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Elementary Theory of Slack Ridden Imperfect Competition

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Elementary Theory of Slack Ridden Imperfect Competition

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Organizational slack is a central variable in the behavioral theory of the firm (CYERT and MARCH 1963). Ever since LEIBENSTEIN described organizational slack under the name of "X-inefficiency", the pervasiveness of the phenomenon has caught the attention of many economists (LEIBENSTEIN 1966). In his book "Beyond Economic Man" LEIBENSTEIN discusses quite a number of empirical studies which show the imporTence of organizational slack (LEIBENSTEIN 1976). However, present day textbooks on microeconomics almost ignore the concept of organizational slack. The same is true for most of the literature on formal models imperfect competition.

Compared with LEIBENSTEIN's attempt at a complete reconstruction of microeconomics (LEIBENSTEIN 1976),the aim of this paper is much more modest. The theory presented here emphasizes organizational slack, but,otherwise, it is quite similar to the accepted view. Attention is restricted to the most elementary framework which can be used for the analysis of imperfect competition, the symmetric linear Cournot oligopoly. The basic principles can be applied to more general contexts, but no attempt in this direction will be made here.

Traditionally, the firm has been viewed as an organization under the control of a strong owner whose relentless pressure on costs succeeds to enforce efficiency of production and administration. At least in the long run the owner's relentless desire to maximize profits removes the last trace of slack.

The pervasiveness of organizational slack suggests that one should look for a different description of reality. The theory presented here will be based on a notion of "slack ridden profit maximization" which maintains that profits are maximized, but on the basis of a cost function which includes slack. This idea must be complemented by an assumption on the behavioral dynamics of slack.

A "strong slack hypothesis" will be introduced. This admittedly extreme assumption simply maintains that slack has the tendency to increase as long as profits are positive; slack can be reduced, but only under the threat of losses. Nothing else limits slack but the necessity of non-negative profits. This has the consequence that in the long run profits tend to be zero, regardless of market structure.

The strong slack hypothesis may be described as a theory of weak ownership. In reality ownership is not quite as weak. It is hard to reconcile empirical findings on the correlation of industrial concentration and profitability (COLLINS and PRESTON 1969, SHEPHARD 1969) with the idea of long run zero profits. In spite of these shortcomings the strong slack hypothes s may still be a better idealization of reality than profit maximization without slack.

The strong slack hypothesis has the virtue of simplicity. It can be used to compare the consequences of extremely weak ownership with those of extremely strong ownership. It turns out that there are striking differences. In the usual theory of the symmetric linear Cournot oligopoly with fixed costs, welfare can be increased by restriction of entry if fixed costs are sufficiently small. Under the strong slack hypothesis the picture is different. It is never the case that welfare can be increased by restriction of entry. Free entry is always best.

Organizational slack should not be looked upon as entirely wasted. It involves some inefficiency, but part of it is enjoyed as "consumption at the working place". It is fair to assume that slack has its benefits for the members of the organization, but the welfare gains are worth less than they cost (see Figure 1).

The inefficient use of resources is only part of the welfare loss caused by slack. It is an important feature of the theory presented below that marginal costs contain slack.

