

# Metal Industry Indicators

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

May 2015

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**The primary metals leading index increased in April, and its 6-month smoothed growth rate also increased but remained in negative territory. Weak U.S. manufacturing activity has decreased metals consumption since the fourth quarter of last year. Furthermore, advanced new orders for primary metals fell sharply in April, indicating only slow metals demand in the first half of 2015. A rebound in the U.S. dollar and slow global economic growth limited U.S. metal products exports, while metal imports are still high. The negative metals price leading index growth rate in March indicates further decreases in most metal prices. Renewed strength in the U.S. dollars and high Asian metal exports continue to place downward pressure on metal prices.**

The **primary metals leading index** increased 0.6% to 162.9 in April from a revised 161.9 in March. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, increased to -4.3% from a revised -5.7% in March. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, whereas 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.

Two of the four indicators that were available for the index's calculation increased in April. A rise in the USGS metals price index growth rate, which had declined steadily since August, contributed 0.5 percentage point to the net increase in the leading index. The stock price index combining construction and farm machinery companies and industrial machinery companies rose in April and made a 0.1-percentage-point contribution. The average workweek in primary metals establishments was the same in March so its contribution was zero. The PMI, the Institute for Supply Management's purchasing managers' index, also remained unchanged in April. Despite that the PMI declined the previous five consecutive months it still remains above the threshold that denotes an increase in future manufacturing activity. The primary metals leading index is subject to revision next month when the remaining four components become available.

The negative **primary metals leading index** growth rate indicates that activity in metals industry activity is likely to slow further in the near term. Growth in the U.S. economy declined in the first quarter of 2015, limiting metals demand. Advanced new orders for durable goods retreated in April, reflecting a decrease in orders for aerospace equipment, which are highly volatile. Furthermore, new orders for primary metals decreased in April.

Nonresidential construction activity, which accounts for two-thirds of construction spending, decreased in the first quarter of 2015. Low oil prices have reduced spending on unconventional oil and natural gas development construction projects and weak new orders for manufactured goods will lead to slower plant construction activity. In contrast, low housing inventories and rising home prices are stimulating residential construction activity. Housing starts rose more than 20% in April. Moreover, residential construction activity is likely to accelerate further as was suggested by a 10% rise in the index of new housing permits from March.

The **steel leading index** decreased 1.5% to 112.9 in March from a revised 114.6 in February. Its 6-month smoothed growth rate dropped to -3.2% from a revised -0.4% in February. Seven of its nine indicators decreased, with a decline in the inflation-adjusted M2 money supply growth rate making the largest negative contribution. The falling steel scrap price growth rate, fewer household appliances shipments, and a dip in new housing permits issued held the leading index back in March. A decrease in domestic steel demand and high imports are inhibiting steel industry activity. Although steel imports decreased three consecutive months, total import market share is still 33%.

The **copper leading index** decreased 0.3% to 131.6 in March from a revised 132.0 in February, and its 6-month smoothed growth rate decreased to 1.5% from a revised 2.3% in February. A shorter average workweek in nonferrous, except aluminum, plants and a decrease in the index of new housing permits issued held the leading index back the most in March. An increase in inflation-adjusted new orders for nonferrous metal products and a rise in the copper price offset some of the negative

contributions from those indicators. The copper leading index growth rate suggests that activity could slow further in the near term.

## U.S. Dollar Strength Undermines Metals Price Growth

The **leading index of metal prices** decreased 0.3% to 103.0 in March from a revised 103.3 in February. However, its 6-month smoothed growth rate increased to -5.9% from a revised -6.2% in February. The declining trade-weighted average exchange value of other major currencies against the U.S. dollar growth rate contributed -0.4 percentage point to the net decrease in the leading index of metal prices. The Organization for Economic Cooperation and Development (OECD) Total Leading Index growth rate declined to its lowest rate in nearly 3 years in March, contributing -0.1 percentage point. In contrast, an increase in the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products contributed 0.2 percentage point. A

wider yield spread between the U.S. 10-year Treasury note and the federal funds rate contributed 0.1 percentage point. The leading index of metal prices signals major changes in the growth rate of nonferrous metal 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, decreased slightly in March. However, the level of metals inventories held in United States continued to rise. Meanwhile, the strength of the U.S. dollars as an investment versus holding commodities undercuts the rise in metals prices. Moreover, the negative metals price leading index growth rate indicate further metal price decreases.

