

EUROPEAN UNIVERSITY INSTITUTE, FLORENCE
DEPARTMENT OF ECONOMICS



EUI WORKING PAPER No. 85/170

SUBJECTIVE PRICE SEARCH AND PRICE COMPETITION

by

Jean JASKOLD GABSZEWICZ* and Paolo GARELLA

This paper was written while the first author was visiting the European University Institute, Florence. Financial support is gratefully acknowledged.

*CORE, Université Catholique de Louvain, Louvain-la-Neuve.

All rights reserved.

No part of this paper may be
reproduced in any form without
permission of the authors.

(C) Jean Jaskold Gabszewicz and Paolo Garella

Printed in Italy in June 1985

European University Institute

Badia Fiesolana

50016 SAN DOMENICO (Fi)
Italy.

Subjective Price Search and Price Competition

by

Jean J. GABSZEWICZ and Paolo GARELLA

February 1985

Abstract

In this paper we analyze price formation in an industry where consumers have a priori beliefs on prices, and firms are aware of this fact. We show that if all consumers are identical, a (Nash) price equilibrium exists in which all firms quote a price which makes consumers expectation of finding a still smaller price not sufficient to bear the search cost. A similar analysis is performed for the case where search costs differ among the consumers in the framework of a location model.

INTRODUCTION

In most models analyzing markets with dispersed prices, one assumes that consumers know the distribution of prices while they ignore which seller quotes which price. Then consumers search sequentially for the lowest price, stopping to search when the expected gain from leaving the last shop visited for a further search becomes non positive. On the other hand, if firms know this search procedure, they can manipulate the distribution of prices by choosing their own price in a manner which is most advantageous to them. An 'equilibrium' distribution of prices may emerge, in which no firm can increase its revenue by unilateral deviation from the price it has chosen. This approach, initiated by Stigler (1961) has given rise to a significant research area, represented, among others, by the following papers: Carlson and McAfee (1983), Reinganum (1979), Rotschild (1973) and (1974), Salop and Stiglitz (1977), Stahl (1982).

With few exceptions (see for example, Rotschild (1974)) nobody has questioned the basic assumption of the above approach, namely that consumers are initially endowed with the knowledge of the true distribution of prices. Presumably the plausibility of this assumption relies on the fact that, in many market places, consumers can repeatedly observe the price fluctuations decided by the sellers, generating thereby a kind of learning process of the price distribution. Nevertheless, as long as the mechanism through which consumers 'learn' the distribution, has not been made explicit, it seems difficult to avoid questioning this assumption. Moreover this assumption is particularly inaccurate when no learning process can be experienced, simply because the product has not yet been sold before on the market. How could consumers know the true distribution of prices when these prices have never been set beforehand? At best, consumers rely on apriori beliefs about prices in orienting their search process on a particular path. This suggests that an alternative assumption, -which fits better the situation just depicted-, can be proposed to represent the informational endowments of consumers. This assumption asserts that *consumers have prior beliefs about the price set by the sellers, and use these beliefs in their sequential search for the lowest price*. In other words, it is assumed that the price of each firm is viewed by a consumer as a random variable defined on some pre-assigned range. Then, if firms do not face any shortage of information, they can predict exactly how consumers search decisions depend on their prior beliefs and on the price they set. Accordingly they can manipulate information gathering by the buyers in a way similar to the one described above, leading eventually to an equilibrium distribution of prices, in which no firm would gain by deviating from the price chosen at equilibrium.

In the present paper we retain the alternative assumption about the information endowments of the consumers, and study the resulting equilibrium price distribution in two different models.

In the first model, we suppose that the unit search cost is the same for all consumers, who are also assumed to share identical prior beliefs on the price set by each firm. Then we prove that there always exists a price equilibrium, which is either the monopoly price, or that price which makes a consumer indifferent between buying at that price from the last shop visited, or undertaking a further search for a lower price.

In the second model, we assume that the unit search cost varies from consumer to consumer, because consumers are located at varying distances from the sellers; in other words, we combine a model of price search with a model of spatial competition. Then we derive necessary and sufficient conditions for the existence of a price equilibrium when there are two sellers, and all consumers have the same prior beliefs on prices represented by a uniform distribution over a given interval of prices.

2. THE HOMOGENEOUS CASE

Let us first consider a situation with n 'population centers' h , $h = 1, \dots, n$, and a single shop at each center. Demand at that shop is equal to $D(p)$, where $D(p)$ denotes the demand function at the shop if the search cost would be infinite: in that case no consumer from other population centers than h would buy from seller located in the h^{th} population center. If all firms quote the same price p we assume that the expected demand at firm h is equal to $D(p)$. Consumers search sequentially with recall; no cost is incurred by a customer if he visits the shop in his own population center, but he must pay a unit search cost c , $c > 0$, per visit, to get information on any other price. We assume: $D(p)$ concave, $D'(p) < 0$ and there exists \bar{p} such that $D(p) = 0$, $\forall p \geq \bar{p}$. Each consumer buys at most a single unit of the (homogeneous) product, and is willing to buy a unit at zero price. Also zero production cost is assumed throughout.

The price p at each shop is viewed as a random variable by the consumers. This random variable is independently and identically distributed across firms and consumers ('homogeneous' case). We denote by $F(p)$ the distribution function of p , and by $f(p)$ the corresponding density; p takes its values in $[0, \bar{p}]$: both F and f are assumed continuous functions of p . Finally we assume

$$c + E(p) \leq \bar{p},$$

where $E(p)$ is equal to $\int_0^{\bar{p}} pf(p)dp$: the expected price plus the unit search cost does not exceed the highest possible price. Next we prove

PROPOSITION 1

In the homogeneous case there exists a (Nash) price equilibrium

$(\tilde{p}, \dots, \tilde{p}, \dots, \tilde{p})$, with $\tilde{p} = \min\{p_M, p^*\}$, where p_M denotes the maximizer of $pD(p)$ (the monopoly price) and p^* the solution of

$$\int_0^{\tilde{p}} F(p) dp = c. \quad (1)$$

Proof:

First it is wellknown that if consumers search sequentially, they leave a firm if, and only if, the price \tilde{p} observed at that firm exceeds p^* (see, for instance, Rothschild, M. (1974)) : the price p^* makes the expected gain from leaving a shop quoting p^* for a further search exactly equal to zero. Indeed, denoting by $\varphi(\tilde{p})$ the expected gain if a price \tilde{p} is observed, it is easily derived that

$$\begin{aligned} \varphi(\tilde{p}) &= \tilde{p} - c - \tilde{p}(1-F(\tilde{p})) - \int_0^{\tilde{p}} pf(p) dp \\ &= \int_0^{\tilde{p}} F(p) dp - c \end{aligned}$$

To show that p^* exists is equivalent to showing that there exists, p^* such that $\varphi(p^*) = 0$. Notice that $\varphi(0) = -c$ and $\partial\varphi/\partial\tilde{p} > 0$. Furthermore

$$\begin{aligned} \varphi(\bar{p}) &= \bar{p} - c - \bar{p}(1-F(\bar{p})) + \int_0^{\bar{p}} pf(p) dp \\ &= \bar{p} - c + E(\bar{p}) > 0, \end{aligned}$$

where the last inequality follows by assumption. Accordingly, by continuity of φ , which follows from the continuity of F , there must exist p^* such that $\varphi(p^*) = 0$, p^* in the compact interval $[0, \bar{p}]$.

