

# Metal Industry Indicators

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

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October 2012

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The primary metals leading index increased sharply in September, and its 6-month smoothed growth rate rose strongly as well. Although this is only the second monthly increase in the growth rate after 5 consecutive decreases, the growth rate appears to be signaling an easing in the decline in U.S. metal industry activity growth. The U.S. economic recovery is supporting primary metals industry activity growth with modest metals demand from the manufacturing and construction sectors. Concerns over the European debt crisis and slower growth in emerging economies have reduced demand for U.S. metals. The metals price leading index increased in August; however, its still negative growth rate suggests further declines in metal prices.

The **primary metals leading index** increased 2.4% to 160.5 in September, from a revised 156.7 in August. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend increased to 0.5% from a revised -4.2% in August. 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](#).

All four of the index's available components increased in September. The USGS metals price index growth rate made the largest contribution, 1.0 percentage point, to the overall gain in the primary metals leading index. The Institute for Supply Management's PMI contributed 0.5 percentage points as it rose above the threshold that denotes an expansion in future U.S. manufacturing activity. The stock price index combining construction and farm machinery companies and industrial machinery companies increased a second month in a row and contributed 0.5 percentage points as well. A longer average workweek in primary metals establishments contributed 0.4 percentage points. The primary metals leading index will likely be revised next month when the remaining four components become available.

The positive primary metals leading index growth rate suggests that the sharp decline in metals industry activity growth could slow in the near term. New orders for durable goods have underpinned the primary metals industry, particularly orders for transportation equipment. The construction sector is also boosting metals consumption. Low interest rates and reduced home inventories have already spurred residential construction. The rebuilding after Hurricane Sandy will undoubtedly generate additional metals consumption. However, slower manufacturing growth in China and the recession in Europe have reduced their imports of U.S. metals.

The **steel leading index** decreased 0.7% in August, the latest month for which it is available, to 107.8 from a revised 108.6 in July. Its 6-month smoothed growth rate declined to -5.1% from -4.1% in July. Most of its nine indicators decreased, with the largest negative contribution coming from the declining inflation-adjusted M2 money supply growth rate. The falling steel scrap price growth rate also had a strong negative pull. Dips in new orders for iron and steel products and the index for new housing permits also weighed on the steel leading index. In contrast, the only sizable positive contribution to the leading index was from the boost in light truck and car sales. The relatively deep negative steel leading index growth rate indicates that U.S. steel industry activity growth could decline further in the near future.

The **copper leading index** decreased 0.7% in August to 123.4 from a revised 124.3 in July. Its 6-month smoothed growth rate declined to 3.2% from 5.2% in July. Only one of the index's six indicators increased in August, the yield spread between the U.S. 10-year Treasury note and the federal funds rate. A shorter average workweek in nonferrous metals products, except aluminum, manufacturing plants made the largest negative contribution. Slips in the S&P stock price index for building products companies and the index for new housing permits made smaller negative contributions. Despite the August decline in the copper leading index, its growth rate suggests that activity in the U.S. copper industry could grow modestly in the near future.

### High Inventories May Suppress Metals Price Growth

The **metals price leading index** increased 0.4% in August, the latest month for which it is available, to 106.1 from a revised 105.7 in July, and its 6-month smoothed growth rate increased to -2.0% from a revised -3.1% in July. Two of its four components

increased. The growth rate of the trade-weighted average exchange value of other major currencies against the U.S. dollar, which had generally declined since April 2011, increased and made a 0.6-percentage-point contribution to the net gain in the leading index. A wider yield spread between the U.S. 10-year Treasury note and the federal funds rate contributed 0.2 percentage points. In contrast, the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous metal products resumed its downward spiral after a 1-month uptick in July. It contributed -0.3 percentage points. The growth rate of the Organization for Economic Cooperation and Development (OECD) Total Leading Index continued to sink deeper in negative territory in August. It contributed -0.1 percentage point to metals price leading index. 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, decreased in August after increasing 4 consecutive months. The level of these inventories is at a 40-month high. High inventories and the negative metals price leading index growth rate suggest further declines in metal prices.

