

Metal Industry Indicators

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

February 2012

The primary metals leading index started the new year with a strong increase and a high 6-month smoothed growth rate. Increased new orders for durable goods in 2011, particularly for transportation equipment, invigorated metals consumption last year. The primary metals leading index growth rate is suggesting modest to moderate growth in U.S. metal industry activity. The metals price leading index increased in December, but not enough to signal metals price growth in the near future.

The **primary metals leading index** increased 1.5% to 162.6 in January from a revised 160.2 in December. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend increased to 6.2% from a revised 3.8% in December. A growth rate above +1.0% is usually a sign of an upward near-term trend for future 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](#).

Three of the index's four available components increased in January, and one declined. A jump in the stock price index combining construction and farm machinery companies and industrial machinery companies contributed 1.3 percentage points to the net increase in the leading index. A rise in the USGS metals price index growth rate boosted the leading index by 0.3 percentage points. In January, the Institute for Supply Management's PMI moved another point higher above the threshold that denotes an increase in future manufacturing activity. It contributed 0.2 percentage points to the leading index. In contrast, fewer average weekly hours in primary metals establishments held the index back 0.4 percentage points. The primary metals leading index will likely be revised next month when the remaining four components become available.

The increasing primary metals leading index growth rate indicates that metals industry activity growth should continue. Robust growth in the manufacturing sector continues to generate new orders for ferrous and nonferrous metals products. Although metals consumption in the construction sector has not been as strong, it has improved. Building permits for apartment building outpaced single-family home building during 2011 as the demand for rental apartments soared. The recovery in the U.S. economy is generating enough metals consumption to sustain healthy U.S. metals activity growth.

The **steel leading index** edged up 0.1% in December, the latest month for which it is available, to 111.4 from a revised 111.3 in

November. However, its 6-month smoothed growth rate slipped to 2.0% from a revised 2.1% in November. Movement among its nine indicators was mixed, and none of the indicators' contributions were especially large. An increase in shipments of household appliances buoyed the steel leading index some in December, but this was offset by the falling inflation-adjusted M2 money supply growth rate. The modestly high steel leading index growth rate suggests that steel industry activity could continue to grow in the near term.

The **copper leading index** increased 1.9% in December to 119.6 from a revised 117.4 in November. Its 6-month smoothed growth rate rose to 0.7% from a revised -2.8% in November. Most of its indicators increased, but robust inflation-adjusted new orders for nonferrous metals products made the largest positive contribution to the leading index. A longer average workweek in nonferrous metals products (except aluminum) plants also made a large positive contribution. Recently the copper leading index growth rate has been unusually volatile, suggesting that the recovery in the U.S. copper industry could be uneven in the near future.

Metals Price Declines Still a Possibility

The **metals price leading index** increased 1.3% in December, the latest month for which it is available, to 107.1 from a revised 105.7 in November, and its 6-month smoothed growth rate rose to -1.7% from a revised -4.2% in November. Two of its four components increased. The growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products contributed 1.2 percentage points to net increase in the metals price leading index. The growth rate of the Organization for Economic Cooperation and Development (OECD) Total Leading Index also increased in December, adding another 0.5 percentage points. Nevertheless, the OECD leading index is still indicating further growth declines in many industrialized countries. In contrast, the falling growth rate of the trade-weighted average

exchange value of other major currencies against the U.S. dollar made the largest negative contribution, -0.4 percentage points, to the metals price leading index. The contribution from the tightening yield spread between the U.S. 10-year Treasury note and the federal funds rate rounded to zero. The metals price leading index signals major changes in the growth rate of nonferrous metals prices an average of 8 months in advance.

The growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, which is an indicator of supply and

usually moves inversely with the price of metals, jumped in December. This along with the still negative metals price leading index growth rate suggests that metals prices could fall in the near term.

