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Dan Berkowitz

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JEL Classification: P22, P35 and H42

Daniel Berkowitz*
Assistant Professor
Department of Economics
University of Wisconsin-Madison
Madison, WI 53706

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Abstract

This paper models the incentives of local governments in formally centrally planned economies to resist a price liberalization in the consumer market. It is argued that many of these governments have a consumption bias amd are willing to forego a unit of local state enterprise profit to in order to increase consumer welfare. The existence of a consumption bias explains why a local government would continue to hold down state sector prices when private capacity holdings are sufficiently low. It also predicts that once private capacity holdings reach a sufficiently large level, a local government would both increase consumer welfare and local budgetary revenues by supporting a price liberalization.

Because of the slow progress of large-scale privatization in the former Soviet Union and Eastern Europe, state-owned enterprises continue to coexist with an emerging private sector. Despite the advantages of a flexible price system, many state firms continue to charge prices at which demand exceeds supply. A case in point is the recent experience of the Russian Republic. On January 2, 1992, President Yeltsin issued a decree which released approximately 90% of retail prices and 80% of wholesale prices from administrative control (Bush 1991,p.22; Decree, 1991). Yet, during the course of the year, many local governments continued to order their state firms to maintain prices below free market levels.

Local government resistance to free market pricing is most evident in consumer goods and services. When price liberalization began, the Russian federal government established regulated prices for fourteen basic food products, such as salt, sugar, bread and dairy products. Funds were allocated to local governments to subsidize retail enterprises selling these basic commodities. Although most local governments did not receive sufficient funding to support these low prices, "in many regions the mandatory list was expanded at the initiative of the local administration." (Demchenko, 1992a, p.29) During the first half of 1992, prices of some 27 food groups were controlled by local authorities. In the second quarter of 1992, the Russian federal government gradually began to lift price restrictions on basic foodstuffs. However, most local governments continued subsidies with funds from local budgets. (Demchenko, 1992a, p.29)

The objective of this paper is to model the conditions under which a local government would support or resist a price liberalization in its state retail stores. A price liberalization means that the a goods price is allowed to rise to a level in which demand is no less than supply. Thus, a local government resists liberalization when it sets a price in its state stores at which demand exceeds supply.

The model incorporates several important features of a consumer goods market for economies in transition. First, all local capacity is either under local government control or private control[1] and a local government or private firm exerts control by setting a goods price. Second, a local government is driven by a "consumption bias" and, therefore, is willing to forego a unit of locally generated state firm profit in order to gain an additional unit of local consumer welfare. Finally, the local governmment does not have the administrative means to target specific consumer groups for transfers-in-kind and cannot regulate private firms.

This paper demonstrates that the local capacity profile is an important predictor of whether a local government will resist or support a price liberalization. When most of the capacity is controlled by the local government, enforcement of low state prices effectively promotes consumer welfare. In this case, a local government would resist a liberalization. However, when the private firm controls a sufficiently large share of capacity, local administrators will tend to favor a liberalization. In this case, if the state firm was ordered to charge a price at which demand exceeds supply, then the private firm would charge an exorbitant excess capacity price. An effective state price liberalization would induce the private firm to cut its price to a full capacity level and could increase both consumer welfare and state firm profits.

Recent papers by Boycko (1992), Osband (1992) and Weitzman (1991) argue

[1] Thus, the model ignores local capacity controlled by non-local state organs. This is reasonable, since in the former Soviet Union and much of Eastern Europe, most state provision of consumer goods and services was under control of local governments. See Butakov, 1980, chapter 1.

that the persistence of prices at which demand exceeds supply in formerly centrally planned economies cause major welfare losses. These papers argue that such prices induce consumers to engage in unproductive activities such as queuing, hoarding, bribing and search. While these papers argue that a rapid price liberalization is critical to a successful reform, they do not explain why prices that are not market-clearing persist. This paper argues that the political economy of local markets is an important reason for this persistence.

This paper is related to two literatures. Papers by Rees (1984, section 7.1), Bos (1986), Hagen (1979), Harris and Wiens (1980), Beato and Mas-Colell (1984)) analyze how a public (state) firm in competition with a private firm can improve efficiency in an imperfectly competitive market. These contributions analyze the extent to which a public firm should optimally deviate from marginal cost pricing under different assumptions regarding the timing of the public/private interaction. In all of these studies, markets clear. This paper extends these works by incorporating disequilibrium pricing.

This paper also uses the literature on price competition under capacity constraints that began with Edgeworth (1897) and continues with Levitan and Shubik (1972), Kreps and Scheinkman (1983) and Brock and Scheinkman (1985) in the context of a supergame. In these papers, all firms maximize profits. In this paper, although a private firm maximizes profit, the state firm is concerned about both consumer welfare and profit.

The paper is organized in the following manner: Section I sets up the model for an economy with a state and a private firm. Section II analyzes the price policy of a private firm. Section III derives conditions under which the local government would support or resist a price liberalization. Section IV extends the analysis to a local economy with two private firms.

Section V concludes.

I. **The Model**

In a local market, there is a capacity profile, $\{k_s, k_p\}$, in which k_s and k_p are components controlled by the local government and a private firm. There is a state and a private firm which can sell up to k_s and k_p units of a homogeneous consumer good at a constant per unit cost. The state firm has no cost advantage and, with no loss of generality, private costs are normalized: $c_s \geq c_p = 0$. The inverse market demand curve is linear and given by $P(q)$: $P(q) = p = a - q \geq 0$.