The business cycle and inventories are only two factors in metal price determination. Some 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**

	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>2011</b>						
August	108.5	3.6	3.2	-4.0	3.8	16.0
September	106.6	-35.5	6.1	-19.8	-37.1	11.2
October	107.5	-24.0	19.6	-20.6	-22.8	1.2
November	107.3	-31.4	17.9	-33.6	-31.1	-12.9
December	109.1	-28.1	21.6	-32.9	-27.4	-3.3
<b>2012</b>						
January	107.5	-7.4	18.6	-11.1	-6.8	7.8
February	107.5	-3.7	12.3	-6.5	-2.7	-3.1
March	107.3	-5.3	9.8	-20.0	-2.7	-3.0
April	107.4r	-1.6	11.9r	-20.3	0.0	-6.4
May	106.4	-20.3	15.3r	-22.5	-19.6	-3.6
June	105.7	-17.0	17.6	-29.1	-15.3	-25.1
July	105.7r	-13.6	21.1r	-23.5	-13.0	-38.6
August	106.1	9.9	20.0	-20.5	-9.5	-13.5
September	NA	11.0	NA	4.2	9.7	-17.9

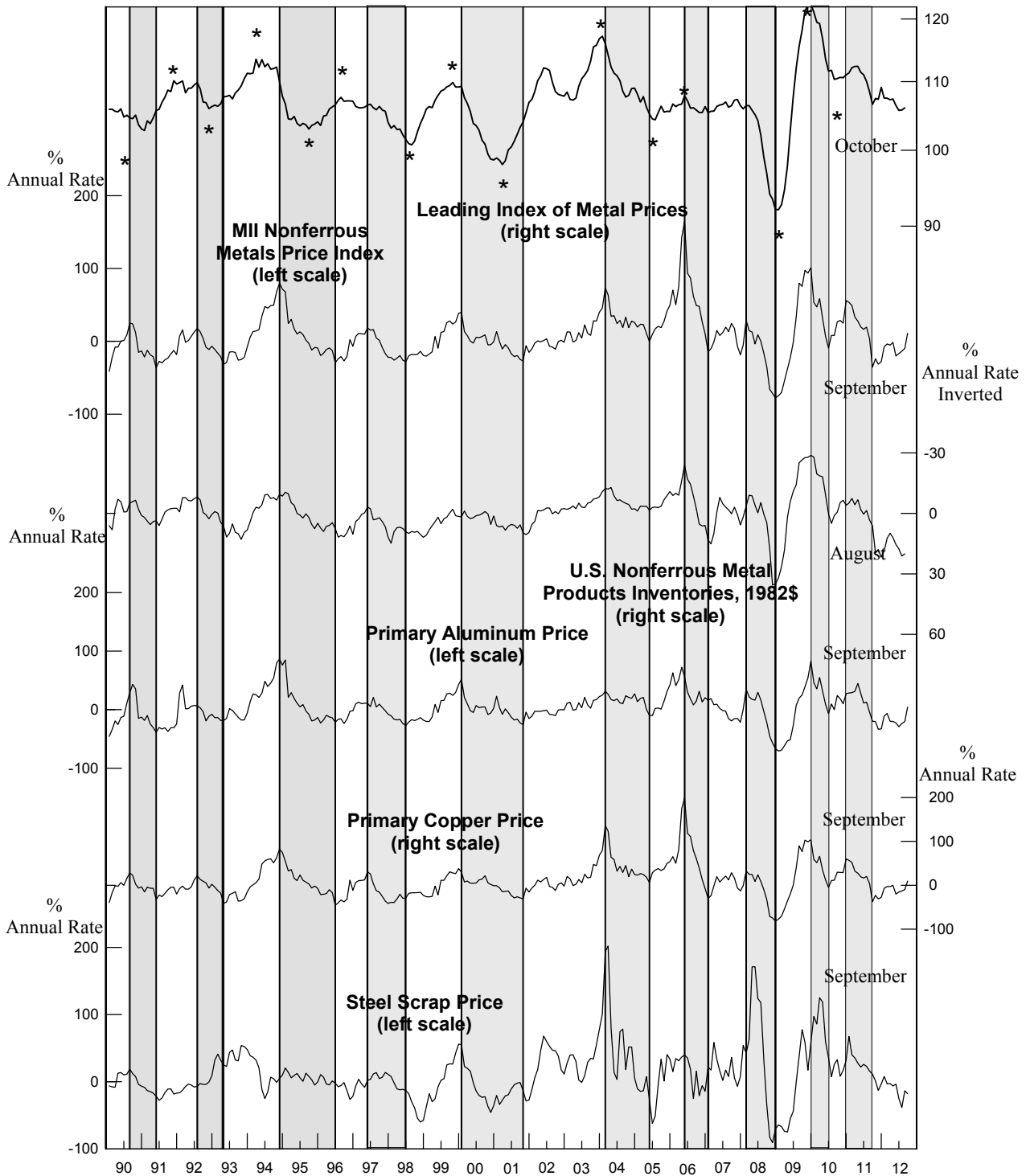
**NA:** Not available    **r:** Revised

**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**

	<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>2011</b>				
October	158.6	0.9	109.5	10.2
November	161.4	3.4	111.1	11.3
December	162.2	3.7	114.2	15.2
<b>2012</b>				
January	162.6	3.6	113.3	11.6
February	163.3	3.9	113.5	10.0
March	162.4	2.3	112.6	6.7
April	161.8r	1.3r	113.8r	7.5r
May	160.1r	-0.9r	113.5	5.7r