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

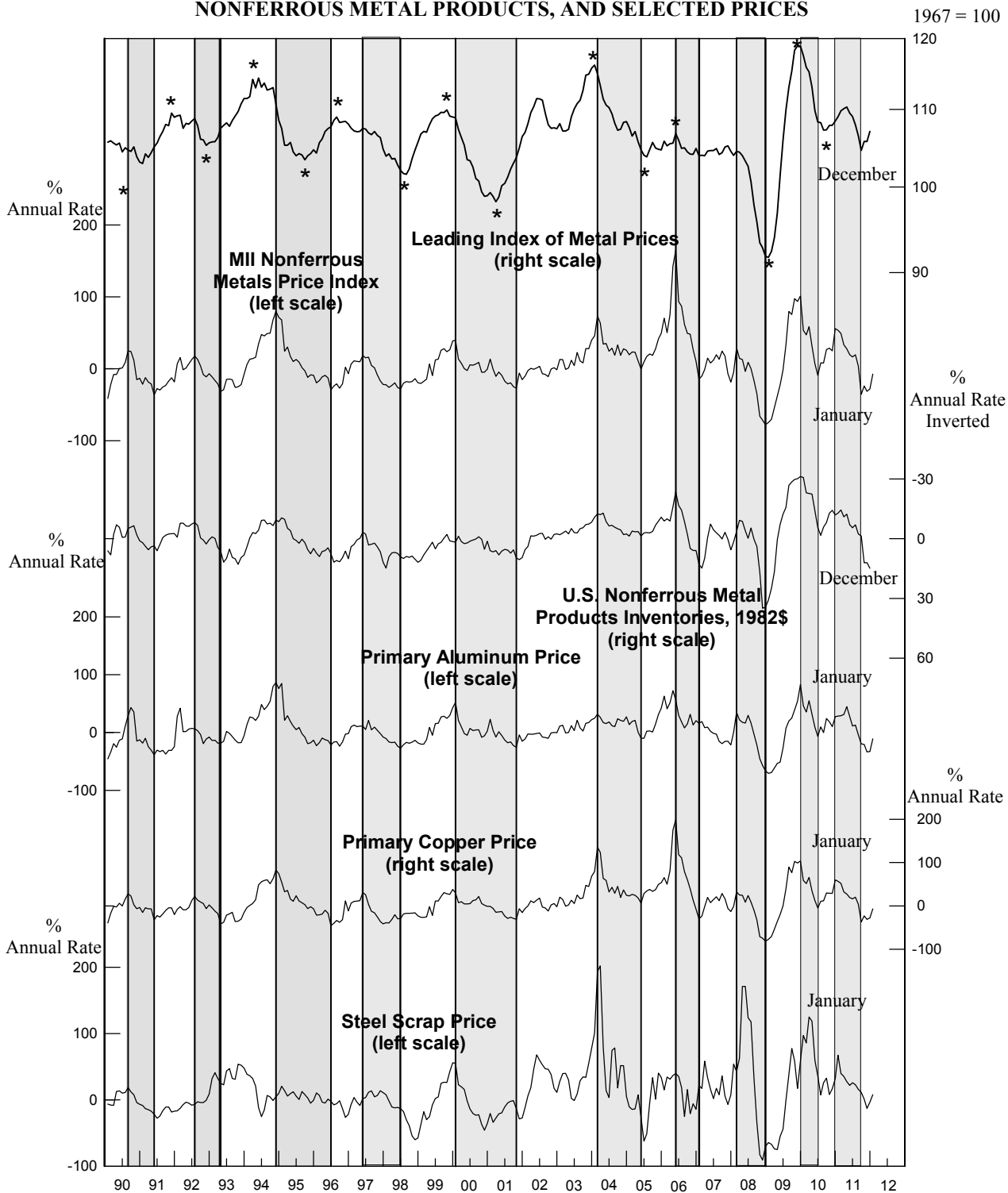
	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
2010						
December	108.4	56.0	-12.0	27.2	60.1	32.0
2011						
January	109.0	53.6	-12.9	28.4	57.0	67.3
February	109.8	49.0	-14.5	29.2	52.3	39.9
March	110.1	33.1	-11.0	31.1	32.2	35.3
April	110.3	27.7	-12.3	44.7	27.6	27.7
May	109.5r	19.7	-7.1	27.8	19.4	21.8
June	109.0	16.5	-5.6	11.1	16.3	25.8
July	107.9	19.4	-7.0	12.7	20.3	22.8
August	106.5r	3.6	-2.4r	-4.0	3.8	16.0
September	104.6r	-35.5	-1.4r	-19.8	-37.1	11.2
October	105.8r	-24.0	12.1r	-20.6	-22.8	1.2
November	105.7r	-31.4	12.0r	-33.6	-31.1	-12.9
December	107.1	-28.1	14.8	-32.9	-27.4	-3.3
2012						
January	NA	-7.4	NA	-11.1	-6.8	7.8

