

LITERATURE

- AZARIADIS, C. (1981): Implicit Contracts and Related Topics: A Survey, in: Hornstein Z. et al. (eds.), *The Economics of the Labour Market*, London, pp. 219-257.
- ETTER, Ch. (1985): Löhne und Beschäftigung im Konjunkturverlauf, *Der Einfluss impliziter Arbeitsverträge in fünfzehn schweizerischen Wirtschaftszweigen 1950-1982*, Bern/Stuttgart.
- FAHRMEIR, L., HAMERLE, A. (Hrsg.) (1984): *Multivariate statistische Verfahren*, Berlin/New York.
- FAY, J.A., MEDOFF, J.L. (1985): Labor and Output Over the Business Cycle: Some Direct Evidence, in: *American Economic Review*, Vol. 75, pp. 638-655.
- LAMMI, P. (1985): The Behaviour of the Firms Regarding the Number of Labour, Paper presented to the 17th CIRET-Conference, Vienna.
- OI, W.Y. (1962): Labour as a Quasi-Fixed Factor, *Journal of Political Economy*, Vol. 70, pp. 538-554.
- RIESER, I. (1980): Determinanten der betrieblichen Arbeitskräftenachfrage, *Die Unternehmung*, 34, Jg., No. 2 (Juni), pp. 133-158.
- ROST, J., SOENWICHSEN, H. (1982): Die Analyse latenter Klassen - Eine Programmbeschreibung, Institut für Pädagogik der Naturwissenschaften an der Universität Kiel, IPN-Kurzberichte 25, Kiel.
- SCHEPERS, W. (1985): Zum kurzfristigen Zusammenhang zwischen Nachfrage und Beschäftigung. Ein Beitrag zur Theorie der kurzfristigen Beschäftigungsentscheidung, Berlin.
- SHELDON, G. (1986): Beschäftigungswirkung der Regelung der Kurzarbeitsentschädigung, in: Scheibert H. et al. (Hrsg.): *Mikroökonomik des Arbeitsmarktes. Theorien, Methoden und empirische Ergebnisse für die Schweiz*, Bern/Stuttgart, S. 99-154.
- SPOERNDLI, E. (1985): Construction of Business Cycle Indicators from Qualitative Survey Data by Means of Multivariate Methods, Paper presented to the 17th CIRET-Conference, Vienna.

**Business Responses to Increasing  
Uncertainty: Survey Results Confronted  
with Theoretical Models**

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they can make use of buffer stocks and backlog demand, prices adjust to close disequilibria information can be gathered, insurers are feasible etc. The influence of uncertainty on production and profits is usually smaller under petty uncertainty and firms therefore try to move into this second world.

In part 4 we present a survey among firms as to their assessment what factors in the business conditions really did change, whether the present situation can be labelled as one of increased uncertainty (and if, then uncertainty about which variable). In chapter 5 we present results on the strategic reaction of the firms to the new conditions and we are able to make some comparisons with a survey among European, Japanese and US-managers conducted by Booz, Allen & Hamilton.

Flexibilisation and smaller units are means proposed by the theoretical models to reduce uncertainty and to increase profits. Chapter 6 tries to find out whether really smaller units are more profitable today and what flexibility really means for firms. In chapter 7 some results of this very preliminary research are presented.

## 1. Introduction and overview

The present paper continues a research program on the effect of uncertainty on economic behavior. The implications of theoretical models about the questions how decisions of firms are different in the world of certainty and uncertainty respectively have been reported in past CIRREP conferences and were recently been summarized in a book (Aldinger 1987). A very brief overview on some results are given in chapter 2, but in general we have to refer the interested reader to the book or to previous CIRREP papers.

The main problem with the work presented so far is that in general they assume the same model in the cases of certainty and uncertainty, mainly to allow the exact comparison of the results. But often firms fail - and economists labelled as Keynesians did never fail to maintain this point - that uncertainty cannot adequately be described by just substituting one certain parameter by a distribution function - since "true uncertainty" is effectively "changing the rules".

