

Metal Industry Indicators

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

January 2007

The primary metals leading index rebounded in December, after a drop in November, and its 6-month smoothed growth rate moved back into positive territory. Global and domestic manufacturing activity outlooks appear more positive, boding increased metals demand. Primary metals industry activity growth could strengthen in the months to come. The metals price leading index growth rate indicates that metal prices could decrease further in the short 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** increased to 152.2 in December from a revised 150.6 in November, and its 6-month smoothed growth rate increased to 0.9% from a revised -0.7% 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](#).

In December, the Institute for Supply Management's PMI recovered from the sharp decline of November. It moved back above the 50 percent threshold that denotes an increase in future domestic manufacturing activity and pushed the leading index up 0.5 percentage points. The rising combined S&P stock price indexes for construction and farm machinery companies and for industrial machinery companies contributed 0.3 percentage points to the leading index in December. The JOC-ECRI metals price index growth rate contributed 0.2 percentage points to the leading index. The December average workweek in primary metals establishments was the same as in November; thus its contribution to the leading index was zero. 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 December primary metals leading index growth rate rose out of negative territory and moved close to the threshold that denotes increased metals industry activity growth. While industry activity growth may be slow in the immediate future, metals demand of the United States and other global economies will likely pickup in the months to come.

The **steel leading index** eased back 0.2% to 117.8 in November, the latest month for which it is available, from a revised 118.0 in October. Its 6-month smoothed growth rate slid to -3.0% from a revised -2.6% in October. Six of its nine indicators declined, but it was the November dip in the PMI and declining shipments of household appliances that had the most downward pull on the steel leading index. The steel leading index growth rate is still pointing to further declines in industry activity growth in the near future.

The **copper leading index** changed little in November, moving to 124.5 from a revised 124.4 in October; however, its growth rate rose to -4.8% from a revised -5.4% in October. Most of its six indicators declined, but added overtime hours in copper rolling, drawing, alloying, and extruding plants boosted the leading index in November. Also, the S&P stock price index for building products made a positive contribution to the leading index. The copper leading index growth rate is indicating that copper industry activity growth will likely continue to decline in the near term.

Metals Inventories Ample for Immediate Metals Demand

The **metals price leading index** was unchanged in November from its revised 105.7 of October. November is the latest month for which it is available. Its 6-month smoothed growth rate eased to -0.6% from -0.5% in October. Two of its three available indicators made negative contribution to the leading index. The inflation-adjusted value of new orders for U.S. nonferrous metal products made a -0.2-percentage-point contribution. The falling yield spread between the U.S. 10-year Treasury Note and the federal funds rate also contributed -0.2 percentage points. In contrast, the growth rate of the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar increased for the second month in row. It made the only positive contribution to the leading index, 0.4 percentage points. The growth rate of 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 and is suggesting modest growth for most global

economies. 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, fell in November. This is the first decrease since May in this indicator, which usually moves inversely with the price of metals. While the metal products inventories growth rate stepped down in November, it is too soon to suggest that current metals stocks are not adequate for immediate demands. The metals price leading index growth rate is still negative and suggests that metals price growth could fall further 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

