

where P_t = quarterly average of Federal Reserve Board Index of Production in period t , and O_t = quarterly obligations in period t (2, p. 144). The second and third quarters preceding that for which output is to be explained were considered significant, so that a lag of nearly a year between obligations and output existed. Further experiments on longer lags were not very satisfactory.

The Ando-Brown paper thus presents important evidence on two of the effects which might be considered important for the discussion of the government spending process and the nature of the defense industries. It is concluded that lagged obligations explain output better than do expenditures, but that recent expenditures have some effect on output, pointing to the possible importance of the industry's dependence on the government for working capital. Their conclusions are summarized in the following statement:

Even variations in rates of procurement of defense items take a considerable period before they register themselves in output. Output appears to be more sensitive to contract awards than to actual expenditure in the aircraft component of defense expenditure, the only one we examined. Aircraft contracts, for example, change output by only 20 percent of the contract by the end of 6 months, 55 percent by the end of three quarters, and are nearly fully reflected in output change by the end of a year. This particular case, however, can be attributed to excess capacity in the industry. New products could be initiated only after lengthy periods of research and would be expected to have lags of considerably greater length [2, p. 11].

The main differences between Ando-Brown and the statistical results to be reported upon in the following section are the following:

(1) The absence of variables representing "announcement" effects in the Ando-Brown paper. These may significantly affect the timing of changes in output and employment.

(2) The use of output rather than employment as the dependent variable. Since the Federal Reserve Board reports [3, p. S-9] that the monthly output series for the aircraft industry is based on man-hours, with an adjustment for output per man-hour in the case of aircraft parts, this particular difference is probably not crucial. I prefer to work with the employment data directly, leaving the polynomial trend to capture changes in output per man-hour, because neither the source nor the quality of the Federal Reserve Board's adjustment is known to me.

(3) The correspondence between Department of Defense budget categories and SIC categories. Ando and Brown relate budget aircraft to SIC aircraft, while the present study, because of the fact that much of the country's missile production takes place in establishments classified as aircraft, attempts to adjust for this.

(4) Ando and Brown work with the period 1954-1959, while the present study incorporates 1955-1963.

G. SUMMARY

The preceding discussion of several large-scale models of the U.S. economy indicated that, by and large, these models do not appear to have portrayed the government sector accurately with respect to purchases of military goods. In general, the equations developed to explain inventories, orders, and unfilled orders are better suited for industries in which sales are made from inventories, and the adjustment mechanism operates through attempts to control inventories.