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The Case of the German Postal Market**

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Competition through Cooperation? The Case of the German Postal Market

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Abstract: How can small and medium-sized German postal providers ensure nationwide geographical coverage without the aid of the former monopolist? A closer look at the industry revealed that postal providers in Germany engage in different types of cooperation in order to expand their geographical coverage independently from the market leader. In order to shed light on the effects of cooperation, I conducted a theoretical analysis using a spatial economic model complemented by a brief game-theoretical discussion. Moreover, I provide the first descriptive and case study evidence from unique data collected in 2010 and 2011, within the framework of a German postal market survey. I found that small postal providers cooperate with each other in order to extend their geographical service area and to succeed in the market. Furthermore, I also found—in both the theoretical analysis as well as in the evidence—that there is a negative counter-effect stemming from this cooperation.

Keywords: Cooperation, Competition, Germany, Network Industries, Postal Sector

JEL-Classification: D24, L22, L51, L97

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1 Introduction

Like other European countries, the German postal market successively opened to competition after the first EU postal directive in 1997. Since then, many market entries and exits have taken place, yet it seems the former monopolist still has not lost any of its market power. Competition in the German postal market will only happen if new postal providers are sufficiently profitable and stay in the market. Analysis of success determinants in network industries shows that wide geographical coverage is among the crucial success factors, and in the postal industry it may be the most important success factor. Because the development of a wide postal network is a very costly matter and because such markets are generally characterized by scale economies, the question arises whether there is a way to ensure wide geographical coverage. The main possibility, which comes into question, is buying into an existing network which presupposes that the network owner provides network access to other market participants and new market entrants. This in turn also requires that the network owner is willing to engage in a cooperative relationship with its competitors.

One of the major consequences of cooperation could be that incumbent firms possibly loose revenue shares to other firms. For this reason, incumbent firms—for example the network owner—might have incentives to prevent competitors from entry into their network, which they can realize through corresponding strategic behavior. The study of the German postal market presented in this paper shows there are different forms of cooperation practiced by postal providers in order to expand their geographical service area. A promising cooperation strategy within the postal industry is cooperation within an organized network. Currently, there are two such large networks in the German postal market: Mail Alliance and P2-Network. In fact, as long as postal providers expect benefits from cooperation, it is very likely that such behavior will be pursued because it results in a win-win situation for both cooperation partners and, moreover, they can ensure the delivery infrastructure with or without the aid of the market leader.

The analysis presented in this paper is based upon the fundamental findings of various studies that show scale and scope economies are strongly pronounced in the postal industry and, moreover, on the idea that cooperation constitutes an appropriate possibility to exploit these economies. There is hardly any research on the cooperation behavior of postal provid-

ers, which can certainly be attributed to the regulation history of the postal market.¹ There is, however, a large number of studies, mainly located in strategy literature, dealing with the performance of firms which engage simultaneously in cooperation and competition with other firms of their industry. These hybrid relationships of firms are called cooptition. The term of cooptition was coined by the authors Brandenburger et al. (1996), Lado et al. (1997), and Zelding (2004) and describes the collaboration of firms, for example by sharing capacities, although they are rivals and compete for customers and market share.² Despite a high number of studies dealing with cooptitive behavior of firms in general, none of these studies refers directly to the postal market. Empirical evidence for the postal market provided by Abdallah (2011) found that firms pursuing a cooptitive strategy perform better than firms only focusing either on cooperative or competitive strategies. Cooperation behavior of German postal providers has also not been analyzed until now. In order to help close the research gap, this paper provides first evidence of German postal cooperative behavior.

In contrast to other network industries such as railway or telecommunications, in the case of postal sector, cooperative relationships can be established quickly and without significant investments, or more precisely without sunk costs. In short, the main question answered in this paper is, does cooperation have a place in competitive network industries such as the German postal market. I provide first evidence on cooperative behavior in the German postal market, which stems from data elevated within a written survey and from in-depth interviews conducted subsequently to the written elevation. I focus the investigation on small and medium-sized postal providers—the competitors of the former monopolist. The evidence from the case studies provides detailed insights into the specific cooperation strategies currently used by German postal providers in order to increase their geographical coverage. Here, the focus is on identifying whether there are reciprocal effects between cooperation and competition and whether these competitive counter-effects, if any exist, outweigh the advantageous effects of cooperation. It is very likely that cooperation does not only yield positive effects, but also negative ones. Prior to evidence from the survey and the interviews, the focus was on a theoretical analysis using an economic spatial model and applying it to the analyzed issue.

This paper is organized as follows. First, in Section 2, I present the economic spatial model considering the geographical characteristic of the postal sector, a brief game theoretic

¹ Cooperation did not really matter as long as the postal sector was regulated as a monopoly.

² In the following, I use the terms “cooperation“ and “collaboration“ synonymously.

cal discussion, and lastly I derive two hypotheses. Subsequently, in Section 3, I provide descriptive and case study evidence. Finally, Section 4 summarizes the main conclusions of this paper.

2 Theoretical Framework

Due to the geographical character of the postal industry, a spatial model seems most appropriate for the analysis. In this paper, I build the analysis based on the spatial model of Harold Hotelling first presented in 1929. While Hotelling used his model primarily for analyzing product differentiation, I changed the model to fit my research question, and in this paper focus on the effects of cooperation and competition in the postal business.

2.1 A Spatial Model of Cooperation

To simplify the analysis, I assume there are three identical postal providers on the market supplying a homogeneous delivery service. As demonstrated in figure 1, the whole area is divided into three regions and a regional monopolistic service provider controls each region. The firms are located in the center of their service areas according to the Hotelling rule, as this is the optimal location allowing them to minimize distances to the customers.³ While in the original model it is argued that customers minimize their transportation costs to the firm's location, in this analysis I switch the perspective and refer to the transportation costs of the firm that delivers the postal items to the customers. Figure 1, also shows the firms' transportation cost functions consisting of a fixed portion f and a variable portion td , whereas d is the travelled distance and t the transportation cost for each unit of distance. The transportation cost is the cost of travelling one round-trip to and from the customer. The fixed costs represented by f in this case are not assumed to be sunk costs in the postal sector

³ D'Aspermont et al. (1979) asserted in their paper in response on Hotelling's so-called *Principle of Minimum Differentiation* that it is invalid and that it cannot be derived that sellers tend to agglomerate in the center of the market. However, due to the characteristics of the postal industry, it is nonetheless reasonable to assume that postal providers locate in the center of their service area, provided that customers are equally distributed, which is given in this scenario, and that ceteris paribus there is no further heterogeneity—as for example differences in the rental costs—distinguishing the locations.