June	157.0r	-4.5r	113.3r	4.1r
July	156.4r	-5.0r	114.0r	4.2r
August	156.7r	-4.2r	113.9	3.2
September	160.5	0.5	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>August</b>	<b>September</b>
1. Average weekly hours, primary metals (NAICS 331)	0.3r	0.4
2. Weighted S&P stock price index, machinery, construction and farm and industrial (December 30, 1994 = 100)	0.5r	0.5
3. Ratio of price to unit labor cost (NAICS 331)	0.1	NA
4. USGS metals price index growth rate	0.0	1.0
5. New orders, primary metal products, (NAICS 331 & 335929) 1982\$	0.0	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 2005\$	-0.6	NA
8. PMI	0.0r	0.5
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	2.4
<b>Coincident Index</b>	<b>July</b>	<b>August</b>
1. Industrial production index, primary metals (NAICS 331)	0.4r	0.1
2. Total employee hours, primary metals (NAICS 331)	-0.3r	-0.3
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982\$	0.4r	0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.6r	0.0

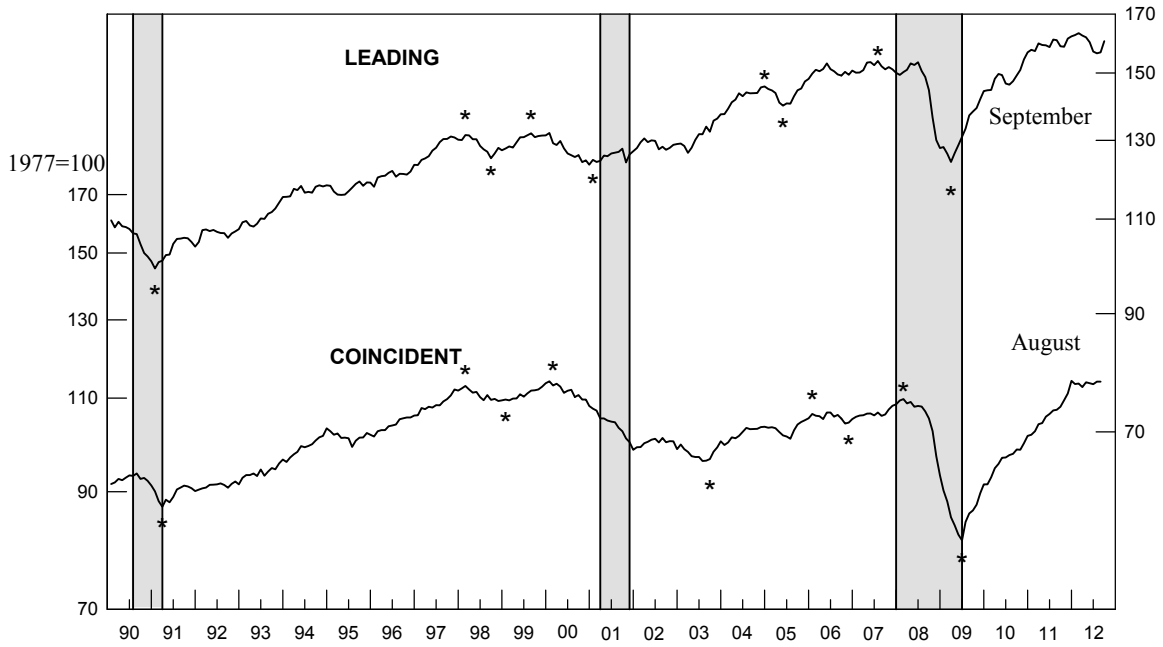
**Sources:** Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Journal of Commerce and U.S. Geological Survey; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board,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

