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### **PROTECTING THE DOMESTIC MARKET: INDUSTRIAL POLICY AND STRATEGIC FIRM BEHAVIOUR**

by

**JENS METGE**

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# Protecting the Domestic Market: Industrial Policy and Strategic Firm Behaviour\*

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## Abstract

Foreign firms to break into a new market commonly undercut domestic prices and, hence, subsidise the consumer's costs of switching in order to get a positive market share. However, this may constitute the act of dumping as drawn in Article VI of the General Agreement on Tariffs and Trade (GATT). Consequently, domestic firms trying to protect themselves against potential competitors often demand an anti-dumping (AD) investigation. In a two-period model of market entry with horizontally differentiated products and exogenous switching costs, it is demonstrated that the mere existence of switching costs and AD-rules may result in an anti-competition effect: the administratively set minimum-price rule protects the domestic firm and yields larger prices. Therefore, there are some consumers who will not buy either product in both periods although they would have done so in absence of AD. Consequently, competition policy should reassess the AD-regulation.

*JEL-Classification:* D21, L13, L52.

*Keywords:* Industrial Policy, Anti-Dumping, Hotelling, Switching Costs, Market Entry.

## 1 Introduction

A lot of foreign firms (Asian, e.g.) try to break into the US and EU market. The domestic firms try to protect themselves against potential foreign competitors. One self-protecting action of the incumbent firms is the anti-dumping clause as stipulated in Article VI of the General Agreement on Tariffs and Trade (GATT). Due to this Article, countries are allowed to protect domestic industrial sectors threatened by foreign competitors.

Under certain circumstances and even if there are identical unit costs, foreign firms may find it necessary to charge temporarily a price lower than the 'normal price' specified in Art. VI

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GATT. One example is the existence of consumer switching costs. According to Weizsäcker (1984) and Klemperer (1987, 1995) these costs taking e.g. the form of certain expenditures (fees and expenses for complementary material) or the time and effort spend in order to get used to the new product. Two examples where consumer switching costs can be observed are (1) frequent flyer programmes, that were noted by Banerjee and Summers (1987) as well as the critique of Carlsson and Löfgren (2006) and (2) the telecommunications industry that was examined by Chen (1997) as well as Wang and Wen (1998).

Since switching costs are brand specific and do not apply to repeated purchase of a product they form an entry barrier for Asian newcomers. According to Klemperer (1987), three types of switching costs can be distinguished: transaction costs, specific learning costs, and artificial or contractual costs. There also can be distinguished monetary switching costs and non-monetary switching costs. The former frequently arise in network industries as, e.g. in the banking sector. There customers often have to pay a fee to close an account. An example for non-monetary switching costs is a discomfort or specific learning cost customers of a brand have to bear upon the first-time usage of another brand, as e.g. after a switch from one of Microsoft's *Word* versions to a  $\text{\LaTeX}$ -based programme.

A foreign firm has to subsidise the consumers' costs of switching in order to persuade the incumbent's customers to switch and to gain a positive market share. However, under Article VI GATT this action may constitute the act of dumping. Papers investigating the link between switching costs and dumping are scarce. There are some papers, e.g. To (1994) as well as Hartigan (1996), analysing export subsidies and consumer switching costs. Trying to fill this gap, I employ a two-period model with market entry, full information and rational behaviour. This game is based on Metge (2007). Products being supplied by a domestic monopolist (firm  $H$ ) and a foreign potential entrant (firm  $F$ ) are horizontally differentiated. It is demonstrated that the mere existence of an anti-dumping regulation distorts the behaviour of the simultaneously price-setting firms.

In the first period, the domestic monopolist charges a product price and a certain part of the consumers being equally distributed on the horizontal market line purchase the monopolist's product. In the second period, a foreign firm decides on entry. After firm  $F$ 's entry decision in period 2, both firms choose simultaneously their prices.

Within this framework there are four main results: (1) With a first-period partial market coverage there are equilibrium configurations under the anti-dumping (AD) regime with partial as well as full market coverage in the second period. (2) When exogenous switching costs occur, a subsidy effect can be observed. Here, the entrant has partly to subsidise the switching costs. Due to the switching costs, an anti-competition effect can be observed, that yields an increase in product prices. (3) In addition, the mere existence of an administratively set minimum-price rule protects the domestic firm and yields larger product prices, so that (4) some consumers abstain from purchasing any variant. Consequently, competition policy should reconsider the anti-dumping regulation drawn in Article VI of the GATT.

The paper proceeds as follows: After this section, section 2 introduces the main assumptions

and the setup of the model. In section 3, the second-period equilibria are derived. Subsequently, section 4 solves the subgame-perfect equilibria and discusses their properties. Finally, section 5 makes some policy recommendations and concludes.

## 2 The Model

Consider a two-period entry game under perfect information and rational behaviour. In the first period, the domestic monopolist (firm  $H$ ) is already in the market. He chooses a product price and collects the first period's profits. At the beginning of the second period, a potential foreign entrant (firm  $F$ ) decides on whether or not to enter the domestic  $H$ -market. Subsequently, both firms simultaneously set their product price, realise their profit and the game ends.

For both periods, the profits are determined by employing Hotelling's linear city model. We assume that there is a continuum of consumers having heterogeneous tastes. These tastes measured by  $\gamma$  are assumed to be uniformly distributed on a market line with length  $L = 1$ . Each consumer buys at most one unit of the horizontally differentiated good. The utility function of the consumer  $j$  buying variant  $i$  in period  $t$ , where  $i = H, F$  and  $t = 1, 2$  respectively, is given by

$$(1) \quad \begin{aligned} U_j &= r - \tau|\phi_i - \gamma_j| - \tilde{p}_{ti} \\ &= \rho - \tau|\phi_i - \gamma_j| - \tilde{m}_{ti}, \end{aligned}$$

where  $\rho$  is the largest possible markup defined as  $\rho =: r - c_{ti}$ , i.e. the difference between the consumer's reservation price  $r$  and the production costs  $c$ . The variable  $\tilde{m}_{ti}$  is the effective markup. Since tastes vary, consumers may have to buy a sub-ideal variant. In this case, they suffer a disutility amounting to  $\tau|\phi_i - \gamma_j|$ , where  $\phi_i$  is firm  $i$ 's location and  $\gamma_j$  marks consumer  $j$ 's location on the unit line. The parameter  $\tau$  measures the strength of this disutility; i.e. in case  $\tau = 0$  the purchase decision of the consumers is solely based on the markup  $m_{ti}$ ,  $m_{ti} := p_{ti} - c_{ti}$ , with  $p_{ti}$  and  $c_{ti}$  being the price and the unit costs of firm  $i$  in period  $t$  respectively. Both firms employ the same technology, hence  $c_{1H} = c_{2H} = c_{2F} = c$ .

In order to exclude a location competition and complications connected to the firms' inclination to maximise their 'hinterland' that cannot be contested by the competitor, it is supposed that the firms' variants are located at the opposite ends on the product line, i.e.  $\phi_H = 0$  and  $\phi_F = 1$ , see e.g. Gabszewicz and Thisse (1992).

Considerations are restricted to cases in which  $\rho < 2\tau$ . Otherwise the willingness to pay exceeds  $2\tau$  and the incumbent would be able to serve the entire market although charging the monopoly markup  $m_{1H} = \rho/2$ . In case  $\rho = 2\tau$  and  $m_{1H} = \rho/2$  the consumer who is located at  $\gamma_j = 1$  is indifferent between the purchase of variant  $H$  and not to buy the latter. Even if the incumbent chooses the monopoly markup he could serve the entire market in period 1. Hence, market entry would be blockaded. In case  $\rho > 2\tau$  and  $s \geq \rho$  the monopolist is able to serve the entire market with a markup  $m_{1H} = \rho - \tau$ .