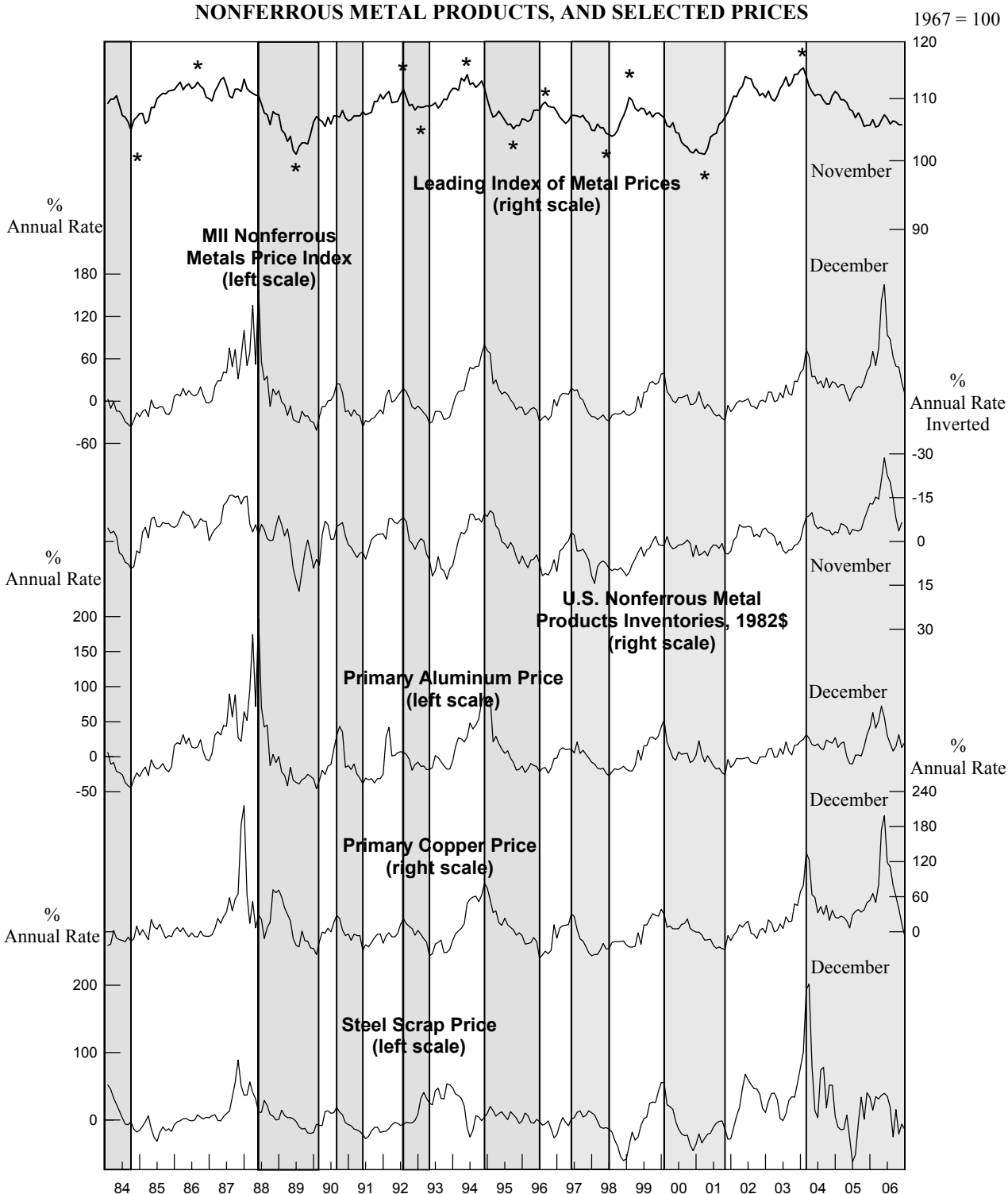
	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
2005						
November	105.6r	41.6	-10.2	31.3	49.9	40.5
December	105.6r	49.3	-13.0	42.1	53.7	33.8
2006						
January	106.5r	70.3	-12.8	62.7	65.4	14.9
February	105.3r	50.2	-15.2	40.9	50.1	34.6
March	105.5r	75.4	-14.5	51.6	81.4	31.3
April	106.4r	143.1	-21.2	72.3	174.4	36.8
May	107.3r	164.9	-28.6	56.1	198.4	39.6
June	106.7r	93.8	-22.6	30.0	118.4	35.5
July	105.8r	87.3	-20.4r	18.4	111.0	18.6
August	106.3r	62.0	-14.7r	8.0	79.0	-25.0
September	106.1r	49.5	-8.0r	14.8	60.2	15.5
October	105.7r	48.2	-3.6r	31.4	39.2	-20.9
November	105.7	26.7	-6.5	12.9	13.7	-5.9
December	NA	10.2	NA	20.5	-7.6	-14.2