To focus on the local government's rationale for setting prices at which demand exceeds supply, several assumptions are employed. First, capacity is insufficient to cover the market and:

(A1) $\quad P(k_s + k_p) = a - k_s - k_p > c_s \geq c_p = 0.$

where $P(k_s + k_p)$ denotes the competitive price. Assumption (A1) says that both firms can earn positive profits at the competitive price. Second, when there is price differentiation, consumers first buy from the cheapest supplier and income effects are absent.[2] When there is no price differentiation, all consumers prefer the state good.[3] Therefore, state and private sales, denoted z_s and z_p, are

[2]This rationing rule maximizes consumer surplus and allows for resale among consumers. See Levitan and Shubik (1972) and Kreps and Scheinkman (1983). In contrast to the rationing rules used in Boycko (1992), Osband (1992) and Weitzman (1991), this rule does not account for the costs of prices at which demand exceeds supply.

[3]The analysis could be conducted under the more general rule (see Kreps and Scheinkman, 1983, p.328, eq. 3) in which consumers are indifferent between the two sellers when there is no price differentiation.

$z_s = \min (k_s, a - p_s)$ if $p_s \le p_p$

$z_p = \min (k_p, \max [0, a - p_p - k_s])$ (1.1)

$z_s = \min (k_s, \max [0, a - p_s - k_p])$ if $p_s > p_p$

$z_p = \min (k_p, a - p_p)$ (1.2)

Finally, a simple strategic interaction between the state and private firm is assumed. The structure of demand and capacity holdings are common knowledge and there are two periods. The local government moves first and irrevocably sets the state firm's price. In the second period, the private firm chooses a price. The goods are then sold in the local market.[4] The private firm maximizes its profits:

Choose $p_p \in [0,a]$: (1.3)

Max $p_p z_p$

The local government maximizes a weighted sum of consumer surplus, CS, and profits:

Choose $p_s \in [c_s, a]$: (1.4)

Max $\lambda(p_s - c_s)z_s + (1 - \lambda)CS$,

The local government places zero weight on private profits. This is appropriate for a situation in which the private firm is a very limited source of tax revenue. Furthermore, since $p_s \in [c_s, a]$, the state firm has a break-even constraint. This could be relaxed to incorporate subsidies with no loss of generality.

[4]The order of moves reflects a situation in which the private firm is more flexible in its pricing policy than the state firm. The state firm may have significant "menu costs" since pricing decisions are subject to the approval of government officials who do not work directly for the firm. However, an unregulated private firm can simply change its price without bureaucratic interference.

The analysis is limited to cases in which the local government has a consumption bias:

(A2) $\lambda \in [0,.5)$

This bias captures two important features of a local environment for economies in transition. The first feature is that voting has become more important, thus implying that local politicians must be responsive to constituents' welfare. Secondly, state firms have become a much weaker tax base.[5] For example, local governments in Russia are having a difficult time collecting taxes from their enterprises because of the rise of inter-enterprise arrears and also because much of the collection is controlled by non-local administrators.[6] Thus, a local government may be willing to forego locally generated tax revenues in order to increase consumer welfare.

II. **Private price policy**

In this model, a local market is efficient when both firms set full capacity prices. When any firm sets an excess capacity price, there is an efficiency loss. This section establishes that when the capacity profile has a sufficiently small private component, the private firm will always set a full capacity price. However, when private capacity is sufficiently large, the private firm sets an excess capacity price as long as the the state

[5] See Berkowitz and Mitchneck (1992) for an analysis of the local environment in the former Soviet Union after 1985. See also Hahn (1992) for a discussion of the importance of local voting.

[6] I thank members of the Yaroslavl' city and oblast (regional) government, especially V.V. Istominova, for emphasizing this point to me during interviews conducted in the summer of 1992.

firm's price is sufficiently low. However, the private firm can be induced to set a full capacity price if the state price is sufficiently high.

The next three lemmas characterize the optimal private pricing policy.

Lemma 2.1 The private firm sets $p_p \geq P(k_s + k_p)$.

Proof (see Kreps and Scheinkman, 1983, Lemma 2). By naming $p_p < P(k_s + k_p)$, private profits are, at most, $p_p k_p$. By setting $p_p = P(k_s + k_p)$, private profits are, at least, $P(k_s + k_p)k_p$. ‖

By Lemma 2.1, the private firm sets at least the competitive price. The private firm maximizes profits by either servicing residual demand or under cutting the state firm's price according to the program Π

(Π) Choose $p_p \in [P(k_s + k_p), a]$:

$$\text{Max}\left[\begin{array}{l} \text{Max } p_p \min\,(k_p,\ \max\,[0,\ a - p_p - k_s]) \quad \text{s.t. } p_p \geq p_s, \\ \text{Max } p_p \min\,(k_p,\ a - p_p) \text{ s.t. } p_p < p_s \end{array}\right]$$

Using the program Π, the next lemma derives necessary conditions on the capacity profile for inefficient private pricing.

