

Metal Industry Indicators

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

February 2008

The primary metals leading index decreased in January, and its 6-month smoothed growth rate slipped lower into negative territory. The growth rate is indicating that activity in the U.S. primary metals industry will likely continue to slow in the near term. The metals price leading index growth rate fell sharply in December, suggesting a decline in metals price growth. However, strong Asian metals demand will likely place upward pressure on 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** decreased 0.3% to 147.3 in January from a revised 147.7 in December, and its 6-month smoothed growth rate slid to -5.9% from a revised -5.7% in December. 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](#).

A drop in the stock price index combining construction and farm machinery companies and industrial machinery companies in January contributed -1.5 percentage points to the net decrease in the primary metals leading index. A slightly shorter average workweek in primary metals establishments in January contributed -0.2 percentage points. In contrast, the JOC-ECRI metals price index growth rate moved back into positive territory, contributing 0.9 percentage points to the leading index. The Institute for Supply Management's PMI rose above the threshold that indicates an increase in future U.S. manufacturing activity and contributed 0.6 percentage points to the primary metals leading index. Only four of the leading index's eight components were available for the January index calculation. The primary metals leading index will likely be revised next month when the remaining four components become available.

The struggling U.S. housing construction sector has limited domestic metals demand. Slower economic growth for most other industrialized countries is also expected. This will also have a negative impact on metals demand. However, high metals

demand from the robust growth in emerging Asian economies, particularly China, will outweigh the weakness in the industrialized countries. Growth in U.S. primary metals industry activity will likely continue to slow in the months directly ahead.

The **steel leading index** decreased 1.6% to 117.4 in December, the latest month for which it is available, from a revised 119.3 in November. Its 6-month smoothed growth rate decreased to -5.1% from a revised -2.2% in November. Shorter weekly hours in iron and steel mills had the strongest negative pull on the steel leading index. Housing sector related indicators, such as shipments of household appliances and new housing permits issued, also had sizable negative pulls in December. A rise in the S&P stock price index for steel companies made the only significant positive contribution to the leading index. 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** increased 0.7% in December to 124.1 from a revised 123.2 in November, and its growth rate rose to -3.0% from a revised -4.5% in November. Four of its six indicators increased in December, with the largest positive contribution coming from added overtime hours in copper rolling, drawing, extruding, and alloying facilities. Longer working hours are usually used to make up for hiring fewer production workers. Fewer new housing permits issued in December and another drop in the price of copper offset some of the gains of the other indicators. The negative copper leading index growth rate is still suggesting that growth in U.S. copper industry activity could continue to slow in the near term.

Asian Metals Demand Applies Pressure To Price Growth Despite U.S. Growth Slowdown

The **metals price leading index** declined 1.0% in December to 106.0 from a revised 107.1 in November. December is the latest month for which it is available. Its 6-month smoothed growth rate settled at zero in December from a revised 2.2% in November. The growth rate of the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar, which declined for only the second time in the past 11 months, made the only negative contribution, -1.5 percentage points, to the net decrease in the leading index. However, it outweighed 0.3-percentage-point contributions, from both the yield spread between the U.S. 10-year Treasury Note and the federal funds rate, as well as from the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products. The fourth index component, the growth rate of the Economic Cycle Research Institute's (ECRI) 18-Country Long Leading Index, was only available through November. It has been generally decreasing since early 2005 and now has fallen

below the threshold that indicates decreased 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 in December. This indicator, which usually moves inversely with the price of metals, has stepped up into positive territory. This along with the negative metals price leading index growth rate would normally indicate that metal price growth could decline. However, Asian metals demand is robust enough to keep metal prices growing in the foreseeable 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