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

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2006				
January	150.0	8.3	106.4	6.3
February	151.7	9.9	105.8	4.4
March	151.3	8.5	106.2	4.6
April	153.4	10.5	106.2	4.1
May	155.1	11.5	107.8	6.3
June	152.9	6.9	108.2	6.1
July	152.8r	5.4r	107.9r	4.4r
August	150.7r	1.6r	107.5r	2.8r
September	150.2	0.1	106.1r	-0.2r
October	151.5r	1.2r	104.9r	-2.6r
November	150.6r	-0.7r	104.7	-2.9
December	152.2	0.9	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	0.0
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)		-0.1	0.3
3. Ratio of price to unit labor cost (NAICS 331)		-0.6	NA
4. JOC-ECRI metals price index growth rate		0.1	0.2
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$		-0.1	NA
6. Index of new private housing units authorized by permit		-0.1	NA
7. Growth rate of U.S. M2 money supply, 2000\$		0.3	NA
8. PMI		-0.2r	0.5
Trend adjustment		0.0	0.0
Percent change (except for rounding differences)		-0.6r	1.0
Coincident Index		October	November
1. Industrial production index, primary metals (NAICS 331)		-0.6r	-0.3
2. Total employee hours, primary metals (NAICS 331)		-0.3r	-0.1
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$		-0.5r	0.1
Trend adjustment		0.1	0.1
Percent change (except for rounding differences)		-1.3r	-0.2

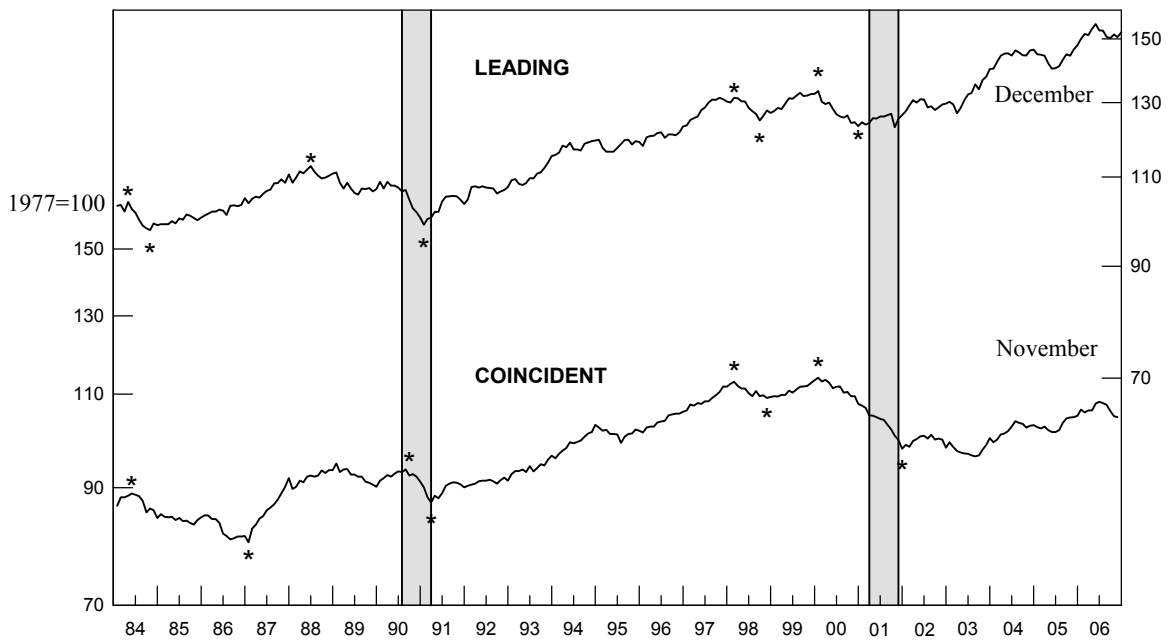
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal 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.

