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Metal Industry Indicators

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

December 2008

The primary metals leading index continued to fall in November, and its 6-month smoothed growth rate set a new record low. This is indicating further activity declines in the U.S. primary metals industry in the near term. The metals price leading index growth rate continued to tumble in October, with no turnaround in sight for metal prices.

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 5.4% to 126.6 in November from a revised 133.8 in October, and its 6-month smoothed growth rate dropped to –24.9% from a revised –18.3% in October. 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 stock price index combining construction and farm machinery companies and industrial machinery companies made the largest negative contribution, –1.8 percentage points, to the overall decline in the primary metals leading index. The lowest JOC-ECRI metals price index growth rate on record contributed –1.4 percentage points to the leading index. The shortest average workweek in primary metals establishments since the 1990–91 recession also made a –1.4-percentage-point contribution. The Institute for Supply Management's PMI has remained below the threshold that denotes a decline in future manufacturing activity for four consecutive months. It contributed –1.0 percentage point to the leading index. Only four of the leading index's eight components were available for the November index calculation. The primary metals leading index will likely be revised next month when the remaining four components become available.

The current recession in the United States is curtailing domestic primary metals activity growth. The distressed construction and manufacturing sectors, especially the automotive industry, have reduced their metals demand. Many other industrialized economies are also in a recession and have limited their metals demand. Growth in emerging economies, whose metals consumption had underpinned U.S. metals activity growth, has slowed significantly. The U.S. primary metal industry will likely have further activity deceleration in the near future.

The **steel leading index** decreased 4.5% in October, the latest month for which it is available, to 103.0 from a revised 107.9 in September. Its 6-month smoothed growth rate fell to –21.0% from a revised –15.1% in September. Most of its indicators declined, but decreases in the S&P stock price index for steel companies and the steel scrap price growth rate made the most negative impact on the leading index. The rising inflation-adjusted M2 money supply growth rate offset some of the plummeting readings of the other indicators. The deeply negative leading index growth rate points to a continuation of the decline in activity growth in the U.S. steel industry in the near term.

The **copper leading index** posted a 5.9% decline in October, falling to 114.6 from a revised 121.8 in September. Its growth rate sank to –13.4% from a revised –3.4% in September. Movement among the index components was mixed. Sharp declines in the S&P stock price index for building products companies and the copper price made the largest negative contributions to the leading index. A more than 1-hour reduction in overtime hours in copper rolling, drawing, extruding, and alloying plants also indicates a contraction in copper industry activity growth. The negative growth rate of the copper leading index is signal-

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ing that growth in U.S. copper industry activity is likely to decrease in the near term.

High Inventories Plus Low Demand Equals Decreased Metals Price Growth

The **metals price leading index** decreased 0.9% to 102.6 in October, the latest month for which it is available, from a revised 103.5 in September. Its 6-month smoothed growth rate declined to –5.5% from a revised –4.4% in September. Two of its three available indicators increased. However, the decline in growth rate of the index measuring the trade-weighted average exchange value of other major currencies against the U.S. dollar outweighed the positive contributions, as it contributed –2.4 percentage points to net decline in the leading index. In contrast, the wider yield spread between the U.S. 10-year Treasury Note and the federal funds rate contributed 1.3 percentage points. The contribution from the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products was 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 September. It increased, but is still negative and is indicating further declines in industrialized 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.