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 Organization for Economic Cooperation and Development (OECD) Total 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 Organization for Economic Cooperation and Development (OECD); 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
2011				
February	155.5r	9.5r	100.6r	10.4r
March	157.4r	10.6r	102.1r	11.9r
April	157.6	9.6r	102.4r	10.7r
May	156.7r	7.3r	103.7r	11.7r
June	156.8r	6.3r	104.2r	11.1r
July	158.8r	7.5r	104.8r	10.7r
August	158.4r	5.5r	104.6r	8.6r
September	156.5r	1.8r	105.7r	9.0r
October	156.7r	1.1r	107.0r	9.9r
November	159.0r	3.1r	108.9r	11.6r
December	160.2r	3.8r	112.1	15.7
2012				
January	162.6	6.2	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)	0.5r	-0.4
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	0.0r	1.3
3. Ratio of price to unit labor cost (NAICS 331)	-0.2	NA
4. USGS metals price index growth rate	0.0	0.3
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$	0.5	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 2005\$	-0.2	NA
8. PMI	0.1r	0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.6	1.4
Coincident Index	November	December
1. Industrial production index, primary metals (NAICS 331)	0.4r	0.6
2. Total employee hours, primary metals (NAICS 331)	0.2r	0.5
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$	1.1r	1.6
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	1.8r	2.8

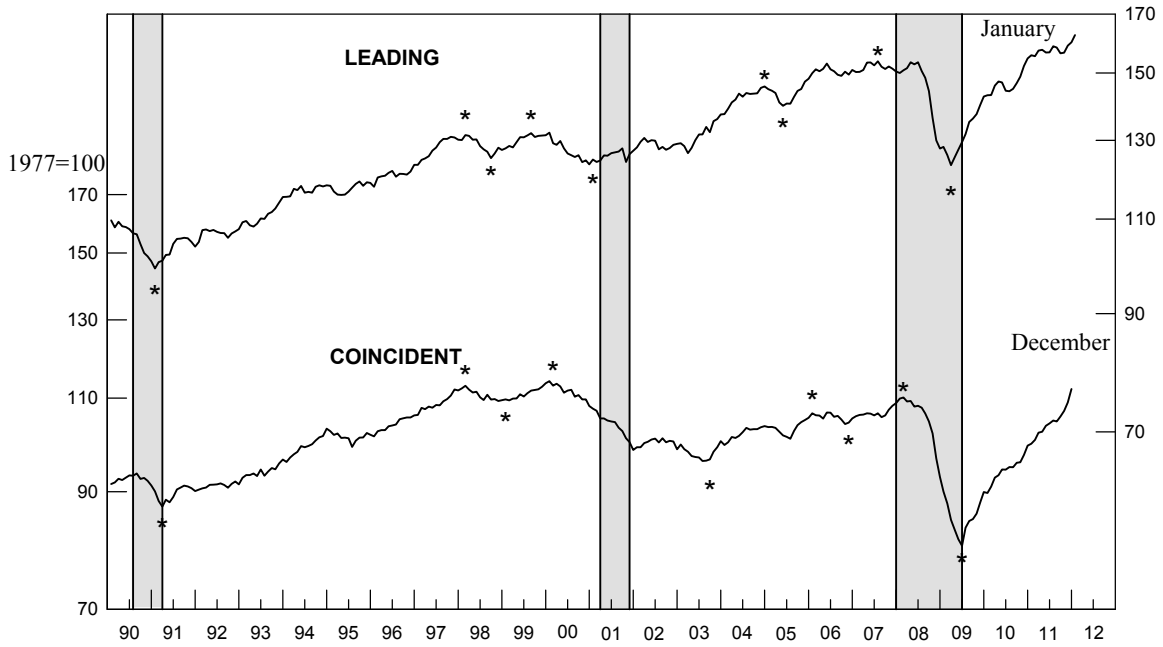
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and U.S. Geological Survey; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board,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

