



Collusion in transport: group effects in a historical perspective

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Abstract

This paper considers non-economic factors involved in the occurrence and sustainability of collusion. Group development among executives of incumbent firms created during the evolution of an industry can stimulate collusion, even in the uncertain introduction stage of a new industry. Certain social conditions and social characteristics of executives related to the industry characteristics of entry barriers and geographical structure help to explain differences in group development relevant to collusion. A historical analysis of four transportation industries illustrates the manner in which the non-economic factors operate. ©2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

Collusion between firms is normally studied as an economic phenomenon. In this paper, however, collusion is discussed from a perspective which takes into account both economic and non-economic factors. In addition to considering formal and tacit collusion as commonly defined, the present paper will address cooperative agreements, especially joint ventures, since, as suggested by Kwoka (1992) and Bresnahan and Salop (1986), these agreements can have important collusive effects.

As Asch and Seneca (1975) found in a study of American collusive firms between 1958 and 1967, collusion does not necessarily result in higher collective profits.¹ It is possible

¹ Their empirical data concerned firms found by the court to have colluded and a control group.

that high risks induce firms to collude at relatively low profit levels, but the exact relation between risk and collusion remains an open question. Hay and Kelley (1974) perceive an ambivalent effect of high risk. The two main risk factors they distinguish, lumpiness and infrequency of orders and high fixed cost levels, trigger collusive agreements, but at the same time destabilize collusion. As a result, attempts at collusion in high-risk industries are generally short-lived.

The probability of collusion also seems unclear in the case of uncertainty. Jacquemin and Slade (1989, p. 420) express the prevailing view in industrial economics that high uncertainty leads to divergent opinions and expectations among firms about future developments and, therefore, frustrates the possibility of collusion. However, in the introduction stage of an industry, a standard situation of high uncertainty, firms tend to forge joint ventures to enable them to participate in a new market while minimizing risk by matching their interests with those of their competitors (see, for instance, Harrigan, 1985). Thus, uncertainty is not a barrier to collusion when firms are more interested in relative rather than absolute outcomes. In this case, 'bandwagon' effects occur (Schenk, 1996).

This contradictory information suggests that the relation between risk, uncertainty and collusion cannot be determined by purely economic reasoning. I suggest here that the social relations among executives play a significant role in determining this relation. Collusion is similar to the emergence of social groups. With rare exception, for example Casson (1990, p. 14), the concept of social groups has been applied to interfirm cooperation. Of course, social interactions between executives are not exclusively collusive and are involved in other cooperative endeavors (see Sweegers, 1998). However, this paper restricts itself to collusive effects of such interactions. To present the social scientific insights concerning social groups, I will use the term cooperation instead of collusion. For the same reason, reference is frequently made to individuals, decision makers (business executives), rather than firms.

An interdisciplinary approach requires that the analysis of the formation of social groups be related to the economic analysis of the evolution of industries, for instance, by the product life cycle model. New industries are often at least partly developed by established firms, which consider the new industry a substitute for, or an offspring of, their existing activities. History matters in this case because the social relations and attitudes of executives created prior to the introduction influence their behavior in the new industry.

To formalize a historical approach, in the next section a group development model of social psychological origin is presented and then related to the product life cycle model. I deal with the social conditions under which interaction is expected to lead to cooperation between (prospective) group members in Section 3. In addition, I argue that certain shared social characteristics of business executives tend to promote group development. The focus is on the social conditions and social characteristics that can be related to the economic characteristics of an industry, namely, entry barriers and geographical structure. In the fourth section, the effect of group development on the occurrence and sustainability of collusive behavior is illustrated by longitudinal analyses of several high-risk industries, viz. four branches of the container transportation industry. The analyses were based on material collected from the literature and company archives and interviews with executives (Van Driel, 1990, 1993). Concluding remarks follow in Section 5.

