PRIVATIZING A SERVICE SECTOR: WHERE TO START?

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Abstract:
This paper develops a theoretical framework for the analysis of transformation of the service sector during privatization process. A simple model which includes a supplier of services and retail firms is presented and applied to study the effects of various sequences of privatization. Our findings indicate that privatizing the supplier first is always at least as good as privatizing the retailers first because (unlike the strategy of privatizing the retail firms first) it increases both the number of retail firms and profit of the supplier.

Keywords: service sector, demand uncertainty, privatization, trade in services, retail market

JEL Classification: D730

1. Introduction

The problem of privatization and the relative advantages of private ownership and central planning has been intensively discussed in the economic literature (see e.g. Hayek, 1945; Tirole, 1991). Current economic opinion favors privatization (see Kikeri et al., 1992; Glaeser and Scheinkman, 1996). However, the question: how to change the ownership structure in different sectors of the economy (what is the optimal speed of the privatization process, and what should be privatized first) is still a subject of economic discussion (see, for example, Aghion and Tirole, 1993; Katz and Owen, 1993; Murphy et al., 1992). What economists do agree on is that privatization is a slow process and any sector of the economy cannot be entirely privatized at a given moment of time (see Aghion and Tirole, 1993; Katz and Owen, 1993; Schmidt and Schnitzer, 1993; Glaeser and Scheinkman, 1996).

The present paper focuses on the service sector which includes a single supplier of services and retail firms. Taking into account that all economic subjects in a given sector of the economy cannot be privatized instantaneously, we analyze the problem of sequencing privatization, i.e., we would like to clarify what should be privatized first: the supplier of services or retail firms? (see e.g. Husain and Sahay,

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1992, for the justification of the importance of sequencing of privatization). In particular, we are interested in the impact of different sequences of privatization on the profit of economic subjects in the sector analyzed and on the size of the retail market in the period of transition to market economy. We begin by setting out three "stylized facts" that are intended to characterize the situation in transitional economies:[1)]

a) The supplying firms inherited from the pretransition period are highly monopolistic. Bennet and Dixon (1995) emphasize that in the pretransition period, production in Eastern European countries and Commonwealth of Independent States was highly concentrated (partly for economies of scale and partly to simplify the central planner resource allocation problem). They point out that: in the USSR, for example, for a breakdown of 344 product groups, the largest supplier made 50 – 75 % of the output in 83 cases, and more than 75 % in 126 cases.[2)] Since, the break-up of large firms in a short period is difficult and not always technically feasible (see Bennet and Dixon, 1995; Kroll, 1991), in a transitional economy highly monopolistic sectors prevail.

b) The firms in a transitional economy (also state-owned firms) are using commercial criteria with control of their production and pricing decisions. The characteristic feature of the transitional economy is the lack of a central planner. Schmidt and Schnitzer (1993) argue that before privatization firms are usually run as joint stock companies, owned by the state and controlled by a board of directors (selected by a government agency) which supervises the management and induces profit maximizing behavior. Therefore, in a transitional economy even state owned firms take into account market criteria; in particular, they attempt to exploit their monopolistic positions to earn high profits (see e.g. Hare and Revesz, 1992; or Bennet and Dixon, 1995).

c) All firms in a transitional economy show a certain degree of risk aversion, however, privately-owned firms are more risk averse than state-owned ones. In the centrally planned economy, where all decisions were made by a central planner, an individual firm did not care about the risk associated with variable market conditions. In a transitional economy, where firms are obliged to use commercial criteria, the income of managers is usually linked to the firm's performance by a system of bonuses and/or stock options (also, if the state-owned firm is doing badly the manager can be replaced) (see Schmidt and Schnitzer, 1993). Consequently, even if the owner of the firm (i.e. the state) can be considered risk neutral, the managers of state-owned firms are not less concerned about the risk associated with the variability of market conditions, and surely they don't like the risk (i.e. they are risk averse). Since managers of privately-owned firms are better controlled by shareholders and also better paid (so that they have much more to lose if the firm is doing badly) they are also much more risk averse than their counterparts in state – owned firms (see Hayek, 1945; Glaeser and Scheinkman, 1995).