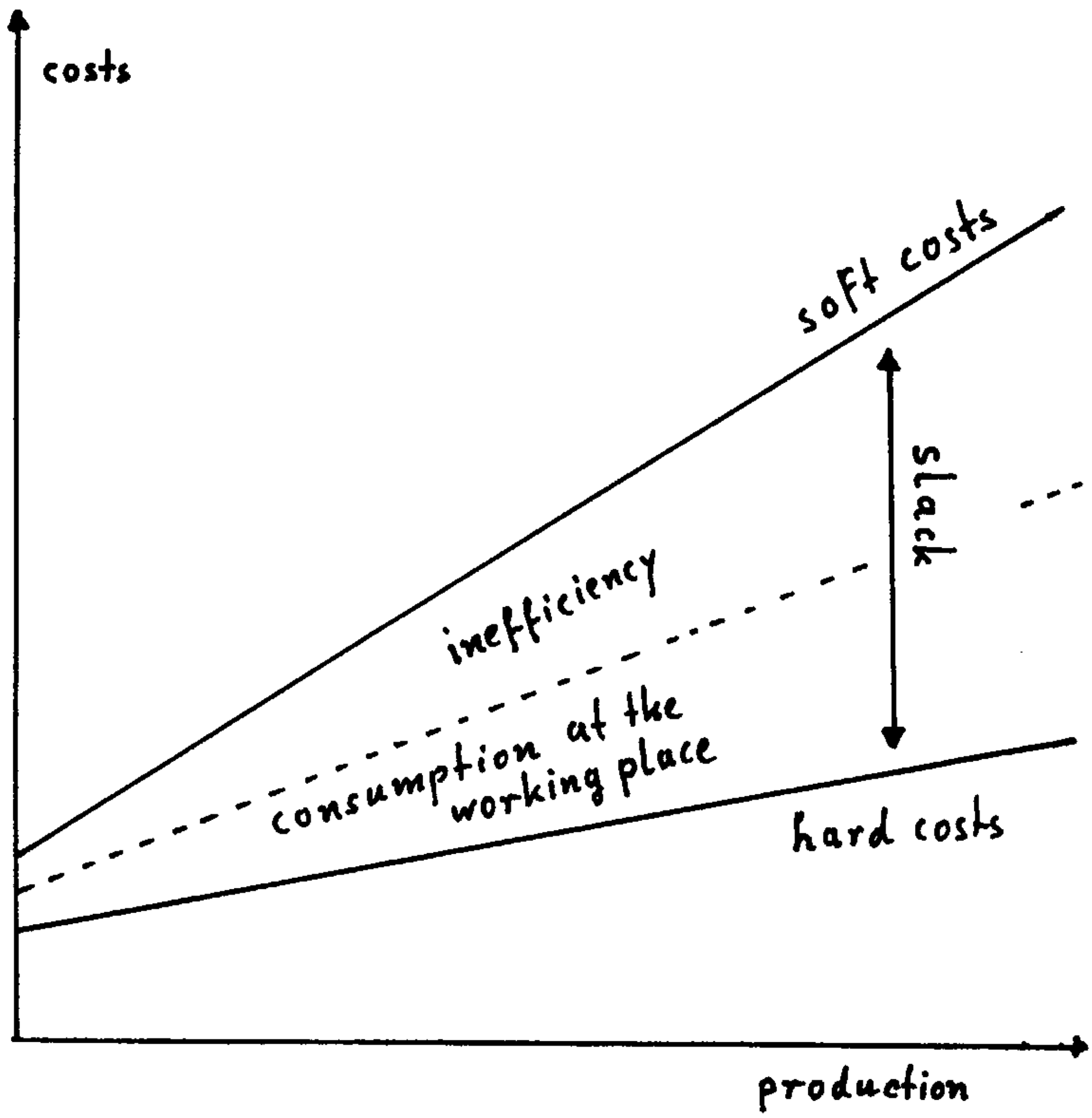

Figure 1: Cost Composition. — Soft costs include hard costs and organizational slack. Organizational slack is subdivided into "inefficiency" and "consumption at the working place".

Increased marginal costs lead to increased prices and reduced production with adverse effects on consumer's rent. The "marginal cost effect" of slack is more important for welfare than the inefficient use of organizational resources.

The gap between the strong slack hypothesis and profit maximization without slack can be bridged by a "general slack hypothesis" which permits a continuum of intermediate cases. It postulates a dynamics of slack which results in a balance between slack and profits. Under the general slack hypothesis an increase of the number of competitors has qualitatively similar effects as in the Cournot theory without slack:price and profits decline.

In imperfect markets with slack, competition does not only reduce profits; it also puts pressure on costs. It can be expected that the importance of competition is enhanced by its role as a cost reducing force. The results obtained here illustrate this point of view.

1. Slack and Costs

It is assumed that there are n oligopolists $i = 1,\dots,n$. The following notations will be used:

x_i supply of firm i
K_i costs of firm i
s_i slack rate of firm i
S_i total slack of firm i
A_i firm i's consumption at the working place

Costs are linear in x_i. The slack rates s_i can be described as slack per unit of output. For the sake of simplicty it is assumed that fixed costs are not affected by slack. One could introduce slack on fixed costs, too, but this would make computations much more complicated.

(1) $$K_i = F + (c + s_i)x_i \qquad \text{for } i = 1,\dots,n$$

with $F > 0$ and $c \geq 0$

The constant c is the level below which marginal costs cannot be reduced. Slack rates must be non-negative.