Now assume that $p^* \leq p_M$ and that, contrary to the proposition, the n -tuple (p^*, \dots, p^*) is not a price equilibrium. Then there exists a firm h and a price $p_h \neq p^*$ yielding a strictly higher expected revenue than $E(\Pi(p^*, \dots, p^*))$ (E denotes the expectation operator and Π the revenue function). Notice that p_h cannot exceed p^* ; otherwise all the customers in the h^{th} population center who have visited firm h at first, leave that firm, searching for a lower price, and they find it indeed in any other shop than h (namely they find p^* !). But then $0 = E(\Pi(p^*, \dots, p_h, \dots, p^*)) < E(\Pi(p^*, \dots, p^*, \dots, p^*)) = D(p^*) \cdot p^*$, a contradiction. On the other hand, if p_h is strictly smaller than p^* , then all customers in the h^{th} population center who have first visited firm h , remain in that firm and $E(\Pi(p^*, \dots, p_h, \dots, p^*)) = p_h D(p_h) < p^* D(p^*) = E(\Pi(p^*, \dots, p^*, \dots, p^*))$, where the last inequality follows from the fact that $p^* < p_M$ and strict concavity of $p \cdot D(p)$.

Finally if $p_M < p^*$, each firm is not constrained by p^* , and setting the monopoly price p_M it keeps in the shop all its potential customers, while simultaneously maximizing its expected payoff.

Q.E.D.

Thus the mechanism of price competition underlying the above analysis is much different from the mechanism of non cooperative price competition for an homogeneous good when there is perfect information. There we know that prices have to descend to zero, because at any strictly positive price, it pays to undercut the competitor. This cutthroat competition remains valid here, for all prices which exceed p^* . However no firm has an interest to undercut p^* itself: In any case customers remain in the shop, and the firm may behave as a 'local monopolist' on this segment of the market.

On the other hand we notice that $\frac{\partial p^*}{\partial c} = \frac{1}{F(p^*)} > 1$ and that $p^* = c + p^*(1-F(p^*)) + \int_0^p pf(p) dp > c$. Furthermore it is worth noticing that the price equilibrium does not change with the number of firms, at least as long as the unit search cost c does not depend on the number of firms. One should expect however the search cost c to be a decreasing function of n : when the 'density' of firms increases on the network where consumers are located, the unit search cost should diminish. Since $\frac{\partial p^*(n)}{\partial n} = \frac{\partial p^*(c)}{\partial c} < 0$, a reasonable conjecture is that the price equilibrium tends to zero when the number of firms tends to ∞ . Finally we notice that no price dispersion arises at equilibrium, and that at the same price, no consumer undertakes any search.

A natural question to raise is whether the above properties continue to hold when consumers are no longer identical. In the next section we analyze this question assuming a continuum of consumers with varying search costs and a uniform distribution as representing their prior beliefs.

3. THE HETEROGENEOUS CASE

We consider in the following a classical Hotelling's location model. On a line of length L , two sellers, 1 and 2, of a homogeneous product, with zero production cost, are located at respective distances a and b , from the end points of this line ($a + b \leq L$; $a \geq 0$, $b \geq 0$). Customers are evenly distributed along the line and each customer, indexed by t , $t \in [0, L]$, consumes exactly a single unit of this commodity, irrespective of its price. In Hotelling's original model the prices quoted by each seller are known from the start to all consumers, who place their purchase order to the seller quoting the lowest delivered price. Here, it is assumed alternatively, that each customer only knows with certainty the price announced by the seller *nearest to him* on the linear segment. While each customer ignores, therefore, one of the two prices it is assumed that he can acquire this information at a cost which depends linearly on the distance separating his own location from the location of the more distant seller. The buyer can,

accordingly, either buy at the known price from the nearest shop, or postpone the purchase until he has first searched for the price set by the more distant seller. The decision whether to purchase at the known price without search or whether to solicit the other seller depends on the expectation of finding a lower price. Here, as in section 2, we shall represent consumers expectations about the unknown price by a probability function $F(p)$ defined over some range $[0, \bar{p}]$. Again $F(p)$ has to be interpreted as a probability distribution, the form of which is determined by the consumers prior beliefs about prices. Since we have assumed that consumer t has no information on the price quoted by the more distant seller, it is natural to assume that $F(p)$ is an *uniform* distribution on $[0, \bar{p}]$ with corresponding uniform density $f(p)$. We normalize prices so that $\bar{p} = 1$. To summarize: all customers t share the same prior uniform distribution $F(p)$ on $[0, 1]$, where p denotes the price set by the firm located at the farthest distance from customer t . Since all consumers t in the set

$$A_1 \stackrel{\text{def}}{=} \{t | 0 \leq t \leq \frac{L+a-b}{2}\}$$

are located closer to seller 1 than seller 2, they have perfect information on the price p_1 set by seller 1. Similarly consumers in the set

$$A_2 \stackrel{\text{def}}{=} \{t | \frac{L+a-b}{2} < t \leq L\}$$

have perfect information on the price p_2 (see figure 1).

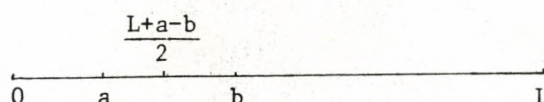


Figure 1

The cost of acquiring information about the price at the more distant of the two sellers is then given by

$$\begin{aligned} c(t) &= [(L-b) - t] c, \quad \text{if } t \in A_1 \\ &= (t-a) c, \quad \text{if } t \in A_2 \end{aligned}$$

The decision to buy from the nearest seller, without search, rather than searching and then choosing the most favourable opportunity depends upon whether the search is expected to be profitable or not. The expected gains from the search for customer t is given by (for $t \in A_1$)¹:

$$\varphi(\tilde{p}_1, t) = \tilde{p}_1 - \int_0^{\tilde{p}_1} [p_2 + c(t)] f(p_2) - [\tilde{p}_1 + c(t)] \int_{\tilde{p}_1}^1 f(p_2) df_2$$

$$= \tilde{p}_1 - \int_0^{\tilde{p}_1} [p_2 + c(t)] dp_2 - [\tilde{p}_1 + c(t)] \int_{\tilde{p}_1}^1 dp_2,$$

where \tilde{p}_1 represents the observed value of p at location a . Then customer t in A_1 (resp. A_2) will search if and only if $\varphi(\tilde{p}_1, t)$ (resp. $\varphi(\tilde{p}_2, t)$) is greater than zero; then he may buy from one or the other shop according as $\tilde{p}_1 \geq p_2$ (resp. $\tilde{p}_2 \geq p_1$).

An important role in the following will be played by that price, -call it $p_1^*(t)$ for $t \in A_1$ and $p_2^*(t)$ for $t \in A_2$ - which, when observed at the nearest shop makes consumer t indifferent between buying instantaneously without search, and searching. It is easily found that

$$p_1^*(t) = \sqrt{2c(L-b-t)} \quad , \quad t \in A_1 \quad (2a)$$

and

$$p_2^*(t) = \sqrt{2c(t-a)} \quad , \quad t \in A_2 \quad (2b)$$

In order to have $p_1^*(t)$ and $p_2^*(t)$ in $[0,1]$ the condition $L \leq \frac{1}{2c}$ is held throughout.

The next proposition describes the market outcome resulting from the situation just described when the two sellers choose their price in a non cooperative manner. To this end let us derive the (contingent) demand functions of both sellers $D_1(p_1, p_2)$ and $D_2(p_1, p_2)$. To simplify the analysis, consider figure 2, which describes the reservation prices, $p_1^*(t)$ and $p_2^*(t)$ as function of t .