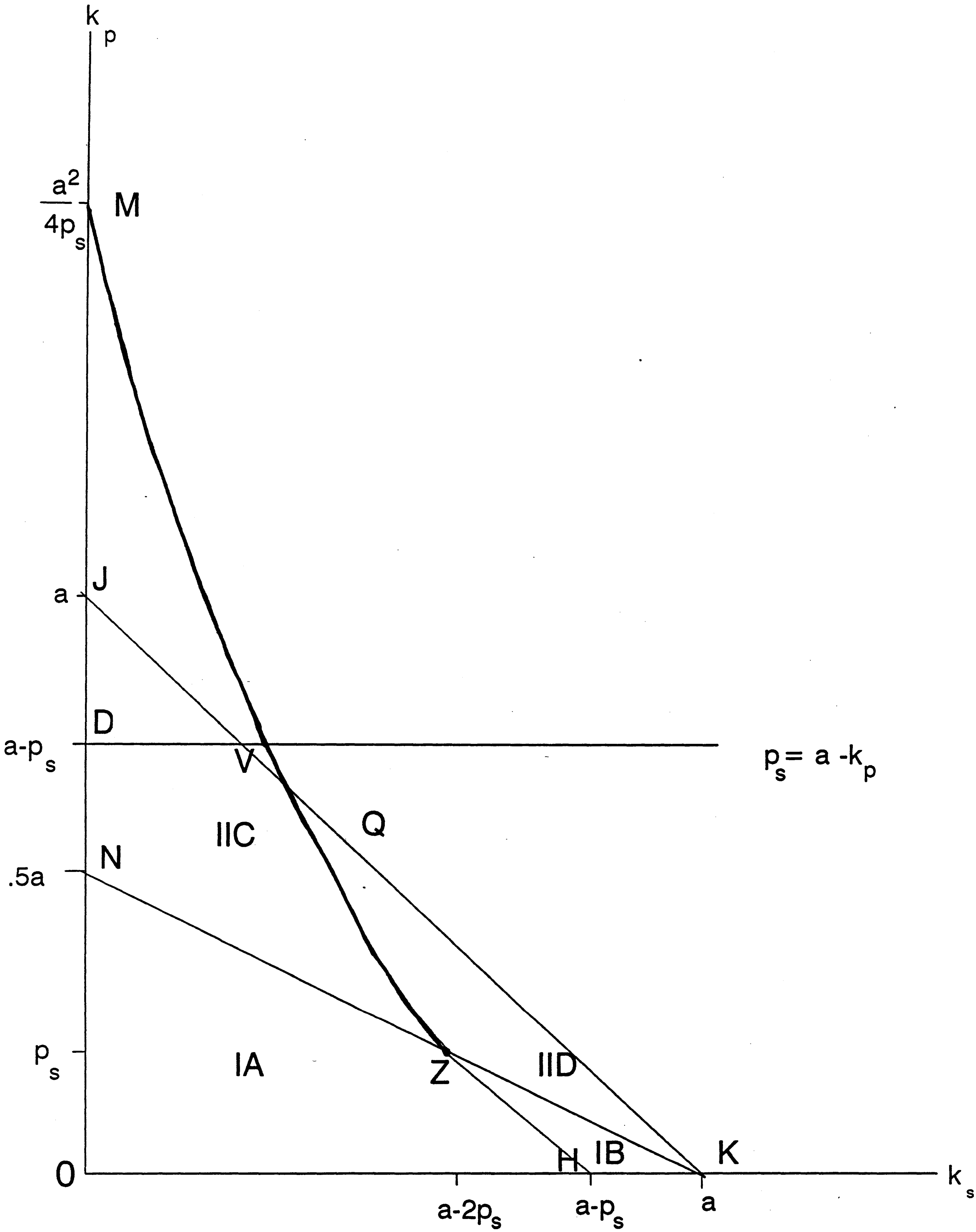
Lemma 2.2 Suppose the state and private firms have positive market share. If the private firm sets an excess capacity price, then

$$k_s + 2k_p > a \tag{2.1}$$

Proof. See the appendix.

Lemma 2.2 has two important implications. First, fixing k_s, the larger the private firm's capacity is, the more likely it that it will be in the potentially inefficient capacity zone. Second, if the local government

FIGURE 1



k_p
$\frac{a^2}{4p_s}$
M
a
J
D
$a-p_s$
V
$p_s = a - k_p$
Q
IIC
N
.5a
p_s
IA
Z
IID
H
IB
K
0
k_s
$a-2p_s$
$a-p_s$
a

transferred a unit of state capacity to the private firm, potential private inefficiency becomes more likely. The next lemma analyzes the relation between the capacity profile and the private reaction function.

Lemma 2.3 Suppose that both firms have positive market share and (A1) holds. The optimal private pricing strategy is in one of two capacity zones:

Zone I: $k_s + 2k_p \le a$ (2.2)

IA. $p_s \le P(k_s + k_p)$, where

$p_p = P(k_s + k_p) \ge p_s$, $z_s = k_s$, $z_p = k_p$;

IB. $P(k_s + k_p) < p_s$ and

$p_p = p_s - \varepsilon < p_s$, $z_s = a - k_p - p_s < k_s$, $z_p = k_p$

Zone II: $k_s + 2k_p > a$ (2.3)

IIC. $p_s < .25(a - k_s)^2/k_p$ and

$p_p = .5(a - k_s) \ge p_s$, $z_s = k_s$, $z_p = .5(a - k_s) < k_p$

IID. $.25(a - k_s)^2/k_p \le p_s$ and

$p_p = p_s - \varepsilon < p_s$, $z_s = a - k_p - p_s < k_s$, $z_p = k_p$

Proof. See the appendix.

Figure 1 illustrates the four possible regions of the capacity space containing the private reaction function. When $c_s = 0$, segment JK is the open upper bound satisfying assumption (A1): $P(k_s + k_p) > c_s = 0$. Thus, any feasible capacity profile, $\{k_s,k_p\}$, lies below segment JK. Segment NK: $k_s + 2k_p = a$, splits the feasible set into two zones. Any $\{k_s,k_p\} \in R^2_{++}$ on or below segment NK and is in zone I: $k_s + 2k_p \le a$. Any $\{k_s,k_p\}$ contained in the open set NKJ is in zone II: $k_s + 2k_p > a$.

The state firm's price splits zone I into regions IA and IB. Any

$\{k_s, k_p\}$ on or below segment ZH places the economy is in regime IA: $p_s \leq P(k_s + k_p)$ and $p_p = P(k_s + k_p)$. Regime IA is efficient since both firms set full capacity prices. Any $\{k_s, k_p\}$ above ZM is in regime IB: $p_s - \varepsilon = p_p \geq P(k_s + k_p)$. This region is inefficient because the state sets an excess capacity price. State pricing in zone I can induce a first best outcome. That is, any $\{k_s, k_p\}$ in this zone can be an efficient regime if the state firm's price is no greater than the competitive level.