(2) $s_i \geq 0$ for $i = 1,\ldots,n$

The cost function (1) includes slack. One may distinguish "soft costs" and "hard costs". Hard costs are those costs which would arise without slack, i.e. at $s_i = 0$. Costs functions observed in reality, e.g. in econometric studies, should be thought of as "soft" or "slack inclusive".

Hard costs may not be observable at all. It is not necessary to assume that anybody in the organisation knows the amount of slack. As long as there is no outside pressure which forces management to reduce slack, there is no reason why anybody should want to know much about slack,since everybody enjoys its benefits. Profits are assumed to be maximized on the basis of soft costs. The necessary computations do not require any knowledge of hard costs.

Total slack is defined as follows:

(3) $S_i = x_i s_i$ for $i = 1,\ldots,n$

For the sake of simplicity a constant fraction α of total slack is assumed to be consumption at the working place.

(4) $A_i = \alpha S_i$

with $0 \leq \alpha \leq 1$.

We refer to α as the "slack consumption rate". Maybe it would be more realistic to assume a concave non-linear relationship between A_i and S_i but this possibility shall not be investigated here.

2. Normalized symmetric linear Cournot oligopoly

It is assumed that the cost function (1) is the same for all oligopolists. This is meant by the term "symmetric". The possibility of different slack rates for different firms is not excluded by assumption. The equality of all slack rates will be obtained as a result. The following notations will be used:

$x = \sum_{i=1}^{n} x_i$	total supply
$\hat{p}$	price
$p = \hat{p} - c$	normalized price
G_i	profits of firm i

Consider a linear demand function:

(5) $\hat{p} = b - ax$
for $b - ax \geq 0$ and $\hat{p} = 0$ otherwise

Equation (5) can be rewritten as follows:

(6) $p = b - c - ax$
for $b - ax \geq 0$ and $p = -c$ otherwise

Without loss of generality we can assume $b > c$ since profitable production is impossible for $b \leq c$. The quantity unit and the money unit can be chosen in such a way that we have:

(7) $a = b - c = 1$

With this normalization the demand function has the following form:

(8) $p = 1 - x$
for $1 - x \geq -c$ and $p = -c$ otherwise

Profits G_i are as follows:

(9) $G_i = px_i - s_i x_i - F$

The normalized model described by (8) and (9) can be interpreted as an oligopoly without variable hard costs. For the sake of brevity p will be called "price", since $\hat{p}$ will not be important for the analysis.

3. Slack ridden profit maximization

Slack ridden profit maximization optimizes on the basis of soft costs. For the normalized Cournot oligopoly, profits are given by (9). The marginal conditions for internal Cournot equilibrium are as follows:

$$(10) \qquad \frac{\partial G_i}{\partial x_i} = 1 - x - x_i - s_i = 0$$

The following notation will be used:

$$(11) \qquad s = \frac{1}{n} \sum_{i=1}^{n} s_i$$

The average slack rate s will turn out to be an important variable. Summing up over equations (10) one obtains:

$$(12) \qquad n - nx - x - ns = 0$$

$$(13) \qquad x = \frac{n}{n+1} (1-s)$$

In the same way as total supply x, price p is determined by s:

$$(14) \qquad p = \frac{1}{n+1} + \frac{n}{n+1} s$$

Equations(10) together with (13) yield:

$$(15) \qquad x_i = \frac{1}{n+1} + \frac{n}{n+1} s - s_i$$

Equation (9) can be written as follows:

$$(16) \qquad G_i = (p - s_i) x_i - F$$

This yields:

$$(17) \qquad G_i = \left(\frac{1}{n+1} + \frac{n}{n+1} s - s_i\right)^2 - F$$

For the special case of zero slack rates one obtains the following formula:

(18) $$G_i = \frac{1}{(n+1)^2} - F$$

for $s_1 = s_2 = \ldots = s_n = 0$.

