



BOARD OF GOVERNORS  
OF THE  
FEDERAL RESERVE SYSTEM

WASHINGTON, D. C. 20551

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ADDRESS OFFICIAL CORRESPONDENCE  
TO THE BOARD

To: Federal Open Market Committee

From: Michael J. Prell

Enclosed is a memorandum by the Board staff dealing with the outlook for capacity pressures in light of the improvement in the U.S. trade position, a matter touched upon in discussion at the July FOMC meeting.

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## Office Correspondence

Date July 22, 1987To Board of GovernorsSubject: Capacity utilization inFrom Staff\* of the Divisions of  
Research and Statistics and  
International Financetrade-sensitive industries.FOR INFORMATION ONLY

Recently, questions have been raised about the possibility that a surge in domestic production generated by an improvement in the U.S. trade situation might push up capacity utilization rates in selected industries to levels that would be associated with production bottlenecks or shortages and a build up of inflationary pressures. In order to address these issues, we have attempted an industry disaggregation of the July Greenbook projection of total manufacturing industrial production and capacity utilization. Inferences about the potential for inflation pressures are discussed based on the disaggregated projection.

Recent production and capacity developments.

Industrial production in the manufacturing sector increased at a 3-1/2 percent annual rate during the first half of 1987--up from the 2-1/4 percent rise recorded in 1986 (table 1, upper panel). As has been the case for the past three years, production of nondurable goods--especially textiles, chemicals, and printing and publishing--grew considerably faster in the first half of 1987 than durable goods production (4.7 percent annual rate versus a 2.5 percent rate). However, within durable goods manufacturing there was a pronounced acceleration of output in several industries--most notably primary metals and nonelectrical machinery. At the same time, production of aerospace equipment and furniture continued to grow rapidly.

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\* James Kennedy, with Peter Hooper, Larry Slifman, David Stockton, Peter Tinsley.

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Many of this year's strong industries have been benefiting from an improvement in the trade situation. The lower panel of table 1 shows estimates of changes in the volume of exports and imports for selected manufacturing industries between the first four months of 1986 and the first four months of 1987. (The latest available data, by industry, are for April 1987; year-over-year changes are shown because the data are not available on a seasonally adjusted basis.) As can be seen on lines 2, 4a, 5, 7 and 9, the gains in production of primary metals, computers, aircraft, textiles, and chemicals reflect, in part, strong foreign demand and in some cases falling imports. Moreover, in recent months a reported pickup in exports of machinery other than computers (not captured by the figures shown in the table) may account for some of the strengthening of production for this sector in the first half of the year.

The increase in overall manufacturing production so far this year has exceeded the rise in capacity by only a slight margin; consequently, the utilization rate has been little changed. At 80.1 percent in June, the manufacturing operating rate was still a bit below its long-run (20-year) average (table 2). However, utilization rates in some industries were well above their long-run averages, and in some cases even surpassed previous cyclical peaks. The highest rates were in the paper and textile industries and at producers of aerospace equipment. In all three industries, utilization was at or above previous peak values. In addition, operating rates were above average for fabricated metals, chemicals, and rubber and plastics. In contrast, at 71 percent, utilization for nonelectrical machinery--an industry that appears to be quite "trade sensitive"--was well below its long-run average.

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The outlook for aggregate activity.

As shown in the lower panel of table 2, the bulk of GNP growth over the projection period is expected to be in the goods sector (compare lines 1 and 4). Within the goods sector, domestic spending (line 5), which was a primary source of GNP growth between 1983 and 1986, is likely to play a much smaller role during 1987 and 1988. In particular, slower growth of goods consumption is expected to be only partially offset by growth in capital equipment outlays.

At the same time, an improvement in the real merchandise trade balance (line 9) is projected to be a pivotal contributor to growth. The staff expects real nonagricultural exports to continue to grow at a relatively rapid rate through 1988, while non-oil import volumes begin to decline slightly. Categories in which real net exports can be expected to grow the most are those that are relatively free of quantitative trade restrictions, and in which Japan and Western Europe (whose currencies have risen the most against the dollar) figure most prominently as our competitors. These categories would include chemicals, a wide range of machinery, aircraft, and many consumer durables. Real net exports of other items, such as many crude materials, textiles, wood and paper products, apparel, footwear, and certain types of business machines and small household appliances, may be stimulated somewhat less by the decline in the dollar. These are categories for which our major competitors are countries whose currencies have risen much less against the dollar or for which quantitative restrictions are more prevalent.