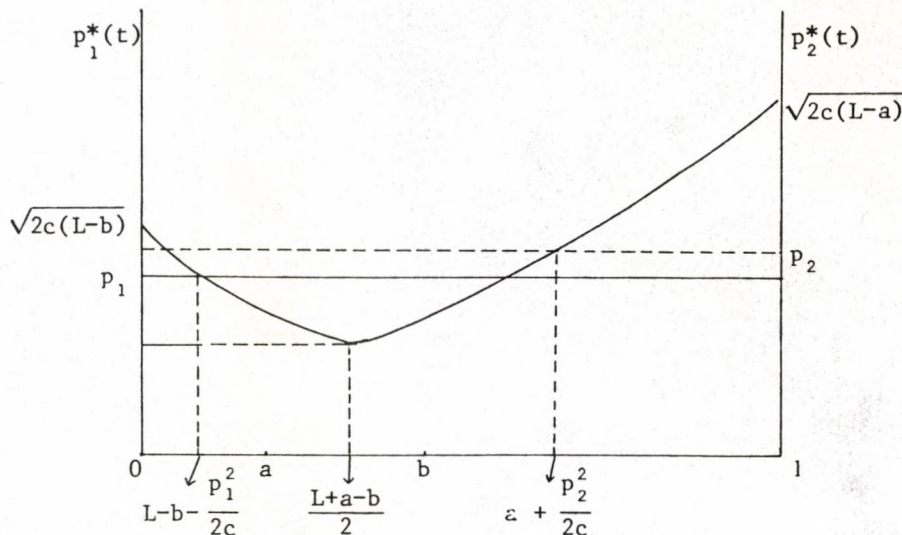


Figure 2

If $p_1 \leq \sqrt{c(L-a-b)} = p_1^*(\frac{L+a-b}{2})$, all customers t in A_1 who first visit seller 1 remain in his shop and buy from him since $p_1 \leq p_1^*(t)$ for all $t \in A_1$. If $\sqrt{c(L-a-b)} < p_1 < p_2$, all customers in the set

$$\{t | p_1 \leq p_1^*(t)\} = \{t | t \in A_1, p_1 \leq \sqrt{2c(L-b-t)}\} = [0, L-b-\frac{p_1^2}{2c}]$$

still remain in the shop of seller 1, while customers in $]L-b-\frac{p_1^2}{2c}, \frac{L+a-b}{2}]$ leave and visit seller 2 where they find a price p_2 higher than p_1 : accordingly they come back to seller 1 and buy from him. Moreover customers in the set $\{t | t \in A_2; p_2^*(t) < p_2\}$ who first visit seller 2 leave him and visit seller 1. Since $p_1 < p_2$, they also buy from seller 1. Finally if $\sqrt{c(L-a-b)} \leq p_2 \leq p_1$, all customers in the set

$$\{t | t \in A_1, p_1^*(t) < p_1\} \cup \{t | t \in A_2; p_2^*(t) < p_2\}$$

visit both shops, but buy from seller 2 (as a convention we shall assume that if both sellers quote the same price, each of them serves all customers the closest to him, i.e. A_1 for seller 1, and A_2 for seller 2). From this analysis, it follows that

$$\begin{aligned} D_1(p_1, p_2) &= \frac{L+a-b}{2}, \text{ if } p_1 \leq \sqrt{c(L-a-b)} \text{ and } p_2 \leq \sqrt{c(L-a-b)} \\ &= a + \frac{p_2^2}{2c}, \text{ if } p_2 > \sqrt{c(L-a-b)} \text{ and } p_1 < p_2 \leq \sqrt{2c(L-a)} \\ &= L-b - \frac{p_1^2}{2c}, \text{ if } p_1 > \sqrt{c(L-a-b)} \text{ and } p_2 < p_1 \leq \sqrt{2c(L-b)} \\ &= \frac{L+a-b}{2}, \text{ if } p_1 = p_2 \geq \sqrt{c(L-a-b)}. \end{aligned}$$

Performing a similar analysis from the view point of seller 2 yields

$$\begin{aligned} D_2(p_1, p_2) &= \frac{L-a+b}{2}, \text{ if } p_2 \leq \sqrt{c(L-a-b)} \text{ and } p_1 \leq \sqrt{c(L-a-b)} \\ &= b + \frac{p_1^2}{2c}, \text{ if } \sqrt{c(L-a-b)} < p_2 < p_1 \leq \sqrt{2c(L-b)} \\ &= \frac{L-a+b}{2}, \text{ if } p_2 = p_1 \geq \sqrt{c(L-a-b)} \\ &= L-a - \frac{p_2^2}{2c}, \text{ if } p_2 > \sqrt{c(L-a-b)} \text{ and } p_1 < p_2 \leq \sqrt{2c(L-a)}. \end{aligned}$$

We are now in a position to prove

PROPOSITION 2

There is a price equilibrium if, and only if,

$$b + 3a \leq L \quad (3)$$

and

$$a + 3b \leq L ; \quad (4)$$

and, whenever it exists, the price equilibrium is uniquely determined by

$$p^* = p_1^* = p_2^* \stackrel{\text{def}}{=} \sqrt{c(L-a-b)} .$$

Proof:

First let us show that there exists no pair of prices $(\tilde{p}_1, \tilde{p}_2) \neq (p^*, p^*)$ which is a price equilibrium. Assume on the contrary that the pair $(\tilde{p}_1, \tilde{p}_2)$ is a price equilibrium with $\tilde{p}_i \neq p^*$ for at least some i , $i = 1, 2$. It is easy to see that no \tilde{p}_i can be strictly smaller than p^* : otherwise seller i could increase \tilde{p}_i while keeping in his shop all customers that are nearest to him, thereby increasing his revenue, a contradiction. Accordingly $\tilde{p}_1 \geq p^*$ and $\tilde{p}_2 \geq p^*$ with at least a strict inequality for some i . On the other hand, we must have $\tilde{p}_1 = \tilde{p}_2$. Assume on the contrary that $\tilde{p}_1 > \tilde{p}_2$, say. Then $D_2(\tilde{p}_1, \tilde{p}_2) = b + \frac{\tilde{p}_1^2}{2c}$, and $\tilde{p}_2 \cdot (b + \frac{\tilde{p}_1^2}{2c}) < p_2 \cdot (b + \frac{\tilde{p}_1^2}{2c})$ for $\tilde{p}_2 < p_2 < \tilde{p}_1$, a contradiction. So assume finally $\tilde{p}_1 = \tilde{p}_2 > p^*$. Then

$$\tilde{p}_1 D_1(\tilde{p}_1, \tilde{p}_2) = \tilde{p}_1 \left(\frac{L+a-b}{2} \right) < (\tilde{p}_1 - \epsilon) \cdot D_1(\tilde{p}_1 - \epsilon, \tilde{p}_2) = (\tilde{p}_1 - \epsilon) \left(a + \frac{\tilde{p}_2^2}{2c} \right) ,$$

for ϵ sufficiently small, since $(a + \frac{\tilde{p}_2^2}{2c}) > \frac{L+a-b}{2}$. Consequently there exists no pair of prices different from (p^*, p^*) which yields a price equilibrium.

Now let us show that (p^*, p^*) is a price equilibrium if and only if both inequalities (3) and (4) hold simultaneously. To this end let us assume that $p_2 = p^*$, and compute the revenue $R_1(p_1, p^*) \stackrel{\text{def}}{=} p_1 D_1(p_1, p^*)$ for seller 1. Then

$$\begin{aligned} R_1(p_1, p^*) &= p_1 \cdot \frac{L+a-b}{2} \quad \text{if } p_1 \leq p^* = p_2 ; \\ &= p_1 \cdot \left(L - b - \frac{p_1^2}{2c} \right) \quad \text{if } p_1 > p^* . \end{aligned}$$

(the graph of $R_1(p_1, p^*)$ is depicted on figure 3).