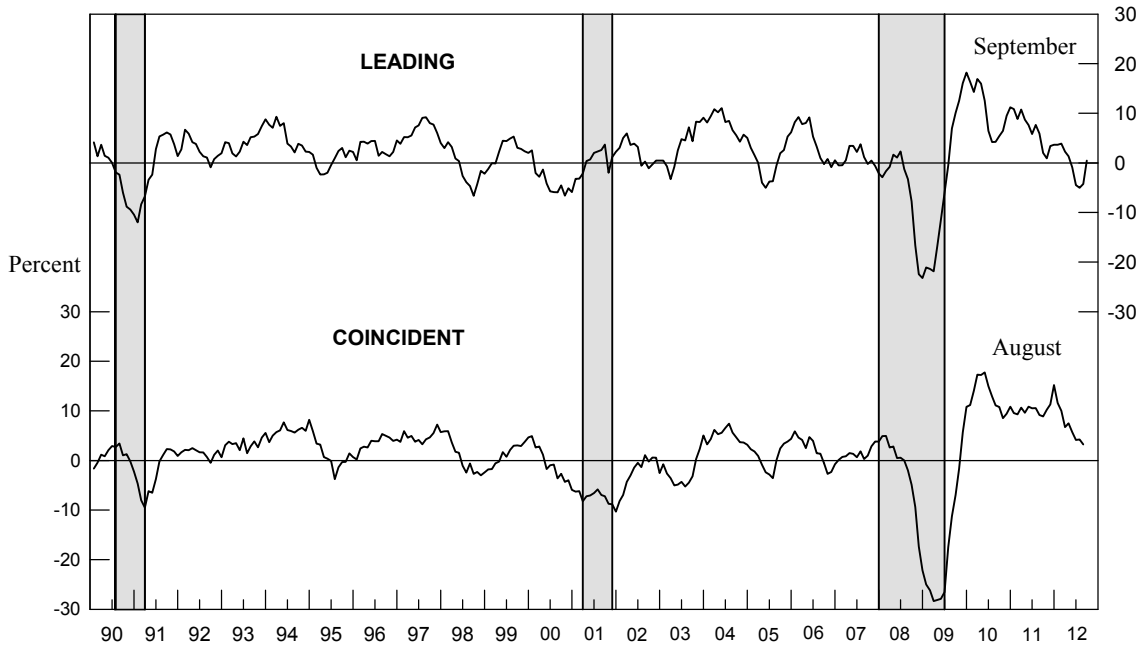
**PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1990-2012** 1977=100



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
<b>2011</b>				
September	110.5	2.1	113.0	5.2
October	110.3	1.2	114.2	6.5
November	111.5r	2.7	115.6	7.7
December	112.0	3.0	117.5	9.7
<b>2012</b>				
January	112.2	3.0	117.0	7.8
February	111.5	1.5	117.4	7.4
March	111.6r	1.5	116.4	4.5
April	111.5r	1.1r	117.3	5.2r
May	110.9	-0.2	117.5	4.6
June	109.0	-3.4r	116.4	1.8
July	108.6r	-4.1	116.6	1.5
August	107.8	-5.1	117.2	2.0