The state firm's price splits zone II into two inefficient regions. For any $\{k_s, k_p\}$ below segment ZQ, $p_s < .25(a - k_s)^2/k_p$, $p_p = .5(a - k_s) \geq p_s$ and region IIC holds. For any $\{k_s, k_p\}$ in IIC and below segment DV, both firms have a positive market share, the state firm is efficient and the private firm sets an excess capacity price. For any $\{k_s, k_p\}$ in the semi-open set ZQK, region IID holds: $p_s \geq .25(a - k_s)^2/k_p$. In this region, the private firm is efficient and the state firm sets an excess capacity price.

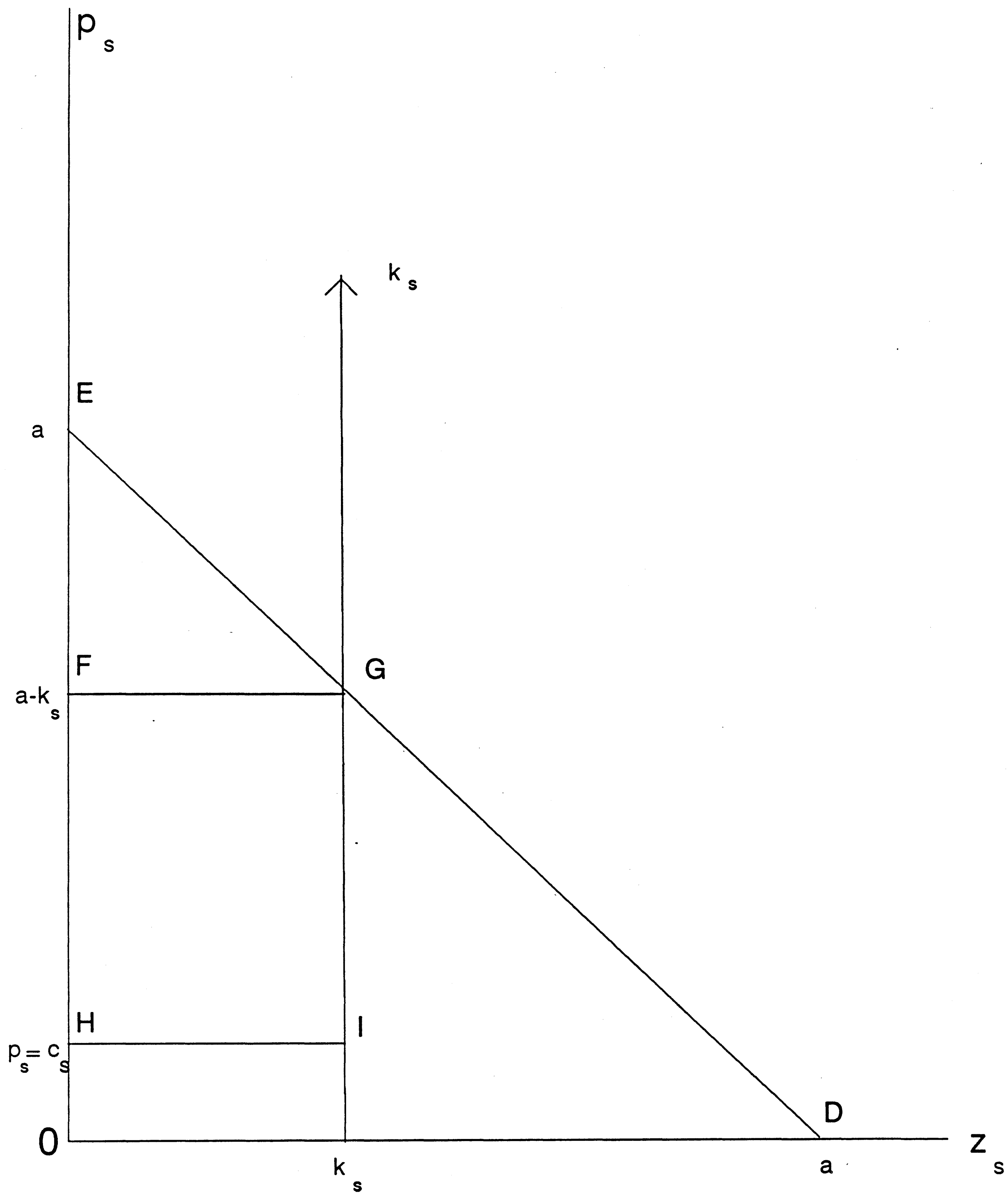
Lemma 2.3 implies that a local government has several options for minimizing efficiency losses in zone II. Any $\{k_s, k_p\}$ in the interior of zone II could be placed in the interior of zone I via a one-to-one capacity transfer from the private to the state firm. Thus, a first best policy would be for the local government to expropriate private capacity and set $p_s \leq P(k_s + k_p)$. Second, if an unregulated private firm sets a price for which sales are less than capacity, the local govermment might also impose a price ceiling. Local governments, as well as higher organs in the former Soviet Union and Eastern Europe, typically have employed both of these forms of direct control when private firms were accumulating "excessive" profits.[7]

If a local government cannot impose these direct controls, it could

[7]For the former Soviet Union see Grossman, 1977 and Simes 1975; for Hungary see Kornai, 1990; for the former East Germany see Aslund 1983 and for Poland see Aslund 1983 and Rostenkowski 1989.

FIGURE 2

State Market: $p_s^* = c_s$.



minimize efficiency losses in zone II by choosing an optimal price for the state firm. The next section argues that a local government will support a state price liberalization when the economy is in zone II and it is more desirable to have the private firm, rather than the state firm, set a full capacity price.

III. **State pricing policy**

This section derives the local government's optimal pricing policy. When $k_s + 2k_p \leq a$, the local government resists liberalization. In this situation, the local government can transfer potential state firm profits to consumers by setting a state firm price below the market-clearing level. However, when $k_s + 2k_p > a$, the local government may either support or resist a price liberalization. In this situation, a local government is more likely to support price liberalization as private capacity holdings grow and the state firm's costs increase.