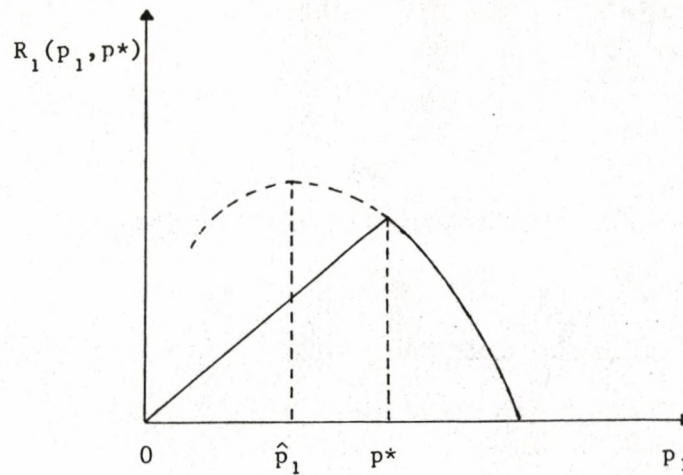


Figure 3

Consequently $p^* = p_1$ is a best reply against $p^* = p_2$ if, and only if, the solution \hat{p}_1 to the problem

$$\max_{p_1} p_1 \cdot \left(L - b - \frac{p_1^2}{2c} \right)$$

is smaller or equal to p^* , i.e. iff $\hat{p}_1 \stackrel{\text{def}}{=} \sqrt{\frac{(L-b)2c}{3}} \leq \sqrt{c(L-a-b)} = p_1^*$ i.e. if and only if (3) holds. Similarly assume $p^* = p_1$ and compute the revenue $R_2(p^*, p_2) \stackrel{\text{def}}{=} p_2 D_2(p^*, p_2)$. As above, $p^* = p_2$ is a best reply against $p^* = p_1$ if, and only if, the solution \hat{p}_2 to the problem

$$\max_{p_2} p_2 \left(L - a - \frac{p_2^2}{2c} \right)$$

is smaller or equal to p^* , i.e. iff $\hat{p}_2 \stackrel{\text{def}}{=} \sqrt{\frac{(L-a)2c}{3}} \leq \sqrt{c(L-a-b)} = p^*$, i.e. if, and only if, (4) holds.

Q.E.D.

Notice that if we restrict ourselves to symmetric locations (i.e. $a = b$), the pair of prices (p^*, p^*) is a price equilibrium if, and only if, both firms are located outside the quartiles ($a = b \leq \frac{L}{4}$). Figure 4 depicts the set of location pairs (a, b) for which (p^*, p^*) is a price equilibrium.

On the other hand no price dispersion arises at equilibrium when it exists, exactly as in the homogeneous case; and again, no customer undertakes any search at equilibrium.

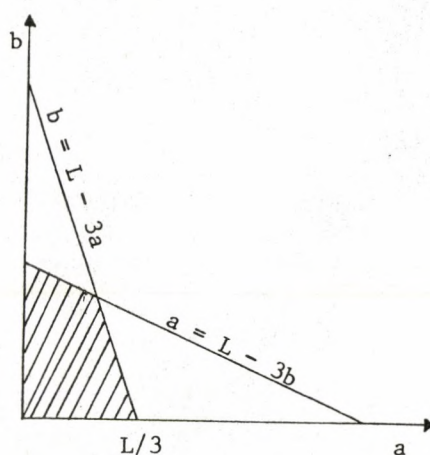


Figure 4

Finally, it is worth noticing, for further comparison, that performing a similar analysis, -but assuming that search costs are *quadratic* with respect to the distance²-, leads to drastically different conclusions. It can then be shown (see appendix) that a price equilibrium exists, if and only if, both firms are located at the two extremes of the road. To all pair of locations interior to the linear segment $[0, L]$ no price equilibrium exists.

4. CONCLUSION

In this paper we have analyzed how price competition operates when a 'subjective' price search, relying on a priori consumers' beliefs about prices, is substituted to the objective price search, relying on the knowledge of the true distribution of prices. In the first model (the 'homogeneous case' of section 2) the equilibrium price is either the monopoly price, or the price which makes each consumer indifferent between buying at that price at the local shop, or searching. An analogous conclusion has been reached by Reinganum (1979) in a model of objective price search with a continuum of firms. As for the results of the second model, -when the search behaviour is presented in a spatial framework-, they have to be confronted with Hotelling's original work (Hotelling (1929)) and another paper which the authors are completing (Gabszewicz and Garella (1985)). In both Hotelling's model, -where consumers are perfectly informed,- and in the present one, there is a wide domain of location parameters entailing the absence of price equilibrium. However the mechanisms which causes the existence of a price cycle, is very different in the two cases. In Hotelling's case, it relies on the incentive to each firm to undercut the price of its competitor when sellers are too close to each other; here, whatever the locations, the only possible equilibrium obtains at that price at which no consumer searches. But when firms are too close to

each other, the revenue at that pair of prices, is 'beated' by a higher price where the firm quoting that price loses some customers. Thus the beating strategy is not the undercutting price but, on the contrary, a price which is higher than the candidate for an equilibrium. The difference between the two models is even more apparent in the case where search costs are assumed to be quadratic with the distance. While a price equilibrium exists at *all* location pairs under perfect information about prices (see d'Aspremont et al. (1979)), a price equilibrium *never* exists under imperfect information (except in the degenerate case where firms are located at the two extremes of the line).

We have shown elsewhere (Gabszewicz and Garella (1985)) that if 'objective' price search, -meaning by this that consumers know the true distribution of prices,- is combined with a spatial framework, the nature of the price equilibrium is drastically different. First prices must necessarily be different at each shop; second, for the existence of an equilibrium, firms cannot be too far apart from each other; finally there is search at equilibrium. From these examples we may conclude that the existence of competition between firms and the resulting equilibrium configurations of prices and firms' locations show substantial differences when different consumers' price information patterns are assumed.

FOOTNOTES

¹ Subscript 1 and 2 for prices must be interchanged in order to get $\varphi(\tilde{p}_2, t)$ for $t \in A_2$.

² For any distance x , search costs are given by cx^2 .

APPENDIX

Consider the case where the cost of acquiring information about the price at the more distant of the two sellers is given by quadratic costs, i.e.

$$\begin{aligned} c(t) &= c[(L-b-t)]^2, \text{ if } t \in A_1 \\ &= c(t-a)^2, \text{ if } t \in A_2. \end{aligned}$$

For $t \in A_1$, the expected gain from search for customer t obtains as

$$\tilde{p}_1 - \left\{ \int_0^{\tilde{p}_1} [p_2 + c(L-b-t)^2] dp_2 + [c(L-b-t)^2 + \tilde{p}_1] \int_{\tilde{p}_1}^1 dp_2 \right\}$$

if the price \tilde{p}_1 is observed at shop 1. Consequently, the price $p_1^*(t)$ which makes consumer t , $t \in A_1$, indifferent between buying instantaneously without search and searching, is given by

$$p_1^*(t) = 2\sqrt{c}(L-b-t).$$

Similarly, the price $p_2^*(t)$ which makes consumer t , $t \in A_2$, indifferent between buying instantaneously at shop 2, without search and searching is given by

$$p_2^*(t) = 2\sqrt{c}(t-a).$$

If $p_1 \leq \sqrt{c}(L-a-b) = p_1^*\left(\frac{L+a-b}{2}\right)$, all consumers t in A_1 who first visit seller 1, remain in his shop and buy from him since $p_1 \leq p_1^*(t)$ for all t in A_1 . If $\sqrt{c}(L-a-b) < p_1$ all customers in the set

$$\{t | p_1 \leq p_1^*(t)\} = \{t | t \in A_1, p_1 \leq 2\sqrt{c}(L-b-t)\} = \left[0, L-b-\frac{p_1}{2\sqrt{c}}\right]$$

still remain in the shop of seller 1, while customers in $\left]L-b-\frac{p_1}{2\sqrt{c}}, \frac{L+a-b}{2}\right]$ leave and visit seller 2.

Now assume that seller 2 quotes $p_2^* = \sqrt{c}(L-a-b)$. If seller 1 quotes a price p_1 smaller than p_2^* his revenue is equal to $p_1 \cdot \frac{L+a-b}{2}$, while if he quotes a price p_1 higher than p_1^* , his revenue is equal to $p_1(L-b-\frac{p_1}{2\sqrt{c}})$. Accordingly $p_1 = p_2^* = \sqrt{c}(L-a-b)$ is a best reply against p_2^* if and only if the solution \hat{p}_1 to the problem

$$\max_{p_1} p_1 \left(L-b-\frac{p_1}{2\sqrt{c}}\right)$$

is smaller or equal to $\sqrt{c}(L-a-b)$, i.e. iff $\hat{p}_1 = \sqrt{c}(L-b) \leq \sqrt{c}(L-a-b)$, a condition which can be satisfied if and only if $a = 0$.