4. The strong slack hypothesis and its consequences

The strong slack hypothesis takes the extreme view that "slack squeezes out profit". This means that in the long run profits will be zero regardless of the number of competitors:

(19) $$G_i = 0 \quad \text{for } i = 1,\ldots,n$$

The long run equilibrium condition (19) together with the formula (17) for Cournot equilibrium profits at given slack rates permits us to determine equilibrium slack rates. We must have:

(20) $$\left(\frac{1}{n+1} + \frac{n}{n+1}s - s_i\right)^2 = F$$

Moreover, the expression in brackets on the left hand side is nothing else than x_i and therefore must be non-negative. Since this is the case, for fixed s the left hand side is a decreasing function of s_i. Consequently, for given s there is at most one s_i which satisfies (20). This shows that in long run equilibrium all slack rates must be equal:

(21) $$s_i = s \quad \text{for } i = 1,\ldots,n$$

With the help of (21) condition (20) yields the following equation for s:

(22) $$\frac{1}{(n+1)^2}(1-s)^2 = F$$

In view of (13) we must have:

(23) $$0 \leq s \leq 1$$

Considering this we can conclude:

$$(24) \qquad 1 - s = (n + 1)\sqrt{F}$$

$$(25) \qquad s = 1 - (n+1)\sqrt{F}$$

Together with (24) equation (13) yields:

$$(26) \qquad x = n\sqrt{F}$$

Hence

$$(27) \qquad p = 1 - n\sqrt{F}$$

In view of (23) it follows by (22) that we must have:

$$(28) \qquad \frac{1}{(n+1)^2} \geq F$$

With the help of (18) it can be seen immediately that (28) can be interpreted as non-negativity condition for Cournot equilibrium profits at zero slack rates. In view of (28) an inequality for x follows by (25):

$$(29) \qquad x \leq \frac{n}{n+1}$$

The right hand side of (29) is nothing else than Cournot equilibrium supply at zero slack rates. With the exception of the border case of equality in (28) total supply will be lower and price will be higher under the strong slack hypothesis than at Cournot equilibrium without slack.

It is worth pointing out that (27) shows a strong influence of fixed costs on price. In this respect, slack ridden competition is quite different from competition without slack.

5. Conditions of entry

The strong slack hypothesis (19) excludes both negative and positive profits. The exclusion of negative profits is based on the usual assumption that long run losses would eventually force at least one competitor to leave the market.

Let $\bar{n}$ be the maximum number of competitors such that condition (28) is satisfied for $n = \bar{n}$.

$$(30) \qquad \bar{n} = \max_{n=1,2,\ldots} \{n \mid \frac{1}{n+1} \geq \sqrt{F}\}$$

Entry restrictions like government regulations may result in a number of competitors smaller than $\bar{n}$. We shall speak of a closed oligopoly if the number n of competitors is exogenously fixed. Contrary to this in open oligopoly the number of competitors in long run equilibrium is an endogenous variable; it is assumed that there are sufficiently many potential competitors (more than $\bar{n}$) who may enter the market if they find this advantageous.

In the framework of a theory of slack ridden imperfect competition this description of open oligopoly needs to be complemented by some further assumptions on potential competitors. One has to say something on the slack rate of new entrants. We shall only consider the case of efficient free entry, where new firms can come in with zero slack rates. This is quite reasonable if one thinks of new entrants as highly energetic hard working entrepreneurs. However, for some markets the only potential entrants may be old established firms which operate with considerable slack on highly concentrated markets. In such cases, there will be a positive minimum slack rate for new entrants.

Suppose that there are n-1 firms 1,...,n on the market and a potential competitor n with zero slack rate considers entry. It is reasonable to assume that he will enter if and only if after his entry the sustainability condition $n \leq \bar{n}$ is satisfied. For $n > \bar{n}$ he has to expect long run losses, even if in the short run he may have positive Cournot profits due to his efficiency advantage. For $n \leq \bar{n}$ he need not fear such long run losses and in view of his efficiency his short run profits will be non-negative, too.

Admittedly, the argument sketched above is not very precise and needs further elaboration. It is implicitly assumed that long run losses always outweigh temporary gains. In order to justify this assumption one would have to look at the dynamic process which leads to long run equilibrium in much more detail. However, if it should turn out that competitor n has an incentive to enter even if $n > \bar{n}$ holds, this would mean that no long run equilibrium can be achieved. Therefore $n = \bar{n}$ is at least a necessary condition for long run equilibrium under efficient free entry.

6. Welfare considerations

In the following we shall look at the question whether welfare may be increased by restriction of entry. This question will be investigated both under the usual assumptions of profit maximization without slack and under the strong slack hypothesis.