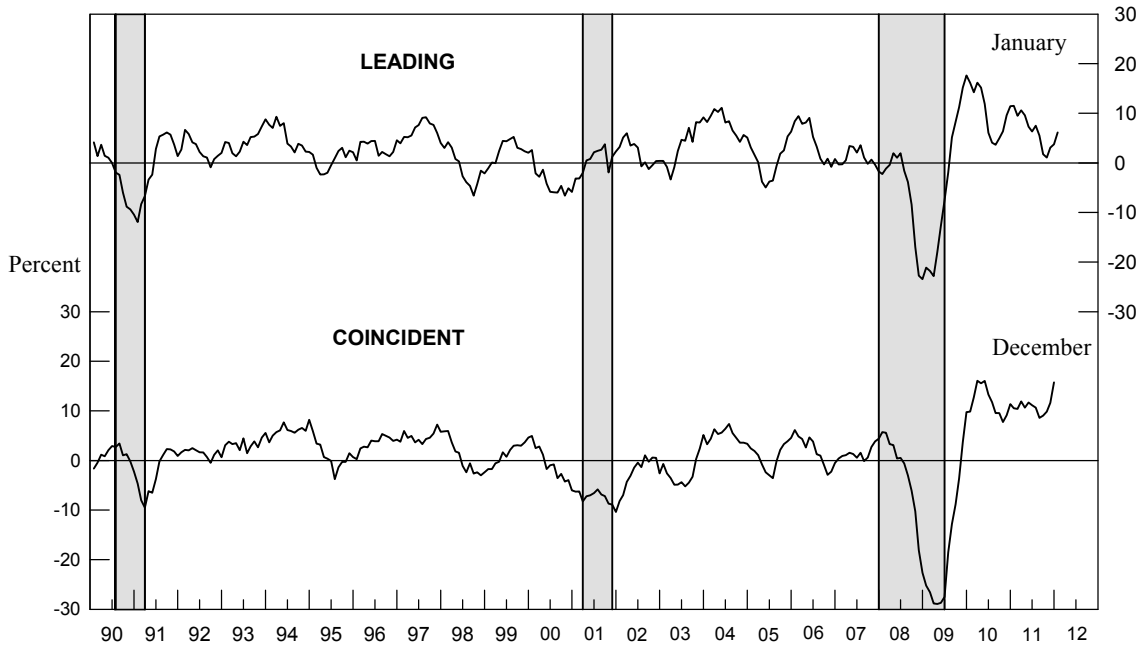
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1990-2012 1977=100



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, 1990-2012 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
2011				
January	110.7r	5.4r	110.2r	8.8r
February	110.2r	3.8r	109.4r	5.9r
March	110.5r	3.8r	110.3r	6.6r
April	110.3r	3.2r	110.2r	5.7r
May	109.3r	1.6r	110.7r	5.6r
June	109.3r	1.5r	111.2r	5.9r
July	110.9r	3.8r	111.1r	4.8r
August	110.7r	2.9r	111.6r	4.6r
September	110.1r	1.2r	112.0r	4.3r
October	110.2r	0.8r	113.1r	5.4r
November	111.3r	2.1r	115.1r	7.7r
December	111.4	2.0	117.1	10.0