A similar analysis performed from the viewpoint of seller 2 shows that $p_2 = \sqrt{c}(L-a-b)$ is a best reply against $p_1^* = \sqrt{c}(L-a-b)$ if, and only if, $b = 0$. Accordingly the pair of prices $(\sqrt{c}(L-a-b), \sqrt{c}(L-a-b))$ is a price equilibrium only if both sellers are located at the two extremes of the road.

On the other hand, using arguments similar to those used in the beginning of the proof of proposition 1, leads to the conclusion that no other pair of prices can be a price equilibrium. In conclusion, there exists no price equilibrium when information costs are quadratic, except in the degenerate case where both sellers are located at the two extremes of the road.

REFERENCES

- Carlson, J. and Preston McAfee (1983), Discrete Equilibrium Price Dispersion, *Journal of Political Economy*, 91, 3, 480-493.
- d'Aspremont, C., J. Jaskold Gabszewicz and J. Thisse (1979), On Hotelling's Stability in Competition, *Econometrica*, 47, 1145-1150.
- Eaton B.C. and R.G. Lipsey (1975), The Principle of Minimum Differentiation Reconsidered. Some New Developments in the Theory of Spatial Competition, *Review of Economics Studies*, 42, 1, 27-49.
- Gabszewicz, J. and P. Garella (1985), Scattered Sellers and Ill-Informed Buyers: a Model of Price Dispersion, CORE, Discussion Paper n° 8503.
- Hotelling, H. (1929), Stability in Competition, *Economic Journal*, 39, 41-57.
- Reinganum, J.F. (1979), A Simple Model of Equilibrium Price Dispersion, *Journal of Political Economy*, 81, 1885-1908.
- Rötschild, M. (1973), Models of Market Organization with Imperfect Information: A Survey, *Journal of Political Economy*, 81, 1283-1308.
- Rötschild, M. (1974), Searching for the Lowest Price when the Distribution of Prices is Unknown, *Journal of Political Economy*, 82, 689-711.
- Salop, S.C. and J. Stiglitz (1977), Bargains and Ripoffs: A Model of Monopolistically Competitive Price Dispersion, *Review of Economic Studies*, 44, 493-510.
- Stahl, K. (1982), Differentiated Products, Consumer Search and Locational Oligopoly, *Journal of Industrial Economics*, 51, 1, 97-113.
- Stigler, G. (1961), The Economics of Information, *Journal of Political Economy*, 69, 213-225.

WORKING PAPERS ECONOMICS DEPARTMENT

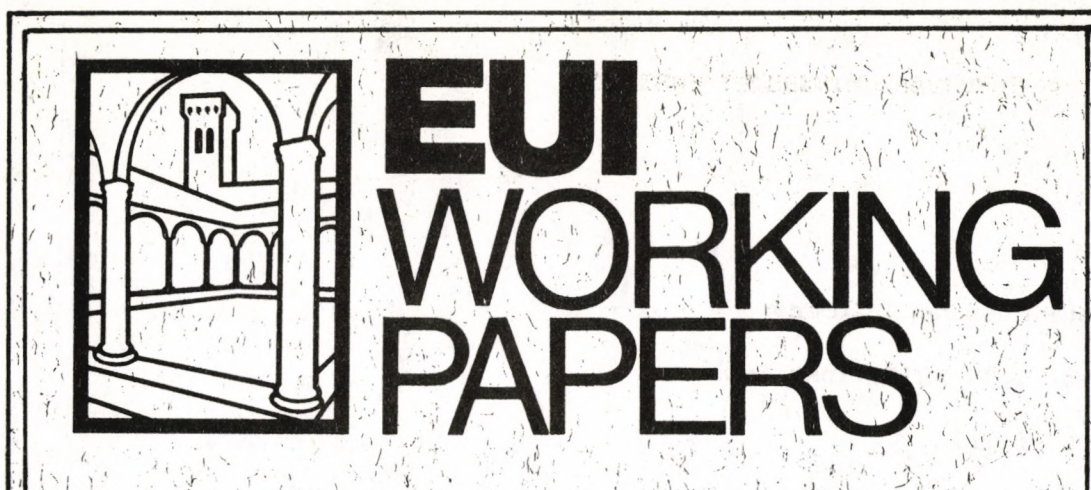
No. 1: Jacques PELKMANS	The European Community and the Newly Industrialized Countries
No. 3: Aldo RUSTICHINI	Seasonality in Eurodollar Interest Rates
No. 9: Manfred E. STREIT	Information Processing in Futures Markets. An Essay on the Adequacy of an Abstraction.
No. 10: Kumaraswamy VELUPILLAI	When Workers Save and Invest: Some Kaldorian Dynamics
No. 11: Kumaraswamy VELUPILLAI	A Neo-Cambridge Model of Income Distribution and Unemployment
No. 12: Kumaraswamy VELUPILLAI Guglielmo CHIODI	On Lindahl's Theory of Distribution
No. 22: Don PATINKIN	Paul A. Samuelson on Monetary Theory
No. 23: Marcello DE CECCO	Inflation and Structural Change in the Euro-Dollar Market
No. 24: Marcello DE CECCO	The Vicious/Virtuous Circle Debate in the '20s and the '70s
No. 25: Manfred E. STREIT	Modelling, Managing and Monitoring Futures Trading: Frontiers of Analytical Inquiry
No. 26: Domenico Mario NUTI	Economic Crisis in Eastern Europe: Prospects and Repercussions
No. 34: Jean-Paul FITOUSSI	Modern Macroeconomic Theory; an Overview
No. 35: Richard M. GOODWIN Kumaraswamy VELUPILLAI	Economic Systems and their Regulation
No. 46: Alessandra VENTURINI	Is the Bargaining Theory Still an Effective Framework of Analysis for Strike Patterns in Europe?
No. 47: Richard M. GOODWIN	Schumpeter: The Man I Knew
No. 48: Jean-Paul FITOUSSI Daniel SZPIRO	Politique de l'Emploi et Réduction de la Durée du Travail
No. 56: Berc RUSTEM Kumaraswamy VELUPILLAI	Preferences in Policy Optimization and Optimal Economic Policy
No. 60: Jean-Paul FITOUSSI	Adjusting to Competitive Depression. The Case of the Reduction in Working Time
No. 64: Marcello DE CECCO	Italian Monetary Policy in the 1980s

- | | |
|--|--|
| No. 65: Gianpaolo ROSSINI | Intra-industry Trade in Two areas:
Some Aspects of Trade Within and
Outside a Custom Union |
| No. 66: Wolfgang GEBAUER | Euromarkets and Monetary Control:
The Deutschmark Case |
| No. 67: Gerd WEINRICH | On the Theory of Effective Demand
under Stochastic Rationing |
| No. 68: Saul ESTRIN
Derek C. JONES | The Effects of Worker Participation
upon Productivity in French Pro-
ducer Cooperatives |
| No. 69: Berc RUSTEM
Kumaraswamy VELUPILLAI | On the Formalization of Political
Preferences: A Contribution to
the Frischian Scheme |
| No. 72: Wolfgang GEBAUER | Inflation and Interest: the Fisher
Theorem Revisited |
| No. 75: Sheila A. CHAPMAN | Eastern Hard Currency Debt 1970-
1983. An Overview. |
| No. 90: Will BARTLETT | Unemployment, Migration and In-
dustrialization in Yugoslavia,
1958-1982 |
| No. 91: Wolfgang GEBAUER | Kondratieff's Long Waves |
| No. 92: Elisabeth DE GELLINCK
Paul A. GEROSKI
Alexis JACQUEMIN | Inter-Industry and Inter-Temporal
Variations in the Effect of Trade
on Industry Performance |
| 84/103: Marcello DE CECCO | The International Debt Problem in
the Interwar Period |
| 84/105: Derek C. JONES | The Economic Performance of Pro-
ducer Cooperatives within Command
Economies: Evidence for the Case
of Poland |
| 84/111: Jean-Paul FITOUSSI
Kumaraswamy VELUPILLAI | A Non-Linear Model of Fluctuations
in Output in a Mixed Economy |
| 84/113: Domenico Mario NUTI | Mergers and Disequilibrium in Labour-
Managed Economies |
| 84/114: Saul ESTRIN
Jan SVEJNAR | Explanations of Earnings in Yugoslavia:
the Capital and Labor Schools Compared |
| 84/116: Reinhard JOHN | On the Weak Axiom of Revealed Preference
Without Demand Continuity Assumptions |