If however cost curves and market power and products change, extra cost components like information costs occur, if demand is differentiated and production globalized, then it becomes difficult to describe these changes in single models. We present in chapter 3 a new dichotomization of uncertainty into "petty" versus "severe" uncertainty. Under severe uncertainty there are no strategies by which firms can react after the veil of uncertainty has lifted, disequilibria will result, uncertainty has large consequences on production and usually reduces profits. Under petty uncertainty firms can apply ex post strategies, they are flexible to correct preliminary decisions

2. Micro models on the impact of uncertainty on optimal production, investment and inventory

Microeconomic theory on the optimal behavior of firms under uncertainty offers a large variety of models, according to the variables about which uncertainty exists, to the decision variables, etc. Models usually apply Von Neumann-Morgenstern Utility-maximization and uncertainty is introduced by replacing a certain variable  $X_0$  by a uncertain variable  $X$ , about which a probability distribution,  $f(X)$  is (assumed to be) known.

Aiginger (1987) has summarized the models and developed four propositions under which unambiguous results are available as to the influence of uncertainty on production. The utility  $U$  depends on the variable  $Z$  (which could be understood as profits).  $Z$  itself depends on two variables  $X$  and  $Y$  (which usually are price and output).  $X$  is known under uncertainty (as  $X_0$ ), in case of uncertainty a probability function about this variable -  $f(X)$  - is known.  $Y^*$  is the optimal value of the decision variable resulting from the maximization in equation (1),  $\hat{Y}$  is the optimal value of the decision variable in the corresponding uncertainty model (2)

- (1)  $\text{Max } U [Z(X_0, Y)] \rightarrow Y^*$  (certainty maximum)
- (2)  $\text{Max } E U [Z(X, Y)] \rightarrow \hat{Y}$  (uncertainty maximum)

Proposition 1: Linear technology ( $\partial^2_{XX} = 0$ ) plus  $\partial^2_{XY} / \partial X > 0$  yields the following sufficient condition

$$(3) U_{ZZ} \leq 0 \rightarrow \hat{Y} \leq Y^*$$

Proposition 1 tells us that risk aversion may be a sufficient reason for a negative influence of uncertainty on the decision variable, however the simple

relation "risk aversion/neutrality/loving implies lower/equal/higher output" is correct only under two very restrictive assumptions. The first is, that under certainty the optimum value of the decision variable,  $Y^*$ , depends positively on the value of  $X$ . The second assumption is, that profits are linear in the decision variable.

Proposition 2: A linear utility function ( $U_{ZZ} = 0$ ) and technological concavity, neutrality, convexity ( $\partial^2_{YXX} < 0$ ,  $\partial^2_{YXY} = 0$ ,  $\partial^2_{YXX} > 0$ ) yield the following sufficient condition

$$(4) \partial^2_{YXX} \leq 0 \rightarrow \hat{Y} \leq Y^*$$

This proposition leaves aside risk aversion or loving, the effect of uncertainty now depends on technological conditions, like the cost and demand curve. Up to now the models have assumed market clearing. Some variable adjusted ex post in a way to equal supply and demand.

Proposition 3: Given a certainty model, and an uncertainty disequilibrium model in which potential unsatisfied demand as well as unsold production occurs, then uncertainty adds an additional marginal cost component. This yields for this type of model the unambiguous result that production is smaller under uncertainty (for a price equal in both situations)

$$(5) \hat{Y} < Y^*$$

This proposition yields support for the above mentioned presumption of macroeconomists, that uncertainty will reduce output.

A fourth channel for changing optimal production is given if it is possible to make a preliminary decision about the decision variable and then, after the veil of uncertainty is lifted, to revise this decision at some cost. It is easy to show that if the cost of revising the decision upwards is larger than that of downward revision, the optimal preliminary production will rise, in the other case it will fall. Downward irreversibility of gross investment is one related form of asymmetry.

Proposition 4: Suppose it is possible to make a preliminary decision  $y$  and revise this upward (downward) at cost  $c_1$  ( $c_2$ ) then

$$(6) \quad c_1 \geq c_2 \quad \text{tends to imply} \quad \downarrow \geq y^*$$

3. A dichotomization into "petty" versus "severe uncertainty"

In general the propositions of chapter 2 offer a variety of channels through which uncertainty can influence optimal decisions, and it can be shown empirically (Algringer 1987) that conditions in real industrial world seem to favour models in which uncertainty decreases industrial production.