The next lemma analyzes pricing policy when $k_s + 2k_p \leq a$.

Lemma 3.1 Suppose that $\{k_s, k_p\}$ is in zone I: $k_s + 2k_p \leq a$. If the local government has a consumption bias: $\lambda \in [0,.5)$, then $p_s^* = c_s$ and the local government resists liberalization.

Proof. See the appendix.

When $k_s + 2k_p \leq a$, the local government sets $p_s^* \leq P(k_s + k_p)$ and chooses an efficient regime: $z_s = k_s$, $z_p = k_p$. Because the local government has a consumption bias, it sets $p_s^* = c_s$, and transfers potential state firm profits, $[P(k_s + k_p) - c_s]k_s$, to consumers. This is illustrated in figure 2, where segment ED represents demand for the state good and vertical segment $k_s k_s$ is the capacity constraint. Consumer surplus includes the standard triangle, EFG, plus the additional transfer of state firm profits to consumers, rectangle FGHI.

The next two lemmas analyze state pricing when $k_s + 2k_p > a$.

Lemma 3.2 Suppose that $\{k_s, k_p\}$ is in zone II: $k_s + 2k_p > a$ and both firms have positive market share. If $\lambda \in [0,.5)$, the local government either resists or supports price liberalization:

$$p_s^* = c_s < p_p = .5(a - k_s)$$

or

$$p_s^* = .25(a - k_s)^2/k_p > p_p = p_s^* - \varepsilon$$

A sufficient condition for a price liberalization is

$$\Gamma(k_s, k_p, c_s) = .5[a - k_p - p_s^*]^2 - .375[a - k_s]^2 + c_s k_s \tag{3.1}$$

$$k_p[a - .5k_p] - k_s[a - .5k_s] \geq 0$$

where $p_s^* = .25(a - k_s)^2/k_p$

Sketch of Proof. When $\Gamma(k_s, k_p, c_s) \geq 0$, consumer surplus under liberalization exceeds consumer surplus with resistance. Since state firm profits in a liberalization regime are positive and are zero with resistance (i.e., when $p_s^* = c_s$), $\Gamma \geq 0$ is a sufficient condition. See the appendix.

Lemma 3.3. Suppose that $\{k_s, k_p\}$ is in zone II: $k_s + 2k_p > a$ and both firms have positive market share. If $\lambda \in [0,.5)$, the local government is more likely to support price liberalization when:

(a) there is an increase in private capacity;

(b) the state firm's costs, c_s, increase.

The impact of an incremental and costless capacity transfer from the state to the private firm is ambiguous. However, this policy is more likely to provoke local resistance when c_s is high.

Sketch of Proof. Differentiating the function Γ:

$$\partial\Gamma(k_s,k_p,c_s)/\partial k_p > 0,$$

$$\partial\Gamma(k_s,k_p,c_s)/\partial c_s > 0$$

$$\partial\Gamma(k_s,k_p,c_s)/\partial k_p\Big|_{\partial(k_p - k_s) = 0} \text{ is ambiguous}$$

$$\partial^2\Gamma(k_s,k_p,c_s)/\partial k_p\partial c_s\Big|_{\partial(k_p - k_s) = 0} < 0$$

See the appendix for a full proof.

From the standpoint of a local government, an autonomous increase in private capacity makes liberalization more attractive and resistance less attractive. In the liberalization regime

$$p_s^* = .25(a - k_s)^2/k_p,\ z_s = a - k_p - p_s^*, \qquad (3.2)$$
$$p_p^* = p_s^* - \varepsilon,\ z_p = k_p$$

An autonomous increase in k_p induces a drop in p_p^* and p_s^* and an increase in sales: $\partial z_s/\partial k_p + \partial z_p/\partial k_p = - \partial p_s/\partial k_p > 0$. Thus, consumer welfare with liberalization is increasing in k_p. When there is resistance,

$$p_s^* = c_s,\ z_s = k_s, \qquad (3.3)$$
$$p_p^* = .5(a - k_s),\ z_p = .5(a - k_s)$$

The only impact of an autonomous increase in k_p is that excess private capacity, $k_p - .5(a - k_s)$, increases. There is no impact on prices and sales, and welfare does not change. Thus, a local government is more likely to support a liberalization as private capacity holdings increase.

An increase in the state firm's costs, c_s, has no impact on prices and sales and, therefore, no impact on welfare in the liberalization regime. However, an increase in c_s in the resistance regime means that the state firm sells the same amount of goods at a higher price while the private firm's price and sales level remain constant. This induces a fall in consumer welfare and implies that the local government is more likely to support liberalization.

A costless transfer of an increment of state capacity to the private firm may be a legal or an illegal activity. It is legal when the local government transfers some of its capacity to entrepreneurs whose productive capacity had been previously expropriated by the state. An example of an illegal transfer is the case of an employee who steals from state inventories and resells to consumers at the private price. In any case, this transfer makes both the liberalization and resistance regimes less desirable and its impact on a local government's incentive to support liberalization is ambiguous.