In October, the growth rate of the inflation-adjusted value of inventories of U.S. nonferrous metal products, which is an indicator of metals supply, increased to a level last reached during the 1981–82 recession. This, along with the decreasing metals price leading index growth rate indicate further declines in metals price growth 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,
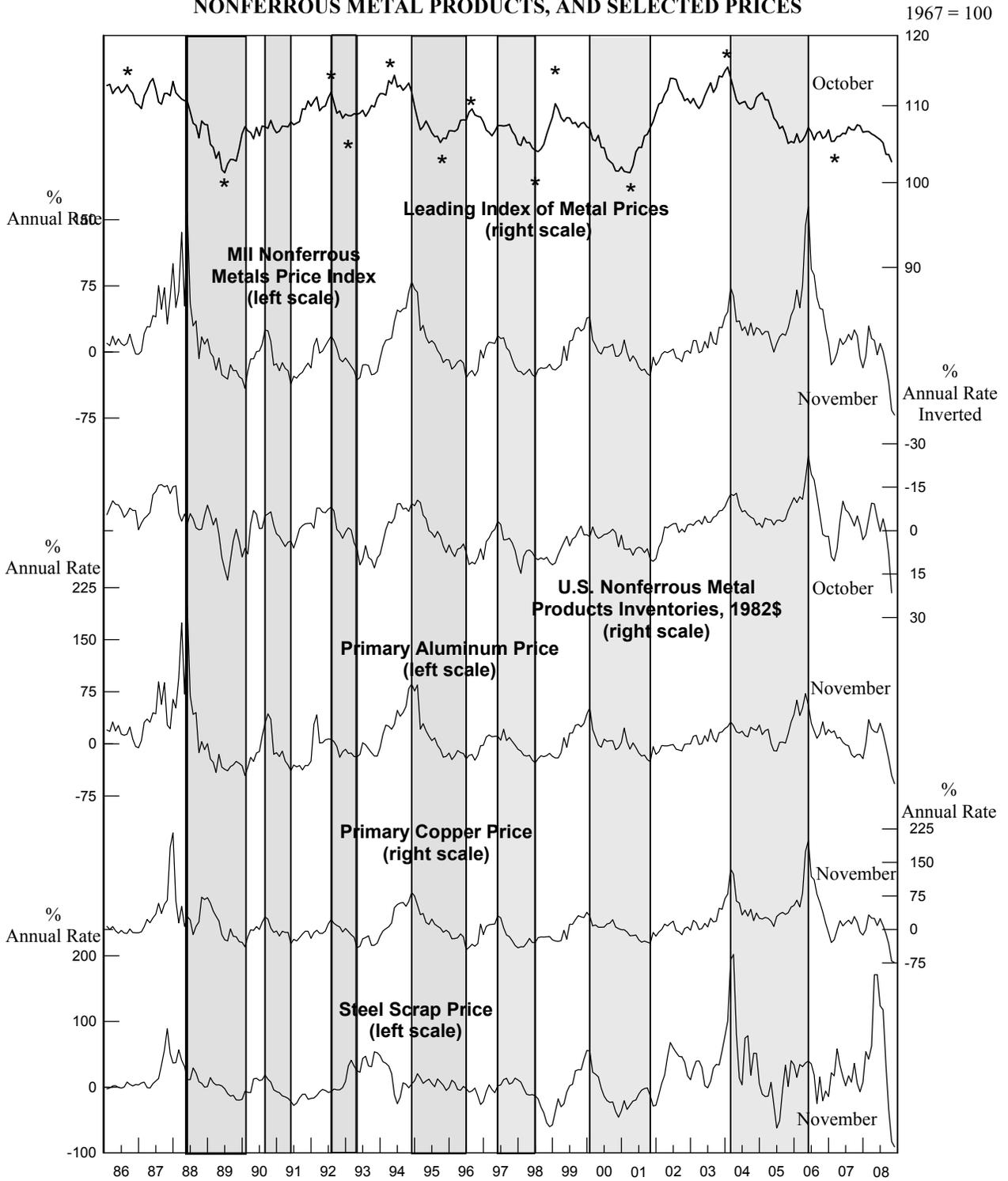**Inventories of Nonferrous Metal Products, and Selected Metal Prices**

| | 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
2007						
October	107.4	18.2	-5.1	-15.5	16.3	5.6
November	107.3	-6.6	-1.7	-15.3	-5.7	-6.8
December	106.4	-18.1	3.1	-21.4	-12.6	7.4
2008						
January	106.5	-4.8	1.5	0.3	-0.9	54.1
February	106.5r	29.6	-4.0	34.9	32.5	42.5
March	106.2r	15.1	-9.5	21.6	25.1	62.7
April	106.0r	13.2	-9.2	17.6	24.6	170.9
May	105.7r	-3.2	-4.1	16.2	8.7	171.1
June	105.5r	9.7	0.3r	29.7	24.2	123.6
July	105.1	0.4	-4.1r	16.1	8.7	117.7
August	103.6r	-15.9	0.3r	-2.7	-9.5	33.4
September	103.5r	-34.6	8.2r	-21.9	-32.2	-34.1
October	102.6	-66.1	21.5	-45.4	-70.8	-82.7
November	NA	-71.6	NA	-57.2	-74.2	-90.8

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

1967 = 100

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.