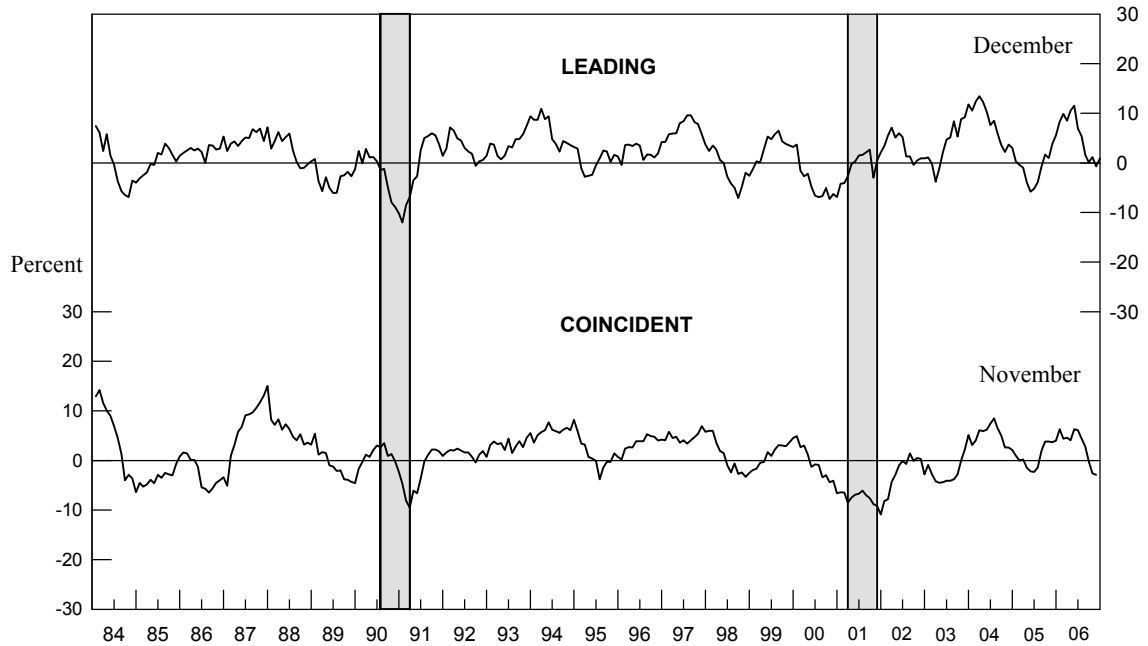
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1984-2006 1977=100



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, 1984-2006 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
2005				
December	120.0	6.6	99.4	4.1
2006				
January	121.3	8.5	99.9	4.9
February	121.1	7.7	99.3	3.7
March	121.3	7.4	98.9	2.7
April	121.9	7.6	98.6	1.8
May	120.7	4.7	99.3	3.0
June	119.8	2.2	99.4	2.7
July	119.2	0.5r	99.2r	1.6
August	118.1	-1.8	99.2r	1.1r
September	117.3	-3.5	98.4r	-0.8r
October	118.0r	-2.6r	97.0r	-3.7r
November	117.8	-3.0	96.8	-3.8

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

Leading Index	October	November
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	-0.2r	0.0
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.0r	-0.1
3. Shipments of household appliances, 1982\$	-0.2r	-0.2
4. S&P stock price index, steel companies	0.6	0.4
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.2	0.0
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	-0.3	-0.1
8. Growth rate of U.S. M2 money supply, 2000\$	0.8	0.2
9. PMI	-0.2	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.4	-0.1
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	-0.7r	-0.4
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	-0.3r	0.2
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	-0.5r	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.4r	-0.1