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**

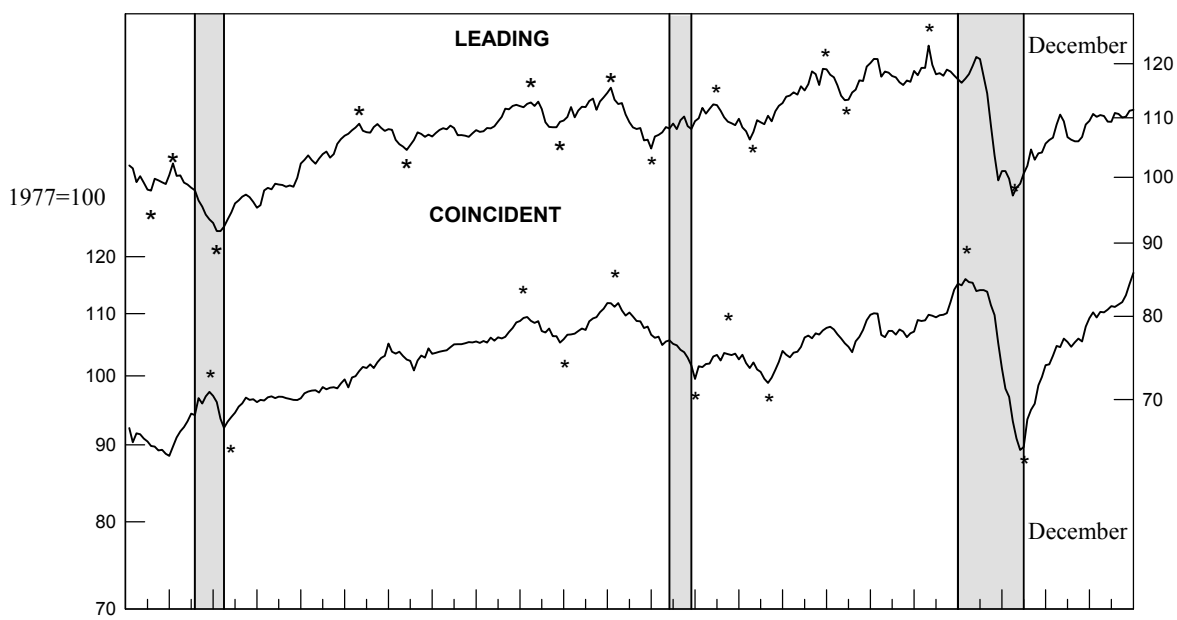
Leading Index	November	December
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	0.1r	0.1
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.4	0.0
3. Shipments of household appliances, 1982\$	-0.2r	0.2
4. S&P stock price index, steel companies	0.5	0.1
5. Retail sales of 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)	-0.2	-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, 2005\$	0.0r	-0.2
9. PMI	0.0r	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.0r	0.0
Coincident Index		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	0.5	0.8
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.9r	0.5
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	0.2r	0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	1.7r	1.7