In the liberalization regime, an incremental transfer of capacity from the state to the private firm increases prices:

$$\partial p_s/\partial k_p - \partial p_s/\partial k_s = .25(a - k_s)(k_p)^{-2}[k_s + 2k_p - a] > 0$$

since $k_s + 2k_p - a > 0$ and

$$\partial p_p/\partial k_p - \partial p_p/\partial k_s = \partial p_s/\partial k_p - \partial p_s/\partial k_s > 0$$

and drives down sales:

$$(\partial z_s/\partial k_p + \partial z_p/\partial k_p) - (\partial z_s/\partial k_s + \partial z_p/\partial k_s) =$$

$$- [\partial p_s/\partial k_p - \partial p_s/\partial k_s] < 0$$

Thus, consumer welfare is decreasing in $\partial k_p - \partial k_s = 0$. In the resistance regime, the transfer of capacity from the state to the private firm induces the private firm to sell more goods at a lower price:

$$\partial p_p/\partial k_p - \partial p_p/\partial k_s = -.5 < 0$$

$$\partial z_p/\partial k_p - \partial z_p/\partial k_s = -.5 < 0$$

while the state firm sells less with no change in price. As shown in the appendix, the welfare losses in the state sector are stronger than the welfare gains in the private sector, and consumer welfare falls in the resistance regime as well. Thus, it is ambiguous as to whether or not this policy would push the local government to support liberalization. An increase in the state firm's costs, c_s, dampens the loss of consumer welfare in the resistance regime, and, therefore, makes resistance more likely.

4. Competition within the private sector

This section briefly extends the model to a market with one state firm and two private firms. It is straightforward to demonstrate that there is a zone of capacity profiles in which the market is always inefficient. If the local government resists liberalization in this zone, then both private firms choose a mixed price strategy and, on average, there is excess private capacity. An optimal state sector price liberalization would both induce private sector efficiency and stabilize private sector prices.[8]

Index the private firms $i = 1, 2$ and, for simplicity, suppose that the private firms have the same capacity, denoted k:

$$k = .5k_p \tag{4.1}$$

Following the previous analysis, assume that the state firm can afford to sell at the competitive price, $P(k_s + 2k)$, capacity is insufficient to cover the market and the state has no cost advantage over the private sector:

(A1) $$P(k_s + 2k) = a - k_s - 2k > c_s \geq c_p = 0$$

In the first period, the local government irrevocably sets the state sector price. In the second period, the two private firms simultaneously and independently choose a price and, then, sales are realized. The rationing rule introduced in section II is employed. In addition, when there is no price differentiation within the private sector, then

$$\text{if } p_s \leq p_1 = p_2 \tag{4.2}$$

$$z_i = \min\left(k, \max\left[(a - p_i - k_s)/2,\ a - p_i - k_s - k\right] \right),\ i = 1,2$$

[8]This instability result is due to Edgeworth and is analyzed at length in Shubik and Levitan (1972) and Kreps and Scheinkman (1983).

if $p_s > p_1 = p_2$ (4.3)

$z_i = \min(\, k,\ \max\,[(a - p_i)/2,\ a - p_i - k]\,),\ i = 1,2$

The next two lemmas generalize and extend the previous analysis of optimal private and state policies. Lemma 4.1 analyzes the optimal private sector response. The proof draws on results in Kreps and Scheinkman (1982) and Brock and Scheinkman (1985) and is available upon request.

Lemma 4.1 Suppose that both private firms and the state firm have positive market share and (A2) holds. The optimal private pricing strategy is in one of two zones:

Zone I: $k_s + 3k \le a$ (4.4)

IA. $p_s \le P(k_s + 2k)$, where

$p_1 = p_2 = P(k_s + 2k) \ge p_s,\ z_s = k_s,\ z_1 = z_2 = k$

IB. $P(k_s + 2k) < p_s$ and

$p_1 = p_2 = p_s - \varepsilon < p_s,\ z_s = a - 2k - p_s < k_s,\ z_1 = z_2 = k$

Zone II: $k_s + 3k > a$ (4.5)

IIC. $p_s < .25(a - k - k_s)^2/k$

$z_s = k_s$ and both private firms choose a mixed price strategy:

$E\pi_1 = E\pi_2 = (a - k - k_s)^2/4$

IID. $.25(a - k - k_s)^2/k \le p_s$ and

$p_p = p_s - \varepsilon < p_s,\ z_s = a - 2k - p_s < k_s,$

$z_1 = z_2 = k$

According to Lemma 4.1, an additional private firm implies that a mixed strategy equilibrium may exist. When the economy is in zone II: $k_s + 3k > a$ and $p_s < .25(a - k - k_s)^2/k$, then, on average, there is excess capacity and price volatility within the private sector. Another implication of Lemma 4.1 is that an additional private firm shrinks the size of the inefficient zone II. With two private firms, zone II is the space $k_s + 3k > a$. Since $k = .5k_p$, this implies $k_s + 1.5k_p > a$. Because zone II with one private firm is $k_s + 2k_p > a$, the feasible range for zone II with two private firms is smaller than when there is one private firm.[9]

Thus, the impact of dividing the private sector into two firms of the same size has two effects. It makes an inefficient outcome less likely. Yet, if the private firms are inefficient, they choose mixed strategies and there is price instability in the private sector.

The next lemma analyzes optimal pricing for the state firm.

Lemma 4.2 Suppose (A1) holds and a local government has a consumption bias: $\lambda \in [0,.5)$. If $k_s + 3k \le a$, a local government resists liberalization: $p_s^* = c_s$. If $k_s + 3k_p > a$ and all firms have positive market share, then liberalization is either resisted or supported:

$$p_s^* = c_s$$

or

$$p_s^* = .25(a - k - k_s)^2/k > p_p = p_s^* - \varepsilon$$

A sufficient condition for a liberalization is

$$\Omega(\mathbf{k_s},\mathbf{2k},\mathbf{c_s}) = .5[a - 2k - p_s^*]^2 + 2k(a - k - p_s^*) + c_s k_s \qquad (4.6)$$
$$- k_s[a - .5k_s] - .25[a - k - k_s^*]^2 \ge 0$$

where

$$p_s^* = .25(a - k - k_s)^2/k$$

and

$$\partial\Omega(\mathbf{k_s},\mathbf{2k},\mathbf{c_s})/\partial k > 0$$
$$\partial\Omega(\mathbf{k_s},\mathbf{2k},\mathbf{c_s})/\partial c_s > 0$$

[9]When $N \ge 2$ = the number of private firms, zone II holds when $P(k_s + Nk) > c_s \ge 0$ and $k_s + (N+1)k > a$. Since $k_p = Nk$, then $k_s + (N+1)k_p/N > a$ and zone II shrinks as N increases.