In the analysis which follows we assume that market demand in a transitional economy is not deterministic, but stochastic (i.e. the relationship between quantities demanded and market prices randomly varies from period to period), and that the firm's beliefs about the sales price are summarized in a subjective probability distribution (the firm cannot affect characteristics of the probability distribution; i.e. the firm is not able to predict changes in demand or decrease the range of possible variations). To keep things simple we focus on the behavior of monopolistic supplier

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1) "Stylized facts" 1 and 2 have been adopted from Bennet and Dixon (1995).

2) The literature on the topic stresses that similar relationships can also be found in other Eastern European economies, see e.g. Landesmann and Szekeley (1991).

of services operating in the market for services of a single type and its retailers. Base on theoretical considerations it is shown that an rational behavior of risk averse monopolistic supplier operating in stochastic environment implies organization of retail market; the equilibrium number of perfectly competitive retail firms operating in the market is finite; the equilibrium volume of output supplied through the retail market is always greater than it would be if the supplier traded directly with final demanders (i.e. retail trade increases consumers surplus). Furthermore we consider and compare two possible sequences of the privatization of the service sector ("privatizing the supplier first" and "privatizing retailers first"). In particular, we show that privatization of the supplier first increases the expected value of profit of the retail sector, decreases profit of the supplier, and increases or doesn't change the equilibrium number of retail firms operating in the market; privatization of the retail sector first decreases or doesn't change the equilibrium number of retail firms and leaves the expected value of profit of the retail sector and profit of the supplier unaffected.

2. Retail Trade in Services

Consider a market for services of a single type. In economic theory such a market is usually analyzed base on the implicit simplifying assumption that sales of services supplied are being made directly to final consumers. In practice, however, a very high proportion of all sales are not to final demanders at all, but to intermediate firms (i.e. to retailers). The existence of retail markets and the role of retail firms in different markets are usually explained by increasing returns in retailing, i.e. economies of scale in transportation, in storage or in the acquisition and dissemination of information about quality, range, and prices of products available (see e.g. Heal, 1980; Wilson, 1975). In the case of retail trade in services most of these factors are irrelevant. The hypothesis here is that retail trade in services is not connected with economies of scale and that it can be explained exclusively by rational behavior of firms operating in a stochastic environment.

To focus on the role of uncertainty (see e.g. Zabel, 1970; Sandmo, 1971; Leland,1972; Lim, 1980; Cukrowski, 1996, for the detail analysis of the behavior of the firm operating in stochastic environment) in the market for services, one can think about a supplier, such as a haulage contractor or a sightseeing tour operator, operating in the market with demand depending on the weather in a season. The supplier is assumed to set a capacity before the season (i.e. before real demand becomes known) and has two options: to sell services directly to final consumers during the season (at an uncertain price), or to sell services forward (before the season) to retail firms (at a fixed price, lower, however, than the expected price to consumers).

To set up the formal model (similar model is analyzed by Cukrowski and Fischer, 2001) consider two types of firms: a monopolistic supplier of a single type of services and perfectly competitive retail firms that can resell services of different type and can freely enter or exit the market. Assume that the relationship between market price P and the output supplied to final demanders Q is described by the following implicit relationship:

$$f(Q,P,u) = 0 \tag{1}$$

where u is a random factor (not known ex ante, but described by subjective probability density $dF(u)$). Restrictions placed on (1) are that for any u, the relationship between P and Q is downward sloping, and that larger values of u are associated with greater demand (see Leland, 1972). Moreover, following Leland (1972), we

assume that the stochastic demand is such that the principle of increasing uncertainty (this principle states that the "riskiness" or dispersion of the total revenue increases if total expected revenue increases; see Leland, 1972 for a detailed discussion) is satisfied (this assumption always holds for additive or multiplicative forms of random demand curves).

Firms (the suppliers and retailers) are managed according to the wishes of their owners (private shareholders or the state), and decisions in each firm are made by a group of decision-makers with sufficiently similar preferences to guarantee the existence of a group-preference function, representable by a von Neuman-Morgenstern utility function. Given this we assume risk aversion (see "stylized fact c"), so that utility function of the firm U is a concave and differentiable function of profits: $U(0) = 0$, $U'(\Pi) > 0$ and $U''(\Pi) < 0$. Denote supplier's utility function as U_s and the utility function of the retail firm as U_r (note that supplier's and retailer's attitudes towards risk could be identical).