84/118: Pierre DEHEZ	Monopolistic Equilibrium and Involuntary Unemployment
84/119: Domenico Mario NUTI	Economic and Financial Evaluation of Investment Projects: General Principles and E.C. Procedures
84/120: Marcello DE CECCO	Monetary Theory and Roman History
84/121: Marcello DE CECCO	International and Transnational Financial Relations
84/122: Marcello DE CECCO	Modes of Financial Development: American Banking Dynamics and World Financial Crises
84/123: Lionello PUNZO Kumaraswamy VELUPILLAI	Multisectoral Models and Joint Production
84/126: John CABLE	Employee Participation and Firm Performance : a Prisoners' Dilemma Framework
84/127: Jesper JESPERSEN	Financial Model Building and Financial Multipliers of the Danish Economy
84/128: Ugo PAGANO	Welfare, Productivity and Self-Management
85/155: François DUCHENE	Beyond the First C.A.P.
85/156: Domenico Mario NUTI	Political and Economic Fluctuations in the Socialist System
85/157: Christophe DEISSENBERG	On the Determination of Macroeconomic Policies with Robust Outcome
85/161: Domenico Mario NUTI	A Critique of Orwell's Oligarchic Collectivism as an Economic System
85/162: Will BARTLETT	Optimal Employment and Investment Policies in Self-Financed Producer Cooperatives
85/169: Jean JASKOLD GABSZEWICZ Paolo GARELLA	Asymmetric International Trade
85/170: Jean JASKOLD GABSZEWICZ Paolo GARELLA	Subjective Price Search and Price Competition

Spare copies of these Working Papers can be obtained from:

Secretariat Economics Department
European University Institute
Badia Fiesolana
50016 S. Domenico di Fiesole (Fi)
Italy



EUI Working Papers are published and distributed by the European University Institute, Florence.

Copies can be obtained free of charge -- depending on the availability of stocks -- from:

The Publications Officer
European University Institute
Badia Fiesolana
I-50016 San Domenico di Fiesole(FI)
Italy

Please use order form overleaf.

To :The Publications Officer
European University Institute
Badia Fiesolana
I-50016 San Domenico di Fiesole(FI)
Italy

From : Name.....
Address.....
.....
.....
.....
.....

Please send me the following EUI Working Paper(s):

No.:.....

Author, title:.....
.....
.....
.....
.....

Date:.....

Signature:

.....



PUBLICATIONS OF THE EUROPEAN UNIVERSITY INSTITUTE

EUI WORKING PAPERS

- | | |
|---|---|
| 1: Jacques PELKMANS | The European Community and the Newly Industrialized Countries * |
| 2: Joseph H.H. WEILER | Supranationalism Revisited - Retrospective and Prospective. The European Communities After Thirty Years * |
| 3: Aldo RUSTICHINI | Seasonality in Eurodollar Interest Rates |
| 4: Mauro CAPPELLETTI/
David GOLAY | Judicial Review, Transnational and Federal: Impact on Integration |
| 5: Leonard GLESKE | The European Monetary System: Present Situation and Future Prospects * |
| 6: Manfred HINZ | Massenkult und Todessymbolik in der national-sozialistischen Architektur * |
| 7: Wilhelm BURKLIN | The "Greens" and the "New Politics": Goodbye to the Three-Party System? |
| 8: Athanasios MOULAKIS | Unilateralism or the Shadow of Confusion * |
| 9: Manfred E. STREIT | Information Processing in Futures Markets. An Essay on the Adequacy of an Abstraction * |
| 10: Kumaraswamy VELUPILLAI | When Workers Save and Invest: Some Kaldorian Dynamics * |
| 11: Kumaraswamy VELUPILLAI | A Neo-Cambridge Model of Income Distribution and Unemployment * |
| 12: Kumaraswamy VELUPILLAI/
Guglielmo CHIODI | On Lindahl's Theory of Distribution * |
| 13: Gunther TEUBNER | Reflexive Rationalitaet des Rechts * |
| 14: Gunther TEUBNER | Substantive and Reflexive Elements in Modern Law * |
| 15: Jens ALBER | Some Causes and Consequences of Social Security Expenditure Development in Western Europe, 1949-1977 * |

- 16:Ian BUDGE Democratic Party Government: Formation and Functioning in Twenty-One Countries *
- 17:Hans DAALDER Parties and Political Mobilization: An Initial Mapping *
- 18:Giuseppe DI PALMA Party Government and Democratic Reproducibility: The Dilemma of New Democracies *
- 19:Richard S. KATZ Party Government: A Rationalistic Conception *
- 20:Juerg STEINER Decision Process and Policy Outcome: An Attempt to Conceptualize the Problem at the Cross-National Level *
- 21:Jens ALBER The Emergence of Welfare Classes in West Germany: Theoretical Perspectives and Empirical Evidence *
- 22:Don PATINKIN Paul A. Samuelson and Monetary Theory
- 23:Marcello DE CECCO Inflation and Structural Change in the Euro-Dollar Market *
- 24:Marcello DE CECCO The Vicious/Virtuous Circle Debate in the '20s and the '70s *
- 25:Manfred E. STREIT Modelling, Managing and Monitoring Futures Trading: Frontiers of Analytical Inquiry *
- 26:Domenico Mario NUTI Economic Crisis in Eastern Europe - Prospects and Repercussions
- 27:Terence C. DAINTITH Legal Analysis of Economic Policy *
- 28:Frank C. CASTLES/
Peter MAIR Left-Right Political Scales: Some Expert Judgements *
- 29:Karl HOHMANN The Ability of German Political Parties to Resolve the Given Problems: the Situation in 1982 *
- 30:Max KAASE The Concept of Political Culture: Its Meaning for Comparative Political Research *

- 31:Klaus TOEPFER
Possibilities and Limitations of a
Regional Economic Development Policy
in the Federal Republic of Germany *
- 32:Ronald INGLEHART
The Changing Structure of Political
Cleavages Among West European Elites
and Publics *
- 33:Moshe LISSAK
Boundaries and Institutional Linkages
Between Elites: Some Illustrations
from Civil-Military Elites in Israel *
- 34:Jean-Paul FITOUSSI
Modern Macroeconomic Theory: An
Overview *
- 35:Richard M. GOODWIN/
Kumaraswamy VELUPILLAI
Economic Systems and their Regulation*
- 36:Maria MAGUIRE
The Growth of Income Maintenance
Expenditure in Ireland, 1951-1979 *
- 37:G. LOWELL FIELD/
John HIGLEY
The States of National Elites and the
Stability of Political Institutions in
81 Nations, 1950-1982
- 38:Dietrich HERZOG
New Protest Elites in the Political
System of West Berlin: The Eclipse of
Consensus? *
- 39:Edward O. LAUMANN/
David KNOKE
A Framework for Concatenated Event
Analysis
- 40:Gwen MOOR/
Richard D. ALBA
Class and Prestige Origins in the
American Elite
- 41:Peter MAIR
Issue-Dimensions and Party Strategies
in the Irish republic 1948-1981: The
Evidence of Manifestos
- 42:Joseph H.H. WEILER
Israel and the Creation of a Palestine
State. The Art of the Impossible and
the Possible *
- 43:Franz Urban PAPPI
Boundary Specification and Structural
Models of Elite Systems: Social
Circles Revisited
- 44:Thomas GAWRON/
Ralf ROGOWSKI
Zur Implementation von
Gerichtsurteilen. Hypothesen zu den
Wirkungsbedingungen von Entscheidungen
des Bundesverfassungsgerichts *