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, 1984-2006

1977=100

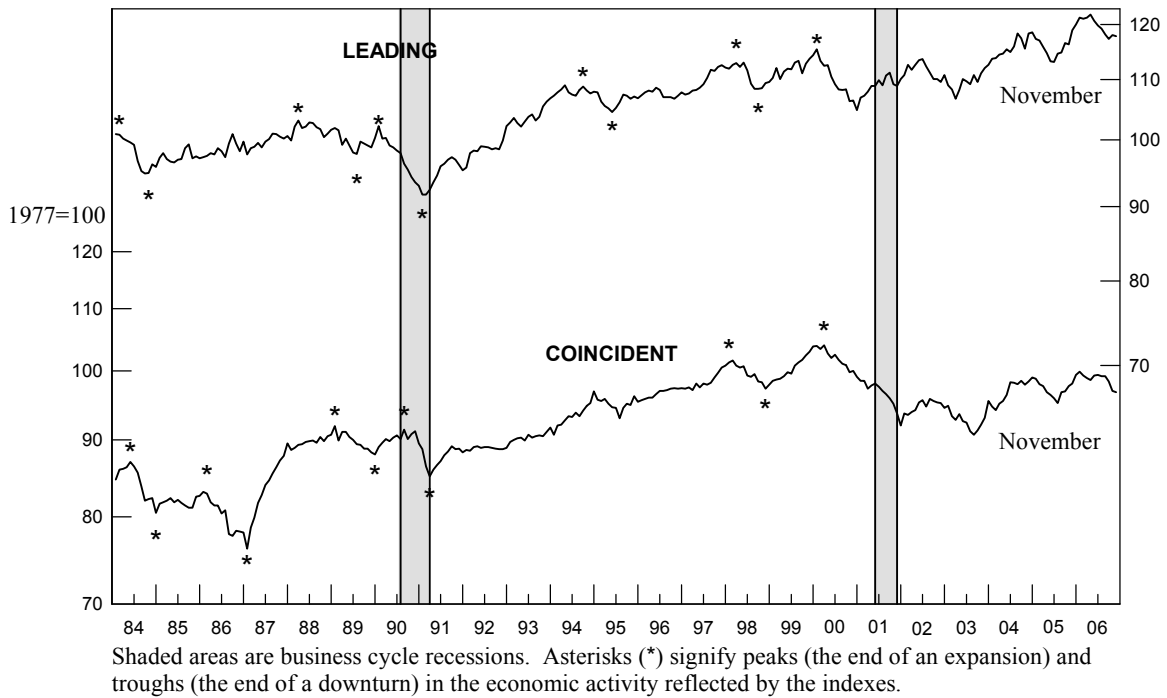
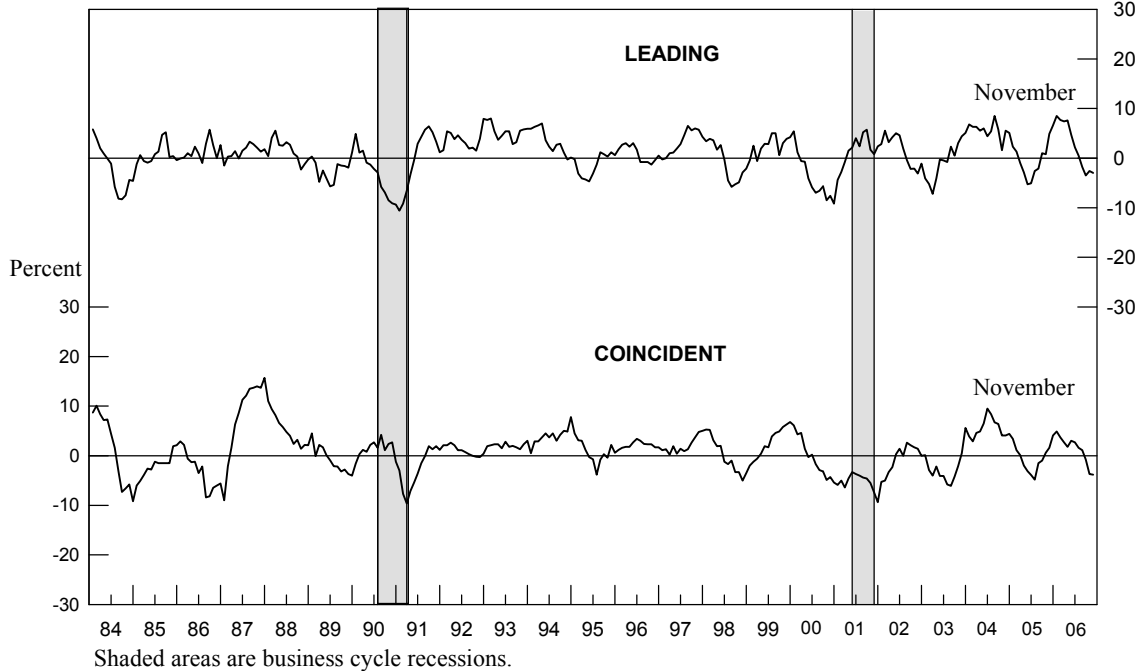