What remains unsatisfactory about the models presented in chapter 2 is that, firms under uncertainty works under exactly the same expectational conditions as under certainty (which the sole exception that one variable now is uncertain). Keynes, Keynesian economists and especially Post Keynesians, however never failed to stress that uncertainty changes the rules, especially that

- economic uncertainty has to be characterized as singular or at least unreplicative constellations
- uncertainty is a situation in which agents cannot assess probabilities to the outcomes
- sometimes economic agents do not even know all relevant alternatives.

Instead of dismissing the feasibility of modelling "true uncertainty" by mathematical models we think it is possible to incorporate the very importance of uncertainty by making the appropriate assumptions. We propose a new tentative dichotomization for situations (types) of uncertainty. On the one side there is a type of uncertainty where uncertainty is some sort of an "intermediate" problem. That means a decision about one part of the variables has to be made before the veil of uncertainty is lifted, some other variable(s) adjust thereafter. This type include models

- where there is an ex post control, which adjust automatically (market price, output given by the demand curve)

- where there is an optimization process feasible for some variable after the realization of the random variable is known (short run profit maximization for the variable factor).

Related economic consequences (to that of ex post control) are given if a decision does not have an one shot character but is of a repeated nature, especially if the realizations of the random variable are not correlated over time or if there exist insurances and/or future markets and there are no irreversibilities. If some or all of these ex post strategies are feasible there will be no disequilibria between supply and demand at least not for some meaningful period. Since this type of uncertainty is relatively easy to cope with we will label it "petty uncertainty". The optimal decision parameters are different nevertheless from those under certainty, however probably not "too far". For example for models following the type of operationalization 2, the third cross derivative of the objective function decides. We can conjecture that for firms with approximately linear costs the effect of uncertainty in such models will be a minor one.

On the other hand there is a type of uncertainty where there is a lack of ex post adjustments in some very broad sense. This lack of ex post adjustment starts with a lack of a formal ex post control in the model or with price stickiness, thereby generating disequilibria. The possibility of a final negative event like bankruptcy or dismissal is another one. Irreversibility of investment or the fixeness of a production technology chosen are further constraints. One single decision is crucially important, so that later decisions in the next periods cannot change the fortune, something even the risk cannot be insured. If some or all of these characteristics hold the economy will experience a lot of disequilibria between supply and demand and between factors employed and factors warranted. Firms will regard this type of uncertainty as especially unfavourable, since they do not have

many chances to react to the realization of the random variable. We will therefore label it as "severe" uncertainty. The optimal decision will differ from certainty much more than for petty uncertainty, since a cost component is added in the uncertainty model (marginal cost of uncertainty, f.e. probability of excess demand or supply, information costs, bankruptcy feasibility) which does not exist under certainty. Under "severe uncertainty" it seems very probable that optimal production is less than under certainty, according to arguments following proposition 2 (marginal costs of uncertainty) and 4 (less downward than upward flexibility). In general severe uncertainty generates a pressure to change the model to a larger extent than just to substitute a known value by a probability function. We would like to add information costs, goodwill and holding costs, probability of bankruptcy, cost of changing the technology etc.

Some examples where uncertainty is mitigated by some ex post control or by rapid price changes on the one side and where it has its full impact are the following:

- In the competitive model with price uncertainty (where ex post prices clear the market), decisions under uncertainty and certainty are identical (for risk neutral firms). In the competitive model under demand uncertainty (with disequilibria) firms produce less under uncertainty.

- In the monopoly model with market clearing there is little room for different behaviour under certainty and uncertainty. The outcome depends on the "technological concavity", where the third cross derivative of revenue and cost functions (about which we do not know much empirically) decides. In the monopoly disequilibrium model under nearly all circumstances the decisions will be different between certainty and uncertainty (due to a component labelled marginal costs of uncertainty which represents the expected cost of unsold production or unsatisfied demand).

- In models in which disequilibria (stocks or backlogged demand) can be transferred into the next period, decisions are more similar to certainty than in those where they are "lost". This stems from the fact that part of the "marginal costs of uncertainty" can be recovered in the dynamic context (goods can be sold, demand satisfied).

- In models where one factor is to be chosen ex ante, the other ex post, uncertainty tends to lower capital input (Nickell, 1978), in models where the ex post adjustment is limited (Kon, 1983) a tendency to provide less capital is seen.

- If a preliminary production decision can be partly revised in the light of new information, if investment goods can be sold in a second hand market, the outcomes are more similar than with inflexibility and irreversibility of investment decisions.

