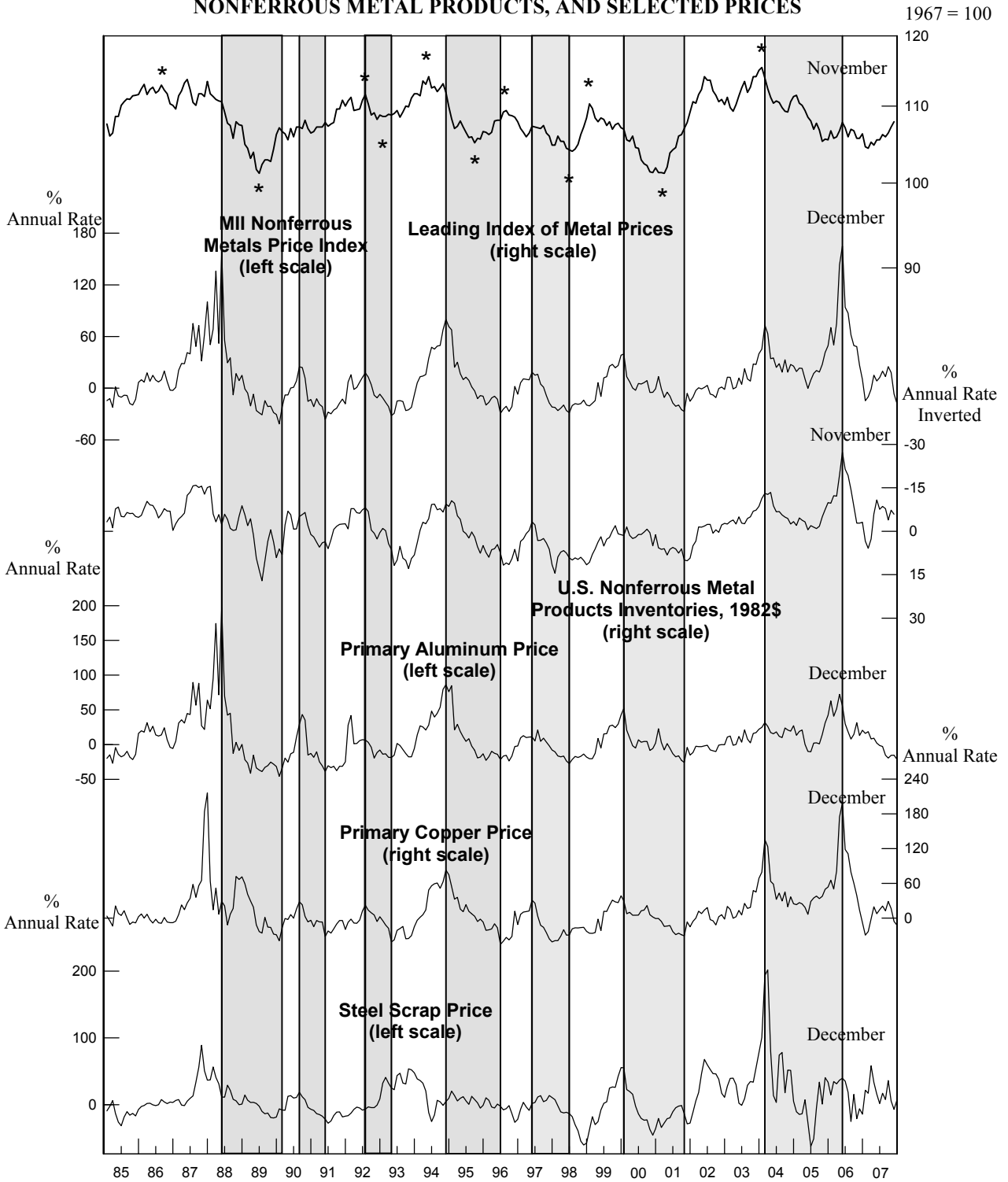
	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
2006						
November	105.7	26.7	-2.8	12.9	13.7	-5.9
December	106.3	10.2	-3.1	20.5	-7.6	-14.2
2007						
January	104.6	-14.6	3.4	16.0	-29.6	21.8
February	104.4	-10.0	5.9	18.7	-23.3	17.2
March	105.2	-1.0	2.7	8.2	-1.3	58.3
April	104.8	15.2	-6.0	9.3	19.5	33.3
May	105.5	8.4	-10.8	2.0	7.5	15.9
June	105.5	12.3	-7.6	-1.4	14.7	1.8
July	106.2	19.9	-8.6r	-2.8	20.9	17.4
August	105.9	13.6	-7.8	-15.4	12.4	7.7
September	106.4	25.1	-3.9r	-19.4	28.9	36.2
October	107.2r	18.2	-7.3r	-15.5	16.3	5.6
November	107.9	-6.6	-5.9	-15.3	-5.7	-6.8
December	NA	-18.1	NA	-21.4	-12.6	7.4