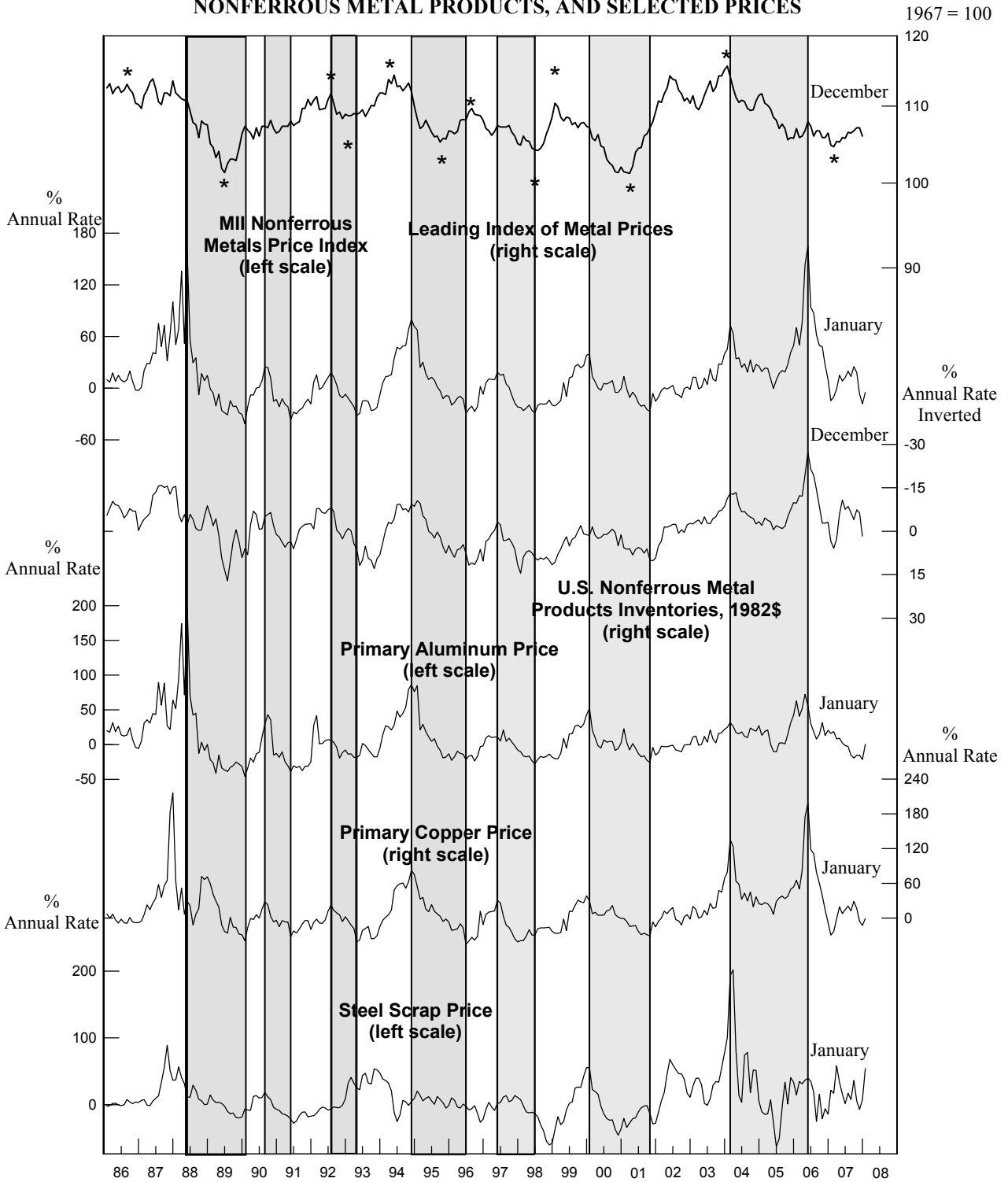
	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
2006						
December	106.4r	10.2	-3.1	20.5	-7.6	-14.2
2007						
January	104.8r	-14.6	3.4	16.0	-29.6	21.8
February	104.6r	-10.0	5.9	18.7	-23.3	17.2
March	105.3r	-1.0	2.7	8.2	-1.3	58.3
April	105.2r	15.2	-6.0	9.3	19.5	33.3
May	105.8r	8.4	-10.8	2.0	7.5	15.9
June	105.7r	12.3	-7.6	-1.4	14.7	1.8
July	106.5r	19.9	-8.6	-2.8	20.9	17.4
August	106.4r	13.6	-6.4r	-15.4	12.4	7.7
September	106.7r	25.1	-4.0r	-19.4	28.9	36.2
October	107.1r	18.2	-7.4r	-15.5	16.3	5.6
November	107.1r	-6.6	-6.4	-15.3	-5.7	-6.8
December	106.0	-18.1	1.7	-21.4	-12.6	7.4
2008						
January	NA	-4.8	NA	0.3	-0.9	54.1