(Panzar 1993). The firms' cost of providing the service to customers is thus given by the following equation:

$$(12) \quad c = f + td$$

For the sake of simplicity I do not distinguish the five postal operations as it is done usually (Panzar 1991), but all upstream and downstream operations are aggregated into one operation representing the transportation of postal items. From this results the implication that the collection process (downstream) and the delivery process (upstream) are of equal length for each round-trip. This also allows for focus on the total transportation costs and the sum of these operations. The potential customers, who are assumed to be identical, are located with uniform density along the stretch of land in each region and it is assumed that firms charge a uniform price for providing the service in each region.⁴ Uniform pricing depending on geographical distance between customer and supplier is widespread in delivery and transportation service industries. Because in the initial setting firms face no competition in their own region, firms may charge a service price above their marginal production costs, which is assumed to be limited by the customers' uniform reservation price in this setting.

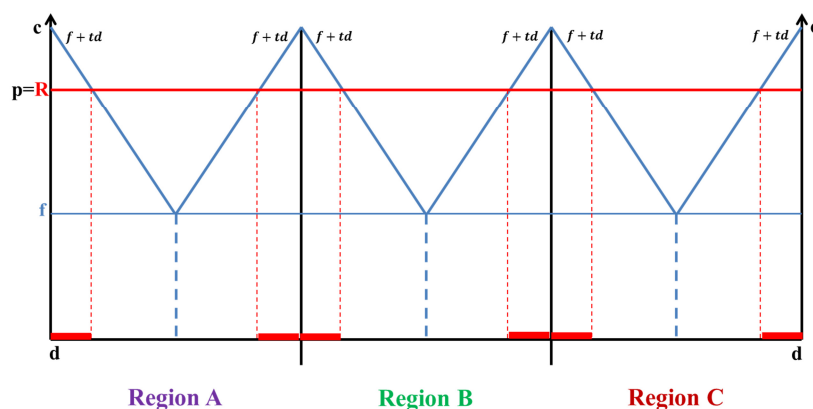


Figure 1: Activity on Regional Level

Source: Modeled after Hotelling (1929)

As shown in Figure 1, transportation costs are the lowest at the firms' locations and they rise on a linear basis with larger distance between the firms' locations and the custom-

⁴ As it is argued later in this paper, the assumption that customers are equally distributed entails the negligence of the role of density economies in this setting.

er's location. All postal providers operate on a regional level as it is too costly to collect and deliver postal items to and from other regions. According to the cost function, it is even not possible for the firms to serve all potential customers of the own region. Beyond the two red dashed lines in each region, the transportation costs exceed the reservation price of the potential customers and are consequently not compensated. Thus, the firms maximize their profit by serving only customers between these two lines. In fact, two groups of potential customers cannot be served in this scenario because the transportation costs exceed the reservation price. Group 1 includes potential customers who are located too far from the firms' locations and group 2 represents potential customers who want to send supra-regional items whereby the latter is only metaphorically represented in the graphical analysis.⁵ In order to serve all potential customers located in one region, either the price p must be increased, or the service costs must be reduced. Increasing the price is not an effective measure in this setting because of the uniform reservation price of the customers. Moreover, because I do not assume inefficiency in production it is not possible for firms to reduce costs without further ado.

A further important implication of the model is the existence of scale and scope economies in the industry, which has been proven by different researchers for various countries.⁶ Consequently, working on a larger scale, or in this case serving more customers, lowers the costs per unit of distance. Exploiting scale economies in this scenario, however, requires the firms to expand their service areas. It is furthermore considered that this is not possible without cooperation with other postal providers.

The scenario depicted in Figure 1 represents the initial situation without cooperation between the postal providers of different locations. In this situation, however, a large part of the market is served in all three regions, but customers who are located too far from the firms' locations and the supra-regional market are not served. Thus, if the firms cooperate, they could serve more customers and lower transportation costs exploiting scale and scope economies. As shown later in this paper, German postal providers do cooperate because they expect advantages from this collaboration *ex ante*. With regard to cooperation, the following are assumptions of the behavior of the agents in this model:⁷

⁵ In practice, the stretches of land, which are too expensive to serve, could also be characterized by low population density.

⁶ Density economies are not relevant in this case because in the model it is assumed that customers are equally distributed in the whole are consisting of regions A, B, and C.

⁷ In fact, these assumptions are central to the model and determine its outcome significantly. For this reason, in Section 2.2 I address the question what changes, if these assumptions vary.

- Cooperative partners make decisions fully independent from each other. This refers to the question whether to cooperate or not, as well as to the question whether to enter the service area of a cooperative partner when the costs have dropped so far that it would be profitable.
- Moreover, it is assumed there is no agreement between cooperative partners mandating that each will not enter the cooperative partner's service area. Consequently, firms are free to enter and operate in the cooperative partner's service area, despite the cooperative relationship.
- The last important assumption of the behavior of the cooperative partners is that they do not adjust the charged price, for example, in answer to another cooperative partner's entry into their own service area.

The positive effect of cooperation applied to the developed model is shown in Figure 2.

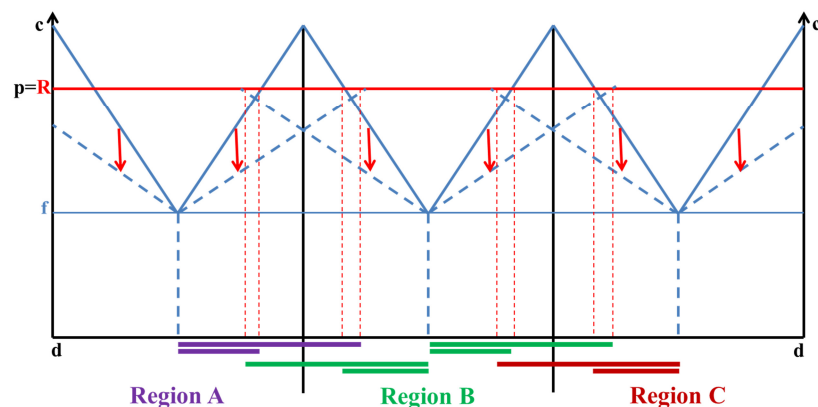


Figure 2: Cost Savings through Cooperation

As illustrated, the cost functions shift downward in case of cooperation. This is attributed to a decrease of transportation costs t of each unit of distance. It is not assumed that the fixed proportion f is affected by cooperation. Moreover, the increased necessity for coordination of cooperative relationships also affects transportation cost because the coordination refers to each service assignment and thus to the distance units travelled. The colored bars below the X-axis in Figure 2 demonstrate, for comparative purposes, the firms' feasible delivery radius with and without cooperation and their entry into other regions. Obviously, both cooperative partners symmetrically benefit from the cooperative behavior in this model and are now able to expand delivery radius around the Hotelling optimum and eventually to enter other firms' regions.

In this scenario firms are not assumed to move locations, as it is the case in the original model. Each firm's direct neighbor is confronted only with half of the total expansion effect if we focus on a one dimensional approach where each firm can only have maximum two neighbors. As presented in literature, the cooperative relationship of firms is not isolated from their competitive relationship. The evidence presented later in this paper in fact confirms that postal providers operate in the tension area of cooperation and competition. While strategy literature focuses on the argument that firm performance in case of simultaneous cooperation and competition with rivals exceeds firm performance in case of either cooperation or competition, I rather find that due to the expansion into other firms' regions, cooperation yields not only advantages, but also disadvantages in this industry.