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

	Six-Month Smoothed Growth Rates					
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
<b>2014</b>						
March	108.8	-11.3	7.7	-5.0	-12.7	4.9
April	108.8	-7.1	10.6	0.3	-8.7	12.1
May	108.5	-0.7	8.9	6.7	-1.0	4.7
June	108.2r	-0.1	8.2	10.2	-1.5	-0.4
July	108.0	5.7	6.2	27.8	2.8	-1.9
August	107.1r	2.2	5.5	36.0	-1.7	-2.5
September	106.3r	-6.1	6.9	12.2	-8.1	-2.0
October	105.7r	-4.7	10.4	19.7	-5.7	-11.6
November	105.2r	-8.9	13.1r	24.0	-11.6	-26.6
December	104.4r	-14.6	13.5	-4.1	-14.5	-25.3
<b>2015</b>						
January	103.4r	-28.6	16.5	-4.0	-33.0	-15.6
February	103.3r	-21.3	15.5r	-9.4	-21.5	-54.9
March	103.0	-15.1	14.0	-10.4	-14.9	-51.8
April	NA	-4.5	NA	0.5	-8.5	-47.3

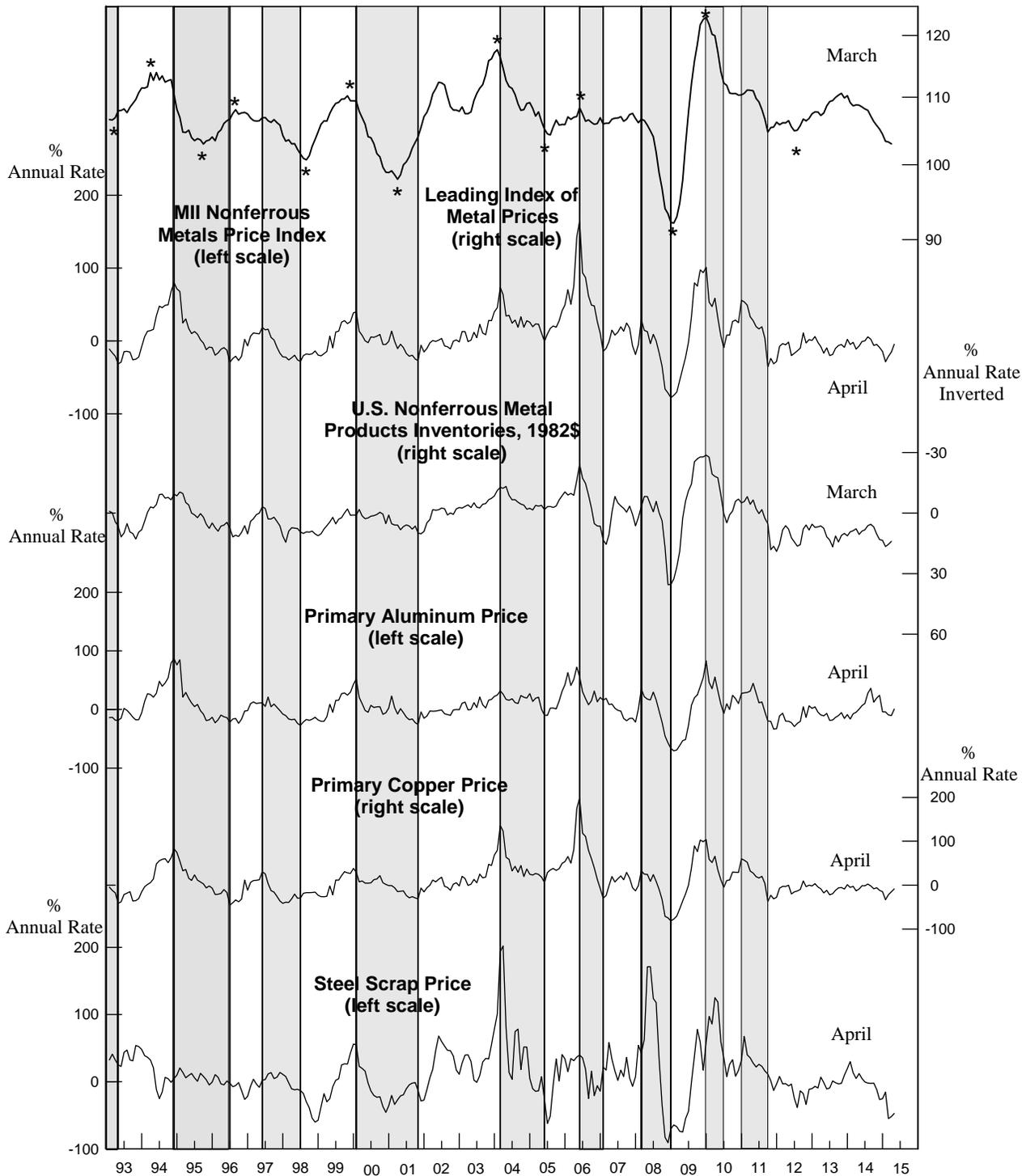
**NA:** Not available    **r:** Revised

**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**

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.

**Table 2.**  
**The Primary Metals Industry Indexes and Growth Rates**

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
<b>2014</b>				
April	166.9	4.6	115.7	4.4
May	167.4	4.5	116.6	5.2
June	168.0r	4.6	117.7	6.2
July	168.8r	4.6r	118.3	6.2
August	168.4r	3.4r	118.0	4.9
September	168.2	2.5	118.5	4.9
October	167.7r	1.4	118.4	3.9
November	166.9r	0.4r	117.6r	2.0r
December	166.6r	-0.2r	118.5r	3.2r