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Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2007				
December	147.9	-5.1	106.2	1.7
2008				
January	148.3	-4.3	107.1	3.0
February	149.7	-2.4	106.7	2.0
March	151.5	0.0	106.6	1.5
April	152.5	1.4	105.8	-0.1
May	151.9r	0.8	104.5	-2.4r
June	151.6	0.7r	105.0r	-1.6r
July	149.4	-1.8	105.5r	-0.7r
August	146.5r	-4.8r	104.2	-2.8
September	141.4r	-10.2r	102.6r	-5.4r
October	133.8r	-18.3r	100.3	-9.0
November	126.6	-24.9	NA	NA

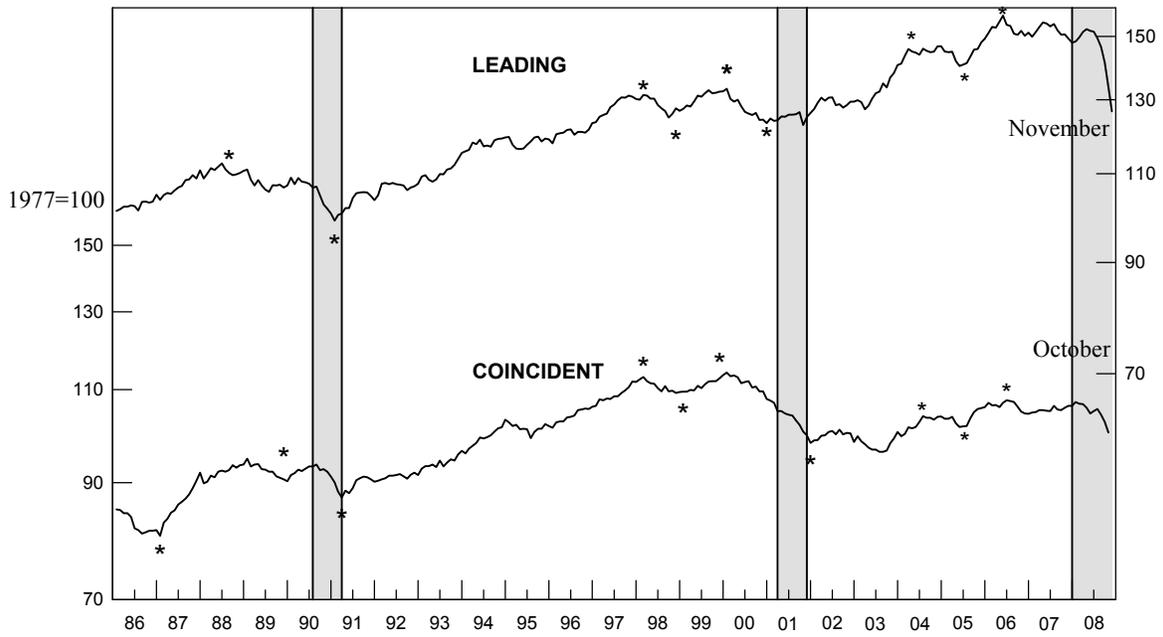**NA:** Not available   **r:** Revised

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

	October	November
1. Average weekly hours, primary metals (NAICS 331)	-0.2r	-1.4
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	-2.9r	-1.8
3. Ratio of price to unit labor cost (NAICS 331)	-0.9	NA
4. JOC-ECRI metals price index growth rate	-1.4r	-1.4
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	-0.7	NA
6. Index of new private housing units authorized by permit	-0.5	NA
7. Growth rate of U.S. M2 money supply, 2000$	1.8	NA
8. PMI	-0.7r	-1.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-5.5r	-5.6