2. Group development and cooperation

Several economists, including Kreps and Spence (1985, p. 341) and Erickson (1976, p. 202), have suggested that past encounters between industry members influence the chance of reaching collusion. A social psychological model of group development is appropriate to formalize the account of processes of interaction over a longer time span. A plethora of group development models exist (Mennecke et al., 1992). The most common variety, the sequential group development models, has interesting similarities with the product life-cycle model. In this model, group development consists of five stages (Forsyth, 1990):²

1. the orientation stage,
2. the conflict stage,
3. the cohesion stage,
4. the task-performing stage,
5. the dissolution stage.

In the orientation stage, groups are formed. Prospective group members exchange information and explore commonalities and identities. Ambiguity is high because of the absence of specific norms regulating the interaction and goal attainment and because of uncertainty about the roles of the members within the group. Once a minimum level of interdependence is attained, conflicts about procedures, commitment, and the behavior of group members are likely to occur. This conflict stage may have a positive effect in clarifying goals, differences, and points of contention. In this way, the cohesion stage can be reached, in which more stability in membership is realized, unity or the ‘we’ feeling among members is increased, and roles, norms, and agreement on procedures are established. In the subsequent stage, the task-performing stage, goals are achieved and problems are solved in mutual cooperation.³ The last stage concerns dissolution.

Like the product life-cycle model, the group development model can be criticized for its deterministic linearity. Further, because it stresses the formulation and achievement of common goals, the model does not offer new insights compared with the approach of economists like Phillips (1962) and Williamson (1965) who have used the concept of group in their analysis of collusion in oligopolistic industries. Nevertheless, the group development model is useful as a descriptive framework for analyzing the collusive behavior of firms. One amendment is necessary: as the empirical material used in this paper does not lend itself to detailed observation of interaction between industry members, the cohesion and task-performing stages are combined.

At first sight, the stages of the amended group development model and the product life-cycle model appear to overlap neatly: orientation-introduction; conflict-growth; cohesion/task performance-mature; and dissolution-decline. The similarity between the orientation stage and the introduction stage, both characterized by a high level of uncertainty, seems especially striking. However, the introduction stage can also be accompanied by the

² In presenting the model, it is common to refer to the work of Tuckman (Tuckman, 1965, Tuckman and Jensen, 1977). I follow Forsyth because the names of the stages in his version of the model are more compatible with those of the product life-cycle model.

³ Task-performing is a potentially misleading term in the group development model because group norms can encourage low productivity (Forsyth, pp. 86–87).

cohesion/task-performing stage. In this case, cooperation is more likely than an economic analysis stressing the unfavorable effect of uncertainty on collusion would predict.

There are, in fact, economic concepts relevant to collusion which show affinity with cooperation as a manifestation of the ‘we’ feeling and behavior in the cohesion/task-performing stage of the group development model. Whereas Casson (1990, p. 13, 1995, p. 134) mentions mutual trust and loyalty to the business group as cultural determinants of sustained collusion, Granovetter (1994, p. 467) states that cartels are “... unlikely to succeed unless their members partake of some moral economy”.⁴ An obvious expression of a moral economy is a live-and-let-live form of competition. Bowman (1989, p. 30) associates this kind of competition with “...stable markets in which behavior is predictable and ... [there are] acceptably high profits and economic survival for all”. According to Kanteleris and Veendorp (1988, p. 236), live-and-let-live behavior implies “...that a firm is willing to (temporarily) forego some profits if a particular move would either hurt, or unduly benefit the opponent relative to itself”. In this perspective, bandwagon-like behavior is likely to occur when firms wish to consolidate their relative positions in a live-and-let-live fashion. This leads to the first hypothesis:

Hypothesis 1: Advanced group development among business executives, manifesting itself in a live-and-let-live type of competition and an inclination to bandwagon behavior, neutralizes the fact that high-risk levels and high uncertainty tend to frustrate the successful realization of collusion.