The following notations will be used:

C	consumers rent
$G = \sum_{i=1}^{n} G_i$	total profits
$S = \sum_{i=1}^{n} S_i$	total slack
$A = \sum_{i=1}^{n} A_i$	total consumption at the working place

The welfare measure W is defined as follows:

$$(31) \quad W = C + G + A$$

In spite of the well-known difficulties with such measures nothing better can be done in the framework of partial analysis. In view of (4) equation (31) can be rewritten as follows:

$$(32) \qquad W = C + G + \alpha S$$

In the case at hand consumer's rent is computed as follows:

$$(33) \qquad C = \frac{1}{2} x^2$$

Under the usual assumptions of profit maximization total slack S is zero and under the strong slack hypothesis G is zero.

7. Welfare effects of entry restriction without slack

We shall first look at the usual theory of Cournot equilibrium without slack. We can rely on the formulas of section 3 with $s_i = 0$ for $i = 1,\dots,n$. The following notations will be used:

W_n	welfare measure for n competitors
$D_n = W_n - W_{n-1}$	first difference of W_n

The formulas of section 3 together with (3) and (33) yield the following expression for W_n:

$$(34) \qquad W_n = \frac{1}{2}\left(\frac{n}{n+1}\right)^2 + \frac{n}{(n+1)^2} - nF$$

Entry of the n'th competitor does not incur a welfare loss as long as we have:

$$(35) \qquad D_n \geq 0$$

Therefore we compute D_n:

$$(36) \qquad D_n = \frac{n^2+2n}{2(n+1)^2} - \frac{(n-1)^2+2(n-1)}{2n^2} - F$$

(37) $$D_n = \frac{n^4+2n^3 - (n^2-1)(n+1)^2}{2n^2(n+1)^2} - F$$

(38) $$D_n = \frac{2n+1}{2n^2(n+1)^2} - F$$

(39) $$D_n = \frac{1}{2n(n+1)^2} + \frac{1}{2n^2(n+1)} - F$$

Equation (39) shows that D_n is a decreasing function of n. With the help of (38) one can determine intervals for F where a given number $\tilde{n}$ is optimal in the sense that it maximizes W_n. Table 1 shows intervals for combinations of maximal numbers $\bar{n}$ and optimal numbers $\tilde{n}$ of competitors in the market (compare (30)). It can be seen that welfare is increased by a restriction of entry if the market is big enough to sustain at least three competitors with non-negative Cournot equilibrium profits.

In order to show that this assertion is generally true and not only for the range of table 1, we observe that in view of (30) the maximal number $\bar{n}$ of competitors satisfies the following inequality:

(40) $$\bar{n} \geq \frac{1}{\sqrt{F}} - 1$$

In order to obtain an upper bound for $\tilde{n}$ to be compared with this lower bound for $\tilde{n}$ we can make use of (38):

(41) $$D_n > \frac{2n}{2n^4} - F$$

(42) $$D_n > \frac{1}{n^3} - F$$

This shows that we must have:

(43) $$\tilde{n} < \frac{1}{\sqrt[3]{F}}$$

Optimal $\tilde{n}$	maximal $\bar{n}$	fixed cost interval
1	1	$.2500 > F > .1111$
1	2	$.1111 \geq F \geq .0694$
2	2	$.0694 \geq F > .0625$
2	3	$.0625 \geq F > .0400$
2	4	$.0400 \geq F > .0278$
2	5	$.0278 \geq F \geq .0243$
3	5	$.0243 \geq F > .0204$
3	6	$.0204 \geq F > .0156$
3	7	$.0156 \geq F > .0123$
3	8	$.0123 \geq F \geq .0112$
4	8	$.0112 \geq F > .0100$
4	9	$.0100 \geq F > .0083$

Table 1: Welfare optimal number $\tilde{n}$ and maximally sustainable number $\bar{n}$ of competitors in Cournot equilibrium without slack.

For $F = .01$ the lower bound for $\bar{n}$ is 9 and the upper bound for $\tilde{n}$ is 4.64. With decreasing F the lower bound for $\tilde{n}$ decreases more quickly than the lower bound for $\bar{n}$. Therefore $\tilde{n} < \bar{n}$ holds outside the range of table 1, too.

Restriction of entry avoids unnessary duplication of fixed costs. This is the reason for its welfare benefits. Each additional competitor above the optimal number $\tilde{n}$ decreases price and increases consumer's rent, but not as much as is needed in order to compensate for the decrease of total profits.