Consequently, in the case of the postal sector it is very likely that a competitive counter-effect follows on the advantageous effect of cooperation, again lowering performance of the cooperating firms. This can be attributed to induced competition between the firms through activity in the same regions. Both firms will expand delivery radius into neighboring regions and it is likely that each of them will try to take customers from the other, if there is no arrangement preventing such behavior, which is assumed in this setting. Independent of the above-mentioned strategic behavior of firms, a negative effect could also simply stem from the fact that customers have the possibility to choose and change suppliers if there are two suppliers in a specific region. The described counter-effect leads to a loss of customers, which again causes an increase of the marginal transportation costs because firms operate on a lower scale again and exploit less scope economies. In the graphical analysis, this leads to an upward back shift of the cost-curve. Finally, firms will probably return to the initial point, lowering their delivery radius because of increased costs. Figure 3 illustrates the backward shift of the cost functions.

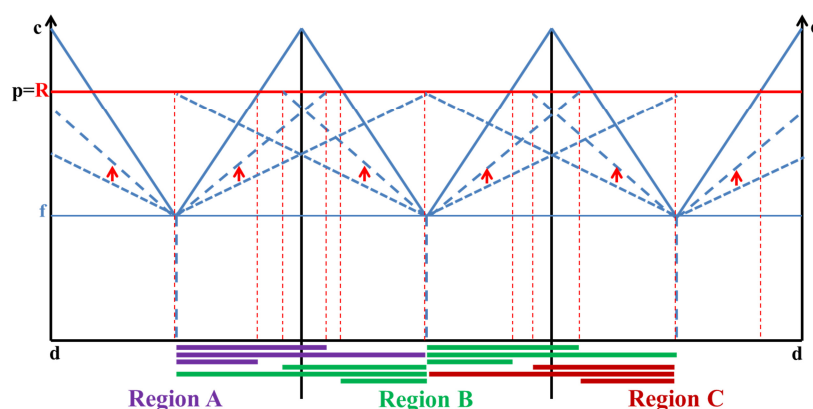


Figure 3: Backward-Shift through Counter-Effect

Theoretically, this process may repeat continuously and the question is whether and, if yes, where the equilibrium of this process will be. This certainly depends on the strategy and aggressiveness of the cooperative partners.⁸

Of course, firms may also adopt different cooperation strategies at the same time. Given the scenario in Figure 2 or Figure 3 where cooperation benefits are realized, firms may

⁸ In Section 2.2, I use a brief game theoretical discussion to shed more light on this issue.

also relocate in order to increase network-coverage and serve more customers. Figure 4 demonstrates this issue for firm A and firm C.

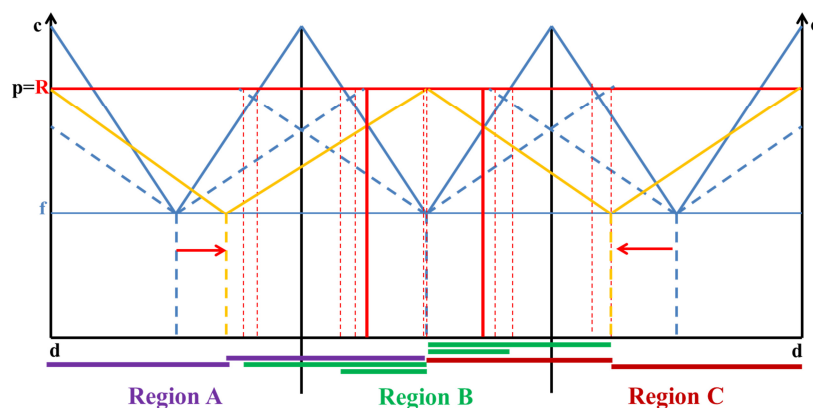


Figure 4: Relocation

Now it becomes obvious that the whole area consisting of regions A, B, and C can be served by firms A and C, and furthermore that firm B is only more profitable than A and C in its own region between the two red solid vertical lines. As a consequence, the market exit of firm B becomes more likely. This illustration shows how scale and scope economies may lead to market exits of postal providers operating on a comparatively low volume level, in other words operating in a comparatively small region. This is particularly problematic when firms do not have many possibilities to increase competitiveness by other means, e.g. through extra-services or through price-reduction as the range of possible extra-services is limited and prices are rather low in the postal industry. Modeling the positive effect of cooperation resulting from the exploitation of scale and scope economies, it has been shown how this helps firms expand their service area. On the other hand, this leads to enhanced competition because firms operate in the same regions. It is primarily scale economies which may lead to the squeezing out of small, less profitable firms from the market in this setting.

2.2 Theoretical Game Considerations

The assumptions about the behavior of cooperating firms made in Section 2.1 were central to the model outcome. It is interesting to know what likely will change if these assumptions are relaxed.

First, it has been assumed that firms do not anticipate anti-cooperative behavior of their cooperation partner but expect advantages and thus cooperate; however, as demonstrated in the spatial model, after establishing the cooperation relationship, they may find the cooperative partner entering their own service area with the consequence of losing customers to their competition. In fact, if firms anticipated non-cooperative behavior of cooperative partners, it could affect their willingness to participate in a cooperative relationship, or in choosing a competitive strategy. As demonstrated in the model established in Section 2.1, cooperation is necessary in order to lower transportation costs because it enables firms to exploit scale and scope economies. The positive effect could, however, be foiled by anti-cooperative behavior of the cooperation partner. A theoretical game analysis is best conducted by using a two-player sequential game as illustrated by the game tree in Figure 5.

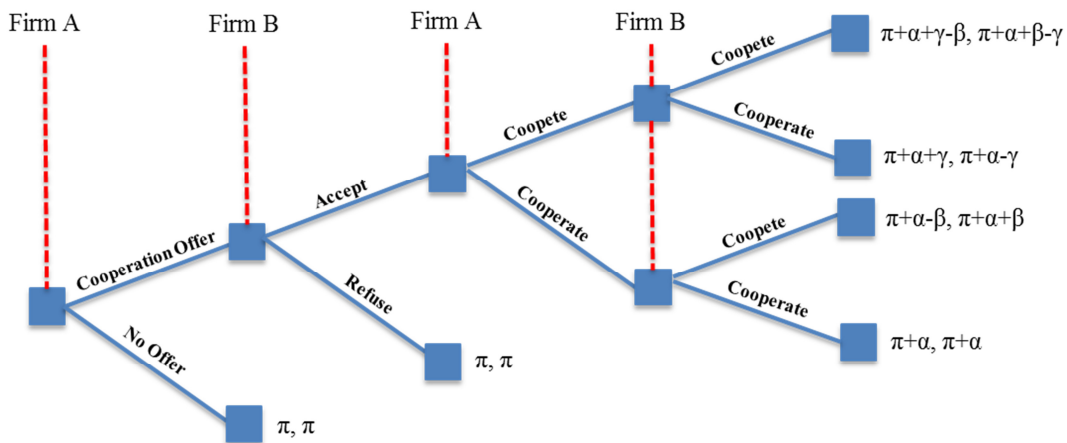


Figure 5: Game Tree of Two-Player Sequential Cooperation/ Competition Game

At the beginning of the game one of the two firms makes an offer of cooperation, which can either be accepted or refused by the other. Subsequently, after firms have realized cooperation advantages (see spatial model in Section 2.1), their reduced transportation costs allows them to enter the cooperation partner's service area. Thus, following the cooperation