3. Social conditions of cooperation and social characteristics of business executives

The group development model does not tell us under what social conditions cooperation in group settings is likely to occur. Social scientists using experimental evidence have identified several of these conditions. Raub and Weesie (1990) distinguish two extreme social settings. When interactions are ‘atomized’, reputation effects are low because actors do not receive information about the interactions of their partners with third parties. In the case of ‘perfect embeddedness’ of interactions, actors receive this information immediately. As a result, an actor’s reputation spreads swiftly through the network, which discourages ‘exploitative’ or ‘defective’ behavior. Similarly, Coleman (1988) states that only if a network tends to ‘closure’, that is, when the partners of a certain actor are also interacting with each other, is effective disciplining of defective behavior possible.⁵

Embeddedness in industry settings implies that executives interact with a specific set of fellow members on a regular basis and that they are able to monitor, directly or indirectly, their competitors’ acts. Therefore, the chances of reaching a certain level of embeddedness and the time needed for this depend on the stability of membership⁶ and the transparency

⁴ The term ‘moral economy’ was introduced by the historian E.P. Thompson (1971).

⁵ Coleman also argues that the closure of a network is related to the number of participants. The larger the group size, the more difficult it is to discipline defective behavior. However, the relevance of the number of firms and the level of concentration in an industry is well recognized in industrial economics and need not concern us here.

⁶ For the sake of simplicity, I abstract from the difference between industry membership of firms and that of executives.

of the industry. In their turn, these factors are related to the industry characteristics of entry barriers and geographical structure. Hence:

Hypothesis 2: Stability of membership and transparency of an industry contribute to group development by increasing the embeddedness of interaction among executives.

Game theory normally pays no attention to the fact that individual players differ in their willingness to cooperate. Johansen (1982, p. 23) tries to cope with these differences by introducing ‘coefficients of aggressiveness’ in game theory, which reflect “...the claim a player or a subcoalition will raise to the surplus which is within reach”. A situation of live-and-let-live competition entails a low coefficient of aggressiveness.

If we distinguish different levels of aggressiveness or cooperativeness, it seems appropriate to take attitudes, and the norms and values of firm representatives into consideration. There is reason to suppose that they differ according to the social characteristics of players. For instance, on the basis of ‘common knowledge of American society’, Etzioni (1988, p. 207) perceives differences in the containment of competition by norms between illegal computer dealers and most other computer sales personnel, between those of marginal doctors or lawyers and core members of these professions, and so on.

The characteristics of players have been found to influence two pillars of cooperation in particular, trust generation and group formation, in a systematic way. Zucker (1986, pp. 82–83) argues that common characteristics such as family background and ethnicity increase the likelihood that trust generated by processes is viable. Several other authors have mentioned the favorable effects of similarity in characteristics on the generation of trust: ‘...the operational guide to the formation of close, trusting relationships seems to be that a person more like me is less likely to betray me’ (Burt, 1992, p. 64; see also Etzioni, p. 209 and Nohria, 1992, pp. 248–249). Group formation by self-categorization is based on perceived similarities between the self and other persons. These similarities can vary and may include perceived similarity in attitudes and values, proximity and social contact, shared outcomes (of a joint task), a common fate, a shared threat, and a common enemy (Turner et al., 1987, p. 52). Self-categorization theory, as a variation of the social identity approach, is more or less opposed to interactionist theories underlying the various group development models (Lau, 1989; Rabbie et al., 1989; Worchell, 1994). Nevertheless, it can help us understand the effects of social characteristics on the pattern and speed of group formation.

Kinship and shared ethnicity are probably the strongest axes of solidarity within ‘business groups’, a concept Granovetter (pp. 462–465) applies to stable cartels. From an interdisciplinary point of view, however, social characteristics which can be structurally related to economic factors are the most interesting. The effects on collusion of two of these characteristics are analyzed in this paper: first, the social backgrounds of executives, and second, their geographical proximity. The first category is industry specific because the (original) entry barriers in an industry tend to influence the social and educational backgrounds of the executives involved. Podolny and Scott Morton (1999, p. 46) mention several sociological studies which suggest an effect of social status and commonality of backgrounds on cooperation among executives. Similarity in background is a potential clue for generation of trust and group identification among executives. Marceau (1989) shows that common social and educational backgrounds are likely to promote the formation of old boys networks

as well as similarity in views about competition and cooperation. In the context of group development, this translates into the following hypothesis:

Hypothesis 3: Similarity in the backgrounds of executives contributes to group development and shortens the time needed for it.