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, 1989-2011

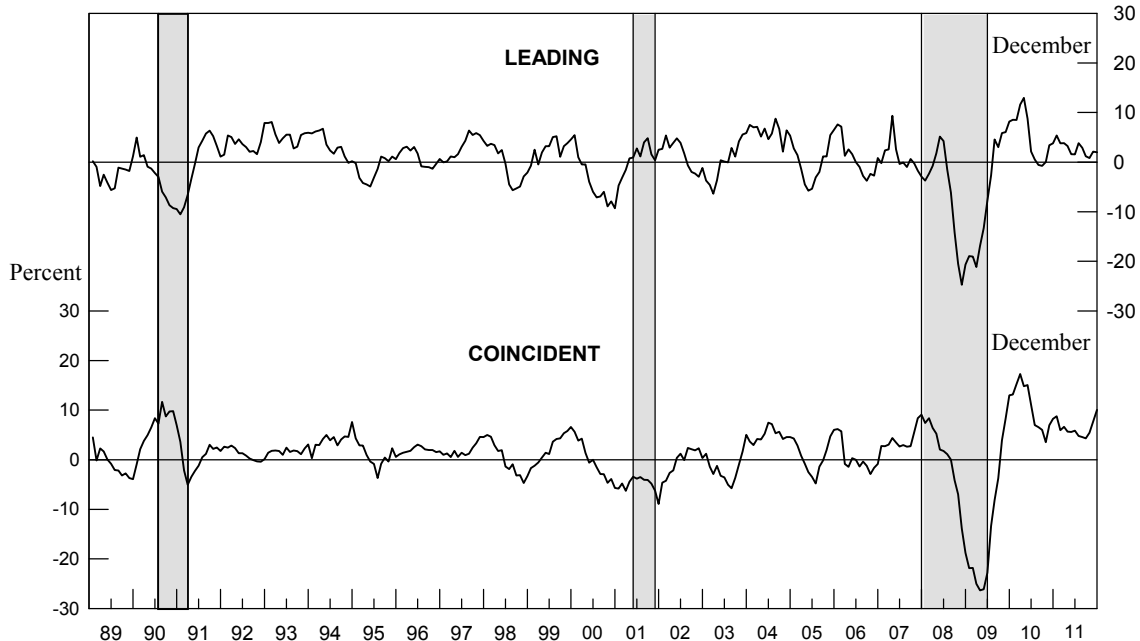
1977=100



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, 1989-2011

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

	<u>Leading Index</u>		<u>Coincident Index</u>	
	<u>(1977 = 100)</u>	<u>Growth Rate</u>	<u>(1977 = 100)</u>	<u>Growth Rate</u>
2011				
January	118.7	-1.2	97.9r	0.9r
February	119.8	0.6	99.9r	4.0r
March	120.4	1.4	100.5r	4.0r
April	121.0	2.5	101.5r	5.3r
May	121.0	2.9	103.5r	8.5
June	120.3	1.7	102.6r	5.6r
July	119.9	0.7r	104.7r	8.7
August	118.0r	-2.5r	106.7r	11.7r
September	113.9	-8.7	106.7r	10.5r
October	118.2	-1.8	107.8r	11.1r
November	117.4r	-2.8r	105.7r	5.9r
December	119.6	0.7	106.4	6.2

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.

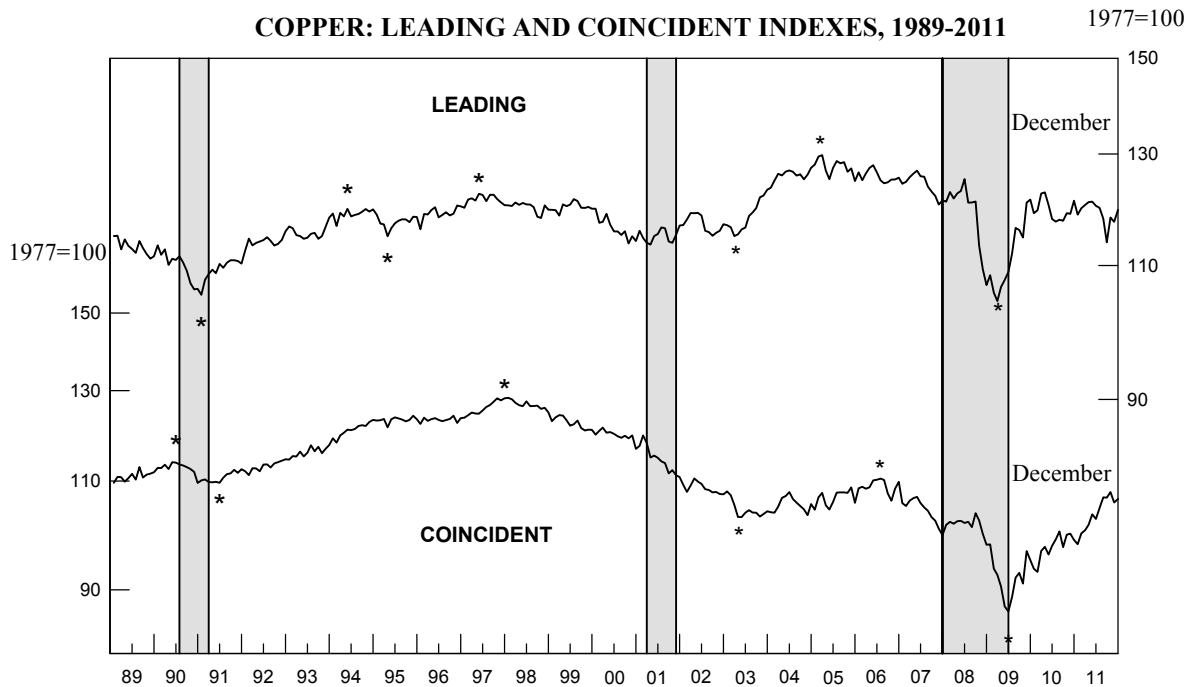
Table 7.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	November	December
1. Average weekly hours, nonferrous metals (except aluminum) (NAICS 3314)	-1.3r	0.7
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	0.3r	0.8
3. S&P stock price index, building products companies	0.5	0.3
4. LME spot price of primary copper	-0.3	0.1
5. Index of new private housing units authorized by permit	0.3	-0.1
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	-0.1	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.6	1.8
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	-0.4r	0.2
2. Total employee hours, nonferrous metals (except aluminum) (NAICS 3314)	-1.6r	0.4
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.9r	0.7