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Disaggregated analysis.

Production. The contour of the forecast in the July Greenbook suggests that the output of durable goods will accelerate as a result of expanding foreign demand (table 3, upper panel). Durable goods output also is expected to be boosted by a combination of gains in capital equipment outlays and an increase in the market share held by domestic producers of capital goods. Industries such as nonelectrical machinery--which historically have been very sensitive to movements in real exchange rates--are expected to post especially large output advances during the next two years. In addition, production is expected to strengthen in industries such as primary and fabricated metals that supply materials and parts to machinery producers. Output of aircraft, which has been growing briskly for more than two years, ought to expand further owing to a large backlog of bookings from both domestic and foreign purchasers; however, gains in aircraft production are expected to be tempered somewhat by anticipated declines in real defense outlays.

Output of nondurable goods is expected to advance roughly 4-1/2 percent this year, based largely on continued strength in chemicals, paper, and textiles. However, growth is expected to slow in 1988, reflecting, in part, sluggishness in consumer outlays for nondurable goods. In addition, the projected deceleration of nondurable goods output is based on our expectation (noted above) that gains in net merchandise exports are likely to have a proportionately greater effect on the durable industries.

Utilization. The operating rate in durables manufacturing is expected to rise to about 78 percent in 1988--slightly below the average rate during the past 20 years (table 3, lower panel). Thus, capacity constraints in these industries are not expected to be widespread. However, bottlenecks may develop

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in some areas: in particular, the projected 1988 operating rate for fabricated metals (line 4) is expected to be approach the peak rate registered during the 1978-80 period. Although overall capacity in the fabricated metals industry has not been growing, constraints in this industry probably will not arise for producers of parts and materials used in the automobile and appliance industries; however, in light of the projected strength in output of capital goods, capacity may be tight for certain types of materials used in producing business equipment.

The operating rate in nondurable manufacturing is projected to rise further this year, and then level off in 1988. Operating rates in textiles, paper, and chemicals next year are expected to remain high by historical standards. In most other industries, rates are expected to be at or above historical averages, but well short of previous cyclical peaks.

Capacity utilization and inflation.

Chart 1 presents a scatter diagram of the level of capacity utilization and changes in the rate of inflation (that is, current year inflation minus inflation in the preceding year). As can be seen by the upward sloping shaded band, higher utilization rates tend to be associated with accelerating prices. The reason is that with the expansion of output, less efficient plant and equipment must be brought into use as the more efficient capital reaches capacity. Moreover, it is often the case that the marginal workers receiving employment are likely to be less productive as output and employment expand. The increasing costs of production associated with rising output eventually lead to higher product prices and could be passed on as higher costs to other industries. Thus, downstream industries--facing higher costs--may be forced to raise prices even if there is excess capacity in their own industry.

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Nonetheless, the observations outside the shaded band indicate that other factors--such as supply disturbances and exchange rate movements--at times have been the dominant influence on goods prices. Moreover, the width of the band--which represents a 70 percent confidence interval--is quite wide. The point is, there is no unique "trigger point" level of utilization below which prices would be stable or declining and above which prices accelerate rapidly. Any shift in demand for the product of an industry is likely to be met by some increase in output and some increase in profit margins and prices; for example, intermediate materials prices accelerated sharply in late 1983 and early 1984--a period when substantial excess capacity existed in many of the industries raising prices. As demand expands and capacity pressures develop, a greater proportion of the increase in demand will be reflected in higher prices rather than in higher output. Indeed, these profit margin and price changes are the mechanisms that reallocate resources to the traded-goods sector.

It is possible that the sectoral composition of production could result in high levels of utilization and price pressures in specific industries, even though the utilization rate for manufacturing as a whole would not appear to be cause for considerable concern. The most obvious problem would be that bottlenecks could develop in certain sectors--for example, materials suppliers such as fabricated metals or specialty steel. Capacity bottlenecks in just a few industries, especially those that produce intermediate inputs that are widely used or difficult to substitute for, could lead to price increases that would then be transmitted to other sectors as higher costs. The higher costs likely would be passed through into prices, despite the existing slack capacity in these other sectors.