NA: Not available r: Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Economic Cycle Research Institute's 18-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

**CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES**



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	<u>Leading Index</u>		<u>Coincident Index</u>	
	<u>(1977 = 100)</u>	<u>Growth Rate</u>	<u>(1977 = 100)</u>	<u>Growth Rate</u>
2007				
January	151.1	-1.6	104.1	-3.4
February	152.5	0.1	104.2	-2.9
March	154.4	2.4	104.8	-1.7
April	156.2	4.4	105.1	-0.9
May	155.8	3.7	105.3	-0.4
June	154.9	2.6	105.0	-0.6
July	155.6	3.3r	105.9r	1.5r
August	153.9r	1.0r	105.5	1.0
September	152.0r	-1.6r	105.0r	0.4r
October	151.5r	-2.2r	105.4r	1.3r
November	150.0r	-3.9r	105.7	1.6
December	147.5	-6.9	NA	NA

NA: Not available **r:** Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	November	December
1. Average weekly hours, primary metals (NAICS 331)	0.1r	-0.5
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	-0.4r	0.7
3. Ratio of price to unit labor cost (NAICS 331)	0.2	NA
4. JOC-ECRI metals price index growth rate	-0.4r	-1.2
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$	0.0	NA
6. Index of new private housing units authorized by permit	0.0	NA
7. Growth rate of U.S. M2 money supply, 2000\$	-0.4	NA
8. PMI	0.0	-0.8
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.9r	-1.8
Coincident Index	October	November
1. Industrial production index, primary metals (NAICS 331)	0.0r	0.2
2. Total employee hours, primary metals (NAICS 331)	0.0	0.2
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$	0.3r	-0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.4r	-0.1

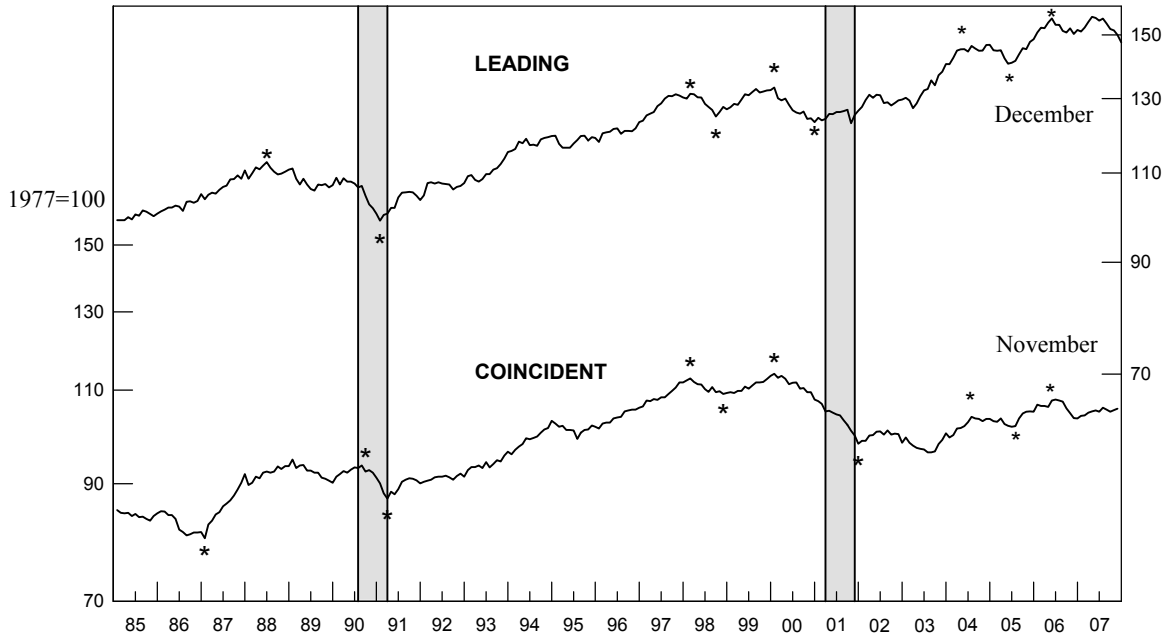
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available **r:** Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