8. Welfare effects of entry restriction under the strong slack hypothesis

Let us now turn our attention to the welfare effects of entry restriction on long run equilibrium under the strong slack hypothesis. For the sake of simplicity the symbols W_n and D_n are used here, too, in order to denote total welfare for the closed oligopoly with n competitors and the first difference of this variable. However, W_n is now computed in a different way. The formulas of section 4 must be used instead of those of section 3. Total profits are zero. In view of (26) and (33) consumer's rent is as follows:

$$(44) \qquad C = \frac{1}{2} n^2 F$$

Total slack, the product of s and x can be computed with the help of (24) and (26):

$$(45) \qquad S = n\sqrt{F} - n(n+1)F$$

This yields:

$$(46) \qquad W_n = \frac{1}{2} n^2 F + \alpha n\sqrt{F} - \alpha n(n+1)F$$

$$(47) \qquad W_n = F[(\frac{1}{2} - \alpha)n^2 - \alpha n + \frac{\alpha n}{\sqrt{F}}]$$

Hence

$$(48) \qquad D_n = F[(\frac{1}{2} - \alpha)(2n - 1) - \alpha + \frac{\alpha}{\sqrt{F}}]$$

$$(49) \qquad D_n = F[(1-2\alpha)n - \frac{1}{2} + \frac{\alpha}{\sqrt{F}}]$$

In view of (40) and $n \leq \bar{n}$ we have:

$$(50) \qquad \frac{1}{\sqrt{F}} - (n+1) \geq 0$$

This fact can be used in order to find out more about D_n:

$$(51) \qquad D_n = F[(1-2\alpha)n - \frac{1}{2} + \alpha(n+1) + \alpha(\frac{1}{\sqrt{F}} - (n+1))]$$

(52) $D_n \geq F[(1-2\alpha)n - \frac{1}{2} + \alpha(n+1)]$

(53) $D_n \geq F[(1-\alpha)n - \frac{1}{2} + \alpha]$

(54) $D_n \geq F[(1-\alpha)(n-1) + \frac{1}{2}]$

In view of $0 \leq \alpha \leq 1$ and $n \geq 1$ this yields:

(55) $D_n \geq \frac{1}{2}F$

This shows that the welfare measure W_n is always increased by the entry of a new competitor as long as the maximal number $\bar{n}$ of competitors has not yet been reached. Restriction of entry cannot increase welfare.

The conclusions are very different from those implied by table 1. Whereas under profit maximization without slack considerable restrictions of entry turn out to be socially beneficial,free entry is always preferable under the strong slack hypothesis.

The effect does not depend on α. Even if all the slack is consumption at the working place, the conclusion remains valid. The influence of slack on marginal costs is the decisive factor.

In the absense of slack, competition reduces price but does not influence costs. In the presence of slack,competition has an additional role as a cost reducing force. This explains why slack ridden imperfect competition may be more in need of free entry conditions than imperfect competition without slack .

9. The dynamics of slack

Even if in this paper attention is concentrated on long run equilibrium it is useful to present an explicit pricture of the dynamics of slack. The "general slack hypothesis" mentioned in the introduction can best be understood as an equilibrium condition of a dynamical process. This process will be described as evolving in continous time. The following notations will be used:

$\dot{s}_i$ time derivative of slack rate s_i

r_i profit rate of firm i

It is reasonable to assume that the firm's capital is tightly related to its fixed costs. Therefore the profit rate will be defined as profits over fixed costs:

$$(56) \quad r_i = \frac{G_i}{F}$$

A simple way of modelling the dynamics of slack is as follows:

$$(57) \quad \dot{s}_i = \begin{cases} \mu r_i - \eta s_i & \text{for } s_i > 0 \text{ or } \mu r_i - \eta s_i > 0 \\ 0 & \text{for } s_i = 0 \text{ and } \mu r_i - \eta s_i \leq 0 \end{cases}$$

where μ and η are non-negative constants. Assumption (57) permits the following interpretation: the slack rate will move up more quickly if the rate of profit is high because then the owner's power to put pressure on management will be weak. Slack will increase less quickly or it may even decline if the slack rate is already very high. The higher the slack rate is, the more obvious and the more visible the inefficiency will be. If the profit rate is negative the slack rate will be reduced regardless how low the slack rate already is. The functional form of (57) guarantees that the slack rate remains non-negative.