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In the aggregate, manufacturing capacity utilization in the July Greenbook is projected to rise to about 81 percent by the end of 1988—only slightly above the average operating rate during the past twenty years (80.6 percent), and well below the peak operating rates observed during 1973 and 1978-80. Thus, capacity utilization at the projected level suggests that widespread tightness of product markets is not likely to be a significant factor boosting aggregate price inflation.

At the disaggregated level, the results presented in table 3 indicate a wide dispersion of industry performance over the next two years. Despite a pickup in production, nonelectrical machinery, electrical equipment, and primary metals would appear generally to have ample capacity to meet growing demands without significant price pressures.<sup>1</sup>

In contrast, in some sectors, such as textiles, paper, chemicals, and fabricated metals, operating rates are projected to approach or exceed the levels reached in the late 1970s. It is important to note, however, that despite the already-high levels of utilization in textiles and chemicals, price increases by domestic producers in these industries over the past year have been relatively moderate (2 to 3 percent).<sup>2</sup> In both industries, discussions with business representatives suggest that firms have been shedding obsolete

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1. During the past few months, producer prices for some types of steel have increased, reflecting a surge in demand since USX resumed production. Most of the increased demand is attributable to stock building by purchasers of steel. Stocks had fallen to very low levels in anticipation of a price war when the strike against USX was settled. However, the reverse has happened—the surge in demand related to stock rebuilding has allowed steel producers to raise prices. Stocks are expected to be rebuilt this fall; as this occurs, demand probably will recede and prices will moderate.

2. Prices for petroleum-based chemicals rose rapidly earlier this year. But these increases reflected the rise in crude oil costs around the turn of the year, not capacity constraints. Indeed, qualitative reports indicate that despite high utilization rates international competitive pressures are still damping prices for many chemicals.



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excess capacity while engaging in aggressive modernization programs. The resulting productivity gains and enhanced ability to handle specialty orders efficiently no doubt account for at least some of the subdued price performance.

Risks to inflation outlook from high utilization rates.

Although the July Greenbook projection of utilization and inflation does not envision any serious capacity bottlenecks, the possibility of constraints--even if limited to a few industries--is an upside risk to the outlook for inflation over the next two years. The upward price pressures in these industries could spill over directly into the costs of other industries, raising prices in sectors where capacity utilization would not appear to be high. To the extent that the demand for labor in these industries might place some upward pressure on wages, there also would be the potential for some spillover in wage setting.<sup>1</sup>

Another risk is that the projection of capacity utilization is contingent on a substantial slowing in gross domestic purchases over the forecast horizon, which squeezes out domestic demands on the manufacturing sector. All else equal, if there is less slowing in domestic spending than we are projecting, then the shift in foreign and domestic demands toward domestic production brought about by the changing terms of trade will simply add to the existing domestic demands. In this situation, the rise in capacity

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1. Although wage increases for factory workers remain relatively modest, press reports have noted that the BLS measure of the unemployment rate in the manufacturing sector has come down since March, with a particularly large drop in June--to 5.6 percent. However, the sharp decline in this jobless measure is inconsistent with the sluggish growth of factory employment reported in the payroll series. The problem may be the definition of industry unemployment rates: individuals that are identified by the household survey as being unemployed are asked the industry of their most recent job. Thus, for example, an unemployed steel worker that held a temporary job at the local K-Mart for a week or two in May would be reported as unemployed from the retail trade industry in June--not the steel industry.

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utilization would be larger than we are projecting, with corresponding consequences for price inflation. Moreover, a larger proportion of our domestic industries could begin to face more significant capacity pressures. In contrast, a sharper slowdown in domestic purchases or greater weakness abroad would, of course, lead to downside risks for the outlook for industrial output and goods prices.

Finally, the behavior of investment in the industrial sector also will be an important determinant of capacity and price pressures. To the extent that firms are forward-looking and undertake advance investments in capacity to meet the expected increases in demands associated with a turnaround in the traded goods sector, the consequences of the expanding demand will be less severe for prices. The evidence from capital spending is mixed, but on the whole seems to suggest that many firms currently are taking a "wait and see" attitude to the possible improvement in activity that is expected to accompany the decline in the exchange value of the dollar.