Since firm  $F$  enters the market after firm  $H$ , some consumers may switch from buying the incumbent's variant to purchasing the entrant's variant. In this case, however, they have to bear

switching costs  $s$ . They may be associated to actual payments, i.e. due to a fee imposed by the bank when closing the account; or they may consist in effort to learn how the new variant works. This could be a switch of the mobile phone and a word-processing programme respectively. Then the effective price the consumers have to pay is  $\tilde{p}_{ti} := p_{ti} + s$  and the effective markup of the firms is  $\tilde{m}_{ti} := \tilde{p}_{ti} - c_{ti}$ .

In general, there may arise four ‘cases’ (i.e. subgames):

I Full market coverage and switching costs in the second period:

Some of the domestic firm’s first-period consumers are deciding for the foreign firm’s variant in the second period and, thus, have to bear switching costs. The whole market is covered, i.e. all consumers buy one or the other variant in the second period.

II Full market coverage and no switching costs in the second period:

The domestic firm’s first-period consumers buy its variant again; and the foreign firm’s customers buy for the first time. Hence, switching costs are not actually paid but the market is fully covered in period 2.

III Partial market coverage and switching costs in the second period:

There are some consumers who switch variant so that they have to bear the switching costs. However, the incumbent firm increases its price by such a degree that some of its first-period customers buy neither variant in the second period.

IV Partial market coverage and no switching costs in the second period:

All of the foreign firm’s customers continue a variant for the first time so that switching costs are not actually paid; and second-period prices are high enough so that some consumers are not served.

The condition distinguishing subgame I (II) from subgame III (IV) is that firms find it optimal to serve all consumers so that the market is just partially covered in the second stage in subgame III (IV). The condition distinguishing subgame I (III) from subgame II (IV) is that switching costs are actually paid. Hence, the model is governed by two characteristics—the market coverage and switching costs.

Among the existence of consumer switching costs there is yet another important criterion that influences the firms’ price-setting behaviour and, thus, the market outcome—the administratively set minimum-price rule. According to Article VI of the GATT,

“[...] dumping, by which products of one country are introduced into the commerce of another country at less than the normal value of the products, is to be condemned if it causes or threatens material injury to an established industry in the territory of a contracting party [of the agreement] or materially retards the establishment of a domestic industry.”

An alternative definition of AD incorporated in Article VI GATT that becomes increasingly important is that exports are sold at prices less than the cost of production. This definition was also noted by Ethier (1987, p. 937).

Doubtless, the authorities have a considerable discretion in determining the normal price. Therefore, it can be assumed that both parties, the incumbent and the entrant, consider the normal price as exogenously *ex-ante*. Clearly, the normal price  $\bar{p}$  will always belong to the interval  $[c, p^m]$ , i.e. exceeds the marginal costs and be lower than the monopoly price. Whenever the entrant sets a price above  $\bar{p}$ , the incumbent will abstain from issuing a dumping complain. In contrast, if the entrant chooses a price lower than the normal price, perfect information and rational behaviour yield the incumbent to instantaneously demand an investigation that establishes the entrant's guilt. Since the entrant anticipates the incumbent's behaviour and the authorities' findings and measures respectively, anti-dumping rules take the form of a minimum-price rule in the present paper and firm  $F$  will at least charge a price equal to the normal one.

### 3 The Second-Period Equilibria

According to the concept of backward induction, the analyses begins with determining the second-period equilibria of the four subgames in this section. Then, equilibria of period 1 can be derived and analysed in section 4.

#### 3.1 Subgame I: Full Coverage and Switching Costs in Period 2

##### 3.1.1 General Considerations

For the foreign firm's entry and price decision, the domestic firm's first-period market share  $q_{1H} \leq 1$  is given. Due to the assumption that  $\rho < 2\tau$  a situation with blockaded entry can be ruled out. However, although a full market coverage is unprofitable under monopoly pricing, the incumbent may nevertheless choose to serve all consumers for strategic reasons in the first period, i.e. to make the foreign firm's entry as costly as possible. Essentially, the first subgame captures situations in which the economy's parameters (including  $q_{1H}$ ) are such that part of the consumers do switch variants. Hence, the exogenously given switching costs are a relevant decision criterion.

Suppose the foreign firm ( $F$ ) enters the market. Then, the consumer indifferent between the incumbent's and entrant's variant is identified by location

$$\tilde{\gamma}_{2H} = \frac{1}{2} + \frac{\tilde{m}_{2F} - m_{2H}}{2\tau},$$

where again  $\tilde{m}_{ti}$  is the effective markup. Consumers having tastes  $\gamma_j \leq \tilde{\gamma}_{2HF}$  prefer the incumbent's over the entrant's variant for the given prices. Similarly, all consumers with  $\gamma_j > \tilde{\gamma}_{2HF}$  strictly prefer the new variant over the incumbent's one. Both, consumers who repeatedly buy the incumbent's variant and first-time customers do not have to bear the costs of switching variants. Hence,  $\tilde{m}_{2H} = m_{2H}$  for the incumbent's loyal clients and  $\tilde{m}_{2F} = m_{2F}$  for the entrant's customers who purchase a variant for the first time.

The situation is illustrated in Figure 1. The bold line represents the decision-relevant utility when buying the entrant's variant. The fact that switching costs reduce the consumer's utility

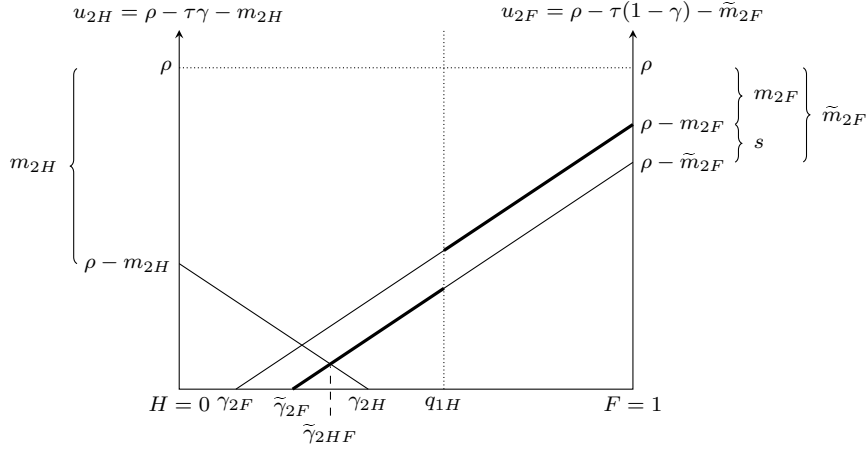


Figure 1: Full Coverage and Switching Costs

for the potential entrant's clients who used the domestic firm's variant before is manifested in the discontinuity of the bold line at  $q_{1H}$ . The indifferent second-period consumer is located at  $\tilde{\gamma}_{2HF}$ . Thus, consumers with  $\gamma_j \in [0, \tilde{\gamma}_{2HF}]$  buy the incumbent's variant again; consumers having  $\gamma_j \in (\tilde{\gamma}_{2HF}, 1]$  buy the entrant's variant, but only those with  $\gamma_j \in (\tilde{\gamma}_{2HF}, q_{1H}]$  bear switching costs.

Under these circumstances, the demand functions are given by

$$(2) \quad q_{2H} = \frac{1}{2} + \frac{\tilde{m}_{2F} - m_{2H}}{2\tau}, \quad q_{2F} = \frac{1}{2} + \frac{m_{2H} - \tilde{m}_{2F}}{2\tau}.$$

Equation (2) reveals an unusual pattern. Although firms are identical, they realise different quantities. The incumbent's quantity increases with the switching costs while the latter one's decreases in  $s$ . Therefore, different from 'normal' oligopoly models  $H$  is able to charge a higher price without losing customers.