It is not only similarity, but also the specific background that matters. Authors like Marceau and, indirectly, Etzioni broadly suggest that a ‘higher’ social background is favorable to a gentle form of competition and cooperation. More specifically, Podolny and Scott Morton (p. 47) postulate that incumbents take the high status of entrants “. . . as an indication of a willingness and ability to uphold the ‘moral community’ of the cartel. . .”. In the empirical section of this paper, I will divide the social backgrounds of executives into broad categories, mainly ‘high’ and ‘low’. It is expected that these backgrounds lead to gentleman-like and street fighter behavior, respectively, or in terms of group development:

Hypothesis 4: A common ‘high’ social background of business executives stimulates the process of group development, whereas a ‘low’ background frustrates group development.

The second category of social characteristics analyzed, geographical proximity, is linked to the geographical structure of the industry involved. The geographical proximity of firms and their executives is a similarity which can trigger group formation by self-categorization of executives because it functions as a natural clue for group identification at the local, regional, or national level. In other words:

Hypothesis 5: The geographical proximity of business firms and their executives stimulates group development.

In more general terms, I demonstrate that the relation between the economic characteristics of industries and social characteristics of executives is not entirely random. By focussing on these industry-specific social characteristics, new light is shed on the effect of the social structure on cooperation within an industry, which Scherer and Ross (1990, pp. 311–312) consider an unexplained residual for the economist. In sum, both the social conditions of cooperation and the social characteristics of executives can be related to two specific industry characteristics, viz., entry barriers and geographical structure.

4. Development of collusion in four transport industries

In this section, I analyze the development of collusion among predominantly Dutch firms operating in four national and international container transportation industries: deep-sea liner shipping, stevedoring, road haulage, and Rhine shipping. Transportation firms do not necessarily have to cope with lumpiness and infrequency of orders, but they are confronted with strong unforeseen fluctuations in demand. Together with the prevailing moderate to high fixed cost levels, a circumstance which is particularly problematic in transport because services cannot be stored, this gives the various transportation branches the features of high-risk industries. Containerization, that is, the replacement of miscellaneous packed general cargo by standardized and much larger cargo boxes, started a revolution in the transport industry in the mid-1960s. Besides changing the cargo to be transported and the transport equipment used, containerization fundamentally altered commercial relations and practices. It is, therefore, legitimate to consider container transport as a new industry. The advent of containerization created uncertainty among transport firms because they could not

assess the implications of a transition to container transport in terms of income and costs. When the deep-sea liner shipping industry actually started to containerize, firms from the other transport industries involved had no choice but to follow. The effect of containerization on the level of risk varied per sector. Since the uncertain introduction stage, international container transport has grown steadily. Starting in 1973, the first year of reliable registration, no S-shaped curve can be identified thus far in the ocean transport of containers (see graph in Drewry Shipping Consultants, 1991, p. 64). Annual growth rates are still 5 percent or more, so a maturing stage has not yet been reached.

The hypotheses were translated into the following research questions. First, how and when did (sustained) collusion occur during the life cycle of the transport industries as part of the process of group development among executives and as a manifestation of a live-and-let-live form of competition and bandwagon behavior? Second, how did stability in membership and transparency of the industries create an embeddedness of interaction conducive to group development? Third, how did the social characteristics of business executives affect views on the proper kind of competition, group identification, and the creation of mutual trust? Fourth, how did existing social relations between executives contribute to collusion when containerization created new transportation industries and increased uncertainty and risk?

4.1. Deep-sea liner shipping

Deep-sea liner shipping is a high-risk industry: costs are almost entirely fixed. This feature triggered collusive agreements. Participation in deep-sea liner shipping required a substantial amount of capital (it was not possible to operate a liner service with just one ship) and specific operational and commercial knowledge. The entry barriers guaranteed a certain degree of stability in industry membership. Because competition in this international industry was organized around separate trades, transparency also remained relatively high. Thus, conditions for embeddedness of interaction were favorable.