Table 1

**INDUSTRIAL PRODUCTION, SELECTED MANUFACTURING INDUSTRIES**  
(Percent change, annual rate)

|                               | 1985       | 1986       | 1987-H1    |
|-------------------------------|------------|------------|------------|
| <b>1. Manufacturing</b>       | <b>2.0</b> | <b>2.3</b> | <b>3.4</b> |
| 2. <i>Durables</i>            | 1.2        | .6         | 2.5        |
| 3. Primary metals             | 3.3        | -8.9       | 8.5        |
| 4. Fabricated metals          | 2.5        | .0         | 1.7        |
| 5. Nonelectrical Machinery    | -1.0       | -2.2       | 6.2        |
| 6. Electrical equipment       | -5.7       | 1.3        | -1.4       |
| 7. Aerospace and misc. trans. | 12.0       | 6.2        | 3.5        |
| 8. <i>Nondurables</i>         | 3.2        | 4.8        | 4.7        |
| 9. Food                       | 2.2        | 2.6        | 2.8        |
| 10. Textiles                  | 10.5       | 8.3        | 8.3        |
| 11. Paper                     | 1.6        | 8.0        | 1.4        |
| 12. Chemicals                 | 3.4        | 4.5        | 7.5        |

Note: Changes are from last quarter of preceding period to last quarter of period indicated.

**GROWTH IN CONSTANT DOLLAR EXPORTS, IMPORTS AND PRODUCTION**  
**SELECTED MANUFACTURING INDUSTRIES**  
(Percent change)

|                                   | Jan-April 1986 to Jan-April 1987 |             | 1987-H1 <sup>1</sup> |
|-----------------------------------|----------------------------------|-------------|----------------------|
|                                   | Exports                          | Imports     | Production           |
| <b>1. Manufacturing</b>           | <b>4.6</b>                       | <b>-4.2</b> | <b>3.4</b>           |
| 2. Primary metals                 | 19.4                             | -22.7       | 8.5                  |
| 3. Fabricated metals              | -.6                              | 1.6         | 1.7                  |
| 4. Nonelectrical machinery        | 0.3                              | -1.6        | 6.2                  |
| 4a. Office and computing machines | 18.5                             | 9.2         | 5.7                  |
| 5. Aerospace and misc. trans      | 11.4                             | n.a.        | 3.5                  |
| 6. Food                           | 4.2                              | 1.4         | 2.8                  |
| 7. Textiles                       | 14.6                             | 1.3         | 8.3                  |
| 8. Paper                          | 5.9                              | 9.1         | 1.4                  |
| 9. Chemicals                      | 7.9                              | -3.3        | 7.5                  |

Note: The current-dollar trade data were deflated by BLS price indexes for exports and imports.

1. Annual rate.

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Table 2

**CAPACITY UTILIZATION, SELECTED MANUFACTURING INDUSTRIES**  
(Percent)

|                               | 1967-86<br>Average | 1973<br>High | 1978-80<br>High | June<br>1987 |
|-------------------------------|--------------------|--------------|-----------------|--------------|
| 1. <b>Manufacturing</b>       | <b>80.6</b>        | <b>87.7</b>  | <b>86.5</b>     | <b>80.1</b>  |
| 2. <i>Durables</i>            | 78.6               | 87.4         | 86.3            | 76.6         |
| 3. Primary metals             | 79.6               | 101.9        | 97.1            | 73.6         |
| 4. Fabricated metals          | 78.0               | 85.0         | 87.4            | 81.5         |
| 5. Nonelectrical Machinery    | 78.1               | 89.0         | 86.0            | 71.4         |
| 6. Electrical equipment       | 78.0               | 85.7         | 89.9            | 70.1         |
| 7. Aerospace and misc. trans. | 77.0               | 77.0         | 87.1            | 89.6         |
| 8. <i>Nondurables</i>         | 83.5               | 88.8         | 87.0            | 85.3         |
| 9. Food                       | 82.2               | 85.8         | 85.1            | 78.1         |
| 10. Textiles                  | 84.9               | 92.1         | 88.3            | 96.2         |
| 11. Paper                     | 88.7               | 95.6         | 92.7            | 95.6         |
| 12. Chemicals                 | 78.7               | 88.6         | 82.9            | 81.8         |
| 13. Rubber and plastics       | 84.7               | 97.5         | 89.4            | 87.9         |