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				
February	151.6r	-1.3r	104.5r	-2.7r
March	153.7r	1.5r	105.2r	-1.2r
April	155.4r	3.5r	105.6r	-0.5r
May	155.0r	2.9r	105.8r	-0.1r
June	154.0r	2.0r	105.5r	-0.2r
July	154.8r	3.0r	106.4r	1.7r
August	152.7r	0.3r	105.8r	0.9r
September	150.9r	-2.1r	105.3r	0.2r
October	151.1r	-1.8r	106.1r	1.7r
November	149.7r	-3.4r	106.3r	2.0r
December	147.7r	-5.7r	105.8	0.6
2008				
January	147.3	-5.9	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		December	January
1. Average weekly hours, primary metals (NAICS 331)		-0.7r	-0.2
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)		0.4r	-1.5
3. Ratio of price to unit labor cost (NAICS 331)		0.0	NA
4. JOC-ECRI metals price index growth rate		-0.5r	0.9
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$		0.0	NA
6. Index of new private housing units authorized by permit		-0.4	NA
7. Growth rate of U.S. M2 money supply, 2000\$		0.1	NA
8. PMI		-0.2r	0.6
Trend adjustment		0.0	0.0
Percent change (except for rounding differences)		-1.3r	-0.2
Coincident Index		November	December
1. Industrial production index, primary metals (NAICS 331)		0.3r	-0.2
2. Total employee hours, primary metals (NAICS 331)		-0.3r	0.1
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$		0.2r	-0.6
Trend adjustment		0.1	0.1
Percent change (except for rounding differences)		0.3r	-0.6

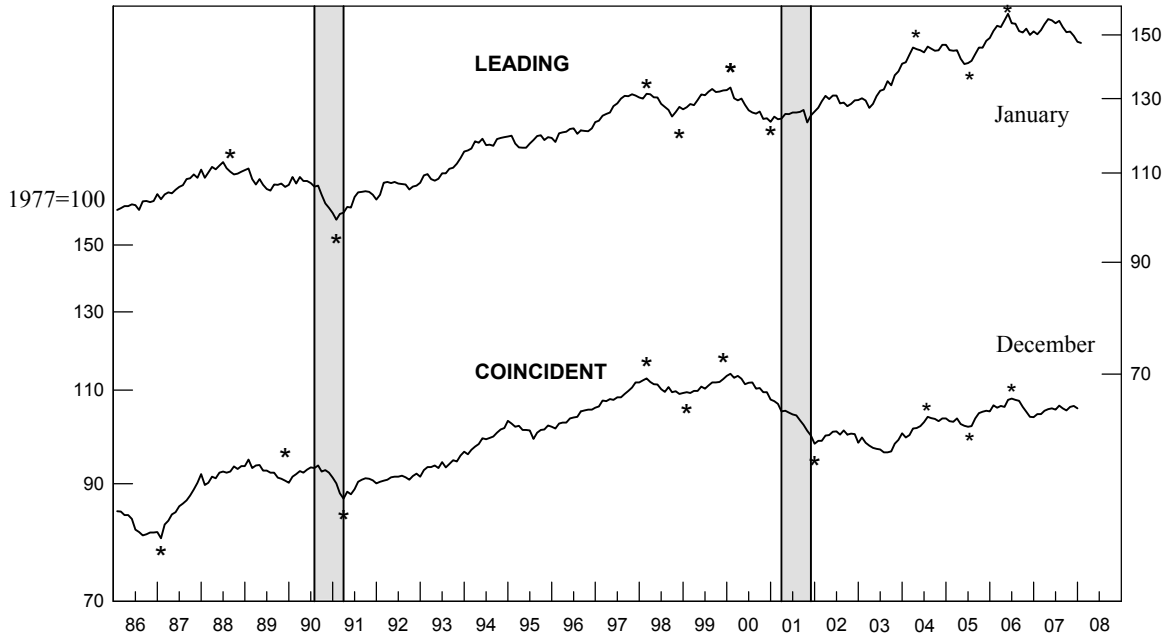
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal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