Table 1

Our distinction between "petty" and "severe uncertainty" resembles that between uncertainty and risk or between Expect Utility Maximization and Keynesian uncertainty. However we think it is necessary and feasible to use the formal structure of Von Neumann-Morgenstern to derive results for situations like risk or Keynesian uncertainty at least as a first approximation. If we have derived a preliminary qualitative result by this procedure we can still argue, that the situation may be "worse" than modelled insofar as people do not know the probability distribution exactly or at least not with great confidence (Fallinguer, 1986), that there are extra costs of uncertainty not yet considered or that even the type of model used should be changed. All these factors, already stressed by Keynesians, will gain more acceptance if we have proved that under "severe uncertainty" behavior really changes even within the procrustean bed of models inherited from the world of certainty and treated by expected utility maximization.

Table 1  
Petty versus severe uncertainty

|   | Petty uncertainty   | Severe uncertainty   |
|---|---|--|
|   | versus  |  |
| definitions   | uncertainty is an intermediate problem, some variables have to be decided before realization of X is known some thereafter in a short run optimisation or they adjust automatically | lack of ex post adjustments<br>- no ex post control<br>- price stickiness  |
| characteristics   | repeated (or small) decisions<br>lack of serial correlation for realizations of X<br>insurances<br>future markets<br><br>ex post flexibility, continuous adjustments                | one shot (large) decisions<br>X serially correlated<br><br>lethal events (bankruptcy, dismissal)<br><br>irreversibilities of investment and technologies               |
| consequences  | minor differences to certainty depending on facts difficult to evaluate ( $\frac{\partial Y}{\partial X}$ )   | important consequences (usually biasing down the optimal value of the decision variable)<br>pressure to change the model to include new cost components and strategies |
| empirically testable conclusions for relevance of the model | equilibria<br>flexible prices and quantities<br>uncertainty does not depress economic activity  | disequilibria<br>price stickiness<br>uncertainty depresses economic activity<br>pressure to change "the rules"   |

#### 4. What really did change

Changes in the rules are unattractive from the theoretical point of view due to at least two reasons. The first is, that they usually thwart the comparison of certainty and uncertainty. Secondly the way in which the changes are modelled is often rather arbitrary and terribly ad hoc. For the first problem we want to refer the reader to literature on the relation between flexibility and uncertainty (see Aiginger 1987, Pfeiffermayr 1987, Turnovsky 1973, Ostroy & Jones 1984, Fuss & Mc Fadden 1978) which demonstrates that usually in models with more flexibility and less disequilibrium profits are higher than in an world without ex post adjustments. The second problem should be addressed in this paper by the means of a survey conducted among Austrian firms in spring 1987.

In a special survey on "Innovations in firms' strategies" (500 firms) the Austrian Institute of Economic Research asked which changes in the business conditions were assessed as the most important ones by industrial firms. Firms considered the most important change to be that in the technological development (33,9 % of the firms). Weaker demand trends followed in second place, internationalization of production followed on the third place.

It is also interesting which changes referred to in literature did get the weakest approval by the firms. "Increasing service component", "Differentiation of demand" and "Increasing interference of politics" were considered as less important than in verbal analyses.

Asked whether the present situation could be characterized by the term "increasing uncertainty" 17,9 % of the firms answered "no" and 82,1 % did agree.

theoretic models offer a variety of variables about which uncertainty may exist. Asked just to mark the variable (s) about which uncertainty existed, firms reported "quantity" and "prices" approximately with the same frequency, the uncertainty about the behavior of competitors followed on third place. Technology, wages, interest rates and input prices - though they are usually assessed as important parameters for firms - seem to be known at the time of decision making.

In this question we had offered a list of 11 variables and allowed firms to name one or more variables. From the theoretical point of view this is not a satisfactory way, since in models we have exactly to choose which variables have to be decided ex ante and which ex post. In another question we asked directly which variables had to be set ex ante and which ex post. In this question firms were forced to check just one category.

Setting the price ex ante and the quantity to be produced ex post was chosen by 28 % as the relevant model. Setting the quantity ex ante and then optimally adjusting the own (monopoly) price was chosen by 16 %. These descriptions should assess the relevance of the two monopoly models in which an ex post control exists (an involuntary inventories are absent).