<b>2015</b>				
January	165.3r	-1.8r	117.5r	1.0r
February	165.3r	-2.0r	116.9r	-0.5r
March	161.9r	-5.7r	115.9	-2.3
April	162.9	-4.3	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**

<b>Leading Index</b>	<b>March</b>	<b>April</b>
1. Average weekly hours, primary metals (NAICS 331)	-0.6	0.0
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994=100)	-0.1r	0.1
3. Ratio of price to unit labor cost (NAICS 331)	-0.4	NA
4. USGS metals price index growth rate	-0.1r	0.5
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$	0.0	NA
6. Index of new private housing units authorized by permit	-0.3	NA
7. Growth rate of U.S. M2 money supply, 2009\$	-0.5	NA
8. PMI	-0.2r	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-2.2r	0.6
<b>Coincident Index</b>	<b>February</b>	<b>March</b>
1. Industrial production index, primary metals (NAICS 331)	-0.4r	-0.6
2. Total employee hours, primary metals (NAICS 331)	-0.2r	-0.4
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$	-0.1r	0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.6r	-0.8

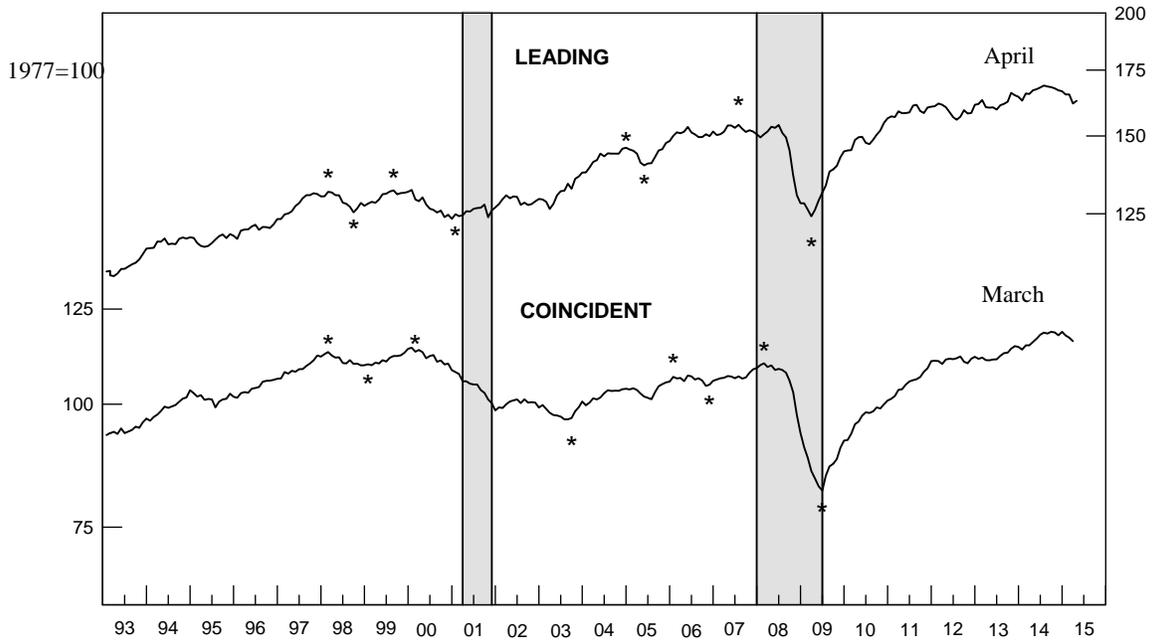
**Sources:** Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and U.S. Geological Survey; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board,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