**CONTRIBUTIONS TO GNP GROWTH<sup>1</sup>**  
(Percentage points)

|  | 1986       | 1987                 | 1988       |
|--|------------|----------------------|------------|
|  |            | -----projection----- |            |
| 1. <b>GNP</b>                              | <b>2.0</b> | <b>3.0</b>           | <b>2.3</b> |
| 2. Services                                | .8         | .7                   | .6         |
| 3. Structures                              | -.2        | -.4                  | -.1        |
| 4. Goods                                   | 1.4        | 2.8                  | 1.9        |
| 5. <i>Domestic purchases of goods</i>      | 1.9        | 1.7                  | .6         |
| 6. Consumer goods                          | 1.7        | 0                    | .2         |
| 7. Capital goods                           | .2         | .2                   | .3         |
| 8. Other <sup>2</sup>                      | 0          | 1.5                  | .1         |
| 9. <i>Net exports of goods<sup>3</sup></i> | -.5        | 1.0                  | 1.3        |
| 10. Nonagricultural exports                | .6         | .9                   | 1.2        |
| 11. Non-oil imports                        | -.8        | .0                   | .2         |

1. Components may not add to totals due to rounding.

2. Government purchases of goods and change in business inventories.

3. Includes agricultural exports and oil imports, which are excluded from the sub-components.

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Table 3

**INDUSTRIAL PRODUCTION, SELECTED MANUFACTURING INDUSTRIES**  
(Percent change, annual rate)

|                             | Export<br>Share <sup>1</sup> | 1986 | 1987            | 1988 |
|-----------------------------|------------------------------|------|-----------------|------|
|                             |                              |      | ---projected--- |      |
| 1. Manufacturing            | 100.0                        | 2.3  | 3.6             | 3.5  |
| 2. Durables                 | 67.7                         | .6   | 2.9             | 4.2  |
| 3. Primary metals           | 3.0                          | -8.9 | 6.1             | 5.0  |
| 4. Fabricated metals        | 3.5                          | .0   | 2.4             | 6.0  |
| 5. Nonelec. machinery       | 22.7                         | -2.2 | 7.0             | 8.0  |
| 6. Electrical equipment     | 12.8                         | 1.3  | .3              | 3.0  |
| 7. Aerospace & misc. trans. | 12/9                         | 6.2  | 4.0             | 6.0  |
| 8. Nondurables              | 32.3                         | 4.8  | 4.6             | 2.5  |
| 9. Food                     | 7.0                          | 2.6  | 2.6             | 2.8  |
| 10. Textiles                | 1.0                          | 8.3  | 6.0             | 2.0  |
| 11. Paper                   | 2.8                          | 8.0  | 2.0             | 3.5  |
| 12. Chemicals               | 14.1                         | 4.5  | 6.0             | 5.5  |

1. Exports as a percent of total manufacturing exports; based on data from 1986.

NOTE: Percent changes are calculated from fourth quarter to fourth quarter.

