

is normally a *secondary* output. Those establishments primarily producing military aircraft and missiles are included in the transportation equipment industry group, and those primarily producing other military equipment are classified in the ordnance industry, which is included in our fabricated metal products industry group. Because the establishments producing the remainder of military output are classified according to the primary, nonmilitary part of their output, exact data on the location of the remainder are not available. It is clear, however, that a large part of the expansion in military output between 1950 and 1953 was in establishments normally producing civilian goods. For example, there were automobile firms producing tanks, textile machinery plants turning out machineguns, and radio receiver establishments manufacturing signal equipment. It appears that the increases in military output after 1950, both in establishments specializing in military goods and in those normally producing primarily other goods, show up in our statistics mostly as increased output in the fabricated metal products, nonelectrical machinery, electrical machinery, and transportation equipment industries. Later, though again exact data are not available, the cutback in military production after 1953 appears to have been concentrated in items of equipment other than aircraft and missiles. As a consequence it is reflected in a reduction of "secondary" output in establishments normally producing civilian goods. Precisely because these products were secondary, it is difficult to trace, industry by industry, the specific impact of changes in the defense program. We do know, however, that the four industries most directly affected were those named above—fabricated metal products, nonelectrical machinery, electrical machinery, and transportation equipment, which includes automobiles.

Despite the substantial investment boom of 1955, 1956, and 1957, the total output of the nonelectrical machinery industry during those 3 years averaged less than it did in 1953—on an annual basis only in the single year 1956 did it exceed the 1953 level. This does not mean, however, that the output of machinery did not increase during this period.⁶ Rather the rise in machinery output was offset by a decline in the output of military equipment produced by the machinery industries. Similarly the fabricated metal products industry group reached an output peak in 1953 which it did not reach again at any time during the 1955–58 period. The decline in output of the ordnance industry proper—which is included in this industry group—and the military output produced as a secondary product by other establishments in this industry group accounts for the failure of total output to reach the 1953 peak.

There is a third statistical characteristic of the data which must be taken into account in interpreting the relative rates of output growth among different industries. This is the bias introduced into the measurement of output by changes in the quality of products. The basic output measures were derived by deflating data on the value of shipments to remove the effects of price changes. Often, however, even the best price indexes cannot make sufficient allowances for quality change. What appears as a price change may really be an increase in cost reflecting improved quality. In general, the greater

⁶ Indeed there was substantial excess demand for machinery and equipment during the period. See Thomas A. Wilson, "An Analysis of the Inflation in Machinery Prices," Study Paper No. 3, Joint Economic Committee, Nov. 6, 1959.