The reason for this characteristic pattern lies in the fact that consumers have to pay switching costs when they buy the incumbent's product in the first period but the entrant's variant in the second one. Two mechanisms can be distinguished: an *anti-competition* and a *subsidy effect*. As usual with Bertrand competition, prices are strategic complements, i.e. a firm's best response to a decrease in the competitor's price is to lower the own price. Bulow et al. (1985) as well as Tirole (1988, pp. 207–208) analyse this fact. In presence of switching costs however, the competitor's effective price has a lower boundary that strictly exceeding the unit cost in the present subgame I. Even if the foreign firm were to choose a price equal to unit costs  $c$ , the consumer with location  $\gamma = q_{1H}$  would still have to pay  $\tilde{p}_{2F} = c + s$  if purchasing the new variant. Note that the entrant will never find it optimal to set a price below the unit costs since he has only one period to collect profits. Hence, switching costs increase the minimum price floor and, thus, ease competition for the incumbent—the latter feels save from a potential price war. This also explains why the domestic firm's markup and quantity are increasing functions of the switching costs: the larger the switching costs, the lower the competition between the competitors.

The subsidy effect only affects the foreign firm. For illustrative purpose, assume that  $\rho$  is very close to  $2\tau$ . Then, the incumbent almost serves the entire market even if he charges the monopoly price. In order to gain entry at all, the foreign firm has to subsidise the consumer's switching costs at least partly. Otherwise, no positive market share could be gained. Although weaker, the same effect is present for all  $\rho < 2\tau$ . In addition, as switching costs increase, the entrant has to subsidise to a larger extent in order to persuade consumers to buy his product so that his markup and quantity decrease with the switching costs.

### 3.1.2 The Firms' Price Decision

As stated by Vives (1999, pp. 205–208), in general, three situations may arise when the incumbent is faced by market entry: (1) he may accommodate (i.e. he accept) entry, (2) he may alter his behaviour so that it becomes unprofitable for the potential entrant to enter (deterrence) or (3) the switching costs or the minimum price  $\bar{p}$  are too high so that entry is effectively blockaded.

For the second period, however, the deterrence and blockade option are irrelevant as long as  $q_{1H} < 1$ . Then, there is always at least one consumer ( $\gamma_j = 1$ ) who did not buy the incumbent's variant in the first period, and the entrant attains a strictly positive market share by charging a price that yields a positive markup if the reservation price exceeds the unit costs of production which is considered to be satisfied. Hence, the domestic firm can only choose to deter entry by setting price so that  $q_{1H} = 1$ . Likewise, whether entry is blockaded or not depends on the first-period decision so that neither deterrence nor blockade need to be considered in the second period.

The minimum price described above restricts the entrant to certain prices. This rule translates into a minimum markup, i.e.  $p_{2F} \geq \bar{p}$  is equivalent to  $m_{2F} \geq \bar{m} := \bar{p} - c$  as the technology remains the same in both periods. The Proposition 1 summarises the results:

**Proposition 1** *Let  $\rho < 2\tau$  and  $s > 3(\tau - \bar{m})$ . Then, the equilibrium values are derived with:*

$$(3) \quad \begin{aligned} m_{2H} &= \frac{1}{2}(\bar{m} + s + \tau), & q_{2H} &= \frac{1}{4\tau}(\bar{m} + s + \tau), & \pi_{2H} &= \frac{1}{8\tau}(\bar{m} + s + \tau)^2, \\ m_{2F} &= \bar{m}, & q_{2F} &= \frac{1}{4\tau}(3\tau - s - \bar{m}), & \pi_{2F} &= \frac{\bar{m}}{4\tau}(3\tau - s - \bar{m}). \end{aligned}$$

*Subgame I is bounded by  $s < \min\{4\tau q_{1H} - \tau - \bar{m}, 4\rho/3 - \tau - \bar{m}\}$ , where again the first restriction marks the transition to subgame II and the second one to subgame III.*

When the minimum price restriction is binding, the foreign firm's markup is independent of the switching costs. In addition, all variables depend on the minimum markup  $\bar{m}$ . Since the minimum markup results from an administratively determined lower boundary for the entrant's price, it has exactly the same impact as the *anti-competition effect* so that the incumbent's markup, quantity as well as profit are increasing functions of  $\bar{m}$ . A higher minimum price makes it also more profitable for the incumbent to turn an otherwise non-binding restriction into a binding one.



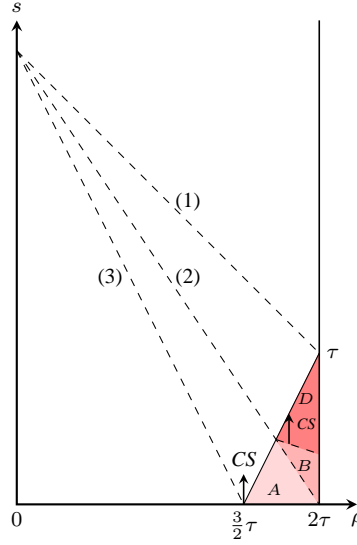


Figure 2: Impact of an AD-Rule for Subgame I in Period 2

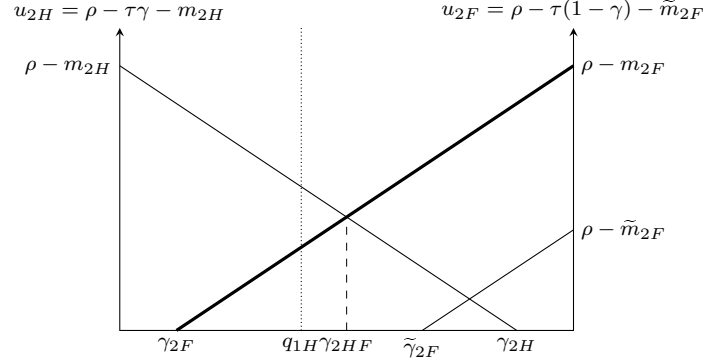
For the entrant, the situation is different. In absence of AD-rules he would choose a lower price. Yet doing so with AD-regulations in force, means to risk an investigation. Hence, higher minimum prices correspond to higher markups, but also to smaller quantities. The total effect of a higher minimum markup on the entrant's profit is *a priori* unclear. However, equation (3) shows that the price effect dominates so that the foreign firm's profit is increasing in the minimum price.

### 3.1.3 The Impact of the Existence of AD-Regulations

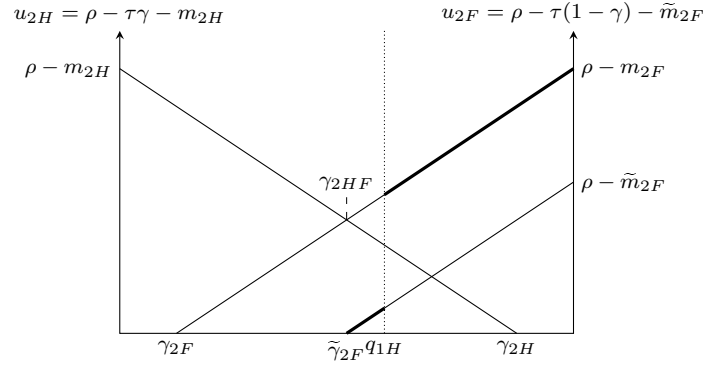
Figure 2 shows the AD-situation for three different levels of the minimum markup: (1)  $\bar{m} = \rho/3$ , (2)  $\bar{m} = \rho/2$ , and (3)  $\bar{m} = 2\rho/3$ . The uppermost dashed line represents  $s = 3(\tau - \bar{m})$  for  $\bar{m} = \rho/3$ . According to Proposition 1, the minimum price is only binding above the dashed line (1); below this line, free-trade behaviour is observed. Since the area  $A + B + D$  coincides with free-trade (FT) behaviour, the minimum price associated to  $\bar{m} = \rho/3$  is ineffective. The same holds true for all  $\bar{m} \leq \rho/3$ . Observe also that the AD-behaviour entails a case switch whenever the minimum price is ineffective.