agreement, each of the two firms has the opportunity to coopete, meaning to expand the delivery radius and to enter the cooperative partner's region. Taking into account these aspects, each agent in this model has a set of three strategies: no cooperation, cooperation, and coopetition. In this case, the payoff is represented by the firm profit as it is conveniently done in Game Theory, and moreover I assume that both players simply try to maximize their profits. If firms do not cooperate, each of them generates a profit of π . No cooperation implies in this setting that each of the two firms is able to provide its service only on a regional level (see Section 2.1). As a consequence, there is no competition between them either.

Through cooperation each of the two firms can realize an additional profit of α .⁹ If the firm chooses to coopete, which implies to cooperate and compete simultaneously, it increases its profit by γ (firm A) or β (firm B), respectively. Because β and γ are both larger than zero, it is very likely that each of both firms will choose to engage in coopetition rather than in mere cooperation. The parameters β and γ are larger than zero, because it is assumed that engaging in coopetition positively contributes to the firms' profits. At the same time, because firms share the whole market (see Section 2.1), this is a zero-sum game and thus the additional gain from coopetition of the one firm is the loss of the other firm. In this setting, adopting a coopetitive strategy implies that the firm enters the other firm's service area and provides its service there despite an existing cooperation relationship.

Parameters β and γ may be seen as the strategy parameters and the exact sizes of them depend on the aggressiveness of the respective firm. Lowering the charged price or extending sales and marketing activities are possible strategies to enhance competitiveness. The existence of a cooperative relationship depends on the value and relation of the parameters β and γ . A simple answer to the question what would firms do if they anticipate anti-cooperative behavior from their cooperation partner, could be that their willingness to cooperate would diminish. However, it is likely that firms also will take into account the benefits from cooperation and thus weigh the opportunities and risks of it. In fact, they would coopete if the benefits from cooperation dominate the risks or disadvantages. The following table summarizes the effects for both firms.

⁹ I assume that cooperation is advantageous in any case. Moreover, additional profit is for both the same, because of the symmetry discussed in Section 2.1. Payoff: (Payoff Firm A, Payoff Firm B)

Table 1: List of Cooperation and Competition Effects

Effect	Firm A	Firm B
Positive cooperation effect	$+\alpha$	$+\alpha$
Effect from competitive behavior of A	$+\gamma$	$-\gamma$
Effect from competitive behavior of B	$-\beta$	$+\beta$
Net effect from cooperative behavior of A only	$\alpha+\gamma$	$\alpha-\gamma$
Net effect from cooperative behavior of B only	$\alpha-\beta$	$\alpha+\beta$
Net effect from cooperative behavior of both	$\alpha+\gamma-\beta$	$\alpha+\beta-\gamma$

The game in this case may be solved with the aid of backward induction, assuming that the preconditions for the applicability of this solution method are fulfilled.¹⁰ As Firm B has the last choice in this case, the first step consists of comparing this firm's payoff in the subgame. Cooperation is the dominant strategy of this firm due to the following equations:

$$(13) \quad \pi + \alpha + \beta > \pi + \alpha \quad \text{with } \beta > 0$$

$$(14) \quad \pi + \alpha + \beta - \gamma > \pi + \alpha - \gamma \quad \text{with } \beta, \gamma > 0$$

Having found the dominant strategies for Firm B, backward induction requires going one step back in the tree and analyzing the maximum payoff of Firm A. Because Firm B chose to cooperate, only two payoffs of Firm A need to be compared, and the following inequation yields that Firm A will also choose to cooperate:

$$(15) \quad \pi + \alpha + \gamma - \beta > \pi + \alpha - \beta \quad \text{with } \beta, \gamma > 0$$

In fact, this game does not end here because in this setting a cooperative relationship will not be stable, if at least one of the following two inequations is fulfilled:

$$(16) \quad \text{Firm A: } (\gamma - \beta) < -\alpha \quad \text{with } \beta, \gamma > 0$$

$$(17) \quad \text{Firm B: } (\beta - \gamma) < -\alpha \quad \text{with } \beta, \gamma > 0$$

In simple terms, both inequations imply that in a cooperative relationship the advantages must outweigh competitive counter-effects otherwise the firm for whom the inequation is fulfilled will not cooperate, and both of them will have a profit of π . Firm B will refuse the offer to cooperate if it expects aggressive anti-cooperative behavior of Firm A. On the

¹⁰ The game is finite, sequential, can be displayed with a game tree, and players act rationally and are perfectly informed about the rational behavior of the opponent player (common knowledge).

other hand, if this is not the case, backward induction again requires going one further step back and from this results that Firm A will only make an offer, if it does not expect aggressive anti-cooperative behavior of Firm B. Due to the negative correlation of both inequations, it becomes very likely that cooperation will not be stable in this setting. A Nash equilibrium would result in this game if both firms cooperate, but only if the following equation is fulfilled:

$$(18) \quad (\gamma = \beta) \quad \text{with} \quad \beta, \gamma > 0$$

If both firms choose to cooperate and equation 18 is fulfilled, both firms would lose if they deviate from this strategy. In this case the payoff for both firms equal the payoff in the case of strategy mix where both firms choose to cooperate. The equality of the parameters γ and β is, for example, fulfilled if both firms would have a pareto-optimal agreement on their cooperative strategies, whereby in this case equal market shares would result. Of course, both firms must adhere to this agreement.

Consequently, a loosening of the assumptions made in Section 2.1, which primarily imply that firms do not anticipate anti-cooperative behavior of the cooperation partner and that firms will not lower the charged price in order to be more competitive, the game theoretical considerations in this section provide additional understanding and clarify the weakness of a cooperative relationship and demonstrate the high probability of a prisoners dilemma in this setting. Both firms choose to cooperate although they could be better off, if both of them cooperate achieving a payoff amounting to $\pi + \alpha$. If both firms cooperate and do not have an agreement on their behavior, or do not adhere to an existing agreement ($\gamma \neq \beta$), cooperation will not be pursued by any of the firms whereby each of them achieves a payoff amounting to π . Applied to the model in Section 2.1 firms will fall back to the original scenario without cooperation if they anticipate competitive behavior of the cooperation partner, or rather they would not engage into cooperation from the beginning.