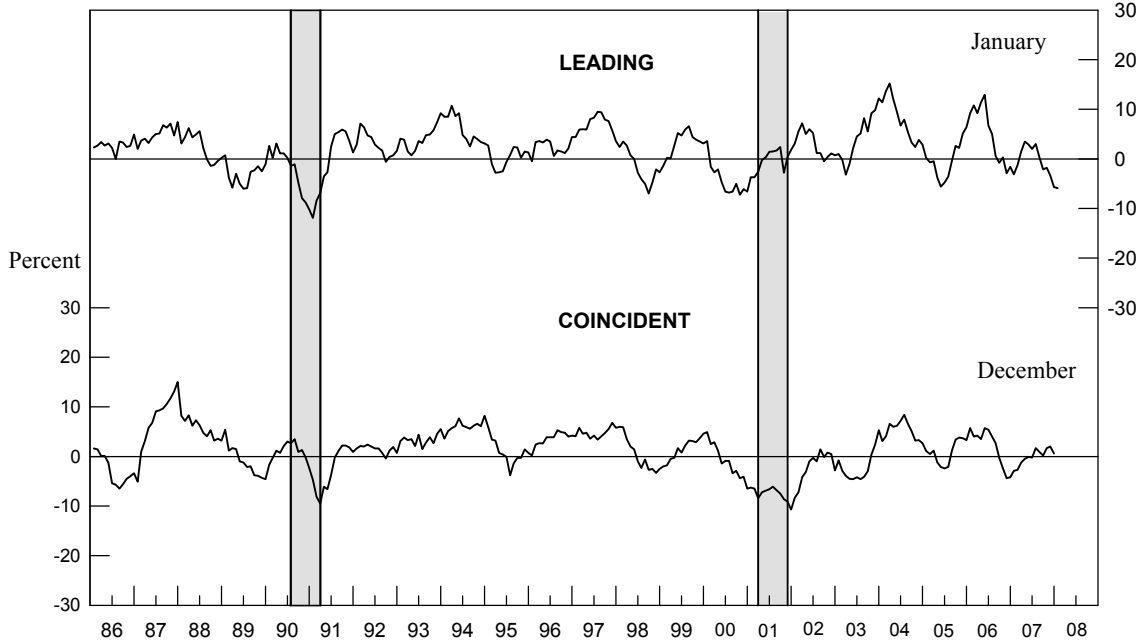
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1986-2008 1977=100



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, 1986-2008 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
2007				
January	120.7r	0.2r	100.6r	0.5r
February	121.4	1.5r	100.2r	0.0r
March	122.3r	2.9	100.5r	0.6r
April	125.4r	7.7r	101.5r	2.3r
May	121.8r	1.6r	101.4r	2.0r
June	119.7r	-1.7r	101.2r	1.4r
July	119.7r	-1.5r	101.8r	2.5r
August	119.3r	-2.1r	101.9r	2.6r
September	119.5r	-1.8r	101.2r	1.3r
October	119.6r	-1.8r	102.3r	3.1r
November	119.3r	-2.2r	103.7r	5.4r
December	117.4	-5.1	102.8	2.9