Coincident Index

	September	October
1. Industrial production index, primary metals (NAICS 331)	-1.0r	-0.9
2. Total employee hours, primary metals (NAICS 331)	-0.6r	-0.4
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	-0.1r	-1.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.6r	-2.5

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

LEADING

COINCIDENT

November

October

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
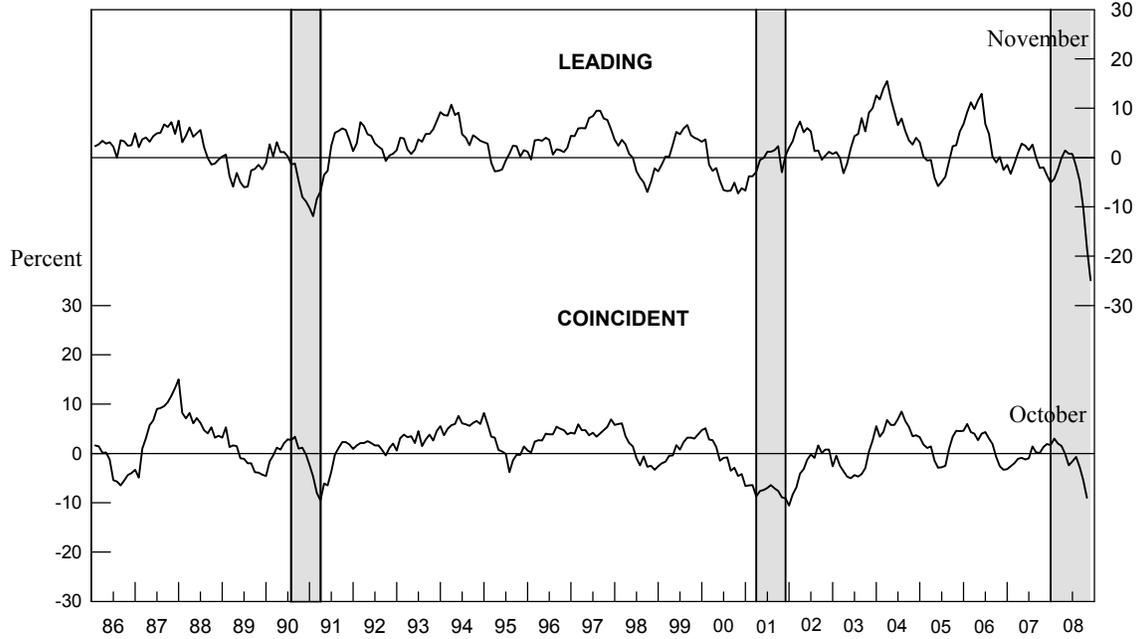
LEADING

November

COINCIDENT

October

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.

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Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2007				
November	118.4	-1.8	104.2	5.4
December	116.2	-5.2	103.8	3.9
2008				
January	116.1	-4.8	103.0	1.7
February	117.2	-2.9	103.9	3.1
March	119.0	0.2	103.8	2.6
April	119.5	1.3	102.4	-0.5
May	121.2	4.6	100.9	-3.2
June	120.6	3.7r	101.7r	-1.7r
July	116.4r	-3.3r	101.6r	-1.8r
August	113.3	-7.6	100.7	-3.4r
September	107.9r	-15.1r	98.8r	-6.6r
October	103.0	-21.0	97.3	-8.8

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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	September	October
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	-1.0	0.1
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	0.0	-0.6
3. Shipments of household appliances, 1982$	0.0r	0.1
4. S&P stock price index, steel companies	-1.2	-2.6
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.4	-0.9
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	-2.0	-1.2
7. Index of new private housing units authorized by permit	-0.3	-0.5
8. Growth rate of U.S. M2 money supply, 2000$	1.0r	1.7
9. PMI	-0.9	-0.7
Trend adjustment	0.0	0.0
	_____	_____
Percent change (except for rounding differences)	-4.8r	-4.6
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	-1.2r	-1.2
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	0.3	-0.5
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	-1.2r	0.1
Trend adjustment	0.1	0.1
	_____	_____
Percent change (except for rounding differences)	-2.0r	-1.5

