PRODUCTIVITY

A historic era in the economic and technological progress in our country appears to be coming to an end. We have had many warning signs of this during the past few years. Our productivity advantage has been nullified, and now our per-capita income has been surpassed. Clearly, we are desperately in need of positive action to make our nation fully competitive again in world markets. At least that's what the statistics tell us.

Productivity statistics generally relate goods produced to man-hours of work performed. The usefulness of such statistics is to compare the efficiency of the unit being studied with similar competitive units. The productive unit being compared can be a person, a plant, or an entire industry, such as a particular U.S. industry versus a Japanese industry.

From 1947 to 1977, productivity was on a steadily rising curve. That has been the reason for the vast improvement in the standard of living we have all enjoyed during that period.

Figure 2 contains the same basic data, showing output per dollar of wages paid. Over the same time period, 1947-1977, the output per dollar of wages paid is practically flat. For the latter half of the 1970s it actually shows a slight decline.

This second graph tells us that over the period mentioned, virtually all of the benefits of increased productivity were paid out in wages and salaries. In fact, from 1977 on, personal compensation claimed a substantially greater share of dollars generated than productivity increase could provide.

Let's look at the graph of Figure 1 in an expanded form. Figure 3 appeared in the Wall Street Journal, August 20, 1982. Again, the data are from the U.S. Bureau of Labor Statistics. This graph indicates that since 1977 labor productivity has remained essentially static.

Table I, from the same Wall Street Journal article, shows that during the same period, unit labor costs increased by more than 50%.

Figure 3 showed no productivity increase, but Table I shows 50% higher wages and salaries. One can easily see the impossible consequences of placing 50% more purchasing power in the hands of individuals who are not, on the average, creating any significantly greater quality of goods or services. This is, in my opinion, one of the reasons for the severe inflation of the past five years. The 50% extra apparent value received as wages and salaries had to be destroyed.

As shown in Figure 3, for the last ten years productivity growth in the United States has not done very well; in fact, for the last five years it has been essentially stalled. Giv-
en that circumstance, we cannot expect that our standard of living in this country should have improved in the interval, nor that it will miraculously get back into a rising mode without some kind of positive stimulus.

It seems very unlikely that the average citizen appreciates this. He is conditioned to rising expectations, and will be very restless when they are not realized. What he does not know is that most of our leading economists cannot prescribe a policy for accelerating productivity growth nor can they clearly define the reason for its decline. It's not so much that certain specific reasons can't be cited within narrow confines, but rather that the overall national problem is so complex as to almost defy analysis.

I will not go into that here, but an excellent discussion of the many facets of this situation is given by Feldstein and reviewed by Salant in the Journal of Economic Literature. I strongly recommend this as reading for anyone involved with long-range economic planning.

In some of its elements, the nonferrous metals industry shows the same symptoms of declining productivity as the overall national economy. I should point out that declining productivity is not characteristic of all industries, and especially it is not true of all unit operations within an industry. Figure 4 shows how a set of selected industries have done in the interval from 1967 to 1979.

The productivity of primary aluminum, and steel production, hasn't gone up much in 12 years, while the productivity of copper mining and primary lead and zinc increased by almost 50%. Aluminum fabrication was also outstanding, but copper fabrication was slow to improve.

I added malt beverages and telecommunications to this chart to show that some industries do have very outstanding records.

Figure 5 shows additional statistics for the copper industry, one of the curves representing ore mined and one representing metal recovered.

You will note that whereas mine productivity has significantly increased, there has been almost no increase in ten years in the output of recoverable metal. This is due to the effect of declining ore grades.

Figure 6 shows copper mine/mill/office statistics (unfortunately, these are lumped together and smelter/refinery statistics (also lumped together).

Productivity in the mill, smelter, and refinery is obviously lagging behind mine productivity, which went up 50%, as shown in Figure 6.

I suspect this is because mills, smelters, and refineries represent massive capital assets which are not so easily upgraded as mine drills, machines, and trucks which wear out and must be replaced much more frequently. Also, there is no doubt that a part of the lag is due to increased environmental regulation and the need for additional personnel to respond to this regulation.

Figure 7 shows productivity trends for the aluminum industry. Productivity in primary aluminum reduction has changed very little in ten years. Again, I believe this is a consequence of the large capital investment in a process and facilities not readily adaptable to change.

For aluminum fabrication, however, productivity has shown a remarkable increase. What may have started all this was explained several years ago by one aluminum mill products executive, who said, "It was a shock to discover that, although output per man-hour in our plants had increased 20% from 1953 to 1965, the increase for the industry was about 60%. Believe me, that stimulated real action on our part." The data are from private sources.

Figure 8 shows some averaged data on the productivity of two separate underground nonferrous mining operations.

The best that can be said of these data is that while productivity has declined, it has not been a drastic drop. It is more favorable than underground coal mining, but less favorable than open-pit copper mining, as shown in Figure 5.

Figure 9 is a sidelight on one unit operation of mining. This shows the potential for increased productivity with newly introduced drilling equipment, in terms of volume of solid rock excavated per drilling man-shift for percussion drilling in hard rock. These data were compiled by a drilling equipment manufacturer (Atlas Copco).

I have not been able to come up with any meaningful statistics on the change in milling productivity with time. I think it's fair to say that, like primary aluminum reduction, it does not change markedly, because milling operations are locked into huge capital investments in machinery that cannot be readily changed.

Table I: Annual Increase in Unit Labor Costs
(1976 = 100)

<table>
<thead>
<tr>
<th>Year</th>
<th>% Increase</th>
<th>Labor Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>5.1</td>
<td>105.1</td>
</tr>
<tr>
<td>1977</td>
<td>8.0</td>
<td>113.5</td>
</tr>
<tr>
<td>1978</td>
<td>10.7</td>
<td>125.6</td>
</tr>
<tr>
<td>1979</td>
<td>11.2</td>
<td>139.7</td>
</tr>
<tr>
<td>1980</td>
<td>7.7</td>
<td>150.5</td>
</tr>
<tr>
<td>1981 Est.</td>
<td>4.1</td>
<td>156.7</td>
</tr>
</tbody>
</table>

Figure 3. Output per hour, all persons, private business sector (1977 = 100).

Figure 4. Growth in output per employee hour in selected industries, 1969-1979 (1967 = 100).

Figure 5. Productivity in copper-ore mining, 1951-1980.