

marily from the inclusion in the sample of consumer goods industries characterized by product differentiation.⁶

Turning first to consumer goods, the separation of the food products group into its separate 4-digit SIC industries enables us to expand the number of consumer goods observations from 15 to 20. Using data supplied by Arthur D. Little, two regression equations were computed expressing the relationship between intra-industry profit variance (X) and industry average profit rate (Y). The first regression was computed using the sample of 15 consumer goods industries included among the industries analyzed by Conrad and Plotkin.⁷ The resulting regression equation is:

$$\text{Equation I} \quad Y = 9.3 + 0.038X$$

with explained variance $R^2 = 0.26$.⁸

A second regression equation was computed based on a sample of 20 industries. The increased number resulted from replacing the food products group by the six food products industries having at least five sample companies.⁹ The regression equation using the adjusted sample is:

$$\text{Equation II} \quad Y = 8.9 + 0.042X$$

with explained variance $R^2 = 0.30$.

Increasing the size of the consumer goods sample raises from 26 to 30 percent the variation among industry average profit rates associated with the variance of intra-industry profits. In addition, the expansion of sample size increases the slope of the regression line from 0.038 to 0.042, indicating a greater response of industry profit rates to changes in intra-industry profit variance.¹⁰ These results substantiate our earlier finding that in the consumer goods sector a strong relationship between intra-industry profit variance and industry average profit rates does in fact exist.

Turning now to the producer goods and mining sectors, the separation of the machinery group into its 4-digit SIC industries enables us to expand the size of the producer goods and mining sample in the same way as we did for consumer goods. Using the Arthur D. Little data two regression equations were computed—the first using essentially the same producer goods and mining industries as were included in the Conrad-Plotkin sample, and the second using an expanded sample adjusted by ungrouping the machinery industries and replacing the single machinery group observation by the seven machinery industry observations containing at least five sample companies.¹¹

⁶ The process of expanding the number of observations increases the reliability of a statistical relationship. That is, all other things equal, a larger sample size reduces the probability that the relationship could have been due to chance. If, in addition, the increase in the size of the sample also increases the strength of the relationship between profit variance and average profit rate, one can even be more confident that such a relationship exists. If the relationship is weakened when the sample size is increased, the likelihood that such a relationship actually exists may be more suspect.

⁷ Observations are listed in Appendix Table 1A.

⁸ Intra-industry variance data used in this equation were computed on an unweighted basis. Data were not submitted by Arthur D. Little, Inc., to permit computing the additional values of the variables for Equation II on the weighted basis used by Conrad and Plotkin for *Risk and Return in American Industry*. The use of weighted variables by Conrad and Plotkin results in a higher R^2 for consumer goods than the ones shown in Equation I. (See Figure 5A of my January 18, 1968, statement before this Subcommittee.) There is no reason to believe that the use of weighted observations should reverse any of the relationships between Equation I and Equation II discussed below.

⁹ Observations are listed in Appendix Table 1B.

¹⁰ The statistical reliability of these relationships was increased because of both the higher correlation coefficient and the enlarged size of the sample. By adding the additional industry observation the statistical probability that the relationship could have occurred by chance was reduced from 2.5 percent to about .5 percent.

¹¹ See Appendix Tables 2A and 2B. Arthur D. Little did not furnish the underlying data on gold mining, lead and zinc, miscellaneous metals, or forest products. Hence, these observations were excluded from the two samples.