Assume that the supplier's cost function is $F_s(Q) = cQ + B$, where Q denotes the volume of output produced, c is the marginal cost, and B is the fixed cost. The cost function of a retail firm is $F_r(q) = qP_0(Q_r)$, where q is the volume of output supplied to final demanders by a single retail firm, and $P_0(Q_r)$ is the price to retail firms if the volume of output Q_r is supplied to the retail market (to focus directly on the problem no additional cost is assumed). The objective of both the supplier and retail firms is to maximize the expected utility of profit (in particular, we assume that firms set the volume of output supplied).

In such a model, the optimal behavior of firms operating in the market with uncertain demand (as described above) is summarized by the following statement (Leland,1972, pp. 282-283): "the optimal level of output (Q_σ^*) supplied to the market by risk averse monopolistic or perfectly competitive firms is a deterministic variable smaller than it would be under certainty (more risk averse the firm is, the bigger deviation from the optimal output under certainty)."

Free entry and exit implies that each individual retail firm operates in the market only if its expected utility from profit is at least equal to the utility of some benchmark activity $b > 0$ (see Applebaum and Katz, 1986; for details). Since for a risk averse retail firm earning random profit Π_r the following is true: $U_r[E(\Pi_r)] > E[U_r(\Pi_r)] \geq b \geq 0$, the expected value of profit of each retail firm operating in the market is positive. This implies that the retail market can be established only if the expected value of profit of the retail sector as a whole is positive, i.e., if the supplier sells services to retail firms at a lower price than the expected price to final consumers.

Proposition 1. Rational behavior of the risk averse monopolistic supplier under uncertainty of demand implies that the supplier is always willing to sell services to retail firms at lower price than the expected price to consumers.

Proof of Proposition 1. Under demand uncertainty the risk averse monopolistic supplier trading directly with consumers earns random profit with the expected value $E[\Pi_s(Q_\sigma^*)]$, such that $E[\Pi_s(Q_\sigma^*)] < E[\Pi_s(Q_0^*)]$, where Q_0^* is the optimal monopolistic output without uncertainty, and Π_s denotes profit of the supplier. Taking into account that the optimal volume of output supplied to consumers by retail firms, and, consequently, demanded from the supplier, is deterministic (see Section 2), and that a risk averse firm always prefers deterministic profit over random profit with the same (or even slightly higher) expected value, the deterministic price $P_0(Q_r)$ at which the supplier would be willing to sell the volume of output Q_r to retail firms should satisfy the following condition:

$$E\{U_s[\Pi_0(Q_r)Q_r - cQ_r - B]\} \geq E\{U_s[\Pi_s(Q_r^*)]\} \tag{2}$$

Since, for any deterministic Q_r

$$E\{U_s[\Pi_0(Q_r)Q_r - cQ_r - B]\} = U_s\{E[P_0(Q_r)Q_r - cQ_r - B]\}, \quad (3)$$

and for a risk averse firm

$$U_s\{E[\Pi_s(Q_\sigma^*)]\} \geq E\{U_s[\Pi_s(Q_\sigma^*)]\}, \quad (4)$$

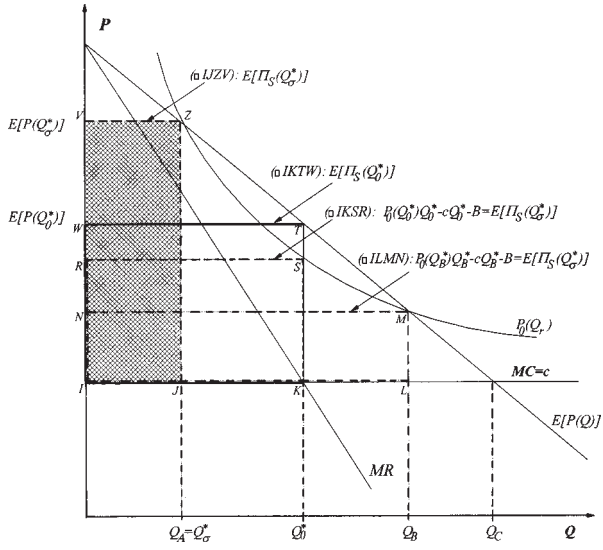
inequality (2) is satisfied for any $P_0(Q_r)$, such that