As demonstrated in Section 2.1, in the case of the original scenario without cooperation, not all customers are served due to cost reasons. One of the major risks in the postal sector is that individuals who are located too far from the firms' location or in sparsely populated areas are not served and the Universal Service Obligation (USO) is constituted in order to assure that each individual has access to the postal service. In the model of this paper, without the existence of the USO, it may be desirable from the social point of view that firms exploit scale and scope economies because this would ensure that they supply the service to

all households at affordable prices.¹¹ However, the result of the game illustrated in Figure 5 yields that firms will likely not cooperate, nor compete in our setting and will concentrate their activity on local level, as illustrated in Section 2.1, and thus will not supply all customers in their regions under certain circumstances. Lastly, it would also be interesting to find out whether a cooperation network covering the whole service area outperforms a large network also covering the whole service area. This question is decisive in order to evaluate whether the joint efforts of small and medium-sized German postal providers cover the whole service area without the aid of the former monopolist, will ensure universal service. According to the analysis in this section, this is foiled by competitive counter-effects making the cooperation network fragile. The fact that postal networks are not physical as, for example, in the case of railway or electricity, intensifies this. Finally, there is a strong need for research dealing with these issues.

2.3 Derivation of Hypotheses

Because there is a lack of literature dealing with cooperation and competition in the postal industry, the hypotheses are derived from theory. Based on the model analysis in the previous sections, the following two hypotheses can be derived:

***Hypothesis 1:** Cooperation between postal providers has a positive effect on their economic success.*

Cooperation enables postal providers, especially small and medium-sized ones, to achieve higher geographical coverage, to process supra-regional mailings, and thus to operate on a higher volume level. This in turn allows them to exploit scale and scope economies and to lower their average or marginal transportation costs, respectively. Consequently, small and medium-sized firms benefit from advantages, which are in fact usually reserved for large firms in network industries.

***Hypothesis 2:** Cooperation also yields a negative effect on firm performance.*

¹¹ Note that firms could also raise the price—especially in the case of a regional monopoly—which also would ensure the supply of the service to all customers. However, it makes sense to assume that there is a reservation price at the demand side, an assumption, which is also incorporated in the spatial model in Section 2.1.

This negative effect primarily results from the positive effect described in Hypothesis 1. As has been shown in the spatial model, the larger geographical coverage and improved success leads to an expansion of firms into the neighboring regions of their cooperation partners, which primarily results from the geographical character of the postal service. This, on the other hand, leads to increased competition in the regions where these postal providers operate simultaneously. This is especially true for business clients because they usually send high volumes of postal items. Consequently, although postal providers benefit from cooperation and improve their competitiveness, especially towards the market leader, this likely leads to mutual suppression of alternative postal providers from the market.

The simple model presented in Section 2.1, which is based on the spatial model of product differentiation presented by Hotelling, was suitable in order to demonstrate how cooperation advantages stemming from the exploitation of scale and scope economies result in positive as well as in negative effects regarding the firms' delivery radius. The two hypotheses on the effects of cooperation in the postal business derived from the spatial model will be analyzed using the elevated data and interviews in the following section.

3 Evidence on Cooperation Behavior in the German Postal Market

Until now, there are no studies dealing with cooperation in the postal sector. Furthermore, there is a lack of appropriate data for the German postal market. For this reason, I elevated data within the framework of a written questionnaire and, moreover, conducted in-depth interviews in order to provide first evidence. In the following, I provide a brief description of the survey and the elevated data and after that present the case study evidence.

3.1 Survey Description

The written questionnaire was conducted in 2010. For the identification of the postal providers, a list of all licensees in the German postal market provided by the German Federal Network Agency was used. The written questionnaires have been sent to 1,459 licensees nationwide and in a second elevation again to 169 postal providers located in the German federal states Hamburg, Bremen, and Lower Saxony, who did not respond to the first sending. In

sum, 179 firms answered the survey. 133 of these answers included filled questionnaires, while the other 46 answers included the information that they are currently not active in the postal market. Regarding the response rate, it must be considered that only about a half of the licenses in circulation are indeed actively used by the firms.¹²

The in-depth interviews were conducted subsequent to the written questionnaire in 2011. The interviewees were picked from a number of firms who volunteered in the written questionnaire to give an interview. After a pilot test, the interviews were conducted at the interviewees' locations. All interviews followed the same semi-structured protocol and were recorded, transcribed, and evaluated repeatedly. In sum, eight case studies resulted from the in-depth interviews, of which seven are included in this paper because they provided sufficient evidence on the analyzed issue.

3.2 Descriptive Statistics

To provide a brief overview on the data used in this paper, Table 2 contains a summary of the major firm-specific characteristics.

Table 2: Firm-specific Characteristics

Category	Subsample	Frequency ^{a)}	Percentage	Cumulative Percentage
Size^{b)}	size < 5	55	41.35	41.35
	5 ≤ size < 10	17	12.78	54.13
	10 ≤ size < 50	30	22.56	76.69
	50 ≤ size < 250	15	11.28	87.97
	size > 250	3	2.26	90.23
	Missing Values	14	10.53	-
Age	age < 5	37	27.82	27.82
	5 ≤ age < 10	37	27.82	55.64
	10 ≤ age < 20	43	32.33	87.97
	Age > 20	12	9.02	96.99
	Missing Values	4	3.01	-
Delivery Radius^{c)}	Local/Regional	54	40.60	40.60

¹² BvDP and TellSell Consulting 2010

	German State	10	7.52	48.12
	Germany	37	27.82	75.94
	International	29	21.80	97.74
	Missing Values	3	2.26	-
Number of Competitors^{d)}	0	20	15.04	15.04
	1-2	41	30.83	45.87
	3-4	22	16.54	62.41
	≥ 5	39	29.32	91.73
	unknown	10	7.52	99.25
	Missing Values	1	0.75	-
Cooperation	Yes	72	54.14	54.14
	No	61	45.86	100
	Missing Values	0	0	-

a) In sum 133 observations; values at the time of the survey; b) One firm did not provide information on its number of employees (the indicator used as a measure for the size) but from the plant visit resulted that this firm has more than 250 employees. This information is added here.; c) With cooperation partners; d) Operating in the own region except market leader

The presented descriptive statistics reveal that the German postal market is primarily characterized by small and young firms. More than 75 percent of them have less than 50 employees. What is more, about 56 percent of the firms are under 10 years old and almost 90 percent of them are under 20 years old. The smallness of the firms is also reflected in their delivery radius. The delivery radius, with the aid of cooperation partners, of almost 50 percent of the firms is confined to the German federal state of their location which seems not to be satisfactory taking into account the geographical character of the service provided in this industry. Consequently, it seems that most firms are active on a small scale.

Furthermore, the firms face high competitive forces in their geographical area. Only about 46 percent have two, or less than two, competitors in their own region, except the market leader. The rest of them have more than two competitors operating in their region. The average number of competitors in the own region equals 1.8 with a maximum value of 5. This suggests that postal providers do not only face high competitive forces from the market leader, but also from other small postal providers. Despite this, about 54 percent of them do cooperate with other postal providers, which in turn indicates that something like competition must exist among postal providers in the German postal market.