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, 1986-2008
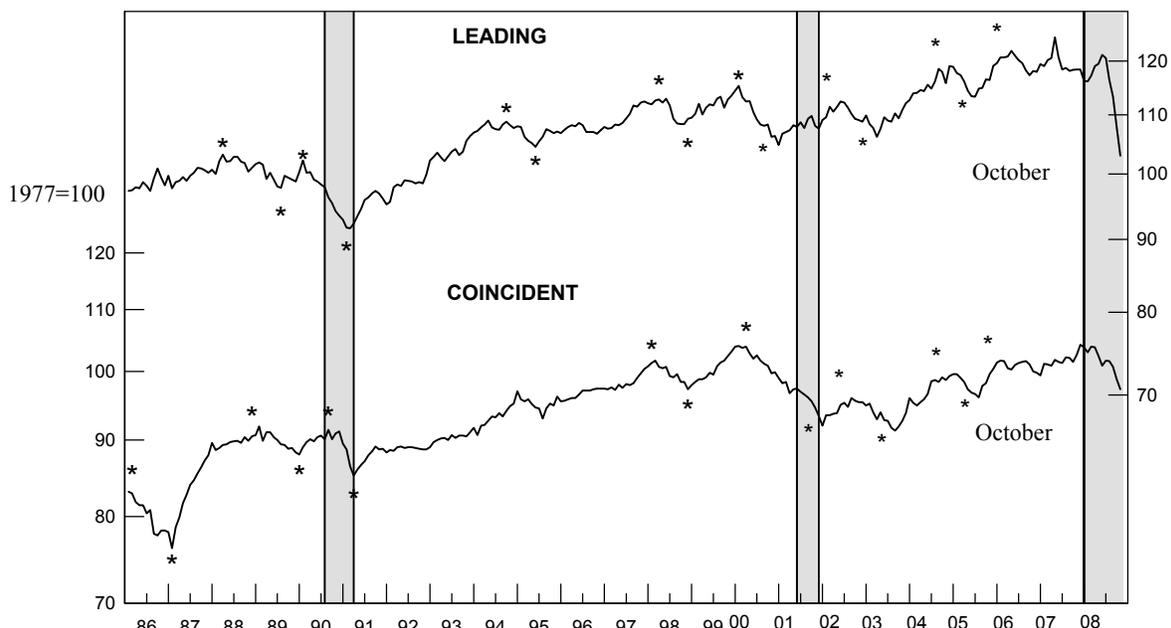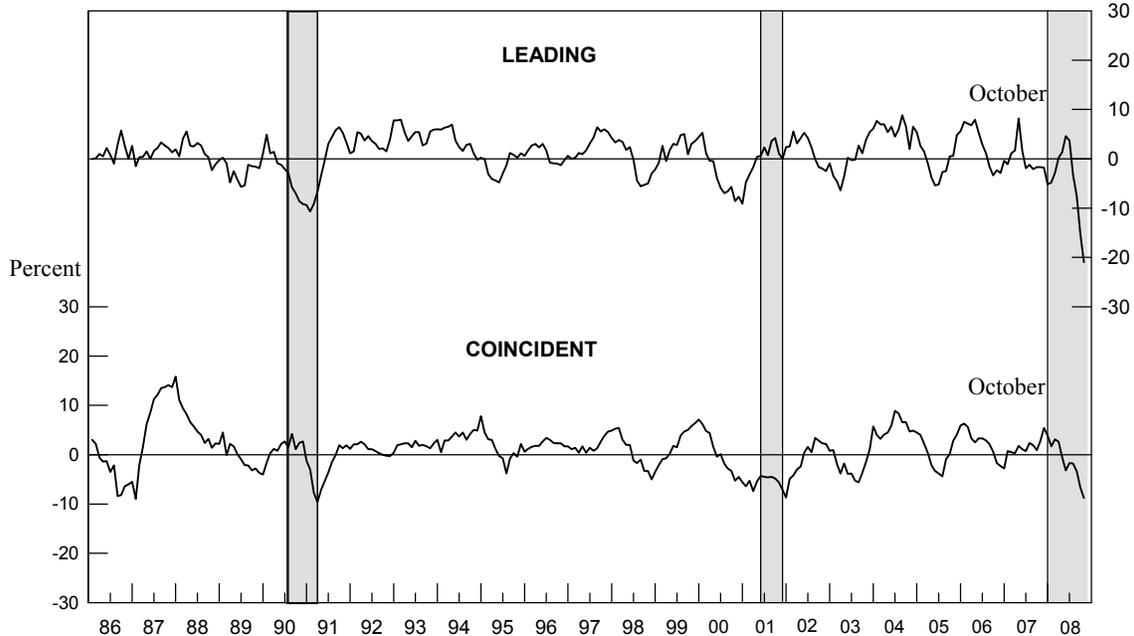
1977=100