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**

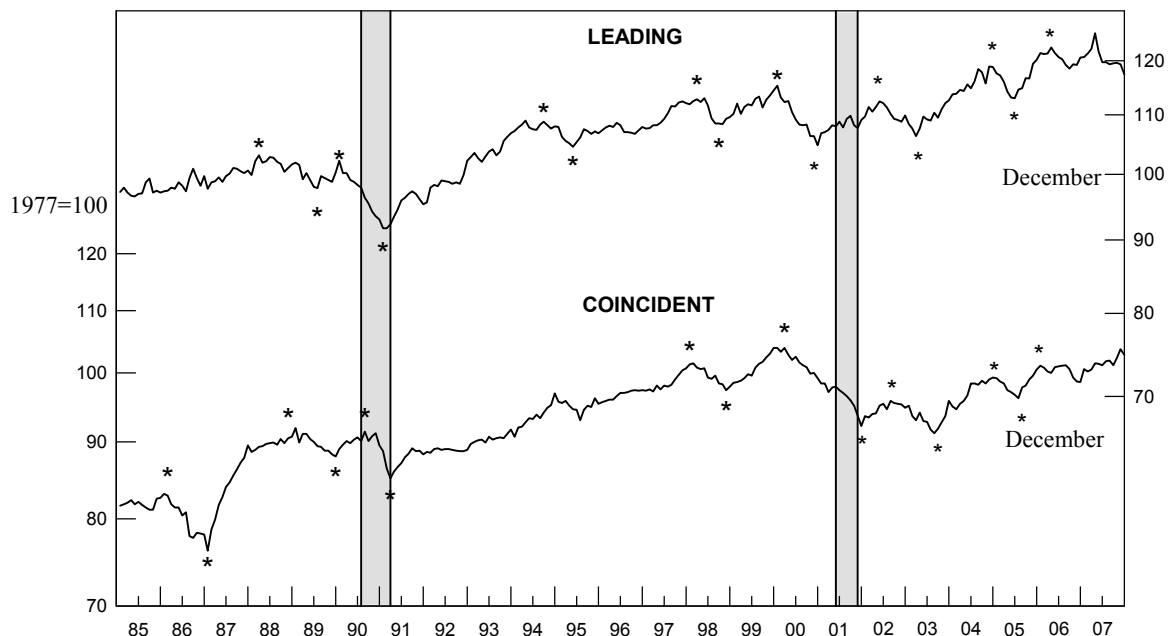
	November	December
Leading Index		
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	0.8r	-0.8
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.1r	0.0
3. Shipments of household appliances, 1982\$	-0.3r	-0.6
4. S&P stock price index, steel companies	-0.5	0.4
5. Retail sales of U.S. passenger cars and light trucks (units)	0.1	0.0
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	0.1	0.0
7. Index of new private housing units authorized by permit	0.0	-0.4
8. Growth rate of U.S. M2 money supply, 2000\$	-0.3r	0.1
9. PMI	-0.1r	-0.2
Trend adjustment	0.0	0.0
	<hr/>	<hr/>
Percent change (except for rounding differences)	-0.1r	-1.5
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	0.2	-0.2
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.0r	0.1
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	1.1r	-0.8
Trend adjustment	0.1	0.1
	<hr/>	<hr/>
Percent change (except for rounding differences)	1.4r	-0.8