$$P_0(Q_r)Q_r - cQ_r - B \geq E[\Pi_s(Q_\sigma^*)] \quad (5)$$

(note that Q_r is deterministic variable, and, consequently, profit of the supplier $P_0(Q_r)Q_r - cQ_r - B$ is deterministic as well).

Expression (5) states that the deterministic profit of the supplier (when he trades with retail firms) should be at least equal to the expected value of profit that the supplier would earn if he sold services directly to final demanders. Note that $E[\Pi_s(Q)]$ is a continuous, strictly concave, function of Q, positive for $Q \in (0, Q_C)$, where Q_C is the optimal competitive output without uncertainty, achieving its maximum for $Q = Q_0^*$. Since $E[\Pi_s(Q_\sigma^*)] < E[\Pi_s(Q_0^*)]$, there exists an interval, say, (Q_A, Q_B), where $Q_A = Q_\sigma^*$ and $Q_0^* < Q_B < Q_C$ in which $E[\Pi_s(Q_\sigma^*)] < E[\Pi_s(Q)]$ (see Figure 1). Plugging $E[\Pi_s(Q_\sigma^*)] = P_0(Q_r)Q_r - cQ_r - B$ and $E[\Pi_s(Q)] = E[P(Q)]Q - cQ - B$, where $E[P(Q)]$ is an expected price if quantity Q is supplied to consumers, into the above inequality and rearranging, we get that $P_0(Q_r) < E[P(Q)]$, for any $Q \equiv Q_r \in (Q_A, Q_B)$.

Figure 1
Relationship between Optimal Output of Monopolistic Supplier and Monopolistic Profit with and without Uncertainty of Demand

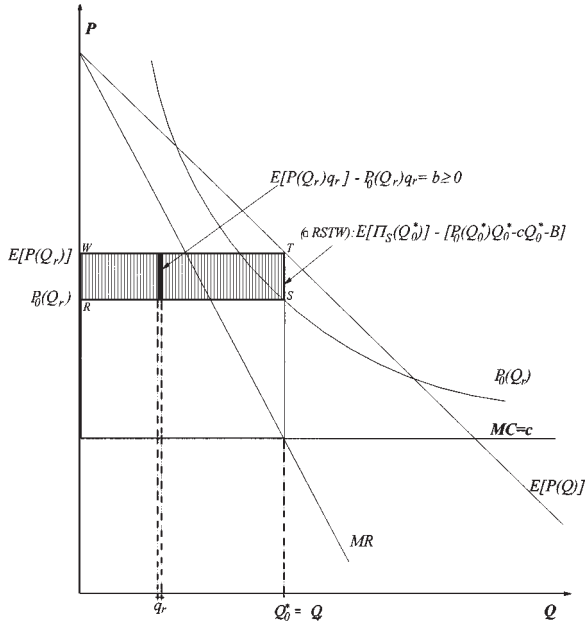


Suppose now that the supplier of services in question trades with retail firms but it cannot (or it is not legally allowed to) impose any vertical restraints, i.e. assume that the supplier is willing to sell to perfectly competitive retail firms any given volume of output Q_r at price $P_0(Q_r)$. Economic equilibrium in the retail market is characterized below.

Proposition 2. The equilibrium number of perfectly competitive retail firms operating in the market is finite.

Proof of Proposition 2. The maximum expected value of profit of the retail sector equals $E[\Pi_s(Q_0^*)] - E[\Pi_s(Q_\sigma^*)]$. Since the expected utility from profit of each individual retail firm should be non-negative, i.e. greater or equal to b (see Section 2), the expected value of profit of each individual risk averse retail firm operating in the market must be positive. Consequently, the maximum expected value of profit of the retail sector can be divided between finite number of firms, i.e. only a finite number of perfectly competitive retail firms can operate in the market (see Figure 2).