Seven English firms forged the first liner shipping cartel or conference in the trade between England and India in 1875, when the steamship era in deep-sea liner shipping had only just begun. In the next few decades, firms from all the important maritime countries started to participate in conferences and the system spread to most other liner trades. Typically, the founding of a conference was preceded by a severe price war. A conference was a price cartel. Furthermore, it aimed at deterring new entrants in a certain trade. In addition, conference members often reached market sharing agreements by founding a cargo or revenue pool. Most conferences faced temporal breakdowns, but they represented a sustained collusive system in international liner shipping with an estimated market coverage of 90 percent until, and even after, the advent of container shipping in the 1960s.⁷

Existing evidence, like Seiler (1993), suggests that, as a result of the level and the kind of entry barriers mentioned, the founders of the steam shipping companies were drawn from a restricted, rather elitist circle of business men. In the Dutch case, they were, almost without exception, former owners/operators of sailing ships, shipping agents, or traders. These indi-

⁷ In liner shipping to and from the USA, the regulative power of conferences was formally restricted because the anti-trust Shipping Act of 1916 prescribed 'open' conferences, which meant that cartels could not exclude outsiders.

viduals were considered ‘gentlemen’ and, in general, manifested a corresponding behavior. In their study of British shipping conferences in the period 1879–1929, Podolny and Scott Morton found that high social status entrants were significantly less likely (40 percent) to be preyed upon by cartel members than low social status entrants. They demonstrate that a high social status of the entering firm’s leading figure was associated with willingness to participate in the moral community of the cartels, and not only with relatively large (financial) resources. The common adherence to certain codes of behavior and the resulting feelings of mutual trust have favored the sustainability of collusion in liner shipping

In the conference and pool system agreement on procedures and mutual task performance, both characteristics of the cohesion/task-performing stage were achieved. The conference rights and pool shares of individual firms often remained valid for several decades. All in all, the international liner shipping industry before the container era in most trades was an example of a combination of tight collusion and low profits or, in other words, a live-and-let-live form of competition (see Dick, 1983, for an illustrative description of the Europe–Australia trade).

In addition to the international collusion, the Dutch liner shipping companies showed a tendency towards even closer national cooperation. In the Dutch liner shipping industry, embedded interaction was likely to occur: industry membership was very stable from 1920, and the concentration of the firms in Amsterdam and Rotterdam contributed to a high level of transparency. Almost from the start of steam shipping to and from the Dutch East Indies in the 1870s, the Dutch companies *Stoomvaart Maatschappij Nederland* (SMN) of Amsterdam and the *Rotterdamsche Lloyd* of Rotterdam cooperated by coordinating schedules and founding joint ventures in liner shipping within and around the East Indies. In 1895, the managing director of SMN spoke openly of a live-and-let-live relation with the *Rotterdamsche Lloyd*. The gentleman-like behavior of these Dutch shipowners was illustrated in 1918, when the *Rotterdamsche Lloyd* did not want to accept a side-payment of half a million guilders from SMN because it considered such a large sum from a partner as inappropriate.

On several occasions, a Dutch liner shipping firm challenged the established position of another (particularly on the trade between Europe and the Americas), but these experiences usually led to the conclusion that there was room for only one Dutch firm or a combination of interests on a certain trade. Geographical proximity, in this case shared nationality, strongly stimulated the far reaching collusive agreements between Dutch liner shipping owners. Because liner shipping firms of different nationalities operated on the same concrete market, the Dutch shipowners were confronted with clearly identifiable sets of foreign competitors. When matters came to a head, the Amsterdam and Rotterdam firms subordinated their local chauvinism to the national cause. Several cases of real or imagined efforts of unfriendly takeovers of Dutch liner companies by foreign ones led Ernst Heldring of the Amsterdam *KNSM* to formulate a plan for a Dutch umbrella shipping combination in 1902. This plan was not realized, but it foreshadowed the founding of the national *VNS* company in 1920, a watershed in the history of Dutch liner shipping. Whereas the *VNS* was awarded the monopoly for serving trades not covered previously by its (eight) founders, all Dutch deep-sea liner shipping companies, with one exception, promised not to enter each others’ trades in the future. The agreement remained valid until the 1960s.