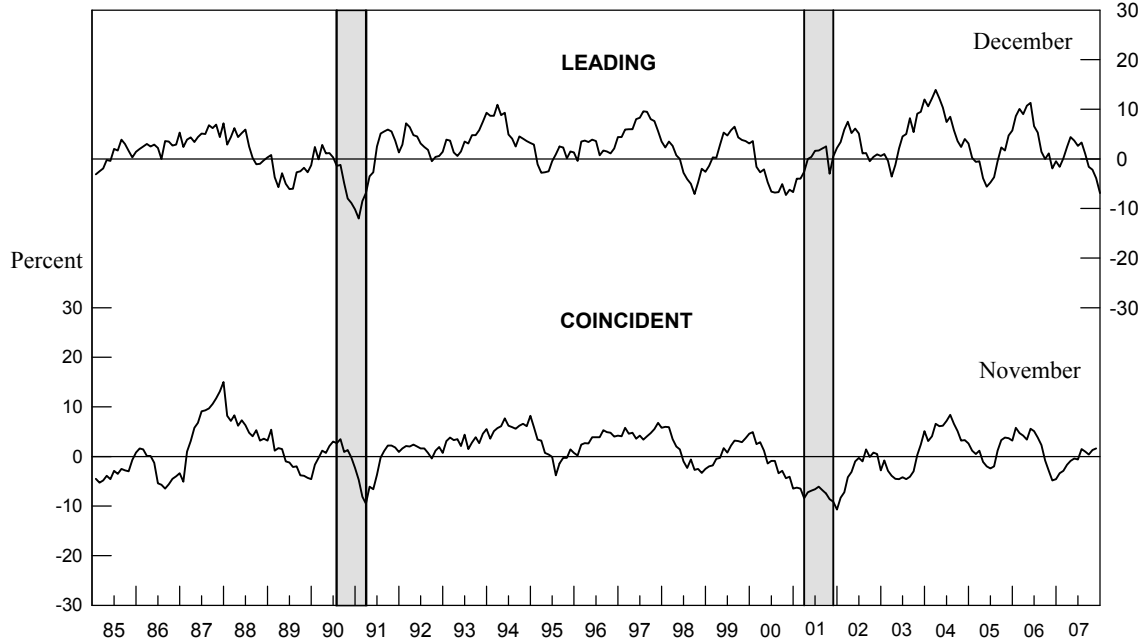
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1985-2007 1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1985-2007 Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

**Table 4.
The Steel Industry Indexes and Growth Rates**

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2006				
December	120.5	-0.1	97.4	-4.9
2007				
January	120.6	0.0	99.2	-1.1
February	121.4	1.3	98.7	-1.6
March	122.4	2.9	98.8	-1.1
April	125.8	8.2	99.8	0.8
May	122.2	2.1	99.8	0.8
June	120.0	-1.3	99.6	0.6
July	120.0r	-1.2r	100.2r	1.9r
August	119.8	-1.5r	100.4	2.3
September	120.0	-1.3r	99.6	1.0r
October	119.9r	-1.6r	100.5r	2.6r
November	118.8	-3.4	100.9	3.0