The special case $\mu = 0$ leads to a long run equilibrium without slack. For $\eta = 0$ we obtain the strong slack hypothesis as a long run equilibrium condition. In the following we shall always assume $\mu > 0$.

The relationship between profit rate and slack rate in long run equilibrium depends on η/μ. Therefore, we introduce the following definition:

(58) $\gamma = \frac{\eta}{\mu}$

It is clear that long run equilibrium with non-negative profits must satisfy:

(59) $r_i = \gamma s_i$

The parameter γ may be thought of as reflecting the institutional strength of profit interests versus slack pressure. We refer to (59) as the "general slack hypothesis".

Ordinary profit maximization without slack may be looked upon as a limiting case of the general slack hypothesis. The two extremes of the special slack hypothesis and profit maximization without slack are bridged by a continuum of intermediate cases.

The general slack hypothesis is a necessary condition for long run equilibrium. However, it is not yet clear whether the process converges to long run equilibrium. A rigorous answer to this question will not be given here. Instead of this we shall present a heuristic argument for convergence with fixed n which might be capable of being worked out into a full fledged proof.

If in (17) the average slack rate s is kept constant, $\dot{s}_i$ is a decreasing function of s_i, as long as s_i is positive. Therefore, the difference between two slack rates s_i and s_j will diminuish over time. Finally, all slack rates s_i will be equal. Suppose that all slack rates are equal to s. Then (57) yields for s > 0:

(60) $\dot{s} = \frac{\mu}{F} \left(\frac{(1-s)^2}{(n+1)^2} - F\right) - \eta s$

Since the right hand side is a decreasing function of s, the average slack rate will grow below the equilibrium level and decline above the equilibrium level. This shows convergence to long run equilibrium.

10. Some consequences of the general slack hypothesis

In view of (56) and (59) the following long run equilibrium condition holds under the general slack hypothesis:

$$(61)\quad G_i = \gamma F s_i$$

for $i = 1,\dots,n$. In view of (17) this equivalent to the following equivalent to the following equation:

$$(62)\quad \left(\frac{1}{n+1} + \frac{n}{n+1}s - s_i \right)^2 = F(1 + \gamma s_i)$$

Essentially, the same argument as has been applied to (20) in section 4 can be used in order to show that (62) has at most one solution s_i in the relevant range. Therefore, all slack rates s_i must be equal here, too. Of course, this conclusion depends on the symmetry assumption that the parameter γ is the same for all firms. (22) is now replaced by the following condition:

$$(63)\quad \frac{1}{(n+1)^2}(1-s)^2 = F(1 + \gamma s)$$

It can be seen easily that for $n \le \bar{n}$, this equation has exactly one solution s in the interval $0 \le s \le 1$.

It is not necessary to solve the quadratic equation (63) in order to investigate the influence of the parameters n, γ and F on s, r, x and p, where r is the common profit rate of all firms. The influences on s can be seen easily if one thinks of both sides of (63) as curves in a diagram showing s horizontally and these expressions vertically (see Fig.2). An increase of n causes a downward shift of the curve representing the left hand side and thereby decreases s. An increase of γ or F causes an upward shift of the curve for the right hand side and thereby decreases s, too. In table 2 these effects are represented by minus signs in the first column.