A completely different situation presents itself for  $\bar{m} = 2\rho/3$ , i.e. the dashed line (3). To the left of (3), FT-behaviour applies, but subgame I does not exist for those values. To the right of (3), AD-behaviour calls for a switch to subgame III since the restriction  $s < 3\rho/4 - \bar{m} - \tau$  is violated. Thus, subgame I turns out to be irrelevant under both regimes. Here, the AD-rules do alter the markup as well as the behaviour of both firms for all markups  $\bar{m} \geq 2\rho/3$ .

Finally, consider the case of  $\bar{m} = \rho/2$ , represented by the dashed line (2). As it can be seen from Figure 2, elements of the two extreme cases just described are present here. Below the dashed line, FT-behaviour applies despite the fact that AD-rules exist. Therefore, area  $A$  marks  $(\rho, s)$ -combinations for which the AD-regulation is ineffective. However, in region  $B$ , the en-



(a) Subcase IIa



(b) Subcase IIb

Figure 3: Full Coverage and no Switching Costs

trant is forced to comply with the minimum price. Although both firms are in the market, prices are higher as compared to the FT-situation, where the markups  $\{m_{2H} = (3\tau + s)/3, m_{2F} = (3\tau - s)/3\}$  are chosen. The free-trade results of this as well as the following subgames have been gathered from Metge (2007). The vector marked CS (i.e. case switch) indicates that combinations of  $(\rho, s)$  lying above area  $B$  belong either to subgame II or subgame III. Hence, for all minimum prices corresponding to a minimum markup of  $\bar{m} \in [\rho/3, 2\rho/3]$ , there are some  $(\rho, s)$ -combinations for which AD-rules leave the economy unaffected and others, for which the behaviour changes.

### 3.2 Subgame II: Full Coverage and no Switching Costs in Period 2

#### 3.2.1 General Considerations

In this section, the second subgame is considered which encompasses situations where all consumers are served in the second period, but switching is not actually observed. Two subcases can be distinguished which are both illustrated in Figure 3.

In subcase IIa, the consumer indifferent between both variants has the location

$$\gamma_{2H} = \frac{1}{2} + \frac{m_{2F} - m_{2H}}{2\tau}.$$

Consumers with  $\gamma_j \in [0, \gamma_{2HF}]$  buy the incumbent's variant in the seconde period and those

with  $\gamma_j \in (\gamma_{2HF}, 1]$  purchase the entrant's product. Switching costs are irrelevant for the customer's decision problem because the incumbent increases her market share in the second period, i.e. she behaves aggressively in the second period. The associated demand functions of the competitors read

$$q_{2H} = \frac{1}{2} + \frac{m_{2F} - m_{2H}}{2\tau}, \quad q_{2F} = \frac{1}{2} + \frac{m_{2H} - m_{2F}}{2\tau}.$$

Subcase IIb is the counterpart of subcase IIa in that the domestic firm pursues an more aggressive strategy in the first period and relaxes in the second one. Again, the bold line shows the consumer's utility from buying the entrant's product in period 2. Since all consumers with  $\gamma_j \leq q_{1H}$  have to pay switching costs when using the new variant, the bold line jumps down at  $q_{1H}$ . Switching costs are not paid because consumer  $\gamma_j = q_{1H}$  receives a higher utility from 'brand loyalty'. His neighbour to the right who purchases for the first time chooses the entrant's variant. Thus, the second-period quantities are determined by the incumbent's first-period actions alone:

$$q_{2H} = q_{1H}, \quad q_{2F} = 1 - q_{1H}.$$

An important peculiarity of subcase IIb should be noted: Both firms choose the product prices such that full market coverage is just maintained in period 2. Thus, they set the highest price compatible with the definition of this subgame.

### 3.2.2 The Firms' Price Decision

Assuming that the minimum price and, thus, the minimum markup  $\bar{m}$  is binding, the following result arises:

**Proposition 2** *If  $\rho < 2\tau$ ,  $\bar{m} > \tau$ ,  $\rho \geq 3(\bar{m} + \tau)/4$  and  $\bar{m} + \tau - 4\tau q_{1H} \geq 0$  there are at least some parameter configurations belonging to subcase IIa. The equilibrium has the following characteristics:*

$$(4) \quad \begin{aligned} m_{2H} &= \frac{1}{2}(\bar{m} + \tau), & q_{2H} &= \frac{1}{4\tau}(\bar{m} + \tau), & \pi_{2H} &= \frac{1}{8\tau}(\bar{m} + \tau)^2, \\ m_{2F} &= \bar{m}, & q_{2F} &= \frac{1}{4\tau}(3\tau - \bar{m}), & \pi_{2F} &= \frac{\bar{m}}{4\tau}(3\tau - \bar{m}), \end{aligned}$$

where  $\bar{m} + \tau - 4\tau q_{1H} = 0$  and  $\rho \geq 3(\bar{m} + \tau)/4$  mark the boundaries to subcase IIb and subgame IV respectively.

The equilibrium values in (4) share characteristics with those for subgame I. Firstly, the optimal markup, quantities and profits are independent of  $s$ . Compared to the values under subgame I, it can be seen that the values become identical when  $s = 0$ . Hence, the incumbent's markup, quantity and profit increase in the minimum markup due to the anti-competition effect of a price floor. We also find that the entrant's markup increases while his quantity decreases with the minimum markup, but that the total effect is positive.

Probably, the most striking feature of Proposition 2 is that it states results for subcase IIa, but not for IIb. The simple reason is that, strictly speaking, the minimum price is never binding in

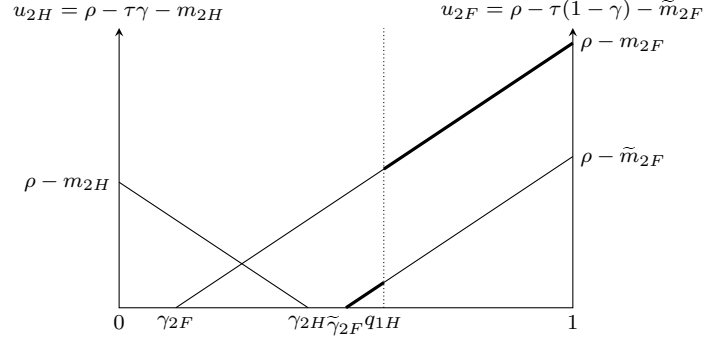


Figure 4: Partial Coverage and Switching Costs

subcase IIb. Nevertheless, AD-regulations may affect firms' behaviour. In absence of AD-rules, subcase IIb applies when  $\min\{\rho - \tau q_{1H}, \rho - \tau(1 - q_{1H})\} \geq 0$  and  $q_{1H} > 1/2$ . Then, the firms pursuing their FT-strategy realise the markups  $\{m_{2H} = \rho - \tau q_{1H}, m_{2F} = \rho - \tau(1 - q_{1H})\}$ .

As explained above, a configuration with full market coverage is just satisfied and a marginal increase of the price (and markup respectively) for either variant results in transition to the partial-coverage subgame IV.

### 3.3 Subgame III: Partial Coverage and Switching Costs in Period 2

#### 3.3.1 General Considerations

This subgame is the first of the partial coverage cases which apply in situations where some consumers do not buy any variant in the second period. Subgame III sets itself apart from IV in that at least some consumers switch from the incumbent's variant to the entrant's one. Figure 4 illustrates the situation assumed in subgame III.

It can be seen in Figure 4 that consumers  $\gamma_j \in (\tilde{\gamma}_{2F}, q_{1H}]$  who previously used the incumbent's product derive a positive utility from buying the foreign firm's variant. In contrast, consumers  $\gamma_j \in (\gamma_{2H}, \tilde{\gamma}_{2F}]$  who also bought the incumbent's product previously now abstain from purchasing a variant altogether. Therefore firms do not compete in prices in this subgame. Consequently, demand is given by

$$q_{2H} = \frac{\rho - m_{2H}}{\tau}, \quad q_{2F} = \frac{\rho - \tilde{m}_{2F}}{\tau}.$$

The firms are local monopolies since the demand functions depend exclusively on their own decision variables. Note also that this situation is compatible with the notion of the incumbent behaving more aggressively in the first than in the second period.