The elevated data reveals that cooperation is an important issue for postal providers. About 72 percent of the asked firms can envisage cooperating with other firms. The partici-

pating firms were also asked in the written questionnaire, to state the reason why they cooperate. In sum, 63 of the 72 firms who stated that they actually cooperate mentioned a reason why they do so. The most frequently mentioned answer, given by 38 percent of the participants, was that firms wish to expand their area of delivery, exploit density economies, and thus increase their volumes. In fact, the larger the service area, the more the firms benefit from scale economies. The second most frequent answer, given by 29 percent of the participants, mentioned was that they want to exploit synergy effects and efficiency gains and thus reduce their costs. The third most frequent answer to this question, submitted by 19 percent of participants, was that firms wish to use the capacities of other firms, as for example their delivery or sorting services. Finally, 14 percent of firms mentioned that they wanted to exchange postal items, combine services and cover a larger product portfolio, which primarily results in the exploitation of scope economies. Figure 6 summarizes these findings.

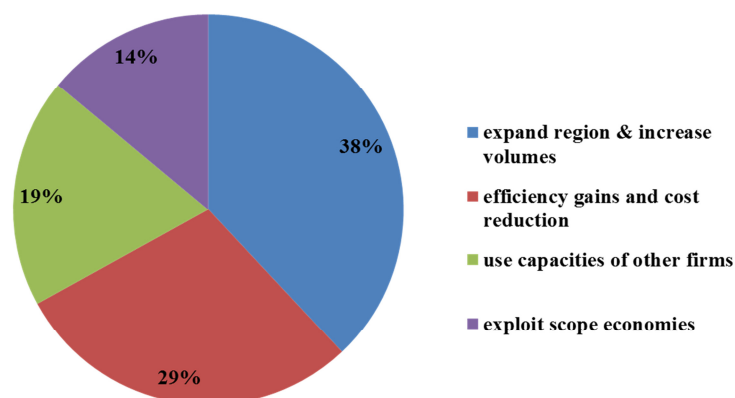


Figure 6: Reason for Cooperation

Source: Own survey data

The firms were also asked in the written questionnaire to assess the intensity of competition on a scale from 1 (very low) to 5 (very high). It can be stated, without any doubt, that there is high perceived competition intensity in the German postal market. While only about 25 percent stated that the competition intensity is low (sum of intensity grades “1” and “2”),

about 42 percent stated that the intensity is high (sum of intensity grades “4” and “5”). The exact distribution of answers is presented in Figure 7.¹³

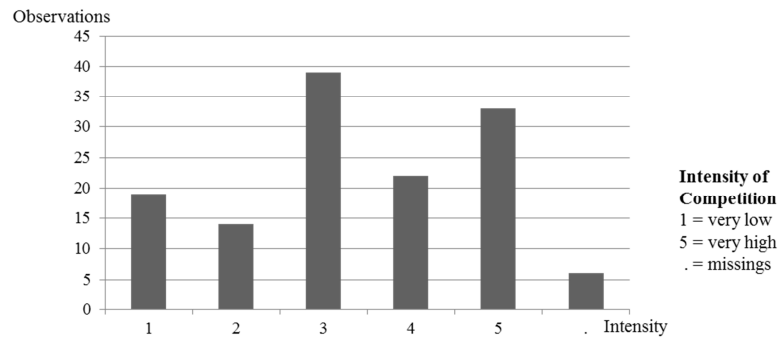


Figure 7: Perceived Intensity of Competition

Source: Own survey data

The first impression from this descriptive analysis confirms the findings in the theoretical analysis in Section 2.1, that firms operate in an area of conflict between cooperation and competition. Thus, as stated in Hypothesis 1 and Hypothesis 2 in Section 2.3, cooperation not only yields advantages but also seems to be accompanied by tension from this relationship. Further indications of the two suspected effects of cooperation can be derived from the correlations of relevant variables. The following table includes the correlation coefficients.

¹³ It is possible that the competition intensity grades mentioned by the firms also involves the competitive pressure stemming from the market leader, although the market leader has been excluded in the question on the number of competitors in the same region.

Table 3: Correlation Matrix of Cooperation and Competition Variables

	Number of Competitors ^{a)}	Cooperation ^{b)}	Intensity of Competition ^{c)}	Profit Change ^{d)}
Number of Competitors	1			
Cooperation	-0.1727	1		
Intensity of Competition	0.2472	-0.0274	1	
Profit Change	0.2143	0.0995	0.1364	1

a) Choice of 1 to 5; the answers “more than 5” have been replaced with 6 and the answers “unknown” have been dropped.¹⁴; b) Variable of dichotomous nature; c) Measured on a scale from 1 (=very low) to 5 (=very high); d) Profit difference between the time of the survey and year 2007

First, the negative correlation measure of the variables “number of competitors” and “cooperation” indicates that the cooperative behavior oppositely changes with the number of competitors in each region. Moreover, the correlation matrix reveals that the number of competitors is positively correlated with the intensity of competition and the firms’ profit change. While it makes sense that the intensity of competition rises with the number of competitors and vice versa, the positive correlation of the variables “number of competitors” and “profit change” seems counterintuitive, likely indicating a second, positive effect stemming from relationship between the competitors. In fact, this is indicated by the positive correlation coefficient of the variables “cooperation” and “profit change.” The negative correlation of the variables “cooperation” and “intensity of competition” seems to verify this suspicion. Lastly, the positive correlation of the variables “intensity of competition” and “profit change” again seem counterintuitive, but likely results from the two countervailing effects of cooperation suspected. Although the correlation measures are rather small, they provided first indications on the direction. Furthermore, the ambivalent results indicate the existence of multiple effects, which are very likely oppositely directed.

The assumption made in the spatial model in Section 2.1, that firms enter their cooperation partner’s service area and compete, may appear too counter-intuitive to be realistic at first glance. In fact, the elevated data confirms the existence of such an ambivalent relationship. Two variables in the dataset are appropriate to shed more light on this issue. First, the

¹⁴ For control, I also replaced the answers “more than 5” with “10” and found no significant change of the correlation coefficients.

firms were asked in the survey if they were planning to expand their delivery radius in future. It turned out that 44 percent of them do plan to expand, which is indicated by the variable “expansion” following. Second, the firms were asked if they plan to open new branches which was confirmed by about 35 percent of them, and is indicated by the variable named “branches” following.¹⁵ What is even more interesting are the correlations of these two variables with the variable representing whether they cooperate, called “cooperation”. The results showed that both variables are positively correlated with the cooperation variable. The correlation coefficient between the variables “expansion” and “cooperation” amounts to 0.1537, and the coefficient for the variables “branches” and “cooperation” amounts to 0.1617, which confirms that cooperation and expansion in fact tend to occur together, and that cooperation is a strategy actually adopted by postal providers.