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**

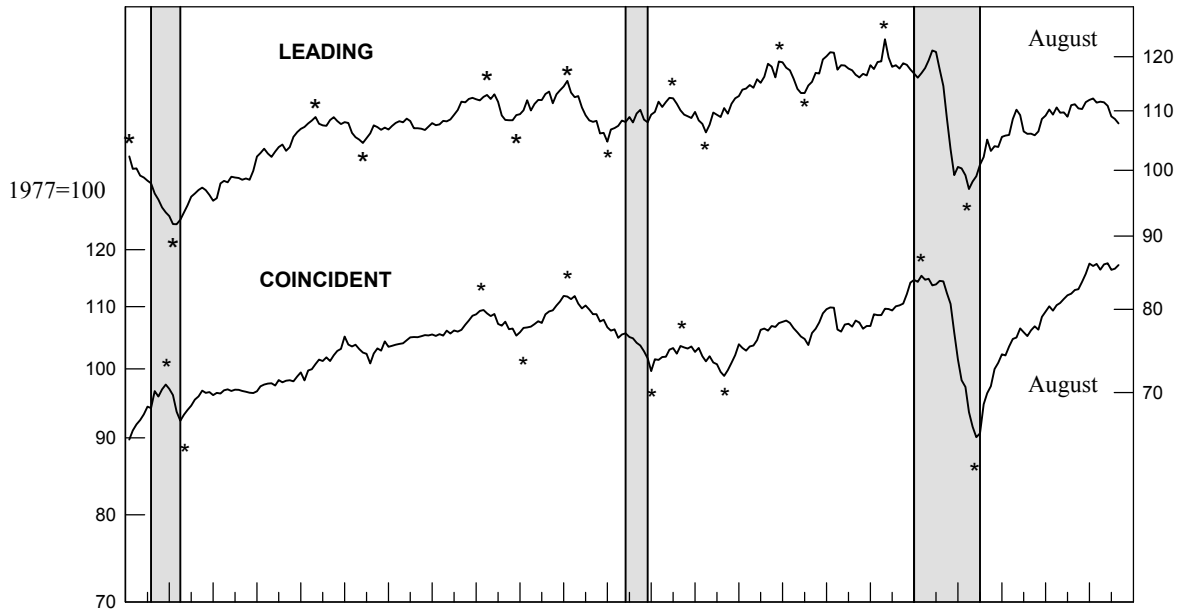
Leading Index	July	August
1. Average weekly hours, iron and steel mills (NAICS 3311 & 3312)	-0.7	0.0
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.2	-0.1
3. Shipments of household appliances, 1982\$	0.1	0.0
4. S&P stock price index, steel companies	0.0	0.0
5. Retail sales of U.S. passenger cars and light trucks (units)	-0.1	0.2
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	-0.4	-0.3
7. Index of new private housing units authorized by permit	0.3	-0.1
8. Growth rate of U.S. M2 money supply, 2005\$	0.1	-0.6
9. PMI	0.0	0.0
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.5	-0.9
<b>Coincident Index</b>		
1. Industrial production index, iron and steel products (NAICS 3311 & 3312)	0.0r	0.3
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982\$	0.7	0.0
3. Total employee hours, iron and steel mills (NAICS 3311 & 3312)	-0.7r	0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.1	0.6