#### 3.3.2 The Firms' Price Decision

Assume that the domestic country has AD-rules and that the minimum price is binding. Then, we obtain the following results:

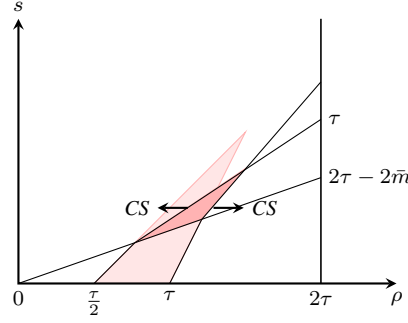


Figure 5: Impact of an AD-Rule for Subgame III in Period 2

**Proposition 3** *If  $\rho < 2\tau$ ,  $s \geq \rho - 2\bar{m}$  and  $s \in [3\rho/2 - \bar{m} - \tau, \rho - \tau(1 - q_{1H}) - \bar{m}]$  the equilibrium values read*

$$\begin{aligned} m_{2H} &= \frac{\rho}{2}, & q_{2H} &= \frac{\rho}{2\tau}, & \pi_{2H} &= \frac{\rho^2}{4\tau}, \\ m_{2F} &= \bar{m}, & q_{2F} &= \frac{1}{\tau}(\rho - s - \bar{m}), & \pi_{2F} &= \frac{\bar{m}}{\tau}(\rho - s - \bar{m}). \end{aligned}$$

Again, the lower boundary  $s = 3\rho/2 - \tau - \bar{m}$  marks the transition to subgame I while the upper boundary  $s = \rho - \tau(1 - q_{1H}) - \bar{m}$  is the borderline to subgame IV.

Since the incumbent is a local monopolist, he charges the monopoly markup that is independent of the level of switching costs and the minimum price. This result in Proposition 3 differs from the corresponding ones for subgame I and II.

The results concerning the foreign firm are similar to the ones for subgame I: the markup increases with the minimum one and the quantity is a decreasing function of both the switching costs and the minimum markup. In contrast to Proposition 1, however, the profits decrease with the minimum markup since  $s \geq \rho - 2\bar{m}$ . This divergence is a consequence of the fact that the entrant fully subsidises the switching costs under subgame III while he only partially compensates his consumers under subgame I.

### 3.3.3 The Impact of the Existence of AD-Regulations

In Figure 5, the line  $s = \rho - 2\bar{m}$  divides the region where the minimum price is binding (above) from the one where it becomes ineffective (below) for  $\bar{m} = \rho/3$ . The light shaded area shows parameter combinations where FT-behaviour can be observed. The darker area above line  $s = \rho - 2\bar{m}$  comprises those  $(\rho, s)$ -combinations for which subgame III under a binding minimum price is observed. Here, the entrant is forced to charge a higher price as compared to a lower (or absent) minimum price. In addition, the area for AD-behaviour is slightly tilted to the right. Accordingly, there are some  $(\rho, s)$ -combinations for which subgame IV applies in the AD-regime although they are covered by subgame III under FT at the left edge of the dark shaded area, where the competitors would choose a markup  $\{m_{2H} = \rho/2, m_{2F} = (\rho - s)/2\}$  under FT.

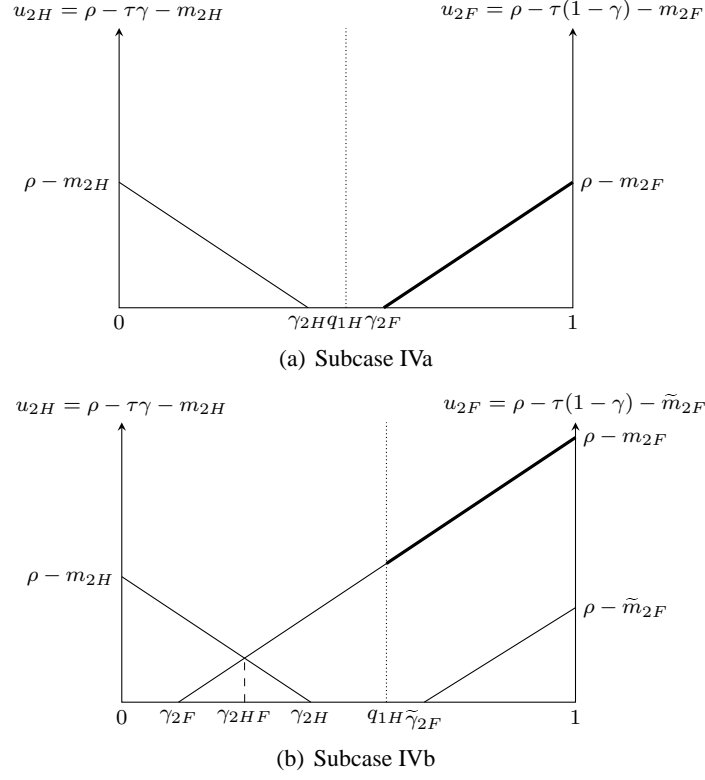


Figure 6: Partial Coverage and no Switching Costs

In contrast, subgame III extends beyond the one under FT at the right edge. Therefore, some  $(\rho, s)$ -combinations belonging to subgame I under FT are covered by subgame III with AD-rules. Clearly, those characteristics are a result of the fact that, unlike subgame I, the entrant fully subsidises the switching costs in subgame III.

### 3.4 Subgame IV: Partial Coverage and no Switching Costs in Period 2

#### 3.4.1 General Considerations

Finally, this subgame comprises situations in which some consumers do not use a variant in the second period and in which switching costs are not actually paid. Again, there arise two subcases IVa and IVb; both are illustrated in Figure 6.

In IVa, consumers with  $\gamma_j \in (\gamma_{2H}, q_{1H}]$  who have bought the incumbent's variant before do not so again. On the other hand, consumers with  $\gamma_j \in (q_{1H}, \gamma_{2F})$  abstain from purchasing any product in both periods. Here, the incumbent as well as the entrant are (local) monopolists so that demand is given by

$$q_{2H} = \gamma_{2H} = \frac{\rho - m_{2H}}{\tau}, \quad q_{2F} = 1 - \gamma_{2F} = \frac{\rho - m_{2F}}{\tau}.$$

Subcase IVb is similar to IIb. All consumers  $\gamma_j \in (q_{1H}, 1]$  who have not previously used the domestic firm's variant derive a positive utility from purchasing the new product. However, different from the corresponding subcase IIb, switching costs are too high so that it is unprofitable

to persuade customers who bought the incumbent's product before to switch. The incumbent having pursued an aggressive strategy in the first period relaxes and raises her price in the second one. Consequently, demand is determined with

$$q_{2H} = \gamma_{2H} = \frac{\rho - m_{2H}}{\tau}, \quad q_{2F} = 1 - q_{1H}.$$

### 3.4.2 The Firms' Price Decision

Since the market is never fully covered in subgame IV, the incumbent is not affected by AD-rules (cf. also subgame III). Consequently, she behaves as a monopolist realising the monopoly markup and profit in both subcases and under the FT- as well as the AD-regime. Therefore, the following Proposition states only the results for the entrant.

**Proposition 4** *Let  $\rho < 2\tau$ ,  $\rho \leq \min\{2(\bar{m} + \tau)/3, \bar{m} + \tau(1 - q_{1H})\}$  and  $\bar{m} \in [\rho/2, \rho]$ . Then, the entrant's equilibrium values are given by*

$$m_{2F} = \bar{m}, \quad q_{2F} = \frac{1}{\tau}(\rho - \bar{m}), \quad \pi_{2F} = \frac{\bar{m}}{\tau}(\rho - \bar{m})$$

*for IVa. Here,  $\rho = 2(\bar{m} + \tau)/3$  marks the boundary to subgame II and  $\rho = \bar{m} + \tau(1 - q_{1H})$  is the transition to IVb. The condition  $\bar{m} = \rho/2$  separates AD-behaviour from the free-trade one.*

Compared to the equilibrium values under subgame III, it can be seen that the values become identical when the switching costs  $s = 0$ . In addition, we find another familiar pattern: The equilibrium values in Proposition 4 are independent of  $s$  since they do not affect the consumers' decision problem in subgame IV. On the other hand, a binding minimum price leaves its traces in that all equilibrium values are functions of the minimum markup. While the entrant's markup naturally increases with the minimum one, his quantity decreases in it. The overall effect of an increasing minimum markup on profits will be negative. Comparing the results of Propositions 4 and 3 shows that the equilibrium values become identical if the switching costs are zero.