To sum up, it can be derived from these figures that cooperation is practiced and desired in the postal sector. Nonetheless, firms are also feeling competitive pressures in the market, which indicates there are different effects and tensions resulting from the activity in the conflicting area between cooperation and competition. In fact, the positive correlations of the variables “Cooperation,” “Number of Competitors,” and “Intensity of Competition” with the variable “Profit Change,” match the findings in previous studies that there are positive effects of both cooperative and competitive strategies on firm performance (Abdallah 2011). However, although it is very likely to assume so, the correlations are not sufficient to verify whether cooperative and competitive strategies simultaneously positively affect firm performance. Thus, the case studies presented in the subsequent section are used to shed more light on cooperative behavior and the effects resulting from it for German postal providers.

3.3 Evidence from Case Studies

Further evidence on the analyzed issue provided in this paper stems from in-depth interviews conducted with postal providers. Below, I present seven cases focusing on the firms’ cooperative behavior and competitive counter-effects. Of particular interest here is information on the firms’ geographical coverage, whether they seek to increase it, and which cooperation strategies the firms adopt to do so. Moreover, to account for the counter-effect of cooperation, I present first indications on the intensity of competition perceived. In the fol-

¹⁵ All firms answered to both questions (n = 133).

lowing, Section 3.3.1 provides a brief description of the cases and Section 3.3.2 summarizes the results of the case studies.

3.3.1 Case Descriptions

The firm in case A, which has more than 250 employees, regionally covers about 80 percent of the German federal state Schleswig Holstein and cooperates occasionally with the market leader in case of supra-regional sending, which the firm cannot deliver by itself using its own network. Nonetheless, regional coverage goes beyond the German State where the firm is located and it is also able to serve other nationwide customers. This firm, however, is focused on providing its services to business clients from the medical industry and rejects to serve private customers because, according to own statements, supplying private customers leads to a complication of delivery routes and thus to inefficiency. Moreover, the firm does not seek to expand their own regional coverage. This firm highlights that their cooperation is associated with coordination efforts and costs, which explains that it does not cooperate with selected firms, nor engage in cooperation within an organized network (e.g. Mail Alliance or P2-Network).

The cooperation strategy of the firm B is very much akin to that of firm A with the difference that its regional coverage is restricted to the German federal State Hamburg, where the firm is located. The firm has less than five employees and is active on a local level and has a very small number of processed items. The limitation of the delivery radius can with great certainty be attributed to the small size of this firm. Firm B has access to the network of the market leader by cooperation with a consolidator and, unlike firm A, endeavors to expand their delivery radius. According to statements from firm B, it feels no tension from the market leader and has no cooperative relationship with other postal providers. Lastly, it does not feel any competitive pressures from either of the postal providers operating in the German postal market.

Firm C has more than 250 employees, is larger than firm A and B, has a much more established network, and is very active in terms of selective cooperation with other firms and also cooperation in the framework of organized networks. It supplies about 80 to 85 percent of customers for postal services in Germany without the aid of the market leader. Its efforts to expand the geographical service area relies primarily on partnerships, investments, and cooperation. This firm is active in both large postal cooperation networks currently existing in Germany: Mail Alliance and P2. Its intention is in fact to establish a parallel delivery infra-

structure in Germany so that they are completely independent from the market leader and supply their service throughout the whole country. This firm also claims that currently cooperation is the only possibility to establish a parallel network for alternative postal providers. Moreover, this firm states that it sees other postal providers with whom it cooperates as competitors and colleagues at the same time. They compete for the same customers, but also cooperate on the infrastructure level in order to ensure nationwide delivery. Lastly, the firm did not state whether it cooperates with the market leader.

Firm D resembles firm C in terms of cooperative behavior, but with less than five employees it is much smaller and has a much less developed network. It covers 100 percent of the region where it is located and is a member of the P2 network in order to ensure supra-regional services. The firm is only able to cover a larger region with the aid of this organized network. Moreover, according to statements from firm D, it feels high competitive pressures stemming from subsidiaries of the market leader. Nonetheless, this firm uses access to the market leaders' network without feeling any restrictions, which indicates an ambivalent relationship with the market leader.

Firm E has a number of employees between five and ten and unfortunately did not give specific information on its regional coverage, but said that coverage varies. It has an incomplete network coverage which depends on which cooperative relationships are maintained at the moment. From this results that it has chosen selective cooperation as a major strategy for expanding regional coverage, but is also partner of the Mail Alliance and cooperates indirectly with partners of the P2-Network. The firm emphasized that it is important to only cooperate with selected partners of these organized networks. Lastly, this firm cooperates particularly with publishing houses because they also have the necessary transportation and delivery infrastructure. It emphasized there is primarily competition for customers in their own region and moreover asserts that it feels high competitive pressures stemming from the market leader.

Firm F has more than 250 employees and is comparatively large, operating nationwide as well as internationally. It tries to expand its own network coverage through organic growth. Despite a very well established network, this firm cooperates intensively with selected partners and has contracts in order to outsource operational functions to these partners. According to statements from firm F, it does not cooperate with any of its large competitors, and particularly not with the market leader DPAG. This firm claims it feels hard competitive

pressures stemming from the market leader, but also from other postal providers because this market is fiercely competitive.

Firm G, with less than five employees very much resembles firms A and B, is also active only on a regional level, and uses the DPAG network in order to ensure the delivery of supra-regional sending. However, this firm does not provide its services to private customers, but only to public institutions, which implies that a large proportion of the items is collected and delivered within the same region. Although it aims to expand its own geographical coverage, the firm's efforts in this respect are rather low. According to statements from firm G, it does not feel hard competitive pressures from the market leader because of its strategic orientation. Lastly, the firm states that it has no further competitors in its own region and thus does not feel much competitive pressure.

3.3.2 Results

Table 4 summarizes information on the cases, the identified cooperation strategies, which of these strategies are adopted by the interviewed firms, their own assessment regarding their current regional coverage, and lastly whether they put forth effort to expand coverage. Moreover, two variables on the competition situation and the firms' profit situations, at the time of the survey are included in this table. The information included in this table stem from the written questionnaire and the in-depth interviews and plant visits. In case information from questionnaires were not confirmed by the interviews, it has been given more weight to the information stemming from the interviews or from observation during plant visits.

Table 4: Case Studies on Cooperation Behavior in the German Postal Market

Case	Size ^{a)}	Cooperation Strategy				Regional Coverage	Effort to expand?	Branch planned?	Number of Competitors ^{b)}	Intensity of Competition ^{c)}	Profit Situation ^{d)}
		Selective Cooperation	Network Cooperation	M&A	Access to Market Leader's Network						
A	Size > 250	No	No	Yes	Yes	80 percent in own German federal state Schleswig-Holstein and nationwide	No	Maybe	Unknown	1	2
B	Size < 5	No	No	No	Yes	Greater Area of own German federal state Hamburg	Yes	Maybe	Unknown	1	3
C ¹⁶	Size > 250	Yes	Yes	Yes	-	80-85 percent of customers for postal services in Germany	Maybe	Maybe	More than 5	5	5
D	Size < 5	Yes	Yes	-	Yes	Active only on local level; covers 100 percent of its own region	Yes	Maybe	5	5	5
E	5 ≤ Size < 10	Yes	Yes	-	-	Did not give specific information; underlined that it varies	Yes	No	0	-	4
F	Size > 250	Yes	-	Yes	No	Nationwide, International	Maybe	Maybe	More than 5	5	2
G	Size < 5	No	No	No	Yes	Local	Potentially	Potentially	0	2	4

a) Measured by the average number of employees at the time of the survey (2010); b) Firms have been asked to give the number of their competitors in their region except of market leader; c) Measured on a scale from 1 (=very low) to 5 (=very high); d) At the time of the survey; measured on a scale from 1 (=very good) to 5 (=unsatisfactory)

¹⁶ This firm did not provide information on its number of employees, the indicator used as a measure for the size, but data from the plant visit resulted that this firm has more than 250 employees.