LEADING

1977=100

COINCIDENT

October

October

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, 1986-2008

Percent

LEADING

October

Percent

COINCIDENT

October

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.

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Table 6.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2007				
November	123.2	-4.2	102.2	-4.3
December	124.2	-2.7	101.3	-5.5
2008				
January	122.6	-4.8	102.2	-3.2
February	124.9	-1.2	103.1	-1.4
March	124.3	-1.9	103.8	-0.2
April	124.0	-2.1	104.0	0.3
May	125.3	0.3	104.6	1.5
June	126.2	2.0	105.0	2.3
July	122.7r	-3.0	104.4r	1.3r
August	122.6	-2.6	102.5r	-1.7r
September	121.8r	-3.4r	102.3r	-1.8r
October	114.6	-13.4	99.6	-6.4

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	September	October
1. Average weekly overtime hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	0.2	-1.0
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	0.1r	0.1
3. S&P stock price index, building products companies	0.4	-2.7
4. LME spot price of primary copper	-0.9	-2.6
5. Index of new private housing units authorized by permit	-0.4	-0.7
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.0	0.8
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.6r	-6.1
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	-0.4r	-0.2
2. Total employee hours, copper rolling, drawing, extruding, and alloying (NAICS 33142)	0.1	-2.6
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.2	-2.7

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, 1986-2008
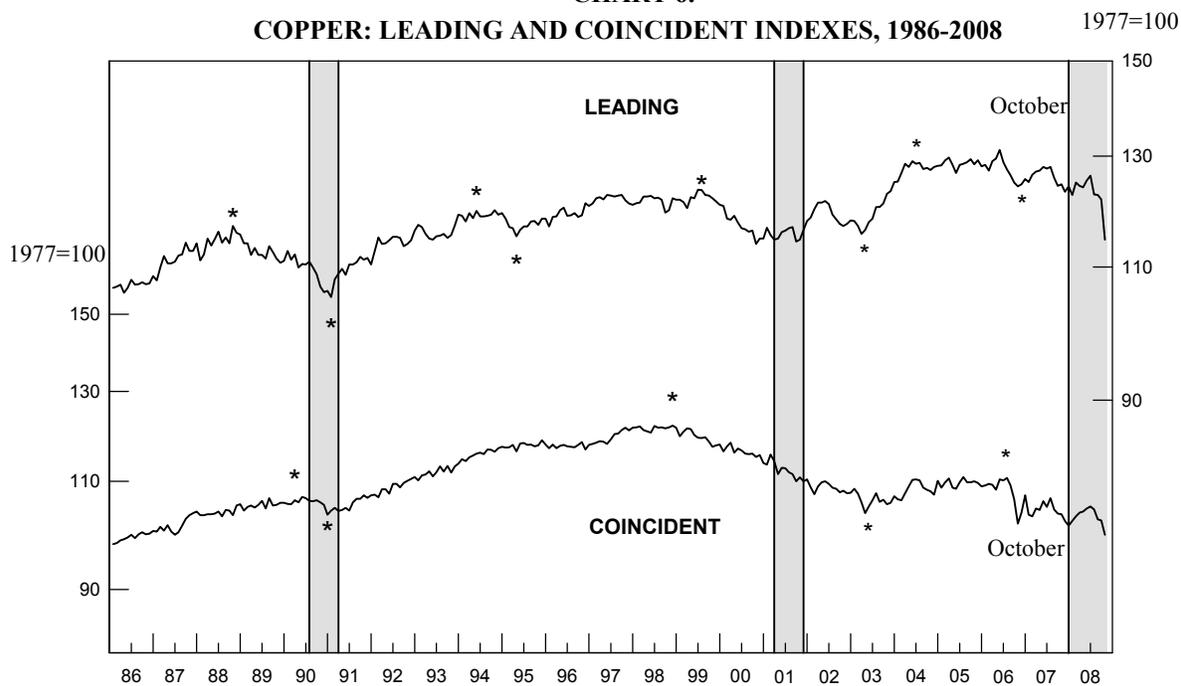
1977=100