The p-q model in which firms have to choose both quantity and prices ex ante (and face disequilibrium ex post) was assessed as realistic by 22,5 %. A model in which quantity had to be chosen ex ante, where prices were fixed and some ex post adjustment of quantity is feasible got the highest share of the answers (31,1 %).

The competitive model, where quantity had to be chosen and market prices adjusted got a minority vote of 7 %. This is surprising if we start from theoretical considerations, but consistent with empirical price rigidity as well as with the firm's contention to be in a rather monopolistic or oligopolistic situation in a very narrow specialized market.

#### 5. Strategic reactions of firms

What firms call their strategic reaction to the new business conditions, means "changing the rules" in theoretical models. We offered four main lines of strategic response, which the firms had to rank with the numbers from 1 (= most important) to 4 (least important). Among each main strategic line firms had to rank the priorities of subcategories.

To allow international comparisons we used a scheme similar to that used by Booz-Allen & Hamilton (MILKEI) survey, who had asked managers in the United States, Europe and Japan to check their strategic responses, though in some times we adjusted the categories offered for reply to the discussion in Austria (thereby reducing the comparability).

As the most important strategic response the firms labelled "adaptive strategies". Among the subcategories on this line, cost reduction finished first, increasing marketing activities was second. These results were similar to that of the BAH survey, in which this strategy was labelled as "renewal" strategy (with very similar subheadings as in our survey):

Renewal strategies were considered as priority in the eighties by European and Japanese companies (in the United States they got the second rank). Cost reductions was considered as the most important and increasing marketing activities as second most important subcategory in the BAH survey as in Austria.

"Innovation" was the second most important strategic reaction, among this category the development of new products was the single most important reaction. Improving technology, marketing and increasing the downstream integration (quality, degree of sophistication) were ranked with approximately even frequency in 2nd, 3rd and 4th place. Innovation strategies finished at the second place also in the BAH for Europe and Japan, but at

third place for the US. Improving technology was considered as equally important in the BAH survey as compared to the development of new products.

Changes in the organization of firms was ranked as the third strategic response. Decreasing fixed costs got priority among this category for Austria, streamlining the organization finished as second subcategory. The BAH survey labelled this strategic line as "implementation", it got the first rank in the US, the second in Europe (jointly with innovation), but only the fourth in Japan.

"Diversification" finished in the fourth place in Austria, among the categories offered within this line the internal strategies (products developed in own firm, new markets) were named much more frequently than external strategies (joint ventures, licencing technologies, acquisitions). This was in line with Japanese and European results, but in contrast to the priority of acquisitions in the USA.

## 6. Flexibility in theory and in real world

### 6.1. Flexibility in theoretical models

Flexibility can be introduced into theoretical models in various ways (for an overview see Pfaffenzmeyer 1987).

It can be introduced into static models by different assumptions as to the choice of the production technique. If labour and capital have to be chosen ex ante, less flexibility exists than if one or both (or the utilization of one or both) factors can be chosen after demand, price or wages become known.

Flexibility can be put into models by allowing a two stage decision process in which some preliminary decision has to be done before the veil of uncertainty is lifted, and this decision can be revised afterwards (totally or partly) at some costs.

Firms can ex ante have the choice between two types of cost curves one with a lower average cost minimum, but a steeper increase before as well as after the minimum and another - "more flexible technique" with a higher minimum, but less steep increase.

In dynamic models the adjustment path of actual capacity to capacity needed can be different, the costs may be high or low, symmetric or asymmetric.

In general expected profits in case of more flexible techniques are larger than those with less flexibility. This is especially true for models similar to the operationalization 1 of chapter 2 (risk neutrality plus linear technology

and for those of operationalization 3 (disequilibrium). The potential losses due to production (capacity) which is too large or too small, can be corrected at least to some part. In the case of large costs of correcting the decision, this will not be corrected (but then profits are at least not less than without flexibility).

In models without disequilibria the results depend on more complicated derivatives, but there is still a large area where profitability increases expected profits.

In all these cases cost curves (and output prices) are assumed to be the identical under uncertainty and certainty, and in the flexible and inflexible models. If one has ex ante to choose between a more or less flexible technique and this decision is binding for a period in which not only demand changes out of a given distribution but also the distribution changes, this no longer has to be the case. The same is true if the output price is different in the flexible and the inflexible world.

This leads to the pragmatic point of view of firms, that flexibility has its disadvantages, but also its costs and that there is something like a optimal degree of flexibility. In the language of models this means endogenizing the optimal degree of flexibility according to the criterion of maximizing expected profits. As far as I know this task has yet to be done in literature.