Figure 2
Relationship between Expected Profit of the Retail Sector and Expected Profit of a Single Retail Firm (expected profit of a single retail firm: $E[P(Q_r)q_r] - P_0(Q_r)q_r$, total expected profit of the retail sector: $E[\Pi_s(Q_0^*)] - [P_0(Q_0^*)Q_0^* - cQ_0^* - B]$)



An empirical evidence presented by Ghosal (1996) confirms a theoretical prediction of Proposition 2. The following result characterizes the optimal volume of output supplied to consumers through the retail market.

Proposition 3. The equilibrium volume of output supplied through the retail market is always greater than it would be if the supplier traded directly with final demanders.

Proof of Proposition 3. Assume that n retail firms operate in the market (n is an integer number greater than zero). Since the expected value of profit of each individual risk averse retail firm operating in the market is positive (see Proof of Proposition 2), the expected value of the retail sector profit is positive as well. Taking into account that $E[P(Q)] - P_0(Q_r) > 0$, if $Q \equiv Q_r \in (Q_A, Q_B)$, where $Q_A = Q_\sigma^*$ and $Q_0^* < Q_B < Q_C$ (see Proof of Proposition 1, and Figure 1), the volume of output sup-

plied through the retail market is always greater than it would be if the supplier traded directly with final demanders, i.e. $Q_r^* > Q_\sigma^*$.

One important implication of Proposition 3 is that retail trade under uncertainty of demand changes the distribution of welfare in the economy. In particular, it decreases the expected value of the deadweight loss (volume of output is higher than without the retail market) and increases the expected value of consumer surplus (final demanders consume more and the expected price is lower). The monopolistic supplier is also better off since it changes random profit to deterministic profit with the same expected value.

3. Impact of the Privatization on the Service Sector

To show the dynamics of the retail market in the period of transition to a market economy, consider a monopolistic market with stochastic demand for services of a single type, and for the sake of simplicity, assume that there are no transaction costs (as presented in Section 2). Furthermore, divide the transition time path into the following three periods (see "stylized fact c"):

– pre-privatization period, all firms are state-owned (a little risk-averse) and take into account commercial criteria,

– privatization period, firms are either state-owned (a little risk averse) or privately-owned (more risk averse) and behave according to commercial criteria,

– post-privatization period, all firms are privately-owned (more risk averse than state-owned) and take into account commercial criteria.

To simplify the analysis, assume that commercial criteria imply that managers of firms operating in the market maximize profit of their owners (private-shareholders or the state). The risk aversion of the supplier and retail firms in the pre-privatization period naturally leads to the organization of the retail market with a finite number of firms.[3)] Considering that at the beginning of the transition period all firms operate in market environment, we can assume that retail market is competitive and remains competitive during the whole transition period.

Since there are two different types of firms: the supplier and retail firms, the following two privatization time paths: $(t_1,t_2)_{S\text{-}R}$ and $(t_1,t_2)_{R\text{-}S}$ (where $t_1,t_2 \in R_+$, and $t_1 < t_2$) are possible:

S-R: t_1 – privatization of the supplier, t_2 – privatization of the retail sector,

R-S: t_1 – privatization of the retail sector, t_2 – privatization of the supplier.

Although both strategies lead to the same final state, their transitions paths are not the same. The propositions below clarify the basic differences of the strategies in question.

Proposition 4. Privatization of the supplier first increases the expected value of profit of the retail sector, decreases profit of the supplier, and increases or doesn't change the equilibrium number of retail firms.

Proof of Proposition 4. Since privatization makes the supplier more risk averse (see Section 1, "stylized fact c") the deviation of the optimal output of the supplier under uncertainty of demand from its optimal output without uncertainty increases (see Leland, 1972). Thus, the offer curve of the more risk averse supplier is located closer to the origin, and, consequently, for any given volume of output sup-

3) Similarly, in the market economy when all firms are privately-owned (i.e. more risk averse than state-owned firms) there will be a certain, finite number of firms operating in the market.

plied, the difference between the expected market price and the offered price to retailers is greater than before privatization. Taking into account that the optimal quantity supplied to final demanders by competitive retail sector remains the same (i.e. equals Q_0^*), the maximum total expected value of profit of the retail sector increases (consequently, profit of the supplier decreases),[4]) and consequently more retail firms may be able to operate in the market. However, since only a significant increase in the expected profit of the retail sector is sufficient to cover the utility level of the benchmark activity of the additional retail firm *b*, the equilibrium number of firms in the retail market increases only if an increase in the expected value of profit of the retail sector is large enough; otherwise, it remains unchanged.