LEADING

October

COINCIDENT

October

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, 1986-2008
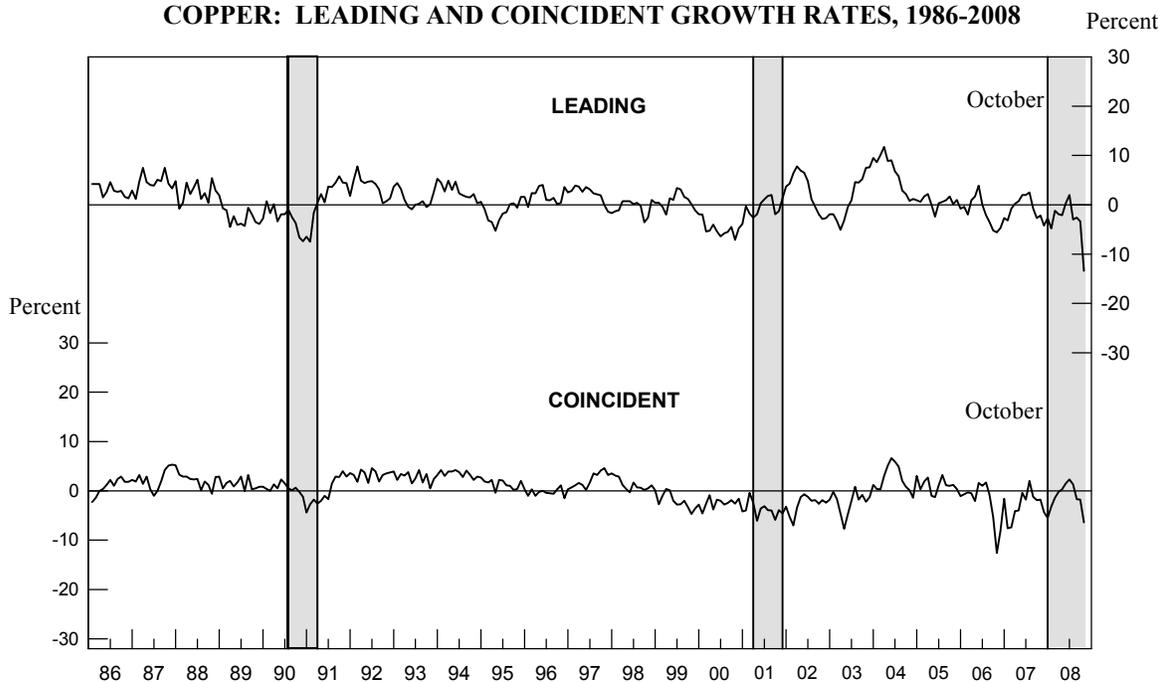
Percent

LEADING

October

COINCIDENT

October

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.

U.S. Geological Survey, December 2008

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.

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[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.

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

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, January 23. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/