A proof is available upon request.

Lemma 4.2 generalizes several basic results of this paper to a market with a state firm and two private firms. The local government always sets a an excess demand price, c_s, when the capacity profile is restricted: $k_s + 3k \leq a$. However, a local government chooses between resistance or support of price liberalization when $k_s + 3k_p > a$. Support for liberalization is more likely as private capacity holdings increase and as the state firm's costs increase.

6. Conclusions

Many economic theorists and policy makers have argued that a rapid liberalization of state sector prices in the formerly centrally planned economies is critical for a successful transition to a market economy. This paper does not dispute the wisdom of free market pricing. However, it does offer an explanation of why local governments have resisted raising prices of many consumer goods and services.

This paper argues that many local governments have a consumption bias. Another way of stating this is to say that they are willing to forego an increment of locally generated profits in order to increase consumer welfare. The existence of a consumption bias explains why local governments would continue to hold down prices when private capacity holdings are sufficiently low. It also predicts that once private capacity holdings reach a sufficiently large level, a local government would increase both consumer welfare and local budgetary revenues by supporting a a price liberalization.

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Appendix

Section 2.

Lemma 2.2 *Proof.* If the private firm sets an excess capacity price and both firms have a positive market share, then $p_p \geq p_s$ and $a - k_s > p_s$. Otherwise,

if $p_p < p_s$ and $z_p = a - p_p < k_p$, then $z_s = 0$;

if $p_p \geq p_s$ and $a - k_s \leq p_s$, then $z_p = 0$.

If $p_p \geq p_s$, then solving (Π)

$\pi_p = p_p \min (k_p, a - p_p - k_s])$

$a - k_s - k_p \leq p_p$

Therefore,

$p_p = \operatorname{argmax} \pi_p = .5(a - k_s)$

If $z_p < k_p$, then

$a - k_s - k_p < p_p = .5(a - k_s)$, which implies

$a < 2k_p + k_s$ ‖

Lemma 2.3 *Proof.* Region IA. If $a \geq 2k_p + k_s$, then $P(k_p + k_s) \geq .5(a - k_s)$. By Lemma 2.1, $p_p \geq P(k_p + k_s)$. Thus, if $p_s \leq P(k_p + k_s)$, then

$p_p \geq p_s$ and $p_p \geq .5(a - k_s)$

and,

$\pi_p = p_p(a - k_s - p_p)$

where

$\partial\pi_p/\partial p_p = a - k_s - 2p_p \leq 0$

since $p_p \geq .5(a - k_s)$. Therefore, $p_p = P(k_p + k_s)$, and

$z_s = k_s$, $z_p = k_p$.

Region IB. $p_s > P(k_p + k_s)$ and $2k_p + k_s \leq a$, imply that

$p_s > P(k_p + k_s) \geq .5(a - k_s)$

If the private firm has positive market share and sets $p_p = p_s$, then

$$\pi_p = p_s(a - k_s - p_s)$$

The private firm would never increase its price since $p_s \geq .5(a - k_s)$ implies

$$\partial\pi_p/\partial p_p\Big|_{p_p = p_s} = a - k_s - 2p_s \leq 0 \text{ and}$$

$$\partial\pi_p/\partial p_p\Big|_{p_p > p_s} = a - k_s - 2p_p < 0$$

If the private firm ε under-cuts the state firm, then it receives profits $\pi_{\tilde{p}}$:

$$\pi_{\tilde{p}} = (p_s - \varepsilon)k_p$$

To establish that $\pi_{\tilde{p}} > \pi_p$, observe that since $p_s > P(k_p + k_s)$,

$$\lim_{\varepsilon \to 0} \pi_{\tilde{p}} - \pi_p = p_s[p_s - P(k_p + k_s)] - k_p\varepsilon = p_s[p_s - P(k_p + k_s)] > 0$$

and

$$z_p = k_p,\ z_s = a - k_p - p_s < k_s.$$

Regions IIC and IID. If $a < 2k_p + k_s$, then $P(k_p + k_s) < .5(a - k_s)$. If the private firm chooses $p_p \geq p_s$, then private profits are

$$\pi_p = \max_{p_p \geq p_s} p_p(a - k_s - p_p)$$

where

$$p_p = \text{argmax}\ \pi_p = .5(a - k_s) \text{ and}$$

$$\pi_p = .25(a - k_s)^2$$

If this is a best response, then a deviation by the private firm is unprofitable. Suppose that private firm under-cuts the state: $P(k_p + k_s) \leq p_{\tilde{p}} < p_s$. Then its new profits are

$$\pi_{\tilde{p}} = p_{\tilde{p}}k_p, \text{ where}$$

$$p_{\tilde{p}} \in \text{argmax}\ \pi_{\tilde{p}} = p_s - \varepsilon.$$

Therefore, $p_p = .5(a - k_s) \geq p_s$ is a best response when

$$\pi_p = .25(a - k_s)^2 \geq \pi_p^{\sim} = (p_s - \varepsilon)k_p$$

$$.25(a - k_s)^2/k_p > p_s.$$

When

$$a < 2k_p + k_s \text{ and } .25(a - k_s)^2/k_p \leq p_s.$$

$p_p = p_s - \varepsilon$: $\varepsilon \to 0$ is the best response. ‖

Section 3.