**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, 1990-2012**

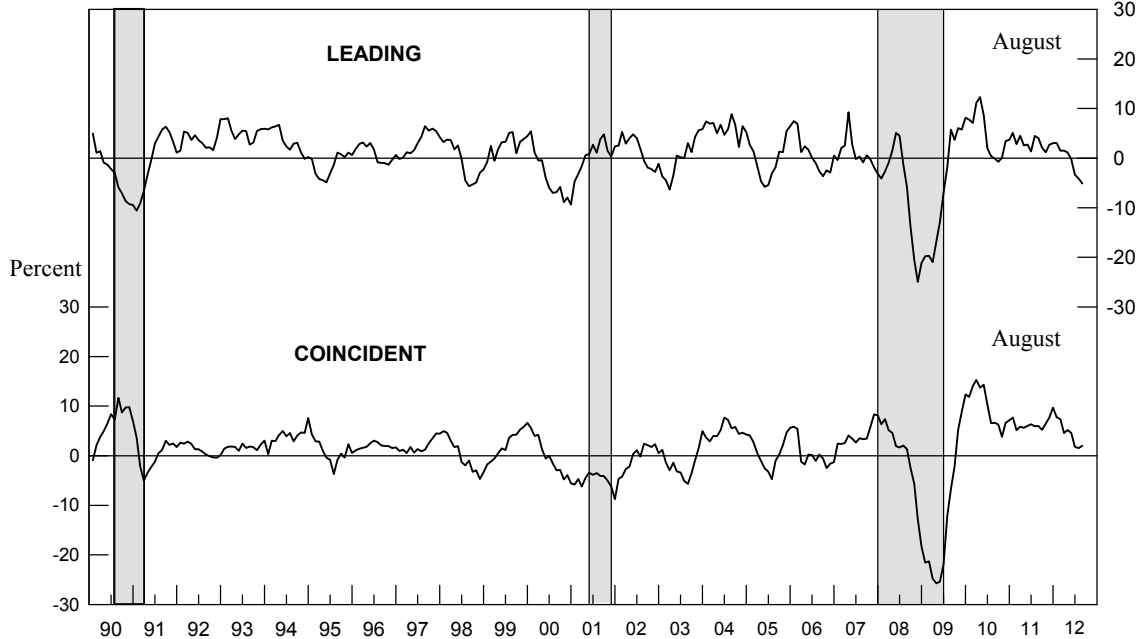
1977=100



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 5.**  
**STEEL: 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 6.**  
**The Copper Industry Indexes and Growth Rates**

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
<b>2011</b>				
September	115.0	-8.3	108.0	7.3
October	119.2	-1.7	109.5	9.0
November	118.3	-2.9	108.6	6.2
December	120.7	0.9	108.5	5.4
<b>2012</b>				
January	123.1	4.8	109.1	5.4
February	123.3	4.7	109.1r	4.1r
March	123.6r	4.9	106.7	-0.9r
April	124.5	5.9r	109.1	2.7r
May	121.5	0.9	105.7r	-3.8r
June	122.7	2.8	107.8r	-0.2r
July	124.3r	5.2	110.3r	3.6r
August	123.4	3.2	108.0	-0.7

r: Revised

**Note:** Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

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

Leading Index	July	August
1. Average weekly hours, nonferrous metals (except aluminum) (NAICS 3314)	0.4	-0.6
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982\$	0.3	0.0
3. S&P stock price index, building products companies	0.3	-0.2
4. LME spot price of primary copper	0.0	0.0
5. Index of new private housing units authorized by permit	0.4	-0.1
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)	1.3	-0.8
<b>Coincident Index</b>		
1. Industrial production index, primary smelting and refining of copper (NAICS 331411)	1.3r	-0.3
2. Total employee hours, nonferrous metals (except aluminum) (NAICS 3314)	0.9	-1.8
3. Copper refiners' shipments (short tons)	NA	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	2.3	-2.0

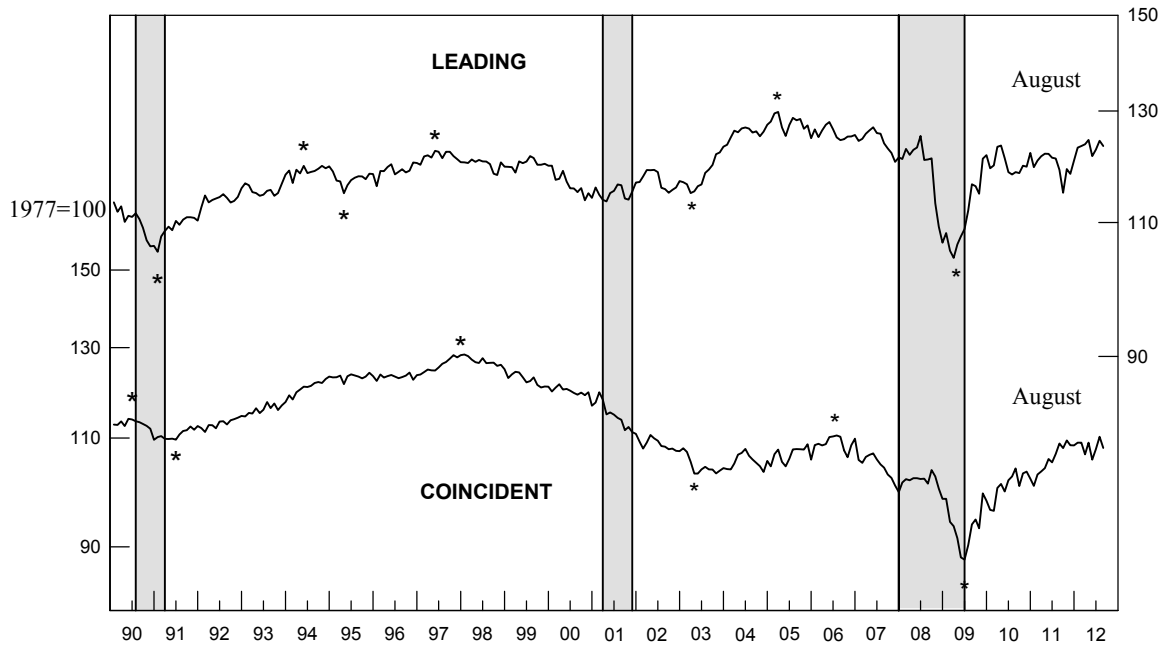
**Sources:** Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau 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, 1990-2012**