The introduction of container shipping, pioneered by the American newcomer *Sea-Land* on the transatlantic trade in April 1966, created strong feelings of uncertainty among

established lines. What they could be certain about was that the risks of liner shipping would increase, due to larger investments per ship and to the corresponding greater capacity expansion per unit. Faced with this situation, it was almost natural that the incumbent liner companies would copy the innovation in mutual cooperation. In all trades, they—with the exception of the American ones, which were probably hindered by the anti-trust regulation⁸ introduced containerization by cooperative efforts called consortia. These consortia were joint service agreements combined with profit pools which reduced the risk of excessive capacity. One or a few consortia were formed in every trade. There was an inherent logic in implementing containerization trade by trade, which matched the social organization of the existing collusive system. The long-standing market sharing by pools facilitated the smooth establishment of consortia: the shares of the individual lines in the consortia were deduced from their existing pool shares. The cohesion/task-performing stage reached by incumbents before containerization stimulated this cooperation, even when economic necessity was not so strong. For instance, the British OCL (itself a combination of shipping firms) covered its market share on the Europe–Far East trade with five container ships of its own, just one ship less than the total of the five members of the competing ScanDutch consortium and enough to develop an independent weekly service. Nevertheless, OCL joined other companies in the leading Trio-consortium. Scherer and Ross (p. 286) contend that containerization undermined long-standing agreements and triggered a wave of price competition, but this observation is largely inspired by the North Atlantic trade situation and is not valid for the early years of container shipping in general.

In The Netherlands, cooperation on the national scale went even further. Besides financial considerations, anxiety about their bargaining position in (future) container consortia prompted four of the six remaining large Dutch liner shipping companies to merge into the NSU (later renamed Nedlloyd Group) in 1970. In 1980, for similar reasons, a fifth one (KNSM) joined Nedlloyd. In the context of the advanced stage of their group development, a national merger seemed natural to the executives of the Dutch firms.

The membership of consortia remained stable until the 1980s. At that point, a fundamental change occurred. Around 1990, the members restructured the consortia into operational vessel sharing agreements. By that time, the old-style conferences and pools had lost most of their power. The international liner shipping industry has been plagued by severe overcapacity and heavy losses since the late 1980s (Drewry Shipping Consultants, 1991, 1992).

The primary cause of this development was the lowering of entry barriers by the uniformization and, therefore, simplification of ship stowage and cargo handling caused by containerization. This phenomenon created instability in industry membership by facilitating the rapid rise of new, non-traditional and, in most cases, financially strong liner shipping companies, especially in the Asian countries like Taiwan and Korea, from the 1970s on. The rise of the newcomers has been truly revolutionary: of the top three container shipping firms in capacity supply at the end of 1996, Evergreen (Taiwan), Sea-Land (USA)

⁸ The effect of the American anti-trust policy is not entirely clear because in 1973 the Federal Maritime Commission conditionally approved a proposed twenty-year charter agreement between Sea-Land and United States Lines, a merger-like cooperation which would have brought 71 percent of U.S.-flag container capacity and 36 percent of total container capacity in the world together (Lerner, 1975, pp. 125–128).

and Maersk Line (Denmark), only Maersk had been active, on a comparatively modest scale, in deep-sea liner shipping before containerization (after 1996, the composition of the top three reflected the rise of the newcomers less because of the mergers of P & O and Nedlloyd in 1996 and Maersk and Sea-Land in 1999). The executives of these newcomers had no ties with the established firms. They also had different occupational backgrounds. Malcom McLean, owner of Sea-Land, developed container shipping out of the American road haulage industry, in which he started his activities as a self-employed entrepreneur. Evergreen was founded in 1968 by a former cargo tender, sailor, and first mate, Y.F. Chang, who started his activities with a secondhand conventional cargo ship. It is likely that these social differences contributed a higher 'coefficient of aggressiveness': the newcomers did not adhere to the prevailing live-and-let-live creed. Unlike Sea-Land, several other entrants abstained from joining the conferences, and their members were in turn forced to follow a more individualistic and competitive approach: cohesion and task performance deteriorated and 'dissolution' loomed at the end of the 1980s.