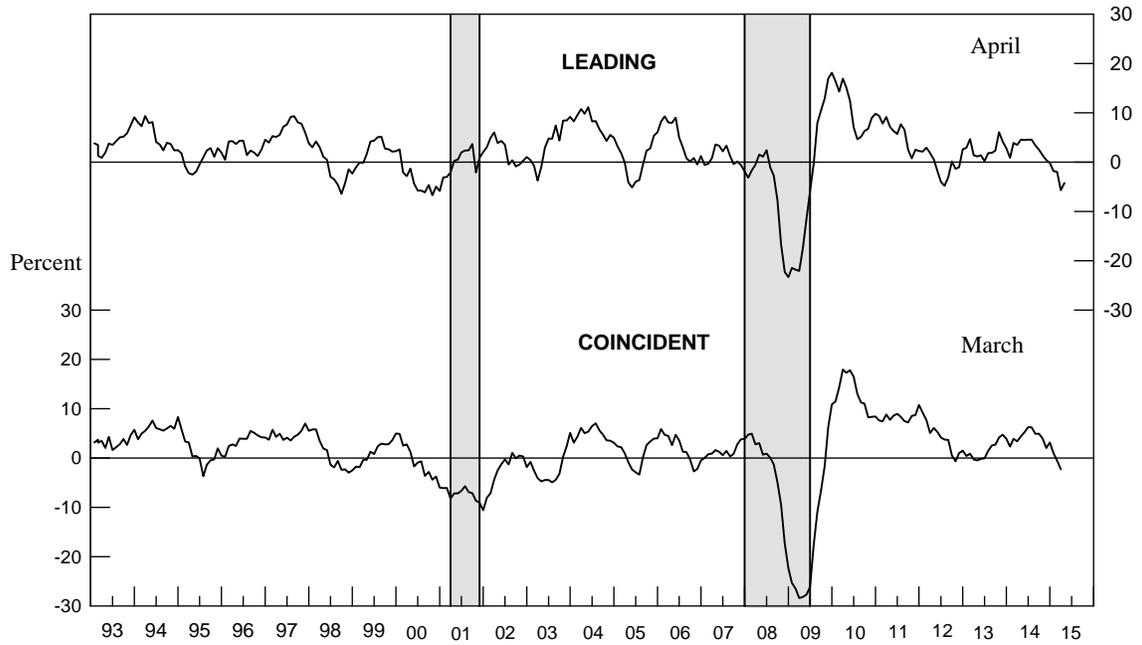
**PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1993-2015** 1977=100



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, 1993-2015** 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**

	<u>Leading Index</u>		<u>Coincident Index</u>	
	<u>(1977 = 100)</u>	<u>Growth Rate</u>	<u>(1977 = 100)</u>	<u>Growth Rate</u>
<b>2014</b>				
April	114.6	2.8	117.5	1.4
May	114.7	2.6	117.8	1.4
June	114.6	1.9	118.5	2.3
July	115.4	2.7	119.4	3.3
August	115.7	2.7	119.6	3.2
September	115.7	2.3	120.5	4.3
October	115.1	0.9	120.8	4.2
November	115.1r	0.8r	120.8	3.9
December	114.6r	-0.1r	120.8	3.6r
<b>2015</b>				
January	114.0r	-1.1r	119.0	0.3r
February	114.6r	-0.4r	118.7r	-0.7
March	112.9	-3.2	118.1	-1.7