### 3.4.3 The Impact of the Existence of AD-Regulations

As in the only other situation where two subcases are relevant, i.e. in subgame II, only subcase IVa is consistent with a binding minimum price; subcase IVb arises solely under FT where the incumbent would charge the monopoly markup  $m_{2H} = \rho/2$ , whereas the entrant would choose  $m_{2F} = \rho - \tau(1 - q_{1H})$ . The reasons are the same and are restated for convenience: As shown above, in absence of AD-rules the entrant sets the highest markup consistent with the subgame definition. If the entrant were to raise the markup even marginally, subcase IVb would cease to exist and both firms would find themselves in subcase IVa. Clearly, any minimum price associated to  $\bar{m} \leq \rho - \tau(1 - q_{1H})$  turns out to be ineffective since the entrant voluntarily chooses a higher markup. In contrast, if  $\bar{m} > \rho - \tau(1 - q_{1H})$ , the consumer at  $\gamma_j = q_{1H}$  would derive a negative utility from purchasing the new variant and, hence, will prefer to buy neither product in the second period. Consequently, subcase IVa becomes relevant. The impact of an

AD-regulation on subcase IVb simply consists in affecting a case switch to subcase IVa that would otherwise not occur for the respective parameter constellations.

For IVa, minimum prices corresponding to  $\bar{m} < \rho/2$  leave the economy unaffected. Then, both firms act as monopolies and charge the monopoly markup  $m_{2H} = m_{2F} = \rho/2$ . Those minimum prices that lead  $\bar{m}$  to exceed the threshold  $\rho/2$  increase the product prices. For binding minimum prices, the case boundaries to II and IVb respectively are the more restrictive the smaller the reservation price  $r$  and  $\rho$  respectively compared to the disutility parameter  $\tau$ .

## 4 The Subgame-Perfect Equilibria

After having determined the Nash-equilibrium configurations for the second period, we can now turn our attention to the first one and fully characterise the subgame-perfect equilibrium and reveal its properties. Although the four subgames are defined using the second-period characteristics of full vs. partial market coverage and of whether or not switching costs are actually paid, the incumbent's first-period decision affects the case definitions through  $q_{1H}$ . Therefore, the incumbent's first-period decision problem is examined for a given case. Subsequently, it is determined which subgame is chosen for a specific  $(\rho, s)$ -combination.

In the first period, the incumbent is the only supplier of the commodity. Consequently, the consumer indifferent between buying and not buying the only available variant determines the domestic firm's demand. The profit maximising monopolist chooses the monopoly markup  $m_{1H} = \rho/2$ . This can be solved by equation (1). Thus, the demand of firm  $H$  is given by

$$(5) \quad \begin{aligned} q_{1H} &= \frac{1}{\tau}(r - p_{1H}) \\ &= \frac{1}{\tau}(\rho - m_{1H}). \end{aligned}$$

As usual, the demand is an increasing function of the reservation price  $r$  and a decreasing function of the product price  $p_{1H}$ . The same holds true for the maximally attainable markup  $\rho$  and the actually chosen markup  $m_{1H}$  since  $\rho$  and  $m_{1H}$  are unambiguously increasing in  $r$  and  $p_{1H}$  respectively.

Given the first-period demand, the incumbent maximises the present value  $(\Pi_H)$  of both periods' profits with respect to the markup  $m_{1H}$ . In general, the present value is defined by

$$(6) \quad \Pi_H := \pi_{1H} + \delta\pi_{2H}, \quad \delta \in (0, 1],$$

where  $\delta$  is the time preference rate common to both firms.

### 4.1 First-Period Equilibria for Subgame I

Assuming that the incumbent wants to be in subgame I, we find the following result:

**Proposition 5** *Given  $\rho < 2\tau$ ,  $H$  sets the monopoly markup  $m_{1H} = \rho/2$  in the AD-regime. The minimum price is binding for  $s \geq 3(\tau - \bar{m})$ . Then, AD-behaviour applies in the second period*



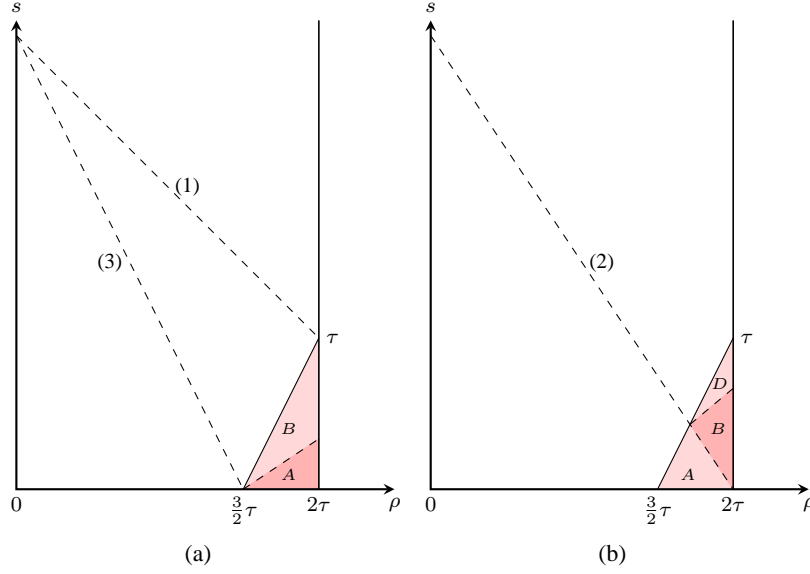


Figure 7: Impact of an AD-Rule for Subgame I in Period 1

where  $s \leq 4\rho/3 - \tau - \bar{m}$  marks the boundary to subgame III. The equilibrium present value of profits is given by

$$\Pi_H^I = \frac{\rho^2}{4\tau} + \frac{\delta}{8\tau}(\bar{m} + \tau + s)^2.$$

Figure 7 illustrates the results of Proposition 5. In subfigure 7(a), the area  $A + B$  constitutes the  $(\rho, s)$ -combinations for which subgame I is defined. Since the incumbent's first-period market share has been obtained, the transition to other subgames is now exactly determined: to the left of area  $A + B$ , the partial-coverage subgame III appears, whereas a switch to the second subgame cannot occur.

In addition, Figure 7(a) illustrates the AD-situation for values of the minimum markup of (1)  $\bar{m} = \rho/3$  and (3)  $\bar{m} = 2\rho/3$  respectively. When the lower minimum markup is chosen, the negatively sloped dashed line (1) separates parameter constellations for which the minimum price is binding (above) and not binding (below). When  $\bar{m}$  is not binding, firms choose their FT-behaviour so that the incumbent realises the present value  $\Pi_H^I = \rho^2/4\tau + [\delta(3\tau + s)^2/(18\tau)]$  as reported in Metge (2007). As it can be seen, minimum prices corresponding to minimum markups of  $\bar{m} \leq \rho/3$  are ineffective as situations above line (1) belong to subgame III even under AD-behaviour.

