Diffusion Indexes of Industrial Production

Beginning July 1991, the Federal Reserve will resume publication of diffusion indexes of industrial production (IP) in its monthly statistical release, *Industrial Production and Capacity Utilization*; diffusion indexes previously were published from July 1979 to March 1990. Like all diffusion indexes, those for IP summarize the direction of change over a given time period in a set of disaggregated data.\(^1\) Thus, their purpose is to provide a measure of the breadth of change in the aggregate series.\(^2\)

Output changes in the 250 series that constitute the total industrial production index form the basis for the calculation of the diffusion indexes.\(^3\)

The value of the diffusion index is equal to the proportion of series that increased over a given time period, referred to as the "span" of the diffusion index, plus one-half of the proportion that was unchanged. The precise computation of a diffusion index is as follows: If an individual series increases over the span of the diffusion index, it receives a value of 100; if it declines, it receives a value of 0; and if it is unchanged, it receives a value of 50. The diffusion index is then calculated by summing these values for each of the components and dividing the result by the number of series included in the diffusion index. Diffusion indexes of IP for spans of one, three, and six months are available for the period beginning July 1967.

The interpretation of diffusion indexes is straightforward: A value of 50 indicates that over the interval spanned by the diffusion index the proportion of series posting increases was equal to the proportion that declined, whereas a reading of more than 50 means that more series rose than declined. As indicated in the chart, the...

\(^1\) Besides those for industrial production, diffusion indexes are calculated, for example, by the Bureau of Labor Statistics for payroll employment and by the Bureau of Economic Analysis for the indexes of leading, coincident, and lagging indicators. The diffusion indexes of payroll employment are described in Patricia M. Getz and Mark G. Ulmer, "Diffusion indexes: a barometer of the economy," *Monthly Labor Review* (April 1990), pp. 13-21. The diffusion indexes of leading, coincident, and lagging indicators are published in *Survey of Current Business*.


\(^3\) The number of series in the total IP index has changed over time, and the calculation of the diffusion indexes reflects these changes. Specifically, from 1968 to 1971, the index comprised 238 series; from 1972 to 1976, 256 series; and since 1977, 250 series. The industrial production index is described in Kenneth Armitage and Dixon A. Tranum, "Industrial Production: 1989 Developments and Historical Revision," *Federal Reserve Bulletin*, vol. 76 (April 1990), pp. 187-204.
## Diffusion Indexes of Industrial Production for spans of one, three, and six months, 1967-90

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### One-month span

- **Indexes are based on seasonally adjusted data.**
- **Year**
- **January**
- **February**
- **March**
- **April**
- **May**
- **June**
- **July**
- **August**
- **September**
- **October**
- **November**
- **December**

### Three-month span

- **Year**
- **January**
- **February**
- **March**
- **April**
- **May**
- **June**
- **July**
- **August**
- **September**
- **October**
- **November**
- **December**

### Six-month span

- **Year**
- **January**
- **February**
- **March**
- **April**
- **May**
- **June**
- **July**
- **August**
- **September**
- **October**
- **November**
- **December**

Indexes are based on seasonally adjusted data.
average level of each of the diffusion indexes was greater than 50 from July 1967 to December 1990, which simply indicates that more industries recorded production advances than declines during this period.

The three- and six-month diffusion indexes are substantially smoother from month to month than the one-month index. This pattern occurs because transitory shocks to production that result from, for example, unseasonable weather or strikes can buffet the one-month diffusion index. In contrast, because they are calculated over longer periods, the three- and six-month indexes are better insulated from such factors.

Relationships between diffusion indexes of industrial production and percentage changes in the industrial production index are examined in James E. Kennedy, "Empirical Relationships between the Total Industrial Production Index and Its Diffusion Indexes," Finance and Economics Discussion Series 163 (Board of Governors of the Federal Reserve System, Divisions of Research and Statistics and Monetary Affairs, July 1991). 4

4. This paper may be obtained on request from The Editor, Finance and Economics Discussion Series, Division of Research and Statistics, mail stop 89, Board of Governors of the Federal Reserve System, Washington, D.C. 20551.