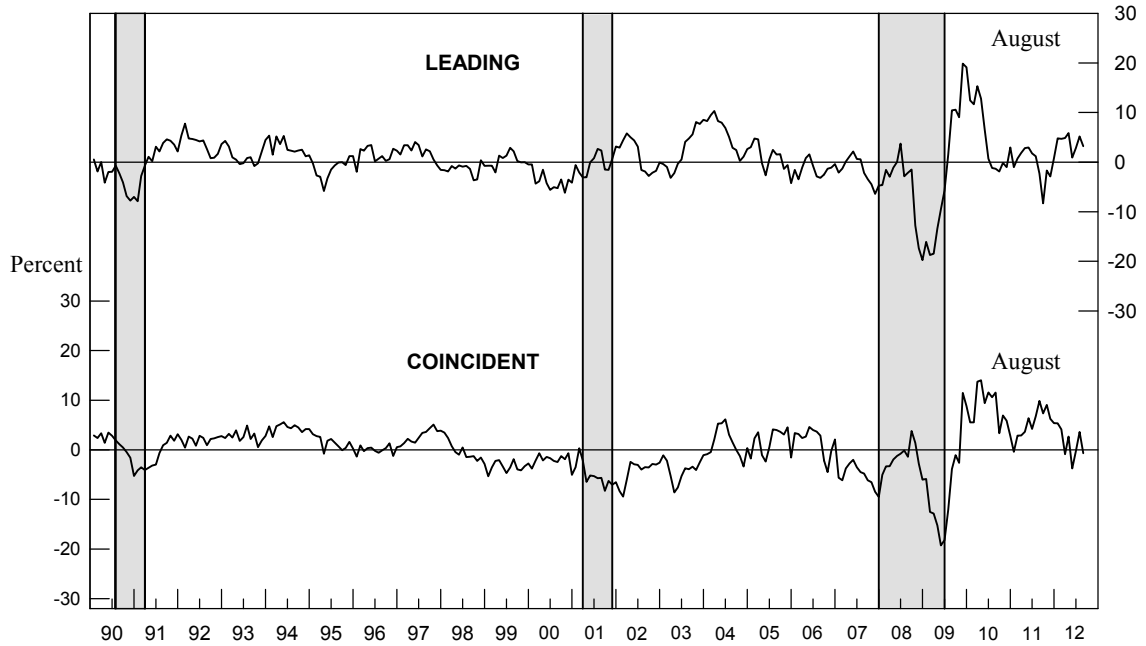
1977=100



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 7.**  
**COPPER: 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.

## 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.

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<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. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

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

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

**The next update for these indexes is scheduled for release on the World Wide Web at 10:00 a.m. EST, Friday, November 16. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>**

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the National Minerals Information Center. The report is prepared by Gail James (703-648-4915; e-mail: [gjames@usgs.gov](mailto:gjames@usgs.gov)) and Ken Beckman (703-648-4916; e-mail: [kbeckman@usgs.gov](mailto: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