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1984-2006

Percent



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
2005				
December	127.8	-0.8	108.0	-1.2
2006				
January	127.9	-0.6	109.3	1.2
February	126.9	-2.0	110.2	2.5
March	128.6	0.6	110.4	2.7r
April	129.5	1.9	109.0	0.2r
May	131.6	4.9	111.5	4.4
June	129.1	0.6	111.7	4.2
July	127.8r	-1.2r	111.7	3.8
August	126.6	-2.9	110.0r	0.6r
September	125.0	-4.9	107.2r	-4.3r
October	124.4r	-5.4	107.3r	-4.0r
November	124.5	-4.8	107.4	-3.7

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

Leading Index	October	November
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-0.2r	0.7
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	-0.1r	-0.2
3. S&P stock price index, building products companies	0.2	0.2
4. LME spot price of primary copper	-0.1	-0.4
5. Index of new private housing units authorized by permit	-0.4	-0.2
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.0	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.6r	0.0
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.2r	0.3
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-1.8r	-1.2
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.5r	-0.8

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, 1984-2006

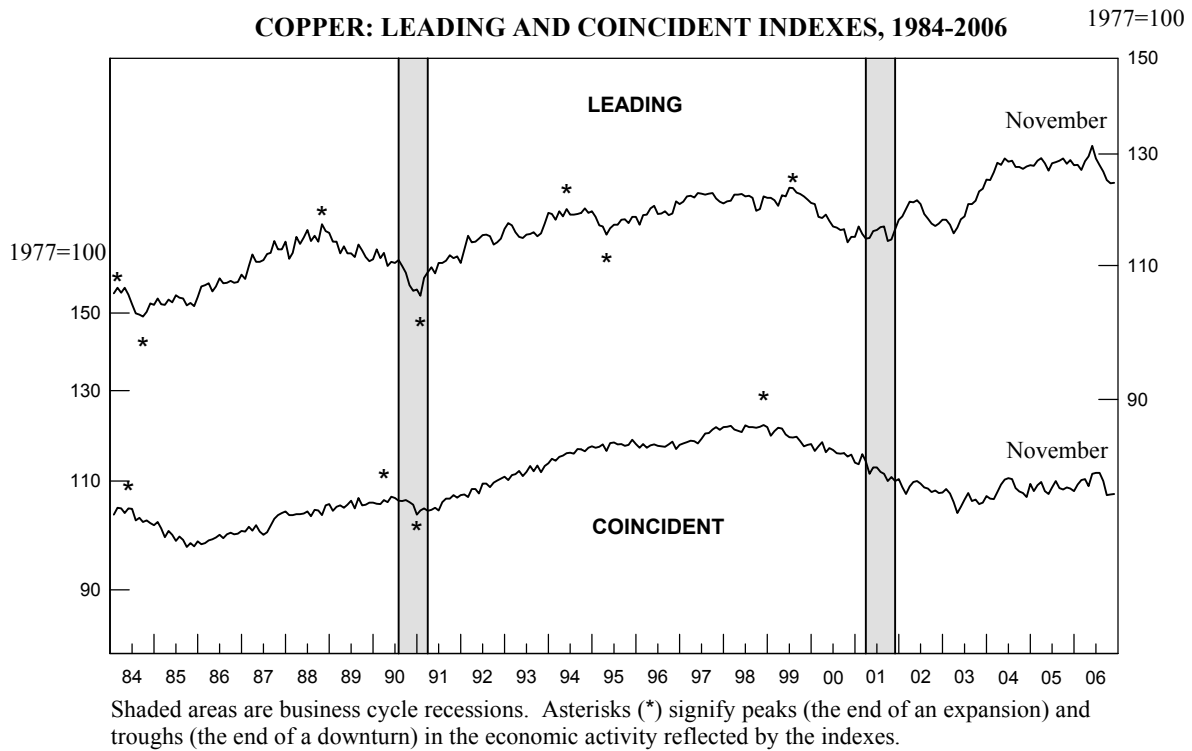
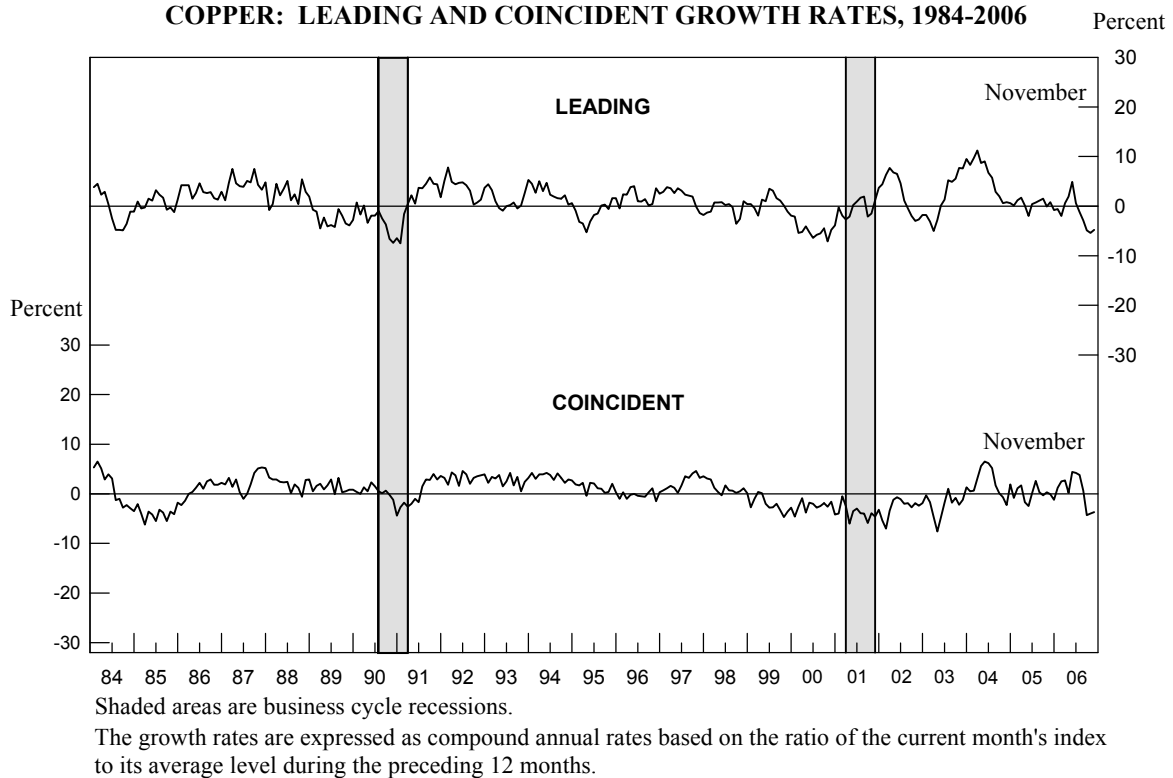


CHART 7.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1984-2006



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.

¹**Business 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 16. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

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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