The dashed line (3) divides FT- from AD-behaviour for a minimum markup of  $\bar{m} = 2\rho/3$ . Here, the minimum price is always binding since subgame I is not defined for locations to the left of region  $A + B$ . However, AD-behaviour will apply in area A. Above that region, subgame III becomes relevant. The seemingly diverging results are easily reconciled. The first subgame exists only if  $q_{1H} > 1/2$ . Proposition 5 implies that the monopolist's first-period quantity is  $q_{1H} = \rho/(2\tau)$  which depends on both, the maximum markup  $\rho$  and the disutility parameter  $\tau$ . Thus, the market share increases with the maximum markup and approaches one

as  $\rho$  approaches  $2\tau$ . A consequence of this ‘variable’ market share is that AD-behaviour is actually observed even for  $\bar{m} = 2\rho/3$ .

Now, consider Figure 7(b). The area  $A+B+D$  defines subgame I under FT which coincides with the corresponding area in Figure 2. The dashed line labelled (2) represents the boundary between FT- and AD-behaviour for  $\bar{m} = \rho/2$ . As in Figure 2, there are some  $(\rho, s)$ -combinations for which the minimum price is ineffective (area  $A$ ). Note that region  $A$  is identical in Figure 2 and 7(b). For other parameter constellations, the minimum price rule will be effective (area  $B$ ). Above region  $B$ , subgame I ceases to exist and subgame III becomes relevant instead. The different slopes of the case boundary in Figure 2 and 7(b) is also a result of the assumption that the quantity  $q_{1H}$  is independent of the maximum markup  $\rho$ .

## 4.2 First-Period Equilibria for Subgame II

The general maximisation problem remains the same for subgame II: The incumbent maximises equation (6) with respect to  $m_{1H}$ , where the demand is given by equation (5). The following result can be obtained:

**Proposition 6** *For  $\rho \in [\tau/2, 2\tau/3)$ , the incumbent chooses  $m_{1H}^c = 2\rho - \tau$  in subcase IIb under AD. When  $\rho \in [2\tau/3, 2\tau)$ , the markup is  $m_{1H} = \rho/2$  in subcase IIb for the AD-regime. The present values of profits are*

$$(7) \quad \begin{aligned} \Pi_H^{IIc} &= \frac{1+\delta}{\tau}(\tau - \rho)(2\rho - \tau) \quad \text{if } \rho \in [\tau/2, 2\tau/3), \\ \Pi_H^{II} &= (1+\delta)\frac{\rho^2}{4\tau} \quad \text{if } \rho \in [2\tau/3, 2\tau), \end{aligned}$$

where the superscript  $c$  stands for the compliance with the definition of the subgame and II marks the subgame. Subcase IIa is always dominated by subcase IIb.

In subcase IIb, the second-period market shares are defined by the incumbent’s first-period one alone. Consider the FT-situation: Here, the incumbent cannot achieve a higher present value than the monopoly one within the boundaries of subcase IIb. Thus, she charges the monopoly price that corresponds to  $m_{1H} = \rho/2$  and achieves the lower result of equation (7). For small values of the maximal markup  $\rho$ , i.e. for  $\rho < 2\tau/3$ , monopoly pricing would result in a negative second-period markup for the entrant so that the domestic firm has to change the first period markup to comply with the subgame definition. Thus,  $m_{1H}^c = 2\rho - \tau$  will be observed for  $\rho \in [\tau/2, 2\tau/3)$  and the upper outcome of equation (7) follows. In case the maximum markup is even lower than  $\tau/2$ , a case switch to IV is inevitable.

As explained in section 3.2.2 on the second-period equilibrium of subcase IIb, minimum prices in the AD-regime are either ineffective or a case switch to IV occurs. Given the optimal first-period choice under FT, it is clear that all minimum markups  $\bar{m} \leq 3\rho/2 - \tau$  are ineffective under monopoly pricing whereas  $\bar{m} > 3\rho/2 - \tau$  entails a case switch. When the incumbent deviates from monopoly pricing, the entrant’s second-period markup is always zero. Consequently, only a minimum markup of  $\bar{m} = 0$  is ineffective. All other minimum markups will yield a switch to subgame IV.

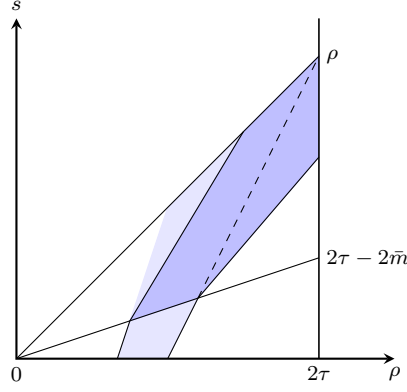


Figure 8: Equilibrium Configurations for Subgame III

### 4.3 First-Period Equilibria for Subgame III

For the first of the partial-coverage subgames we find the following result:

**Proposition 7** *Let  $\rho < 2\tau$  and  $s \in [\min\{\rho, 2(\rho - \tau)\}, 3\rho - 2\tau]$ . Then, a binding minimum markup results in  $m_{1H} = 2\rho - \tau - \bar{m} - s$  as long as  $s > \max\{\rho - 2\bar{m}, 3\rho/2 - \tau - \bar{m}\}$  and  $s < \min\{\rho, 2\rho - \tau - \bar{m}\}$ . The corresponding present value is:*

$$\Pi_H^{III} = \frac{1}{\tau}(2\rho - \bar{m} - s - \tau)(\bar{m} + s + \tau - \rho) + \delta \frac{\rho^2}{4\tau}.$$

The situation is illustrated in Figure 8.

In both partial coverage subgames the domestic and foreign firm are local monopolists. The fact that optimal behaviour within subgame III deviates from the monopoly pricing under AD shows that  $H$  will choose the highest markup just to satisfy the subgame definition. In the FT as well as the AD-regime, the restriction that some consumers are actually switching variants (i.e. for the third subgame  $\tilde{\gamma}_{2F} \leq q_{1H}$  in Figure 4) is the binding one. Condition  $s < \rho$  marks an additional restriction that negotiates the transition to subgame IV.

In Figure 8, the AD-situation for  $\bar{m} = \rho/3$  is presented. Line  $s = \rho - 2\bar{m}$  separates FT- (below) from AD-behaviour (above). This condition also reveals that only a minimum markup  $\bar{m} = 0$  is ineffective. All other minimum markups will influence the firms' behaviour for at least some parameter constellations. In particular, subgame III collapses for  $\bar{m} > \rho/2$ .

Similar to Figure 5, the darker shaded area marking the AD-behaviour is tilted to the right as compared to the light shaded FT-area that is shown for illustrative purpose. The reasons are the same as described below Figure 5.

### 4.4 First-Period Equilibria for Subgame IV

In subgame IV, the maximisation of equation (6) results in Proposition 8.

**Proposition 8** *For  $\rho < \tau$  monopoly pricing with  $m_{1H} = \rho/2$  is observed in subcase IVa under AD. Subcase IVb coincides with subcase IVa for  $\rho \in [2\tau/3, \tau)$ . The equilibrium present value of the incumbent's profits is given by*

$$\Pi_H^{IV} = (1 + \delta) \frac{\rho^2}{4\tau}.$$

The result is unsurprising since there is no price competition as it can be seen in Figure 6. Hence, both firms are local monopolies and switching costs are not paid in subgame IV. The fact that this subgame is restricted to small levels of the reservation price is also intuitive: Given the preference parameters  $\tau$  and  $r$  as well as the constant unit costs  $c$ , firms' discretion to persuade consumers to buy their variant is extremely limited when  $r$  is small. In fact, a full market coverage might not be possible if the unit costs are large compared to the reservation price.

Under AD-rules, the incumbent pursues her FT-behaviour in both periods since both firms are local monopolists. Minimum prices of  $\bar{m} \leq \rho/2$  prove to be ineffective. In case the minimum markup exceeds the monopoly one, the entrant has to charge higher prices and will have a smaller market share as compared to the FT-situation.

## 4.5 The Equilibrium and its Properties

Until now, the analysis has always been conducted within a given case. However, for some parameter constellations two or even three subgames are defined. Which of these will eventually be observed depends on the incumbent's first-period decision. Therefore, we compare the incumbent's present values for the various subgames in order to determine the subgame-perfect equilibrium for the AD-situation assumed in this game.

