The curve (TCC) is, over most of the output range, a positively sloping straight line whose intercept on the cost axis represents the total fixed cost. At some high level of operation it is assumed that the total combined cost curve ceases to be linear and bends upward. Marginal and average variable cost coincide until the level of output that utilizes all segments is attained; at this output, the two curves diverge. The average combined cost curve lies above the marginal cost curve over the low ranges of output and is eventually intersected by the marginal cost curve at its minimum point.

Two alternative models of short-run cost functions have been considered: in one the total cost curve is a cubic curve; in the other the curve is linear until some extreme level of output is reached. The statistical analysis of cost data that follows is designed to indicate which type of theoretically postulated behavior is consistent with the cost behavior of the plant studied during the period of observation. Before discussing our methods and findings, we examine certain sources of divergence between these theoretical cost functions and their empirical counterparts.

2 Sources of Divergence of Empirical from Theoretical Static Cost Functions

In attempting to determine empirical cost functions that are the strict counterparts of those specified in the static theory of cost, several difficulties were encountered. First, it was not possible to include all costs in combined cost. The difficulty of allocating the cost attributable to jointly produced articles necessitated the omission of certain elements. Furthermore, the cost accounting information available may not be sufficiently accurate to represent faithfully the costs actually incurred. Second, the idealized conditions of production visualized in theory will not be fulfilled in any concrete situation. Not only is it sometimes impossible, for technical reasons, to make the continuous adjustment of the variable factors hypothesized, but also managerial inertia or other rigidities may be sufficient to hinder adjustment to changed conditions. It is perhaps to be expected that theoretical curves intended to be generally descriptive in a qualitative sense of all cost functions will neglect, for the sake of simplicity, the rigidities that may be peculiar to given industries or firms. Rigidities, however small, will be a continuous source of divergence whose influence cannot, practicably, be removed by statistical methods. This divergence is accentuated by the degree of the entrepreneur's knowledge concerning market and technical conditions and his ability or willingness to adjust operations in order to attain for any output the minimum cost combination of factors, the basic assumption on which the theoretical model is drawn up. Nevertheless, an empirical

function derived from data for one particular enterprise necessarily reflects the prevailing conditions of production in it, since these conditions represent a selection from among numerous possible forms of organization. Whether the influence of rigidities is sufficiently great to cause the shape of the empirical functions to differ essentially from the theoretical functions can be ascertained only after continued research in the field. Third, a set of problems arises from the attempt to approximate the static conditions assumed in theory. Any firm selected for study operates in a changing environment to which it continually adjusts. Most important are the variations in the prices of factors of production, which, unlike the influence of rigidities, can be removed from the cost data by a process of 'deflation'.

In general, the divergence between the production process analyzed and the theoretical situation assumed to exist can be minimized by three methods: (1) careful selection of a sample, with due regard to both the firm and the time period chosen, in order to reduce the influence of dynamic elements; (2) rectification of the data to remove directly the influence of disturbing factors that could be measured adequately; (3) multiple correlation analysis of the relation between cost and other variables whose influence was not directly measurable, in order to examine and remove their effects.

The application of these three methods is discussed in Sections 3, 4, and 5. The statistical findings are presented in Section 6 and their validity appraised in Section 7. The concluding section attempts to interpret and qualify the findings, reconciling them with the results prescribed by the static theory of cost behavior.

3 Collection of Data

It is much easier to isolate the relation between cost and output if the observations in the statistical sample are as free as possible from the influence of other variables affecting cost. We were fortunate, in this regard, to secure the active cooperation of a leather transmission belting manufacturer, one of whose plants met our sampling requirements admirably. In addition, the nature of the accounting data of the firm facilitated statistical analysis, since costs were kept in considerable detail as totals of expense for four-week accounting periods. Complete records of output measured in several different ways were available, as well as supplementary information concerning operating conditions affecting costs. All these records were comparable for several years.

The assumption, discussed above, under which short-run cost curves are drawn is that changes in the rate at which the plant is utilized are not accompanied by changes in the scale of the plant, in the technical methods of production, or in prices of input factors sufficiently great to induce