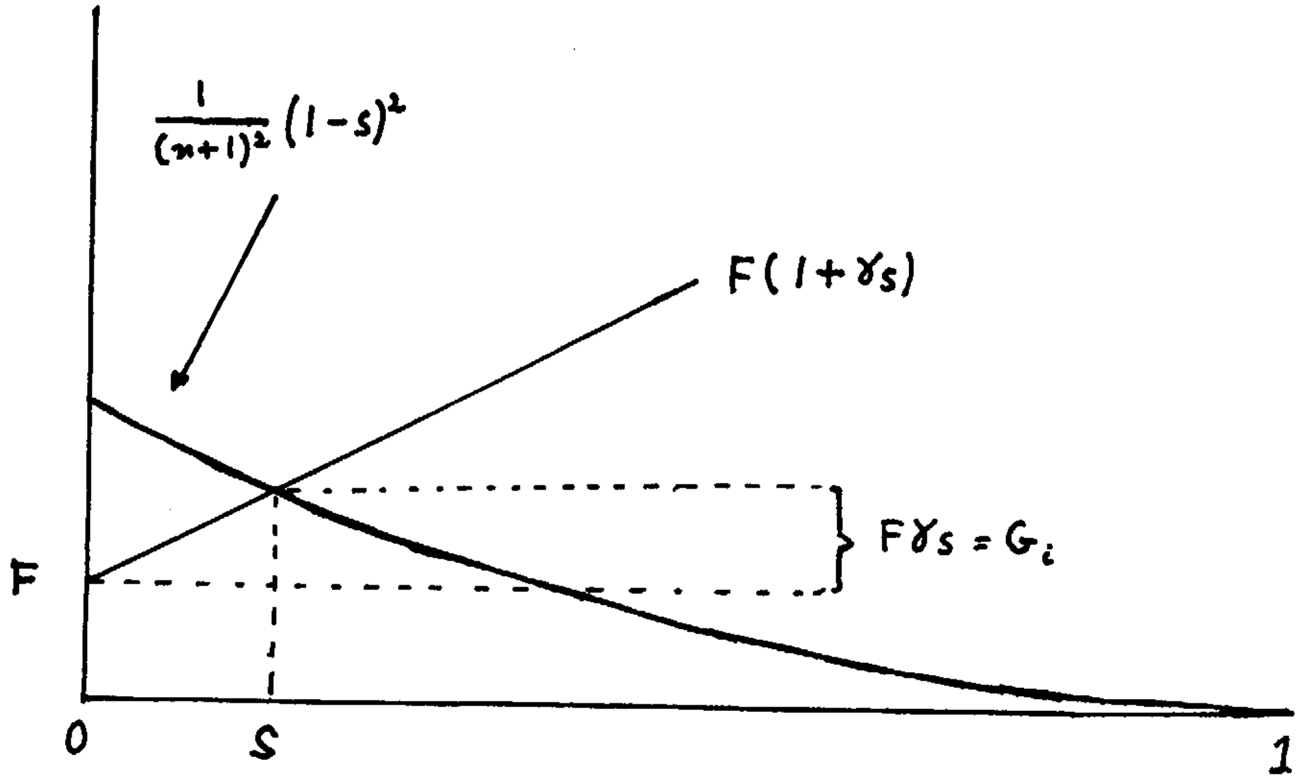

Figure 2: Equilibrium under the general slack hypothesis.

	s	r	x	p
n	-	-	+	-
γ	-	+	+	-
F	-	-	+	-

Table 2: Influences of number of competitors n, ownership strength γ and fixed costs F on slack rate s, profit rate r, supply x and price p.

It is an immediate consequence of the general slack hypothesis (59) that a decrease of s is connected to a decrease of the profit rate r if γ is kept constant. The decrease of s caused by an increase of γ is connected to an increase of $F(1+\gamma s)$. This has the consequence that in spite of the decrease of s the expression $F\gamma s$ is increased. In view of (61) this has the consequence that r is increased by an increase of γ. This is plausible in view of the interpretation of γ as measure of the institutional strength of ownership.

Equation (13) shows that total supply is increased if n is increased and s is decreased or if s alone is decreased. Therefore, an increase of n, γ or F leads to a greater supply and a lower price.

The only influence which may seeem to be somewhat surprising are those of F. At a constant slack rate higher fixed costs would decrease the profit rate. In order to restore the balance slack rates have to be cut, too. In this way, marginal costs are lowered with the result that supply is increased and price is decreased.

Even if hard marginal costs c have been normalized away it is not difficult to see what happens if c is increased. A cut of the slack rate equal to the increase of c would keep the profit rate r constant. In order to restore the balance the profit rate must fall and the slack rate has to be cut by less than the inccrease of c. Soft marginal costs c+s increase, supply is decreased and price goes up.

11. Concluding remarks

If fixed costs are sufficiently small and if entry is free and efficient, long run equilibrium with slack is not very different from long run equilibrium without slack. Under such conditions both profit rates and slack rates must be small. However, if entry is restricted or fixed costs are quite high, it may be quite important what the assumptions are on organizational slack. If slack ridden competition is a fact of life, policy implications based on models without slack may be very misleading. Under such conditions one should not disregard the role of competition as a cost reducing force.

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