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

**Table 5.
The Contribution of Each Steel Index Component to the Percent Change
in the Index from the Previous Month**

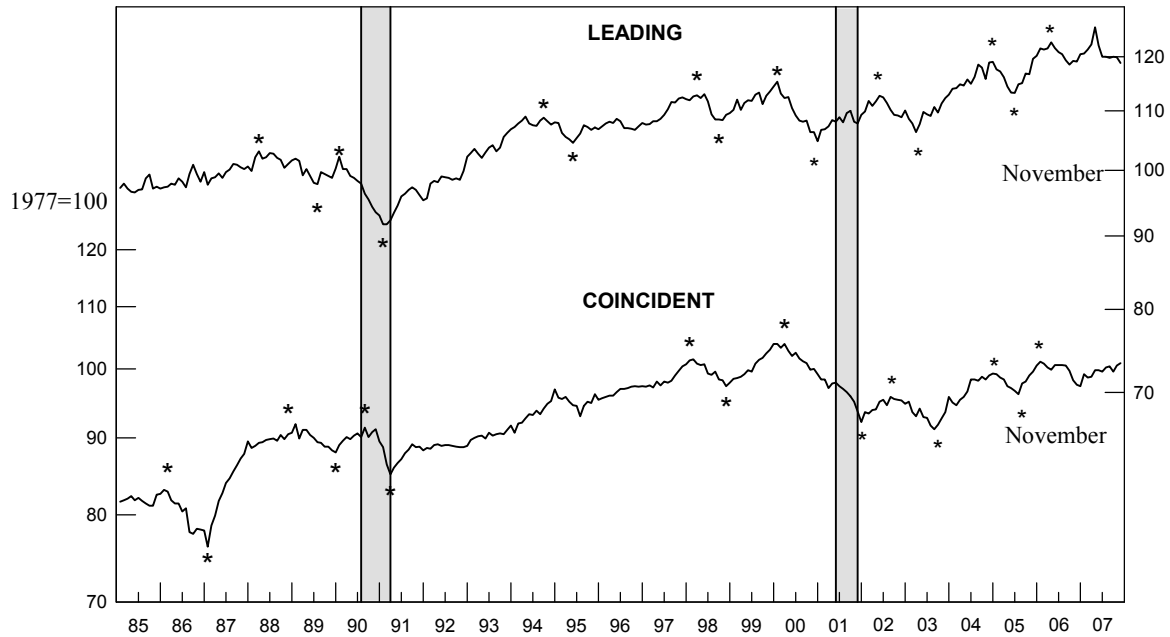
	October	November
Leading Index		
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	0.2	0.0
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.3	0.0
3. Shipments of household appliances, 1982\$	-0.2r	-0.2
4. S&P stock price index, steel companies	0.3	-0.5
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.1	0.1
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	0.1	0.1
7. Index of new private housing units authorized by permit	-0.4	0.0
8. Growth rate of U.S. M2 money supply, 2000\$	-0.3	-0.4
9. PMI	-0.1	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.2r	-0.9
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	0.1	0.2
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.5	-0.1
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	0.2	0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.9r	0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, Institute for Supply Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1985-2007