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

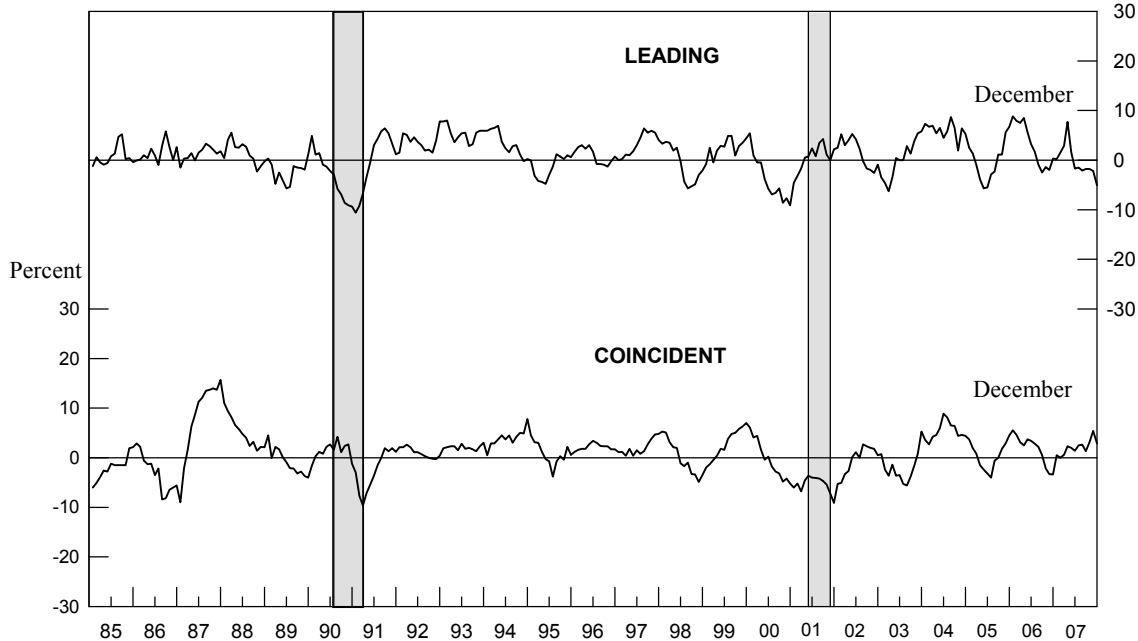
1977=100



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
2007				
January	125.0	-3.6	105.3r	-6.8r
February	126.3	-1.3	104.8r	-7.1r
March	127.1	0.0	106.6r	-3.4r
April	127.2	0.3	106.3r	-3.2r
May	128.3	2.2	107.7r	-0.4r
June	127.9	2.1	106.7r	-1.4r
July	128.2	2.7	108.7r	2.7r
August	125.9r	-0.8r	106.1r	-1.2r
September	124.5	-2.7	104.8r	-2.8r
October	124.7	-2.3	105.1r	-2.1r
November	123.2r	-4.5r	103.5r	-4.7r
December	124.1	-3.0	104.3	-3.2

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.

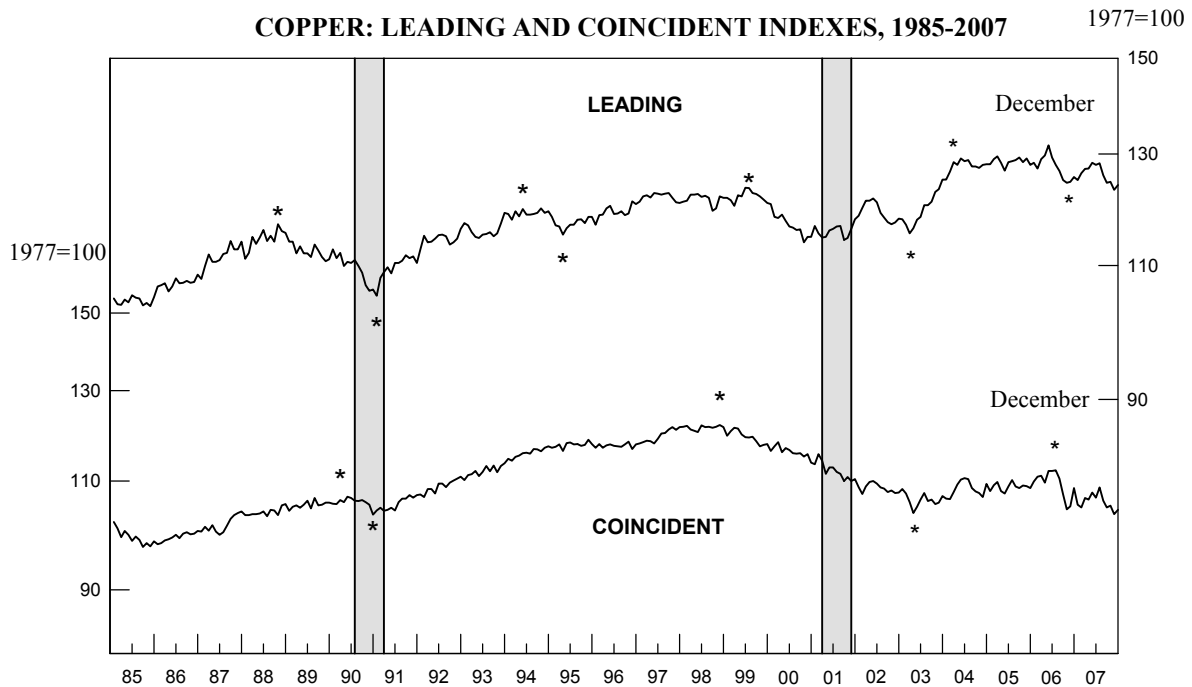
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