### 4.5.1 The Subgame-Perfect Equilibrium

The task is slightly demanding since the present values not only depend on the minimum markup, but whether or not AD-behaviour is observed also depends on the specific value of the minimum markup. Before stating the result, the present values are reproduced for convenience's sake:

$$\begin{aligned} \Pi_H^I &= \frac{\rho^2}{4\tau} + \frac{\delta}{8\tau}(\bar{m} + \tau + s)^2, & \Pi_H^{II} &= (1 + \delta) \frac{\rho^2}{4\tau}, \\ \Pi_H^{III} &= \frac{1}{\tau}(2\rho - \bar{m} - s - \tau)(\bar{m} + s + \tau - \rho) + \delta \frac{\rho^2}{4\tau}, & \Pi_H^{IV} &= (1 + \delta) \frac{\rho^2}{4\tau}. \end{aligned}$$

**Proposition 9** *The incumbent charges the monopoly price independent of the level of switching costs or the minimum price. For  $\rho < \tau$ , the foreign firm enters the market and sets the monopoly markup if  $\bar{m} \leq \rho/2$  and  $m_{2F} = \bar{m}$  otherwise. In the interval  $\rho \in [\tau, 2\tau)$ , the foreign firm enters and chooses a markup of  $m_{2F} = 3\rho/2 - \tau$  in case the AD-rules yield a lower minimum markup. Otherwise the markup will equal the minimum one and subgame IV becomes relevant. Entry deterrence does not occur.*

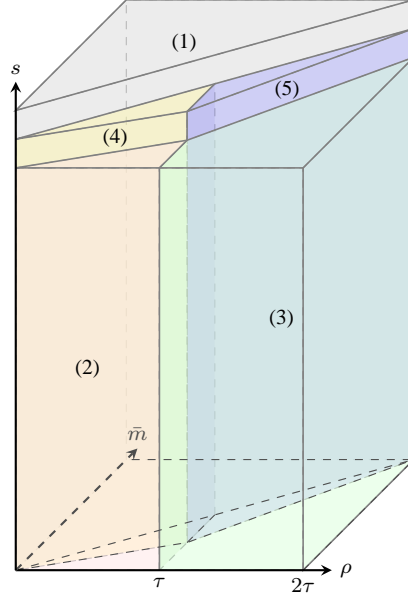


Figure 9: Subgame-Perfect Equilibria in a Three-Dimensional Space

The Proposition 9 shows that only subgame IV and subcase IIb are relevant in the subgame-perfect equilibrium under AD-rules. Neglecting that certain levels of the minimum markup will be effective and, hence, force the entrant to choose a higher price than he would set in absence of the AD-regulation, a two-dimensional space divided into two free-trade parts could be observed.

#### 4.5.2 The Impact of an Anti-Dumping Regulation

However, the level of the minimum price is important since the foreign firm's pricing behaviour might change which generally affects domestic welfare. Figure 9 shows the situation in a three-dimensional space considering the level of  $\bar{m}$ , the switching costs  $s$  and the largest possible markup  $\rho$ .

The tallest area (1) shows parameter constellations for which the foreign firm does not enter the market since the minimum markup  $\bar{m}$  exceeds the maximum one  $\rho$ . In this situation, not even the consumer who prefers the foreign firm's variant the most, i.e. the consumer located on the right hand of the linear market line ( $\gamma_j = 1$ ), would derive a positive utility from buying the new good. Instead he will buy neither commodity.

On the other hand, for  $\bar{m} = 0$ , the associated minimum price is always ineffective, so that firms display their FT-behaviour. Consequently, the areas (2) and (3) in front represent those parameter configurations for which AD-rules leave the economy unaffected—if  $\rho \in [0, \tau)$  the incumbent chooses subgame IV and if  $\rho \in [\tau, 2\tau)$  subgame II respectively. In particular, both firms charge the monopoly price and only partial market coverage will be observed for area (2). Region (3) describes situations in which the domestic firm continues to set the monopoly price. The foreign firm enters the market and chooses a price that exceeds the monopoly one. As a

consequence, his demand shrinks as the reservation price increases. However, due to the high willingness to pay measured by  $r$  and  $\rho$  respectively all consumers are served in the period 2.

The areas in the middle, i.e. (4) and (5), constitute those parameter constellations for which the AD-rules do affect the economy. However, the incumbent's behaviour is not affected. Consequently, the welfare of the incumbent's customers remains unaffected by AD-rules as well. Although the foreign firm always enters the market even in situations illustrated by region (4) and (5), it has to charge higher prices to comply with the AD-rules.

Consider region (4): Some consumers are unwilling to buy either product even under free trade. With an binding anti-dumping regulation, however, the entrant is forced to raise his price above the monopoly one so that the consumers who do purchase his variant are worse-off as compared to the FT-situation. In addition, an even greater number of consumers decline to purchase variant  $F$ .

Area (5) represents parameter configurations for which the market is fully covered under FT and the entrant's price exceeds the monopoly one. Under an AD-regulation, the price ( $p_{2F}$ ) has to be still higher. As a consequence, there are some consumers who will not buy either product in both periods although they would have done so in absence of AD-rules. Again, there are two kinds of negative effects: (i) the higher prices which hurt the entrant's customers and (ii) that some consumers who would be served under FT are not able to afford the foreign variant under AD-rules.

## 5 Policy Recommendations and Conclusion

The model discussed in this paper is aimed at studying the behaviour of firms competing in a regime with with an anti-dumping regulation; i.e. with a minimum-price rule. In addition we employ costs consumers switching the supplier have to bear.

A two-stage model of a horizontally differentiated product market with complete information has been employed. The domestic firm charges a certain price at the beginning of the first period. Consumers and one potential entrant make their respective decisions. The purchase decision of the consumers as well as the entry decision of the potential foreign entrant may be conditional on the price level and the existence of consumer switching costs. In case the foreign firm enters the incumbent's market at the very beginning of period 2, both firms simultaneously set prices. Within this framework, we demonstrate that there are regions of full as well as partial market coverage in the second period, whereas there is a partial coverage in the first period.

Though entry deterrence is easy to achieve under the anti-dumping regime, the accommodation strategy yields a larger profit in the equilibrium configurations for the domestic firm. Hence, the incumbent always chooses to accommodate (i.e. to accept) entry. This strategy profile results from the assumption that the incumbent chooses a first-period markup to serve less than the entire market, so that there is always at least one consumer not buying the incumbent's variant. In case the market is fully covered in the first period, entry is generally blockaded.

Generally the consumer switching costs are a conceivable threat of locking in customers

and deterring entry. Then, the foreign firm may at least partially subsidise the switching costs so that there is a subsidy effect. Yet, in this framework they are never paid in case of a binding anti-dumping regulation. If they do exist, switching costs associated with prices as strategic complements may have an anti-competition effect that leads to larger prices. In this case, the incumbent charges the monopoly price in the first period to signalise the potential entrant not to mess with the entrant's potential business; i.e. to prevent too fierce price competition. Hence, the entrant is able to charge a certain price to realise a positive market share. Yet, some of the incumbent's first-period customers abstain from purchasing any variant in the second period.

Other effects than those stated above come from an anti-dumping regulation such as a minimum-price rule binding upon foreign firms supplying their products in the market of the incumbent. Due to the mere existence of an anti-dumping regulation associated with prices as strategic complements and the existence of switching costs the firms' price-setting behaviour is distorted; the firms are able to charge larger prices but prevent some customers of the incumbent from switching to the entrant's variant in the second period. In addition, in case the price rule is binding, it prevents from too fierce price competition and yields larger profits. Hence, the anti-dumping regulation and its effects should be recognised and taken as an artificial protection of domestic sectors and safeguard measure against foreign potential competitors so that authorities responsible for anti-dumping regulations (as formulated in Article VI of the General Agreement on Tariffs and Trade (GATT) e.g.) should rethink these clauses.

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