Proposition 5. Privatization of the retail sector first decreases or doesn't change the equilibrium number of retail firms and leaves the expected value of profit of the retail sector and profit of the supplier unaffected.

Proof of Proposition 5. For any risk averse firm the expected value of profit for which the expected utility equals *b* (i.e. the utility level of some benchmark activity) is positive and increases if the firm becomes more risk averse. Taking into account that privatization makes retail firms more risk averse, the expected value of profit for which the expected utility equals *b* increases. Since the expected value of profit of the retail sector as a whole does not change (profit of the supplier is unaffected) the privatization of the retail sector decreases the equilibrium number of firms in the competitive retail market. Note, however, that if an increase in the expected value of profit for which the expected utility of a single retail firm equals *b* is not large enough, then the equilibrium number of retail firms remains unchanged. Changes in retail market for services resulting from different privatization strategies are illustrated below.

4. Effects of Different Privatization Strategies: an Example

Consider the effects of privatization strategies defined in the preceding section (i.e. *S-R* and *R-S*) on the retail sector, assuming that in all periods analyzed the structure of the retail market remains unchanged. In particular, assume that there are H_1^*, H_2^*, H_3^* ($H_1^*, H_2^*, H_3^* \geq 1$) firms in the retail market in pre-privatization, privatization, and post-privatization periods, respectively. Denote profit of the supplier in subsequent periods as Π_1^S, Π_2^S and Π_3^S, and the expected profit of the retail sector as $E(\Pi_1^R)$, $E(\Pi_2^R)$ and $E(\Pi_3^R)$, respectively. Moreover, in order to focus on the differences in privatization period, assume that in both considered privatization strategies (*S-R* and *R-S*), the initial and final market equilibria are the same.

In the privatization strategy *S-R* (t_1 – privatization of the monopolistic supplier, t_2 – privatization of the retail sector):

a) at t_1 (i.e. at the beginning of the privatization period) the number of retail firms changes from H_1^* to H_2^*, where $H_2^* \geq H_1^*$ (if the change in risk aversion of the monopolist resulting from privatization is not significant then $H_2^* = H_1^*$; otherwise, $H_2^* > H_1^*$), profit of the supplier decreases from Π_1^S to Π_2^S, and the expected value of profit of the retail sector increases from $E(\Pi_1^R)$ to $E(\Pi_2^R)$;

b) at t_2 (i.e. at the end of the privatization period) the number of retail firms in the market changes from H_2^* to H_3^*, where $H_3^* \geq H_2^*$ (if the change in the risk aversion

4) Note that the sum of supplier's profit and the expected profit of the retail sector equals the maximum monopolistic profit without uncertainty of demand.

of the retail firms resulting from privatization is not significant, then $H_3^* = H_2^*$, otherwise $H_3^* < H_2^*$), and profit of the monopolistic firm, as well as the expected value of profit of the retail sector, doesn't change (i.e. $\Pi_2^S = \Pi_3^S$, and $E(\Pi_2^S) = E(\Pi_3^S)$).