- 45:Alexis PAULY/
René DIEDERICH Migrant Workers and Civil Liberties *
- 46:Alessandra VENTURINI Is the Bargaining Theory Still an
Effective Framework of Analysis for
Strike Patterns in Europe? *
- 47:Richard A. GOODWIN Schumpeter: The Man I Knew
- 48:J.P. FITOUSSI/
Daniel SZPIRO Politique de l'Emploi et Réduction de
la Durée du Travail
- 49:Bruno DE WITTE Retour à Costa. La Primauté du Droit
Communautaire à la Lumière du Droit
International
- 50:Massimo A. BENEDETTELLI Eguaglianza e Libera Circolazione dei
Lavoratori: Principio di Eguaglianza e
Divieti di Discriminazione nella
Giurisprudenza Comunitaria in Materia
di Diritti di Mobilità Territoriale e
Professionale dei Lavoratori
- 51:Gunther TEUBNER Corporate Responsibility as a Problem
of Company Constitution *
- 52:Erich SCHANZE Potentials and Limits of Economic
Analysis: The Constitution of the Firm
- 53:Maurizio COTTA Career and Recruitment Patterns of
Italian Legislators. A Contribution of
the Understanding of a Polarized
System *
- 54:Mattei DOGAN How to become a Cabinet Minister in
Italy: Unwritten Rules of the
Political Game *
- 55:Mariano BAENA DEL ALCAZAR/
Narciso PIZARRO The Structure of the Spanish Power
Elite 1939-1979 *
- 56:Berc RUSTEM/
Kumaraswamy VELUPILLAI Preferences in Policy Optimization and
Optimal Economic Policy
- 57:Giorgio FREDDI Bureaucratic Rationalities and the
Prospect for Party Government *
- 59:Christopher Hill/
James MAYALL The Sanctions Problem: International
and European Perspectives

- 60:Jean-Paul FITOUSSI Adjusting to Competitive Depression.
The Case of the Reduction in Working
Time
- 61:Philippe LEFORT Idéologie et Morale Bourgeoise de la
Famille dans le Ménager de Paris et le
Second Libro di Famiglia, de L.B.
Alberti *
- 62:Peter BROCKMEIER Die Dichter und das Kritisieren
- 63:Hans-Martin PAWLOWSKI Law and Social Conflict
- 64:Marcello DE CECCO Italian Monetary Policy in the 1980s *
- 65:Gianpaolo ROSSINI Intraindustry Trade in Two Areas: Some
Aspects of Trade Within and Outside a
Custom Union
- 66:Wolfgang GEBAUER Euromarkets and Monetary Control: The
Deutschemark Case
- 67:Gerd WEINRICH On the Theory of Effective Demand
under Stochastic Rationing
- 68:Saul ESTRIN/
Derek C. JONES The Effects of Worker Participation
upon Productivity in French Producer
Cooperatives *
- 69:Berc RUSTEM
Kumaraswamy VELUPILLAI On the Formalization of Political
Preferences: A Contribution to the
Frischian Scheme *
- 70:Werner MAIHOFFER Politique et Morale *
- 71:Samuel COHN Five Centuries of Dying in Siena:
Comparison with Southern France *
- 72:Wolfgang GEBAUER Inflation and Interest: the Fisher
Theorem Revisited
- 73:Patrick NERHOT Rationalism and the Modern State *
- 74:Philippe SCHMITTER Democratic Theory and Neo-Corporatist
Practice *
- 75:Sheila A. CHAPMAN Eastern Hard Currency Debt 1970-83. An
Overview

- 76:Richard GRIFFITHS Economic Reconstruction Policy in the Netherlands and its International Consequences, May 1945 - March 1951 *
- 77:Scott NEWTON The 1949 Sterling Crisis and British Policy towards European Integration *
- 78:Giorgio FODOR Why did Europe need a Marshall Plan in 1947? *
- 79:Philippe MIOCHE The Origins of the Monnet Plan: How a Transitory Experiment answered to Deep-Rooted Needs
- 80:Werner ABELSHAUSER The Economic Policy of Ludwig Erhard
- 81:Helge PHARO The Domestic and International Implications of Norwegian Reconstruction
- 82:Heiner R. ADAMSEN Investitionspolitik in der Bundesrepublik Deutschland 1949-1951 *
- 83:Jean BOUVIER Le Plan Monnet et l'Economie Française 1947-1952 *
- 84:Mariuccia SALVATI Industrial and Economic Policy in the Italian Reconstruction *
- 85:William DIEBOLD, Jr. Trade and Payments in Western Europe in Historical Perspective: A Personal View By an Interested Party
- 86:Frances LYNCH French Reconstruction in a European Context
- 87:Gunther TEUBNER Verrechtlichung. Begriffe, Merkmale, Grenzen, Auswege *
- 88:Maria SPINEDI Les Crimes Internationaux de l'Etat dans les Travaux de Codification de la Responsabilité des Etats Entrepris par les Nations Unies *
- 89:Jelle VISSER Dimensions of Union Growth in Postwar Western Europe
- 90:Will BARTLETT Unemployment, Migration and Industrialization in Yugoslavia, 1958-1977

- 91:Wolfgang GEBAUER Kondratieff's Long Waves
- 92:Elisabeth DE GHELLINCK/
Paul A. GEROSKI/
Alexis JACQUEMIN Inter-Industry and Inter-Temporal
Variations in the Effect of Trade on
Industry Performance
- 93:Gunther TEUBNER/
Helmut WILLKE Kontext und Autonomie.
Gesellschaftliche Selbststeuerung
durch Reflexives Recht *
- 94:Wolfgang STREECK/
Philippe C. SCHMITTER Community, Market, State- and
Associations. The Prospective
Contribution of Interest Governance
to Social Order
- 95:Nigel GRIFFIN "Virtue Versus Letters": The Society
of Jesus 1550-1580 and the Export of
an Idea
- 96:Andreas KUNZ Arbeitsbeziehungen und
Arbeitskonflikte im oeffentlichen
Sektor. Deutschland und
Grossbritannien im Vergleich 1914-1924
*
- 97:Wolfgang STREECK Neo-Corporatist Industrial Relations
and the Economic Crisis in West
Germany *
- 98:Simon A. HORNER The Isle of Man and the Channel
Islands - A Study of their Status
under Constitutional, International
and European Law
- 99:Daniel ROCHE Le Monde des Ombres
- 84/100:Gunther TEUBNER After Legal Instrumentalism? *
- 84/101:Patrick NERHOT Contribution aux Débats sur le Droit
Subjectif et le Droit Objectif comme
Sources du Droit *
- 84/102:Jelle VISSER The Position of Central Confederations
in the National Union Movements
- 84/103:Marcello DE CECCO The International Debt Problem in the
Inter-War Period
- 84/104:M. Rainer LEPSIUS Sociology in Germany and Austria 1918-
1945. The Emigration of the Social
Sciences and its Consequences. The