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

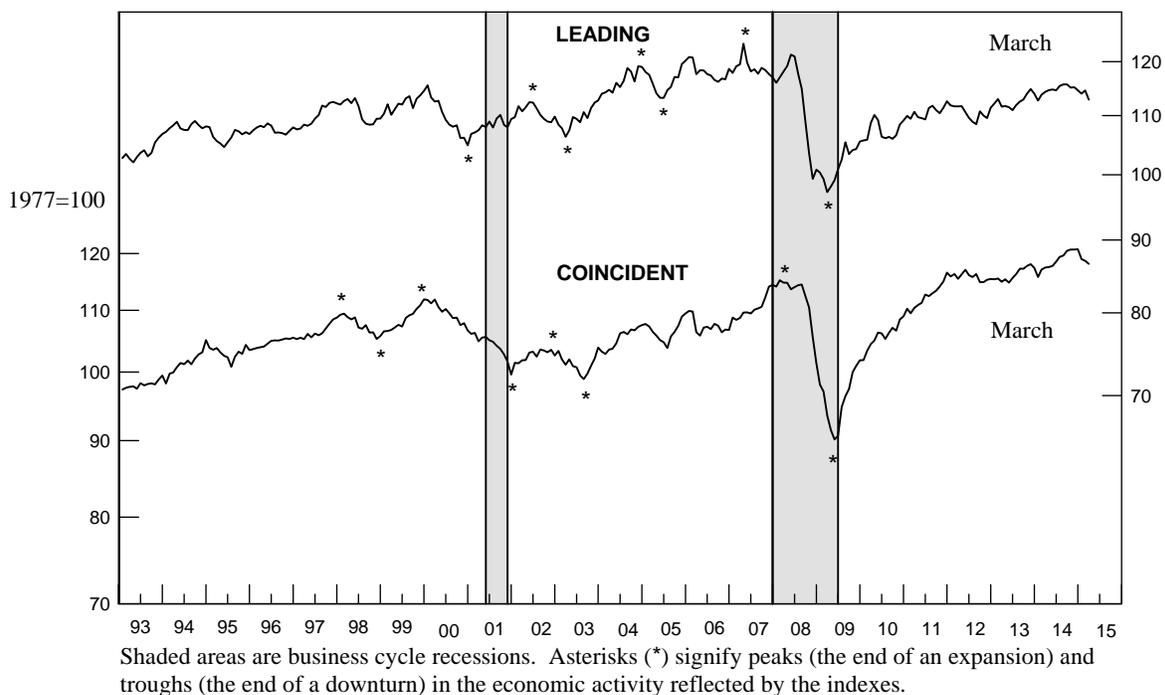
<b>Leading Index</b>	<b>February</b>	<b>March</b>
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	0.2	0.1
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.2r	-0.1
3. Shipments of household appliances, 1982\$	-0.2r	-0.3
4. S&P stock price index, steel companies	0.3	-0.1
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.2	0.2
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	-0.3	-0.3
7. Index of new private housing units authorized by permit	0.2	-0.3
8. Growth rate of U.S. M2 money supply, 2009\$	0.4	-0.5
9. PMI	-0.1	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.5r	-1.5
<b>Coincident Index</b>		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	-0.7r	-0.6
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.0r	0.0
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	0.3	0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.3r	-0.4