	November	December
Leading Index		
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-0.4r	0.7
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	0.0	0.2
3. S&P stock price index, building products companies	-0.1	0.4
4. LME spot price of primary copper	-0.6	-0.2
5. Index of new private housing units authorized by permit	0.0	-0.5
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	-0.1	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-1.2r	0.7
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	0.0r	0.1
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	-1.6r	0.6
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.

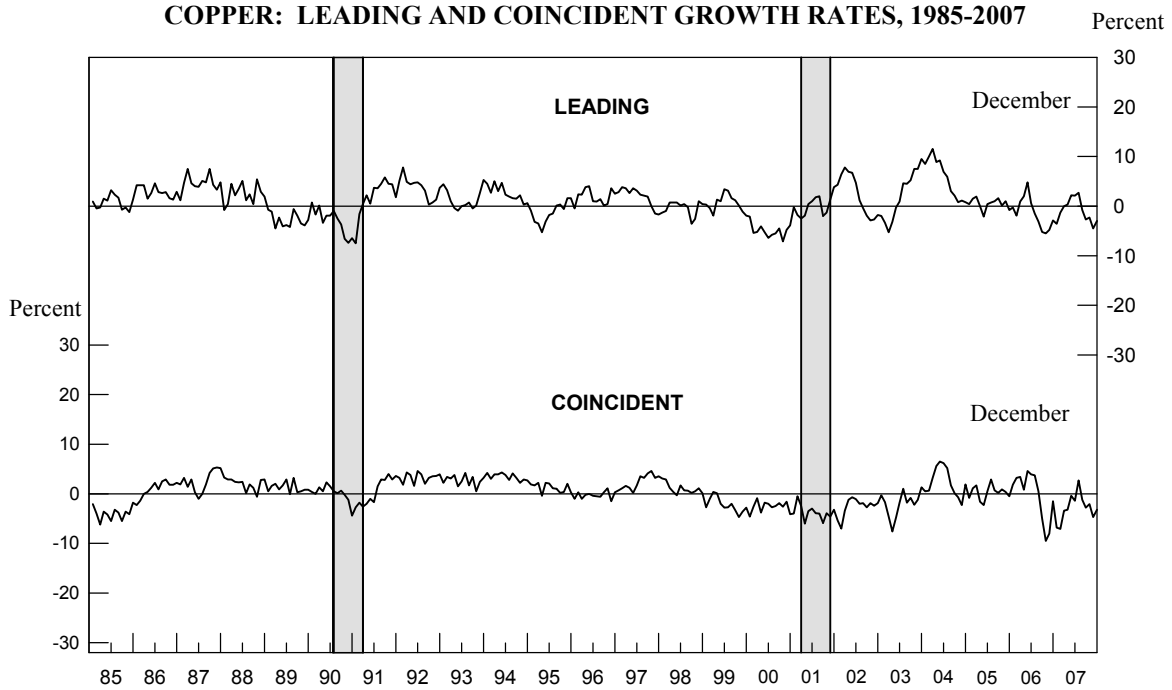
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 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. EDT, Friday, March 21. 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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988 National Center
Reston, Virginia 20192