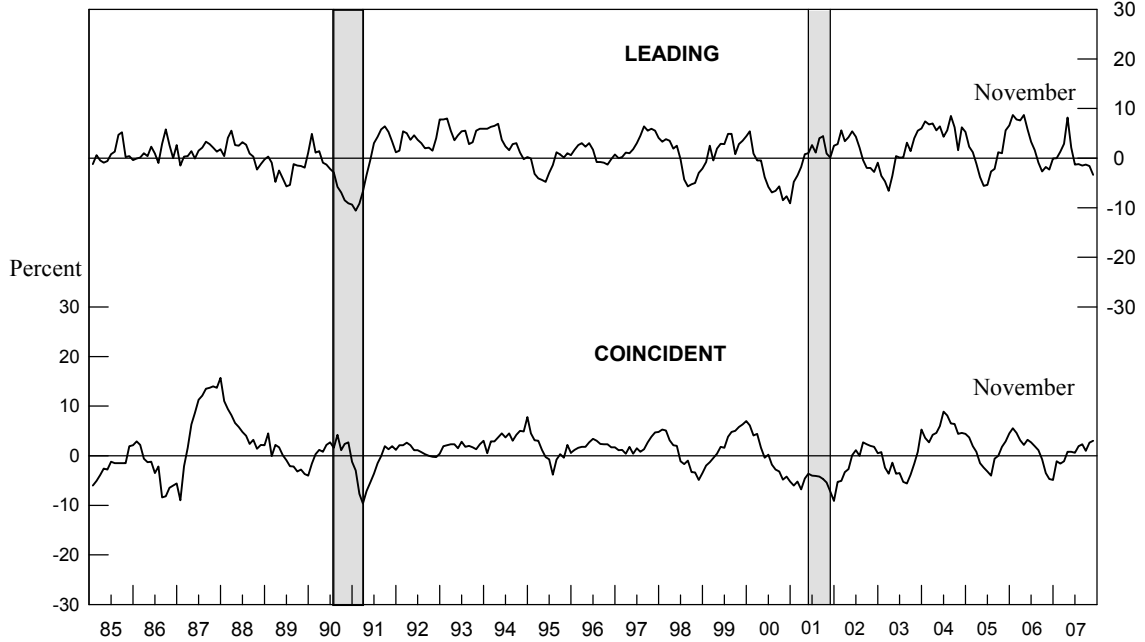
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1985-2007

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 6.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2006				
December	125.6	-2.9	109.4	-0.5
2007				
January	125.0	-3.6	106.2	-5.9
February	126.3	-1.3	105.9	-6.1
March	127.1	0.0	107.7	-2.3
April	127.2	0.3	107.4	-2.3
May	128.3	2.2	108.9	0.4
June	127.9	2.1	107.9	-0.8
July	128.2	2.7	110.1	3.8
August	125.8	-0.9	107.3r	-0.8r
September	124.5	-2.7	106.3r	-1.9r
October	124.7	-2.3r	106.7r	-1.1r
November	124.1	-3.2	106.1	-2.3

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

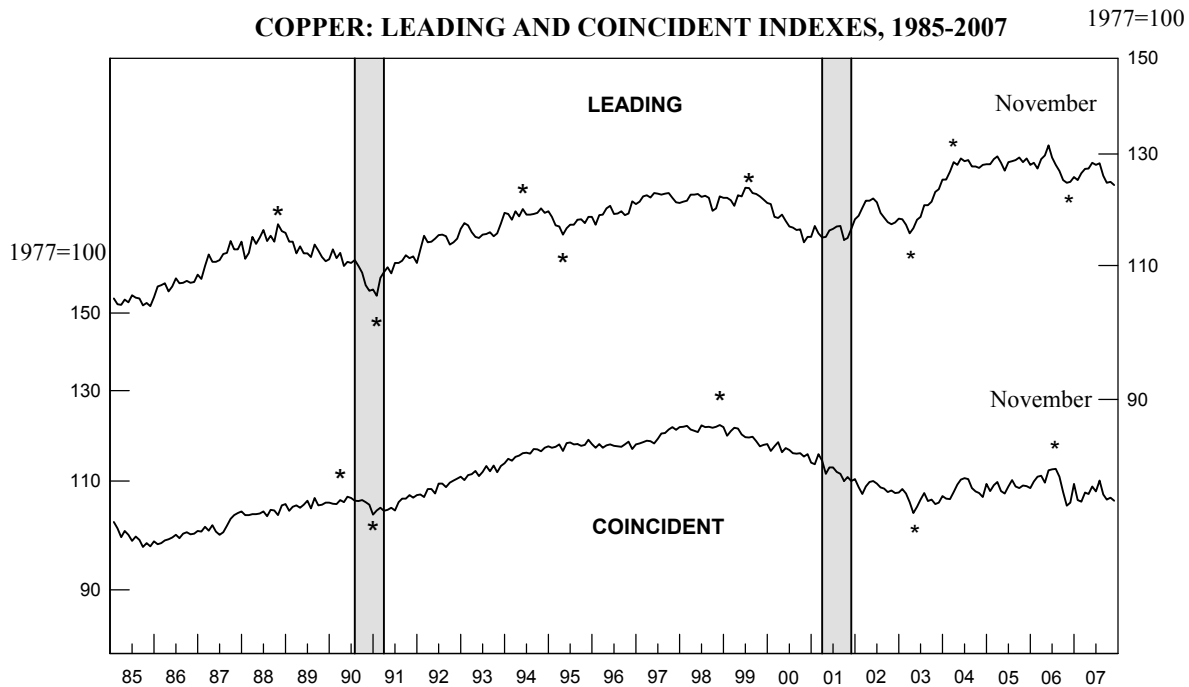
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