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.

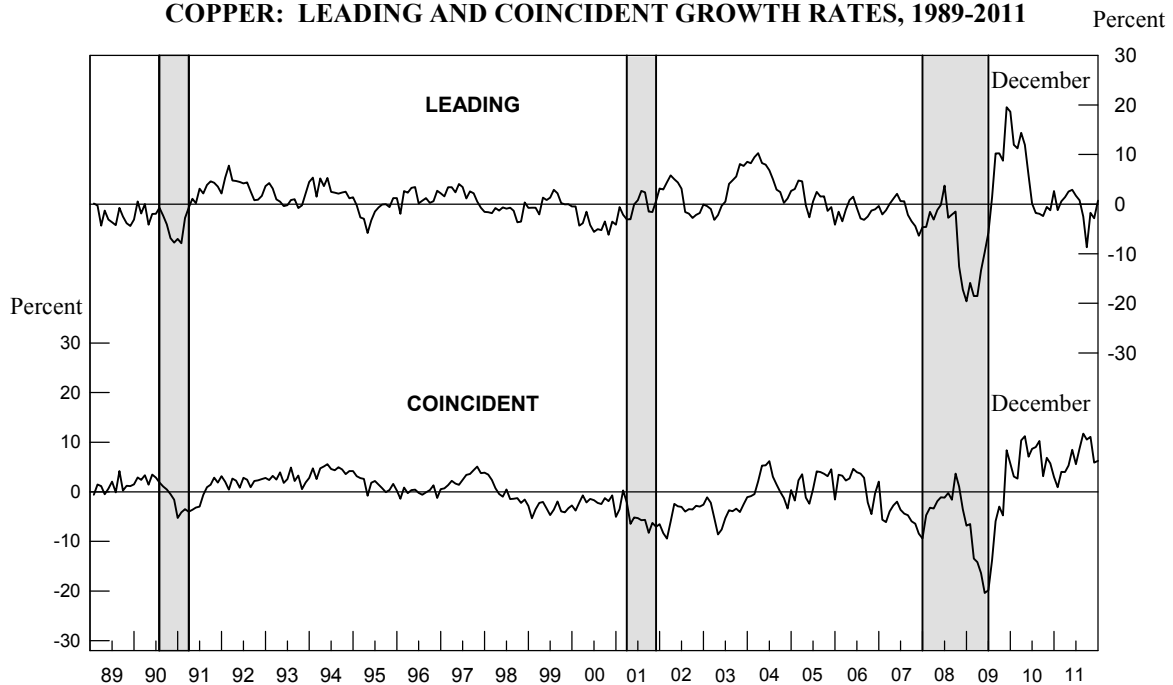
r: Revised NA: Not available

CHART 6.
COPPER: LEADING AND COINCIDENT INDEXES, 1989-2011



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, 1989-2011



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 23. 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 National Minerals Information Center. 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:

U.S. Geological Survey
National Minerals Information Center
988 National Center
Reston, Virginia 20192