- | | |
|--|--|
| | Development of Sociology in Germany
after the Second World War, 1945-1967 |
| 84/105:Derek JONES | The Economic Performances of Producer
Cooperations within Command Economies:
Evidence for the Case of Poland |
| 84/106:Philippe C. SCHMITTER | Neo-Corporatism and the State * |
| 84/107:Marcos BUSER | Der Einfluss der Wirtschaftsverbaende
auf Gesetzgebungsprozesse und das
Vollzugswesen im Bereich des
Umweltschutzes |
| 84/108:Frans van WAARDEN | Bureaucracy around the State:Varieties
of Collective Self-Regulation in the
Dutch Dairy Industry |
| 84/109:Ruggero RANIERI | The Italian Iron and Steel Industry
and European Integration |
| 84/110:Peter FARAGO | Nachfragemacht und die kollektiven
Reaktionen der Nahrungsmittelindustrie |
| 84/111:Jean-Paul FITOUSSI/
Kumuraswamy VELUPILLAI | A Non-Linear Model of Fluctuations in
Output in a Mixed Economy |
| 84/112:Anna Elisabetta GALEOTTI | Individualism and Political Theory |
| 84/113:Domenico Mario NUTI | Mergers and Disequilibrium in Labour-
Managed Economies |
| 84/114:Saul ESTRIN/Jan SVEJNAR | Explanations of Earnings in
Yugoslavia: The Capital and Labor
Schools Compared |
| 84/115:Alan CAWSON/John BALLARD | A Bibliography of Corporatism |
| 84/116:Reinhard JOHN | On the Weak Axiom of Revealed
Preference Without Demand Continuity
Assumptions |
| 84/117:Richard T.GRIFFITHS/
Frances F.B.LYNCH | The FRITALUX/FINEBEL Negotiations
1949/1950 |
| 84/118:Pierre DEHEZ | Monopolistic Equilibrium and
Involuntary Unemployment |
| 84/119:Domenico Mario NUTI | Economic and Financial Evaluation of
Investment Projects; General
Principles and E.C. Procedures |

* :Working Paper out of print

- | | |
|---|---|
| 84/120:Marcello DE CECCO | Monetary Theory and Roman History |
| 84/121:Marcello DE CECCO | International and Transnational
Financial Relations |
| 84/122:Marcello DE CECCO | Modes of Financial Development:
American Banking Dynamics and World
Financial Crises |
| 84/123:Lionello F. PUNZO/
Kumuraswamy VELUPILLAI | Multisectoral Models and Joint
Production |
| 84/124:John FARQUHARSON | The Management of Agriculture and
Food Supplies in Germany, 1944-47 |
| 84/125:Ian HARDEN/Norman LEWIS | De-Legalisation in Britain in the
1980s * |
| 84/126:John CABLE | Employee Participation and Firm
Performance. A Prisoners' Dilemma
Framework |
| 84/127:Jesper JESPERSEN | Financial Model Building and
Financial Multipliers of the
Danish Economy |
| 84/128:Ugo PAGANO | Welfare, Productivity and Self-
Management |
| 84/129:Maureen CAIN | Beyond Informal Justice * |
| 85/130:Otfried HOEFFE | Political Justice - Outline of a
Philosophical Theory |
| 85/131:Stuart J. WOOLF | Charity and Family Subsistence:
Florence in the Early Nineteenth
Century |
| 85/132:Massimo MARCOLIN | The <u>Casa d'Industria</u> in Bologna during
the Napoleonic Period: Public Relief
and Subsistence Strategies |
| 85/133:Osvaldo RAGGIO | Strutture di parentela e controllo
delle risorse in un'area di transito:
la Val Fontanabuona tra Cinque e
Seicento |
| 85/134:Renzo SABBATINI | Work and Family in a Lucchese Paper-
Making Village at the Beginning of the
Nineteenth Century |

- 85/135: Sabine JURATIC Solitude féminine et travail des femmes à Paris à la fin du XVIIIème siècle
- 85/136: Laurence FONTAINE Les effets déséquilibrants du colportage sur les structures de famille et les pratiques économiques dans la vallée de l'Oisans, 18e-19e siècles
- 85/137: Christopher JOHNSON Artisans vs. Fabricants: Urban Protoindustrialisation and the Evolution of Work Culture in Lodève and Bédarieux, 1740-1830
- 85/138: Daniela LOMBARDI La demande d'assistance et les réponses des autorités urbaines face à une crise conjoncturelle: Florence 1619-1622
- 85/139: Orstrom MOLLER Financing European Integration: The European Communities and the Proposed European Union.
- 85/140: John PINDER Economic and Social Powers of the European Union and the Member States: Subordinate or Coordinate Relationship
- 85/141: Vlad CONSTANTINESCO La Repartition des Competences Entre l'Union et les Etats Membres dans le Projet de Traite' Instituant l'Union Europeenne.
- 85/142: Peter BRUECKNER Foreign Affairs Power and Policy in the Draft Treaty Establishing the European Union.
- 85/143: Jan DE MEYER Belgium and the Draft Treaty Establishing the European Union.
- 85/144: Per LACHMANN The Draft Treaty Establishing the European Union: Constitutional and Political Implications in Denmark.
- 85/145: Thijmen KOOPMANS The Judicial System Envisaged in the Draft Treaty.
- 85/146: John TEMPLE-LANG The Draft Treaty Establishing the European Union and the Member

- 85/147:Carl Otto LENZ
States: Ireland
The Draft Treaty Establishing the European Union: Report on the Federal Republic of Germany
- 85/148:David EDWARD/
Richard MCALLISTER/
Robert LANE
The Draft Treaty establishing the European Union: Report on the United Kingdom
- 85/149:Joseph J. M. VAN DER VEN
Les droits de l'Homme: leur universalite' en face de la diversite' des civilisations. *
- 85/150:Ralf ROGOWSKI
Meso-Corporatism and Labour Conflict Resolution *
- 85/151:Jacques GENTON
Problemes Constitutionnels et Politiques poses en France par une eventuelle ratification et mise en oeuvre du projet de Traite d'Union Europeenne
- 85/152:Marjanne de KWAASTENIET
Education as a verzuiling phenomenon
Public and independent education in the Netherlands
- 85/153:Gianfranco PASQUINO
and Luciano BARDI
The Institutions and the Process of Decision-Making in the Draft Treaty
- 85/154:Joseph WEILER
and James MODRALL
The Creation of the Union and Its Relation to the EC Treaties
- 85/155:François DUCHENE
Beyond the first C.A.P.
- 85/156:Domenico Mario NUTI
Political and Economic Fluctuations in the Socialist System
- 85/157:Gianfranco POGGI
Niklas Luhmann on the Welfare State and its Law
- 85/158:Christophe DEISSENBERG
On the Determination of Macroeconomic Policies with Robust Outcome
- 85/159:Pier Paolo D'ATTORRE
ERP Aid and the Problems of Productivity in Italy during the 1950s
- 85/160:Hans-Georg DEGGAU
Ueber einige Voraussetzungen und Folgen der Verrechtlichung
- 85/161:Domenico Mario NUTI
Orwell's Oligarchic Collectivism as an Economic System

- | | |
|--|---|
| 85/162:Will BARTLETT | Optimal Employment and Investment Policies in Self-Financed Produce Cooperatives |
| 85/163:Terence DAINITH | The Design and Performance of Long-term Contracts |
| 85/164:Roland BIEBER | The Institutions and Decision-Making Process in the Draft Treaty Establishing the European Union |
| 85/165:Philippe C. SCHMITTER | Speculations about the Prospective Demise of Authoritarian Regimes and its possible Consequences |
| 85/166:Bruno P. F. WANROOIJ | The American 'Model' in the Moral Education of Fascist Italy |
| 85/167:Th. E. ABELTSHAUSER/
Joern PIPKORN | Zur Entwicklung des Europaeischen Gesellschafts- und Unternehmensrechts |
| 85/168:Philippe MIOCHE | Les difficultés de la modernisation dans le cas de l'industrie française de la machine outil, 1941-1953 |
| 85/169:Jean GABSZEWICZ
Paolo Garella | Assymetric international trade |
| 85/170:Jean GABSZEWICZ
Paolo Garella | Subjective Price Search and Price Competition |
| 85/171:Hans-Ulrich THAMER | Work Practices of French Joiners and Cabinet-Makers in the Eighteenth Century |

