Aggregation of putty-clay production functions. A methodological study of the distribution approach, applied to the Japanese cotton spinning industry
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Document Version
Publisher's PDF, also known as Version of record

Publication date:
1979

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):

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VI CONCLUDING REMARKS

6.1 SUMMARY

The aim of this study, formulated in chapter I, has been to reach a better understanding of the concept of an aggregate production function, by answering the following three questions: can such a function be said to exist; can its form be invariant over time; what influence does technical progress, as a function of time alone, represent on the aggregate production function? We concluded that these questions can be interpreted as demands for greater empirical content of a theory postulating an aggregate production function. Therefore the aim of our study can be seen as an effort to increase the empirical content of such a theory. This is rational from our methodological point of view, provided that we also try to corroborate some of the resulting excess empirical content. We seek to answer the questions posed above, and hence to increase the empirical content, by relating the aggregate production function to the production functions of the individual production units, on the one hand, and to the composition of these units, on the other.

We sketched in chapter II the historical development of the aggregation of production functions which followed the work of Solow and Fishcer. We concluded that this development is theoretically progressive, that is, it leads to theories with an empirical content in excess of that of theories directly postulating an aggregate production function. Therefore we have elaborated this development in the course of our study, particularly as it applies to the distribution approach, which leads to theories having the greatest empirical content of all. As follows from our methodological point of view, this approach also makes a serious attempt to corroborate some of the results of the study.

We illustrated that understanding of the concept of an aggregate production function, by answering the questions put in chapter I. The distribution approach, if an unique capacity distribution exists, also forms (part of) the aggregate production function, this approach has excess empirical content. This theory can be increased further, provided the excess empirical content is in the form of restrictions on the ex ante behavior of the entrepreneur. This restriction is a distribution of the capacity among the units. We also tried to increase the empirical content of this approach further into this, we on distribution approach.

Since we intended to increase this approach to a more empirical content, we tried to increase the empirical content of the approach. In chapter V, using the spinning process in chapter III, we tried to increase the empirical content of the approach. We used the spinning process in chapter III, we tried to increase the empirical content of the approach.
the greatest empirical content. However, empirically the development still is in its infancy: few efforts have been made to corroborate the excess empirical content. As follows from our methodological point of view, we do also make a serious attempt to accomplish this.

The distribution approach was elaborated in chapter III. We illustrated that this approach leads to a better understanding of the concept of an aggregate production function, by answering for a specific function the questions put in chapter I. Moreover, since according to the distribution approach, for each production function a unique capacity distribution is implied whose parameters also form (part of) the parameters of the production function, this approach leads to a theory which has excess empirical content. The empirical content of such a theory can be increased even more by postulating more restrictions on the ex ante functions and on the behaviour of the entrepreneurs, such that a unique efficiency distribution is also implied. However, rather than going further into this, we chose to concentrate on trying to corroborate some of the excess empirical content.

Since we intended to use data on cotton spinning in this corroborating effort, we gave a description of the spinning process in chapter IV. In doing so, we discussed some of the technological characteristics which should be taken into account in the specification of a production function for the spinning process, a particular case being the yarn count. We also demonstrated how the ex ante function for the fine spinning phase can be derived and how it is related to the underlying technology.

In chapter V, using data on the Japanese cotton spinning industry, we tried to corroborate some of the excess empirical content of a theory that postulates the distribution approach. We used data both on individual mills,
which we identified with production units, and on the in-
dustry as a whole. When using these data one should take
into account, besides the characteristics of the process
itself (mentioned in chapter IV), certain peculiarities
of the Japanese situation, in particular the (temporary)
sealing of spindles by government regulation. We introdu-
ced a capacity distribution which has a bell-shaped form
and fits the data on individual spinning mills. Taking
into account the peculiarities of the Japanese situation,
we then derived an aggregate production function whose
form is invariant over time. The excess empirical content
of the theory postulating the distribution approach -
excess compared to that of a theory directly postulating
the aggregate production function - lies in the require-
ment that the values of the parameters found by fitting
the aggregate production function to the industry data be
equal to the values of the parameters calculated from the
data on individual mills. We found that this excess em-
pirical content can be corroborated for a particular spec-
cification of the production function, with bounded sub-
stitutability caused by the necessity to maintain the
idle part of the capital stock and with the coefficients
being exponential functions of time. The remaining ques-
tion then is how to evaluate this in the light of our
study's proposed aim.

6.2 EVALUATION

In trying to understand better the concept of an aggre-
gate production function we used the distribution ap-
proach to derive in the previous chapter the aggregate
production function (5.24) for the Japanese cotton spin-
ning industry. We have shown that the theory postulating
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answer the questions put in this chapter now.

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