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

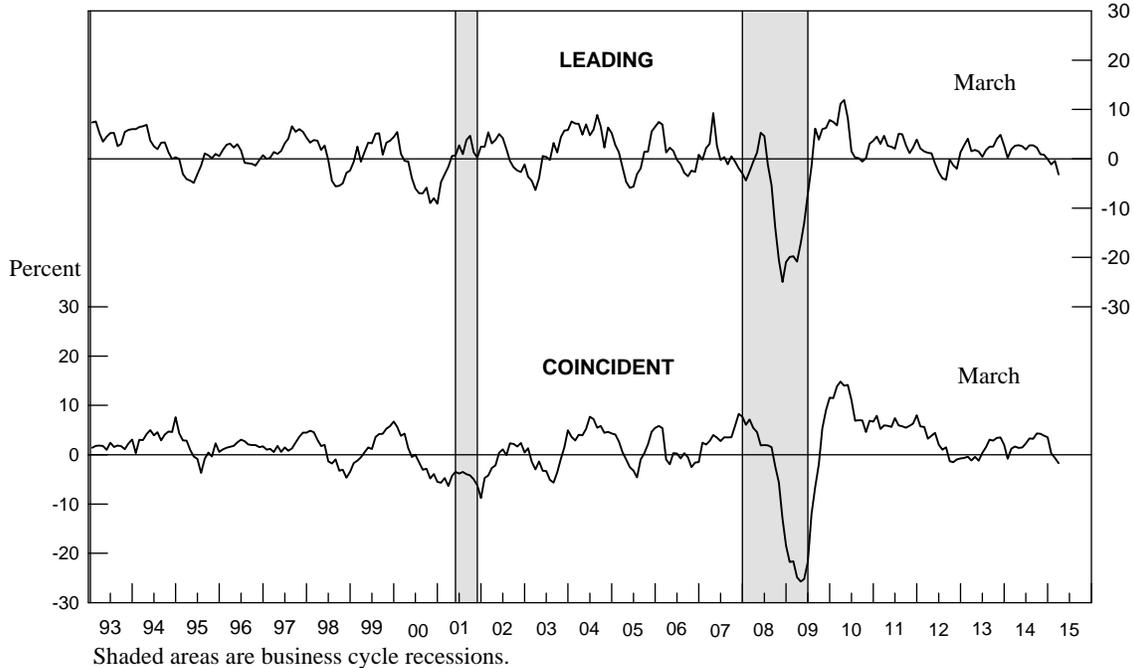
**CHART 4.**  
**STEEL: LEADING AND COINCIDENT INDEXES, 1993-2015**

1977=100



**CHART 5.**  
**STEEL: LEADING AND COINCIDENT GROWTH RATES, 1993-2015**

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**

	<b>Leading Index</b>		<b>Coincident Index</b>	
	<b>(1977 = 100)</b>	<b>Growth Rate</b>	<b>(1977 = 100)</b>	<b>Growth Rate</b>
<b>2014</b>				
April	130.6	2.8	110.7	3.2
May	129.0	0.0	111.5	4.3
June	131.4	3.5	114.3	8.8
July	130.0	0.9	113.2	5.8
August	130.1	0.7	112.8	4.3
September	130.3	0.8	109.6	-1.5
October	130.9	1.4	108.4	-3.7
November	131.5r	2.1r	107.8r	-4.6r
December	131.4r	1.6	111.8r	2.1r
<b>2015</b>				
January	128.9	-2.0	110.1r	-1.1r
February	132.0r	2.3r	111.3r	0.7r
March	131.6	1.5	111.0	-0.1

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**

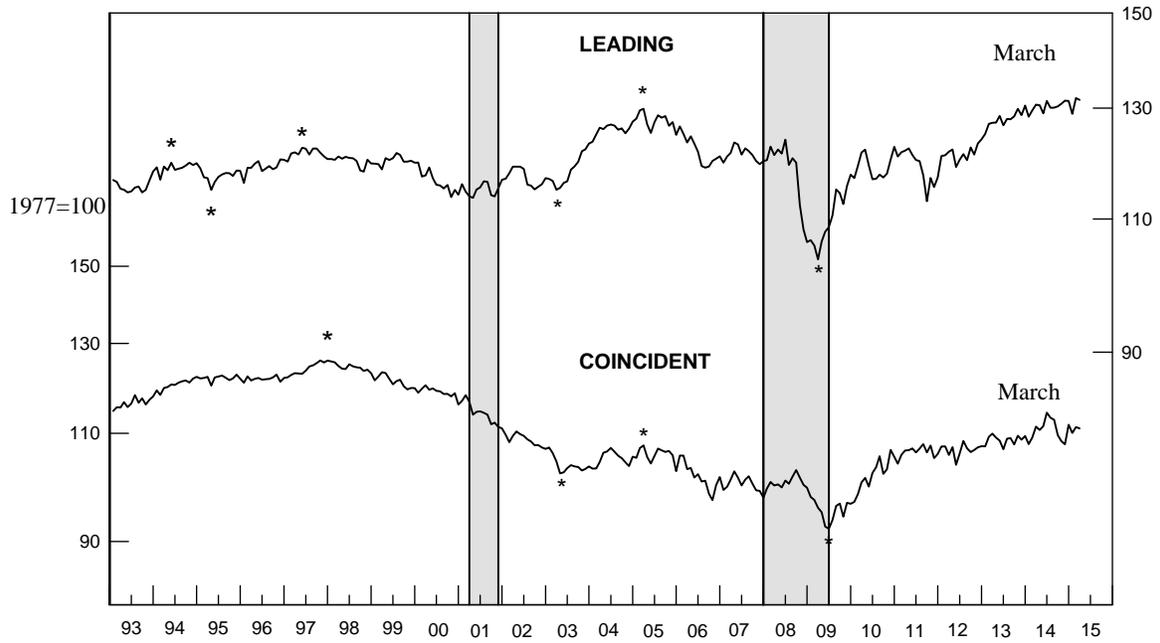
<b>Leading Index</b>	<b>February</b>	<b>March</b>
1. Average weekly hours, nonferrous metals (except aluminum) (NAICS 3314)	1.1r	-0.4
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	0.2	0.2
3. S&P stock price index, building products companies	0.4	0.1
4. LME spot price of primary copper	0.4	0.2
5. Index of new private housing units authorized by permit	0.2	-0.4
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)	<u>2.4r</u>	<u>-0.3</u>
<b>Coincident Index</b>		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	-0.1r	-0.2
2. Total employee hours, nonferrous metals (except aluminum) (NAICS 3314)	1.1r	-0.1
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	<u>1.1r</u>	<u>-0.2</u>