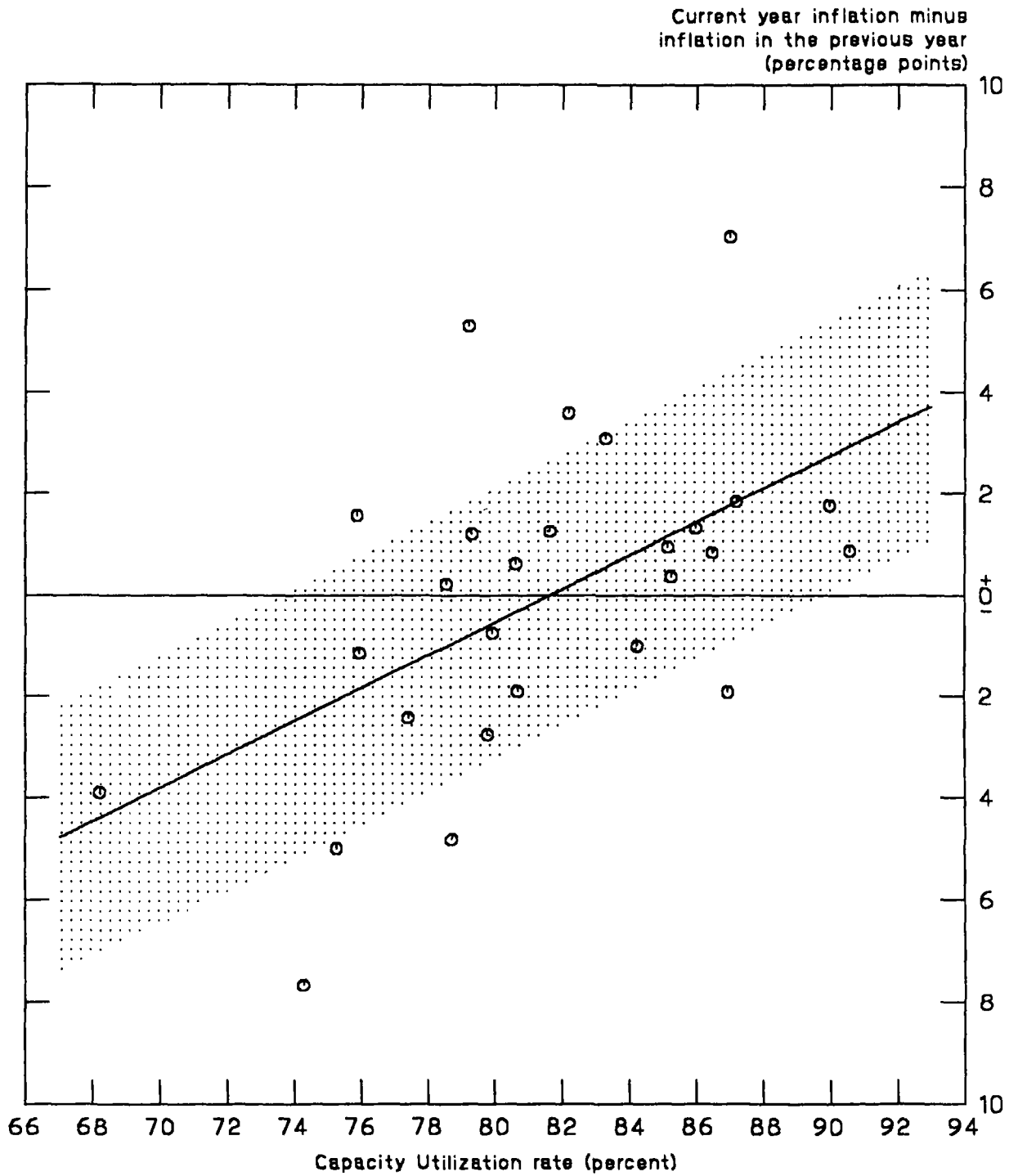
**UTILIZATION RATE, SELECTED MANUFACTURING INDUSTRIES**  
(Percent)

|                             | Average<br>1967-86 | Peak<br>1978-80 | 1986 | 1987            | 1988 |
|-----------------------------|--------------------|-----------------|------|-----------------|------|
|                             |                    |                 |      | ---projected--- |      |
| 1. Manufacturing            | 80.6               | 86.5            | 79.8 | 80.6            | 81.0 |
| 2. Durables                 | 78.6               | 86.3            | 76.5 | 77.0            | 78.0 |
| 3. Primary metals           | 79.6               | 97.1            | 68.7 | 75.4            | 81.2 |
| 4. Fabricated metals        | 78.0               | 87.4            | 80.7 | 82.4            | 86.0 |
| 5. Nonelec. machinery       | 78.1               | 86.0            | 69.9 | 73.0            | 76.2 |
| 6. Electrical equipment     | 78.0               | 89.9            | 71.7 | 69.4            | 69.7 |
| 7. Aerospace & misc. trans. | 77.0               | 87.1            | 89.0 | 90.5            | 93.6 |
| 8. Nondurables              | 83.5               | 87.0            | 84.8 | 85.9            | 85.4 |
| 9. Food                     | 82.2               | 85.1            | 78.2 | 77.8            | 77.8 |
| 10. Textiles                | 84.9               | 88.3            | 94.7 | 96.2            | 95.1 |
| 11. Paper                   | 88.7               | 92.7            | 96.9 | 94.7            | 95.2 |
| 12. Chemicals               | 78.7               | 82.9            | 80.1 | 83.0            | 85.3 |

NOTE: Annual figures are fourth-quarter levels.

# Manufacturing Capacity Utilization and Changes in Producer Price Inflation

1960-1986



The shaded area represents a 70 percent confidence interval around the estimated mean regression line; that is, approximately 70 percent of the sample (1960-86) observations lie within the shaded area.