In general, it turned out that all interviewed firms indeed practice some kind of cooperation. Results from the case studies show that cooperative behavior is influenced by competitive pressures which vary from case to case. Moreover, it also becomes obvious that the relationships between postal providers are ambivalently lying in the tension area between cooperation and competition. The results of the written questionnaire and the case studies revealed that there are different cooperative strategies used by German postal providers in order to increase the geographical service area. In fact, the following four strategies could be identified:

- selective cooperation,
- cooperation within a network,
- mergers and acquisitions,
- and access to the incumbent's network, the market leader.

Each cooperation strategy has particular advantages and disadvantages. The extent of the positive and negative effects on the firms' success vary for different cooperative strategies. It can be assumed that cooperation within a network yields a much larger effect on the firms' success than selective cooperation, due to a larger number of cooperative partners. Moreover, because it can strongly be assumed that firms primarily compete with their direct neighbors for customers, the positive net effect of cooperation within a network exceeds the net effect of selective cooperation. Firms benefit from the large number of partners in a network, but they compete only with those who are located in their immediate surroundings.

In the case of merger and acquisition activities, it is assumed that there is primarily a positive effect because the firm is able to lower the costs, but is not faced with a competitive effect because of the merger. Because the Hotelling optimality in terms of location, described in Section 2.1, also applies to several different locations of one firm, it remains at the profit-maximizing level in the case of merger and acquisition activities—provided that the optimality was fulfilled previously.

In fact, the identified strategies are not necessarily alternatives. The case studies proved that postal providers usually mix the strategies discussed above. To a certain extent, each postal provider has his own delivery network which is more or less large. The necessity to cooperate in order to increase geographical coverage depends on the one hand on the size of this network, and, on the other hand, on the entrepreneurial

goals of the firm. The basic advantages of cooperation in network industries is that it enables firms to work on a larger volume level and thus exploit scale and scope economies.

Through cooperation, firms can expand their own geographical coverage and hence are able to provide services to other regions using the delivery network of the cooperation partner. A cooperation relationship can easily be built and certainly is suitable to increase geographical coverage, but is despite these advantages linked to coordination costs and may cause tension between the strategic partners because of interdependency, and of the operation in the conflicting area between cooperation and competition. By intuition, it can be assumed that cooperative behavior primarily has a positive effect on the firms' success; however, as resulted from the evidence, it is very likely that cooperation also may negatively influence success.

The firms were asked in the interviews to state which of the following three groups represented the major threat for their own success in the market: the market leader, other postal services providers in the market, or new market entrants. Four of the seven firms stated that the major threat comes from the market leader and its subsidiaries, one stated that it depends on the region, and one firm stated that none of these firms represents a threat because it is active on a regional level. Three firms stated that there is actually competition between the alternative postal providers and one of them thinks that this group represents the major threat potential. New market entrants are not seen as a threat by any of the interviewed firms.

4 Concluding Remarks

The two suspected effects of cooperation were demonstrated using the spatial model proposed by Hotelling. This model was suitable to demonstrate how firms benefit from cooperation, how they expand their service area and enter other markets, which in turn leads to enhanced competition between cooperation partners, and in extreme cases even to market exits. The evidence from the written questionnaire and the case studies confirmed that cooperation is widespread in the German postal market; however, only the case studies have shown the diversity of cooperation strategies adopted by small and medium-sized postal providers in order to increase their geographical service area.

This is often the case because postal networks have the benefit of more flexibility than other network industries, so that connections can be perpetually both generated and closed. From this also results the prospect of competition on the infrastructure level in the postal sector. In fact, I found that cooperation yields a positive effect, helping firms to lower marginal or average transportation costs and to expand their service area, as stated in Hypothesis 1. Entry and operation on the local level seems to not be very profitable but is possible, and the results leave the impression that numerous firms would not exist without cooperation either with other postal providers or with the market leader who ensure nationwide delivery in any case.

Consequently, firms can only be competitive on national level through cooperation. Although firms cooperate in order to ensure the infrastructure, they remain competitors and thus compete for customers. From this results a negative counter-effect, which entails an ambivalent relationship of the cooperation partners, as stated in Hypothesis 2. Although firms become more competitive, especially towards the market leader, this also intensifies the competition between the alternative postal providers as well so that it becomes likely that they oust each other from the market.

In strategy literature, it is assumed, principally based on theoretical discussions, that firms engaging simultaneously in cooperative and competitive strategies perform better than firms concentrating on adopting either cooperative or competitive strategies. Unlike the conventional wisdom in strategy literature, I conclude that the negative effect described in Hypothesis 2 is likely induced by the positive effect described in Hypotheses 1 in this case. Moreover, although I demonstrated the probability of a non-cooperative relationship due to the prisoners' dilemma in the theoretical game discussion, the evidence showed that different cooperation strategies are widespread in the postal sector. These seemingly contradicting results can be explained by the fact that firms recently established their cooperation relationship and that it may break hereafter. Despite this logic, only further research will produce a reliable answer to this question.

The assumptions made in this paper in order to deal with the topic entail some restrictions. First, it has not been considered in the analysis that the postal sector is characterized by the fact that firms are not necessarily providing a homogeneous service. In fact, the results of the written questionnaire and the in-depth interviews showed that German postal providers differ with respect to their primary business area, such as

mail, parcel etc., and also with respect to their product lines. Moreover, while I ignored the existence of different intermediate services of the postal network, such as collection, sortation, transportation, and delivery, and aggregated these operations into one service, the evidence has shown that there are firms in the market which specialize in selected operations and purchase the rest of the operations on the market. To deal with this heterogeneity, I focused on the licensees and assumed that they do not differ significantly from each other. Thus, it would be interesting to analyze what effects this specialization has on the cooperation behavior of postal providers. A further question this paper does not answer and which could be interesting for further research, refers to a comparison of cooperation and non-cooperation networks. In fact, I found that cooperation is a possibility for private postal providers to ensure a wide geographical coverage without the aid of the market leader, but there is no evaluation on the economic benefit. Lastly, I did not discuss the USO in detail, which shall ensure that each individual has access to postal services. The importance of the USO becomes even greater, if it is answered with question of whether the alternative network, in this case the cooperation network, is suitable to replace the large former monopolist's network. This question is also proposed for further research.

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