	October	November
Leading Index		
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	1.0	0.3
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	0.0	0.0
3. S&P stock price index, building products companies	-0.2	-0.1
4. LME spot price of primary copper	-0.3	-0.6
5. Index of new private housing units authorized by permit	-0.5	0.0
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.2	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2	-0.5
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.2r	-0.1
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	0.1r	-0.6
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.4r	-0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

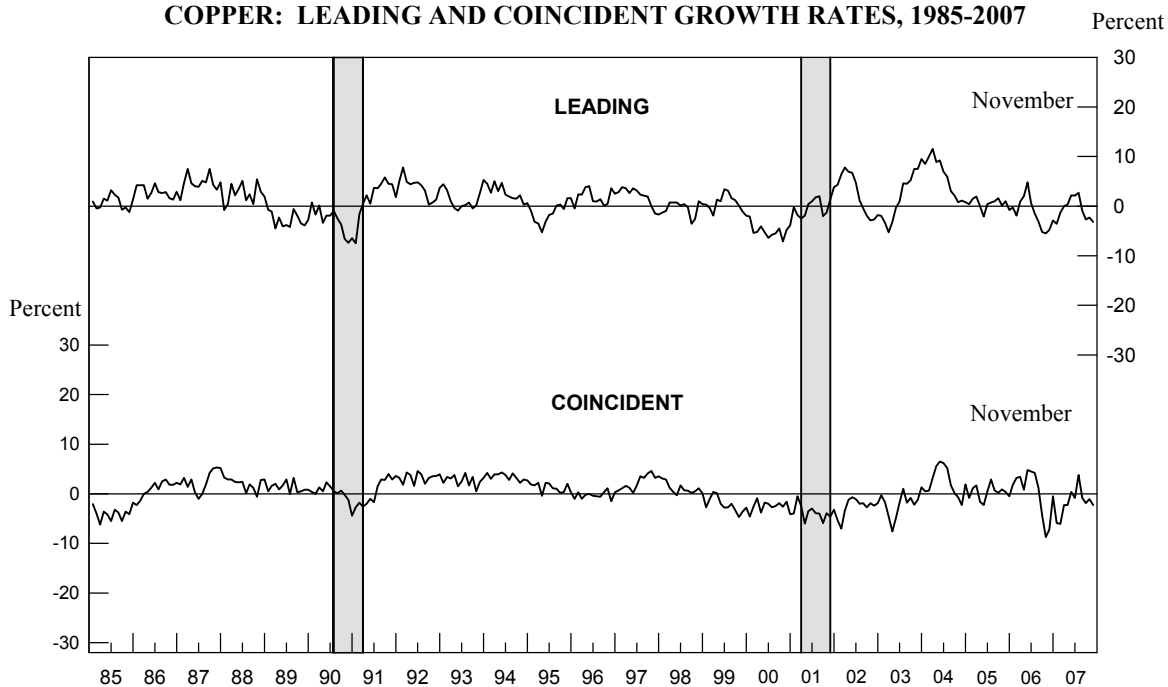
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 1985-2007



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1985-2007



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

¹Business Cycle Indicators, A monthly report from The Conference Board (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next update for these indexes is scheduled for release on the World Wide Web at 10:00 a.m. EST, Friday, February 15. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/miil>

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Gail James (703-648-4915; e-mail: gjames@usgs.gov) and Ken Beckman (703-648-4916; e-mail: kbeckman@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990s. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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