**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; and 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; and 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, 1993-2015**

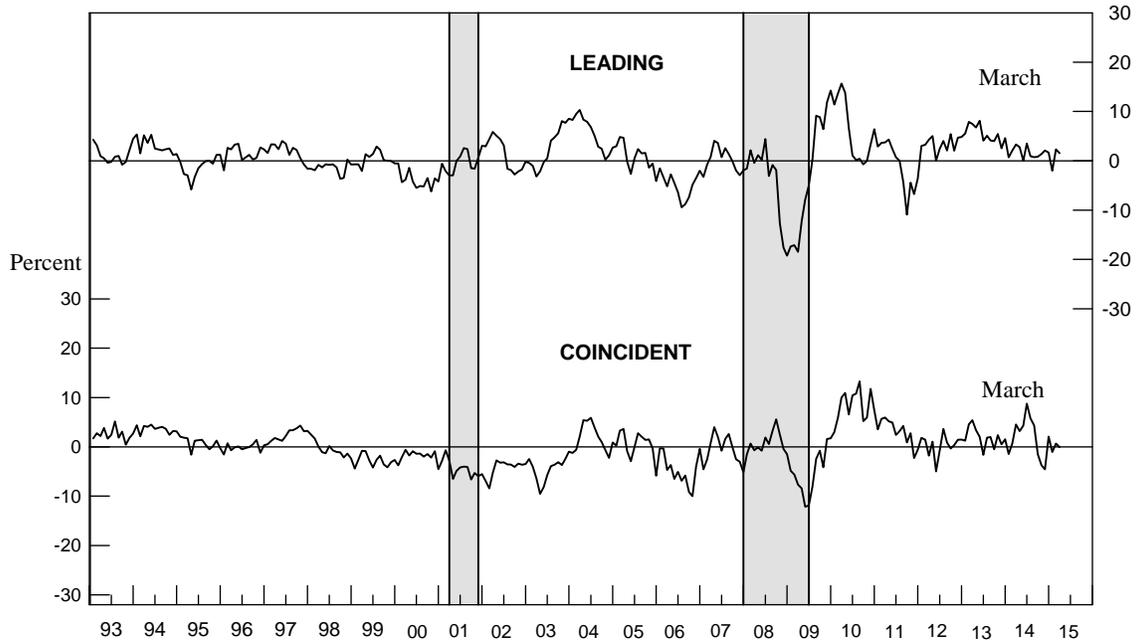
1977=100



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 7.**  
**COPPER: LEADING AND COINCIDENT GROWTH RATES, 1993-2015**

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.

## 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.<sup>1</sup>

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.

<sup>1</sup> 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. Because the historical 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 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:

$$\left( \left( \frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1 \right) * 100$$

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, June 17. 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 National Minerals Information Center. The report is prepared by Gail James (703-648-4915; e-mail: [gjames@usgs.gov](mailto:gjames@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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