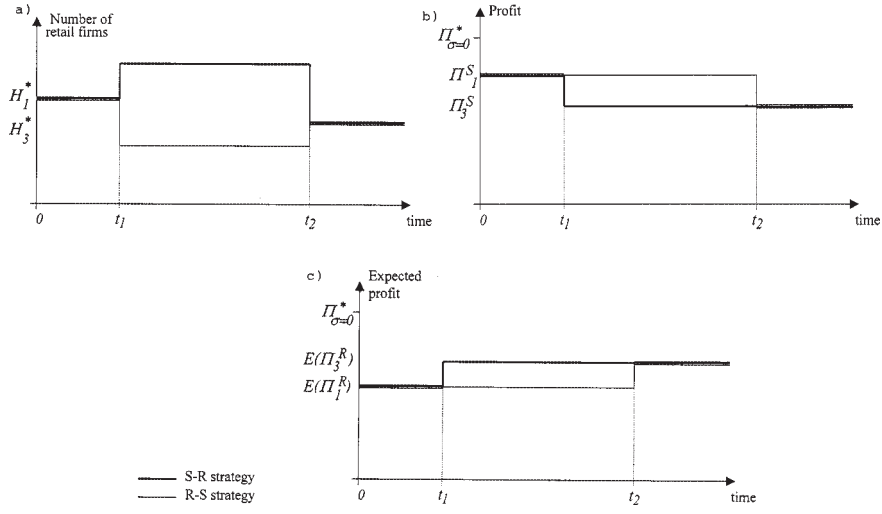
In the privatization strategy *R-S* (t_1 – privatization of the retail sector, t_2 – privatization of the supplier):

a) at t_1 (i. e., at the beginning of the privatization period) the number of retail firms in the market changes from H_1^* to H_2^*, where $H_2^* \leq H_1^*$ (if the change in the risk aversion of the retail firms resulting from privatization is not significant, then $H_2^* = H_1^*$; otherwise, $H_2^* < H_1^*$), and profit of the supplier, as well as the expected value of profit of the retail sector, doesn't change (i.e. $\Pi_1^S = \Pi_2^S$, and $E(\Pi_1^R) = E(\Pi_2^R)$);

b) at t_2 (i.e. the end of the privatization period) the number of retail firms in the market changes from H_2^* to H_3^*, where $H_3^* \leq H_2^*$, (if the change in risk aversion of the monopolist resulting from privatization is not significant, then $H_3^* = H_2^*$; otherwise, $H_3^* > H_2^*$), profit of the supplier decreases from Π_2^S to Π_3^S, and the expected value of profit of the retail sector increases from $E(\Pi_2^R)$ to $E(\Pi_3^R)$.

Changes in the number of firms operating in the retail market, profit of the supplier and the retail sector are represented in Figure 3.

Figure 3
Changes in the Number of Firms Operating in the Retail Market (a), Profit of the Supplier (b), and the Expected Profit of the Retail Sector (c)



5. Conclusion

The analysis shows that, in the presence of uncertainty, the risk averse supplier of services is always willing to sell the output produced to retail firms at a lower price than the expected price to final consumers. This explains why retail firms can earn profit, and, consequently, why retail trade in services can be observed. The paper shows that retail trade implies higher output, and, consequently, decreases the expected price to final demanders (this increases expected consumer surplus and decreases expected deadweight loss). Moreover, the analysis show that an equilibrium number of retail firms operating in the market is finite.

Based on the equilibrium characteristics of the retail market, the impact of different privatization strategies (*S-R* and *R-S*) on the retail market in the transition period has been examined. The results of theoretical considerations show that: privatization strategy *S-R* (the first: the supplier of services, the second: the retail sector), increases or doesn't change the number of retailers in the market and the total expected profit of retail firms (i.e. state-owned firms), and decreases or doesn't change the profit of the supplier (privately-owned firm); privatization strategy *R-S* (the first: the retail sector, the second: the supplier of services), increases or doesn't change the total expected profit of retail firms and decreases or doesn't change the number of retail firms in the market (privately-owned firms) and the expected value of the supplier's profit (state-owned firm).

Privatizing the supplier first (strategy *S-R*) is always at least as good as privatizing the retailers first (strategy *R-S*), because during the privatization period it neither harms the development of the retail market nor decreases the profit of the state-owned firms. We realize that the assumptions made in the paper are perhaps too simplified to describe the complexity of real life and that the impact of changes in entrepreneurial mentality, and in particular in the risk aversion, may be less important in some cases than other potential gains from privatization (such as, for example, improved financial incentives or clearly defined property rights). The present paper, however, intended to emphasize the existence of a path of causation – from privatization, to changes in the service sector via changes in managers' attitudes towards risk. In particular, we aimed to show that the change in aversion towards risk is the main factor affecting the evolution of the retail market in the period of transition to the market economy.

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