Lemma 3.1 *Proof.* Suppose $k_s + 3k \leq a$. If $P(k_s + k) < p_s$, then the economy is in zone IB:

$$CS = .[a - .5k_p - p_s + \varepsilon]k_p + .5[a - k_p - p_s]^2$$

$$\pi_s = (p_s - c_s)(a - k_p - p_s), \text{ and}$$

$$\partial[(1 - \lambda)CS + \lambda\pi_s]/\partial p_s =$$

$$-(1 - 2\lambda)(a - p_s) - \lambda(p_s - c_s + k_p) < 0 \text{ for } \lambda \in [0,.5)$$

Suppose $P(k_s + k) \geq p_s$. Then the economy is in zone IA:

$$CS = [a - .5k_s - p_s]k_s + .5(k_p)^2$$

$$\pi_s = (p_s - c_s)k_s, \text{ and}$$

$$[(1 - \lambda)CS + \lambda\pi_s]/\partial p_s = = (2\lambda - 1)k_s < 0 \text{ for } \lambda \in [0,.5)$$

Therefore, p_s is set at its minimal level, c_s. ‖

Lemma 3.2. *Proof.* Suppose $p_s < .25(a - k_s)^2/k_p = \alpha$. Then zone IIC holds:

$$CS = [a - .5k_s - p_s]k_s + .125(a - k_s)^2$$

$$\pi_s = p_s k_s, \text{ and}$$

$$[(1 - \lambda)CS + \lambda\pi_s]/\partial p_s = = (2\lambda - 1)k_s < 0 \text{ for } \lambda \in [0,.5)$$

and p_s is driven down to c_s. Therefore, in this regime:

$$CS(c_s) = k_s[a - .5k_s - c_s] + .125[a - .5k_s]^2 \quad \text{(i)}$$

$$\pi_s(c_s) = 0 \quad \text{(ii)}$$

Suppose $\alpha = .25(a - k_s)^2/k_p \leq p_s < a - k_p$. Then

$CS = .[a - .5k_p - p_s + \varepsilon]k_p + .5[a - k_p - p_s]^2$

$\pi_s = (p_s - c_s)(a - k_p - p_s)$, and

$\partial[(1 - \lambda)CS + \lambda\pi_s]/\partial p_s =$

$- (1 - 2\lambda)(a - p_s) - \lambda(p_s - c_s + k_p) < 0$ for $\lambda \in [0,.5)$ and p_s is driven to its minimal level, $\alpha = .25(a - k_s)^2/k_p$:

$$CS(\alpha) = k_p[a - .5k_p - \alpha + \varepsilon] + .5[a - .5k_p - \alpha]^2 \qquad \text{(iii)}$$

$$> k_p[a - .5k_p - \alpha] + .5[a - .5k_p - \alpha]^2$$

$$\pi_s(\alpha) = [a - .5k_p - \alpha]^2 \qquad \text{(iv)}$$

Combining (i) and (iii):

$$CS(\alpha) - CS(c_s) = \Gamma(k_s,k_p,c_s) + k_p\varepsilon \qquad \text{(v)}$$

Therefore, if $\Gamma(k_s,k_p,c_s) \geq 0$,

$CS(\alpha) - CS(c_s) > 0$

Furthermore, by (ii) and (iv)

$\pi_s(p_s = \alpha) > \pi_s(p_s = c_s) = 0$ ‖.

Lemma 3.3. Proof.

(a) $\partial\Gamma(k_s,k_p,c_s)/\partial k_p = - (a - k_p - \alpha)\partial\alpha/\partial k_p + \alpha > 0$

since

$\partial\alpha/\partial k_p = -.25(a - k_s)^2/k_p^2 = -\alpha/k_p < 0$

$\partial\Gamma/\partial k_p = \alpha[a - \alpha]/k_p > 0$

(b) $\partial\Gamma/\partial c_s = k_s > 0$

(c) $\partial\Gamma/\partial k_p - \partial\Gamma/\partial k_s = \{\partial CS(\alpha)/\partial k_p - \partial CS(\alpha)/\partial k_s\}$ (i)

$- \{\partial CS(c_s)/\partial k_p - \partial CS(c_s)/\partial k_s\} - \varepsilon$, where

$\{\partial CS(\alpha)/\partial k_p - \partial CS(\alpha)/\partial k_s\} =$

$$\alpha(a - k_s)^{-1}\left[(a - \alpha)(a - k_s - 2k_p)/k_p - (\alpha k_p) \right] < 0 \qquad \text{(ii)}$$

since,

$a < k_s + 2k_p$, and $a > \alpha = .25(a - k_s)^2/k_p$

$\{\partial CS(\mathbf{c_s})/\partial k_p - \partial CS(\mathbf{c_s})/\partial k_s\} = - \partial CS(c_s)/\partial k_s$

$= - [\ (a - k_s - c_s) - .25(a - k_s)\ ]$

$= - [\ .75(a - k_s) - c_s\ ]$ (iii)

By assumption (A1),

$P(k_p + k_s) = a - k_p - k_s > c_s$ (iv)

Plugging (iv) into (iii):

$\{\partial CS(\mathbf{c_s})/\partial k_p - \partial CS(\mathbf{c_s})/\partial k_s < - [\ .75(a - k_s) - P(k_p + k_s)\ ]$

$= -.25[a - 4k_p - k_s] < 0,$

since $a < k_s + 2k_p < k_s + 4k_p$

Therefore, $\partial\Gamma/\partial k_p - \partial\Gamma/\partial k_s =$

$\{\partial CS(\alpha)/\partial k_p - \partial CS(\alpha)/\partial k_s\} + \partial CS(\mathbf{c_s})/\partial k_s\} - \varepsilon$ is

ambiguous, since

$\{\partial CS(\alpha)/\partial k_p - \partial CS(\alpha)/\partial k_s\} < 0$ and $\partial CS(\mathbf{c_s})/\partial k_s > 0$

(d) $\partial^2\Gamma/\partial k_p\partial c_s - \partial\Gamma^2/\partial k_s\partial c_s = \partial^2 CS(\mathbf{c_s})/\partial k_s\partial c_s = - 1 < 0$

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