### 6.2. Flexibility in real world

In the real world usually small firms are considered as "more flexible" than large firms. Capital intensity is higher in large firms, the investment process is more complicated (between investment decision and capacity increase one or two years pass), a second hand market for large plants does

Table 2

Trends in employment according to firm size

| number of employees | employment trend |         |
|---------------------|------------------|---------|
|                     | Germany          | Austria |
| 1                   | + 8,5            |         |
| 2-9                 | +13,7            |         |
| 10-19               | +12,8            | + 5     |
| 20-49               | + 3,8            |         |
| 50-99               | + 0,3            |         |
| 100-499             | - 1,0            | + 1     |
| 500-999             | - 0,2            | -14     |
| 1.000 and more      | - 5,8            | - 5     |

Source: Germany IAB-Mitteilungen 1/87;  
 total economy (without agriculture and without  
 public sector); 1985/77  
 Austria Österreichisches Statistisches Zentralamt  
 Nöchtländwirtschafliche Bereichszählung  
 1983 (2. Teil); total economy 1983/76  
 (inc. self employed)

not exist, time between orders and delivery is longer etc. Data on actual performance of firms according to their size class show that actually small firms are more profitable and contribute overproportionally to employment especially in recent years. This would imply that advantages of small firms due to their flexibility are able to outweigh two presumed advantages of large firm, namely higher technical efficiency (lower average cost curves) and stochastic economies of scale (gains from the possibility of pooling risks within a large firm engaged in different product lines)

presently industrial firms try to change their degree of flexibilization by several mechanisms:

- firms try to decrease fixed costs by choosing more flexible techniques. Especially the electronic revolution in the last years helped to decrease optimal lot size
- firms try to streamline organization, dividing larger firms into sub-firms or at least into smaller decision units (profit centers)
- firms try to change hierarchies reducing the number of stages a command or an information has to pass
- contracts with workers are made more flexible, as to working time, competition etc. Special services or parts of productions are "contracted out" to decrease quasi-fixed-labour costs and to make use of economies of scale for special entrepreneurial functions etc.

The Austrian survey offered the firms 13 types of flexibilization, trying to find out which they considered as the most important.

The winner - considered by 71,5 % of the firms as important or very important - was the broader qualification of workers, thus reversing the past trend towards higher specialization. Decreasing inventories (some steps towards

"just in time production") and computer based ordering and production followed as close second and third (69,6 % , 68,8 %).

62,9 % of the firms strives for a more flexible production technique, 60,3 % want to improve internal information, this proportion is larger as that which wants to improve external information.

Contracting out (of services) is considered as important only by 14,6 %, a more flexible organization in the sense of flatter hierarchies were considered as important only by one third of the managers, more flexible contracts for employees are considered less important than in public discussion.

Increasing the flexibility of prices (which can be interpreted from the theoretical point of view as switching from disequilibrium to equilibrium models or from severe to petty uncertainty) did not get a majority vote. For standardizing production, which would allow less disequilibrium than a production program consisting of many differentiated lines, the same is true (differentiated products seem to sell that much better, that this outweighs the costs of potential disequilibrium).

References:

- Aldinger, K., Production and Decision Theory under Uncertainty.  
Blackwell, Oxford, New York 1987.
- Boor-Allen & Hamilton, The Nickel Survey. Paris 1986.
- Fuss, M., Mc Fadden, D. (eds), Production Economics, North Holland,  
Amsterdam, New York, Oxford 1978.
- Pfaffenwyr, M., Produktionsflexibilität als Strategie, Diplomarbeit at the  
University of Vienna, 1987.

