An F test is used to deal with the question of whether the dummy variables significantly affect the rate of technical change. While the dummies based on increases in professional personnel do not lead to significant values of F even at the 50% level, those based on the expansion of total research personnel result in test values which are significant at the 75% level when Y_1 is used to measure technical change. In addition, the estimated regression coefficients founded on the latter set of dummies take the expected sign and relative order of magnitude.[28]

These findings point out that any inefficiencies resulting from rapid expansion of research facilities are more likely to be associated with increases in the total size of the establishment rather than particularly related to increased hiring of professional personnel. It should be emphasized, however, that empirical support for this hypothesis exists only if we are willing to accept statistical findings as the 75% level of significance. As a result, this conclusion is highly tentative.

CONCLUDING STATEMENTS

In this paper, we have investigated the relationship between research and development and the rate of new product technical change in the pharmaceutical industry. From the empirical evidence, there appears to be a fairly sustained association between research input and new product output. Within this industry, research expenditures are not undertaken merely with the hope of some distant but unknown returns, but rather with the expectation that profitable gains will accrue within a reasonable period of time.

Our analysis also provides some evidence that in the pharmaceutical industry, there are substantial diseconomies of scale in R and D which are associated with large firm size; and that these disadvantages are encountered even by moderately sized firms. One implication of this finding is that an actively enforced pro-competitive policy in this sector is not likely to dampen the rate of technical change and may well stimulate it. While little is known about the extent to which this result is applicable to the economy at large, it does appear that there are grounds for considerable doubt as to the position that large firm size is always a necessary condition for rapid technical advance.

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THE DRUG INDUSTRY AND MEDICAL RESEARCH

THE ECONOMICS OF THE KEFAUVER COMMITTEE INVESTIGATIONS*

(By William S. Comanor†)

In the course of recent American politics, few confrontations have been more lively and more prolonged than that which was waged between the pharmaceutical industry and the Senate Subcommittee on Antitrust and Monopoly (The Kefauver Committee).[1] In December, 1959, the committee opened hearings on the

[28] The dummy variables denoting "no growth" and "moderate growth" are introduced into equations (1) and (2) of table 1. When the dummies describe the rate of expansion in total research personnel, the estimated coefficients and standard errors are, for equation (1): 0.371, 0.220 and 0.209, 0.184, and for equation (2): 0.399, 0.336 and 0.159, 0.297. The coefficient of the "no growth" dummy in equation (1) is statistically significant at the 95% level. Furthermore, the intercept, which encompasses the effect of the third classification, is reduced from 0.422 to 0.199 by the introduction of the dummies into equation (1).

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[1] The pharmaceutical industry in the Congressional proceedings, and therefore in this paper, is limited to firms that produce ethical drugs, as opposed to proprietaries, and that distribute these products in dosage form. Pharmaceuticals, thus, are marketed and sold through the medical profession and require, for the most part, a written medical prescription.