Appendix:

Questionnaire on "Innovation in Firms' Strategy"

1. Which changes in the business conditions do you think has been the most important for your firm?
- |                                     |        |
|-------------------------------------|--------|
| technological changes               | 33,9 % |
| internationalization                | 23,0 % |
| economic uncertainty                | 20,0 % |
| new competitors                     | 15,4 % |
| new channels of distribution        | 10,5 % |
| slow demand trend                   | 25,8 % |
| differentiation of demand           | 8,7 %  |
| increasing service component        | 5,5 %  |
| fluctuation of demand               | 15,3 % |
| increasing interference of politics | 8,9 %  |
2. Can the present situation be adequately described by the term "increasing uncertainty"?
- |     |        |
|-----|--------|
| no  | 17,9 % |
| yes | 82,1 % |
- and if yes, then uncertainty about:
- |                         |        |
|-------------------------|--------|
| quantity to be sold     | 20,6 % |
| price                   | 21,6 % |
| wages                   | 5,7 %  |
| input price             | 5,0 %  |
| technology              | 2,0 %  |
| markets                 | 8,5 %  |
| capacity utilization    | 9,7 %  |
| credit costs            | 1,7 %  |
| success of new products | 6,8 %  |
| Laws, authorities       | 7,4 %  |
| behavior of competitors | 10,9 % |

3. "Uncertainty" can have many different faces. Please check which of the following planning situations applies most closely to your firm. If possible check only one answer

- |   |        |
|---|--------|
| In our planning we determine the price at which we want to sell and adjust quantity produced depending on demand. Unintended stock fluctuations are rather unusual.   | 27,6 % |
| We plan quantity to be produced during the next month or quarter. Market prices fluctuate in a way that we normally sell everything we produce. Unintended stock fluctuations are rather unusual.                         | 7,0 %  |
| We plan quantity produced during the next month or quarter. There is no single market price, but we adjust our own price in such a way that we can sell our production. Unintended stock fluctuations are rather unusual. | 15,9 % |
| We have to plan quantity as well as price (or the price is sticky in the short run). Higher or lower demand is reflected in lower or higher stocks of finished goods.   | 22,5 % |
| We plan an ex-ante (preliminary) production quantity, in the short run the price is fixed. When demand is higher we can adjust production upward (or downward in the reverse case).                                       | 31,1 % |

4. Which strategic response to the changing environment is the most important for your firm?

|                            | Austria | Japan | USA | Europe |
|----------------------------|---------|-------|-----|--------|
| "adaptive" strategies -    |         |       |     |        |
| <u>revel</u>               | 1       | 1     | 2   | 1      |
| "innovation"               | 2       | 2     | 3   | 2,5    |
| "organizational reforms" - |         |       |     |        |
| <u>implementation</u>      | 3       | 4     | 1   | 2,5    |
| diversification            | 4       | 3     | 4   | 4      |

Remark: questions and answers are not fully comparable in the Austrian survey and in the BAH-Survey. The BAH asked for priorities for 1985 and used the terms underlined above

Ranks for subcategories (average of the ranks given) in Austria

| A: adaptive strategies                   | B: innovation                   |
|--|---------------------------------|
| increasing marketing efforts             | new products                    |
| decreasing costs                         | improving technology            |
| product change                           | improving marketing             |
| increasing investment                    | more sophisticated products     |
| quality improvement                      | increasing R & D                |
| international cooperation                | top level attention to R & D    |
| concentration to main line of production | intensifying internal resources |

5. Flexibilization seems to be an important strategy. Which aspect of Flexibilization is important for your firm?

|   | A    | B    |
|---|------|------|
| strengthen organizational culture & communication | 2,98 | 1,96 |
| streamlining organization                         | 2,26 | 1,59 |
| greater top level "leader-ship"                   | 3,04 | 3,49 |
| decreasing fixed costs                            | 1,94 | 3,12 |
| improve employee training                         | 3,30 | 3,52 |
| increasing participation of workers               | 3,38 |      |
| divisionalization into smaller units              | 3,37 |      |
| decreasing investment intensity                   | 55,9 | 44,1 |
| decreasing inventories (just in time)             | 69,6 | 30,4 |
| switching to production on order                  | 40,7 | 59,3 |
| contracting out (of services)                     | 14,6 | 85,4 |
| more flexible contracts for employees             | 38,8 | 61,2 |
| more flexible production techniques               | 62,9 | 37,1 |
| computer based production, ordering etc.          | 68,8 | 31,2 |
| more flexible organization (flatter hierarchy)    | 37,7 | 62,3 |
| broader qualification of workers                  | 71,5 | 28,5 |
| improving external information                    | 53,5 | 46,4 |
| improving internal information                    | 60,3 | 29,7 |
| increasing price reaction (to stabilize capacity) | 45,4 | 64,7 |
| standardization of products                       | 34,2 | 65,8 |

A: very important or important (percentage of firms)  
 B: less important or not important (percentage of firms)