However, faced with prolonged overcapacity and losses, the liner shipping companies have sought new collusive solutions in recent years. On the main East-West routes between industrialized areas, almost all shipping companies have taken part in stabilization agreements since 1988. Stabilization agreements are new-style, more loosely structured shipping cartels especially aimed at voluntary capacity reduction. The effect has been modest; rates have been further reduced. In addition, the European Community has been unwilling to grant the stabilization agreements anti-trust exemption. Furthermore, the collusive effects have been felt of the so-called mega-alliances which most large container carriers have formed since 1994. These alliances are a more intensive form of cooperation than the vessel-sharing agreements. Nowadays, the social demarcation between old and new shipping lines is much less relevant in cooperative issues. Only traditional liner companies took part in the first mega alliances, but in 1995, Sea-Land and Maersk also agreed to form a global alliance. Of the largest carriers, thus far only Evergreen continues to follow an independent policy. Finally, since the new shipping cartels and the mega-alliances have not resulted in the restoration of profit levels, in 1996 several top 20 container shipping firms started to turn to mergers as an alternative cooperative solution.

4.2. Rotterdam stevedoring industry

The introduction of steam shipping in the 19th century boosted the development of stevedoring firms specialized in the transshipment of cargo in the seaports. The costs of these firms were more variable than in liner shipping because they could hire temporary personnel on the spot or from some kind of labor pool, as in Rotterdam since 1916. In the early days of Rotterdam stevedoring, entry barriers were low: one could start by buying some tools and hiring some men to load and unload cargo midstream. The low entry barriers tended to attract a different kind of entrepreneur to the stevedoring industry than liner shipping. Most stevedores were of lower-class descent: the leading firm Thomsen's Havenbedrijf was founded by a sailor, its two large competitors by sons of a former warehouseman. The effect of this social characteristic was clear: these stevedores were not gentlemen, but street fighters. According to an anecdote, during a meal a stevedore spit on a competitor's

bread, saying: “You won’t eat this one anymore” (which he did anyway). This lack of cooperativeness certainly contributed to the fact that the Rotterdam stevedoring firms started to collude much later than liner shipping firms.

Besides, high transparency and geographical proximity only frustrated group development in the stevedoring industry. Foreign competition was much less visible than in liner shipping. The stevedores in the Belgium port of Antwerp were particularly important competitors, but their Rotterdam counterparts literally did not see them. The situation was very transparent in the Rotterdam harbor itself. Particularly in the early years of their industry, the confrontation between master stevedores could become very personal as they raced to contact the captain of an incoming vessel. A relationship with a shipping line was considered a personal possession by the stevedores, and the loss of such a customer to a rival aroused strong emotions.

The transition to transshipment of general goods on wharves by the stevedoring firms from 1907 on raised entry barriers and contributed to a relatively high stability in industry membership and, consequently, to embedded interaction. In 1923, following a comparable agreement on bulk goods stevedoring the year before, the three largest stevedores (Thomsen, Cornelis Swarttouw and Frans Swarttouw) pooled their profits in the transshipment of general goods and agreed to fix prices and divide customers. This move was probably the result of investments in sheds during the First World War. After World War II, the large stevedores took the lead and extended the collusion to the members of the trade association of general goods stevedores, Vereeniging van Rotterdamsche Stuwadoors (VRS), which represented more than half the market. In 1946, the members of the VRS reached an agreement to pool cargo (a measure which lost its financial relevance in the 1950s), to fix tariffs, and not to deprive other members of their customers.

At the beginning of the 20th century, Thomsen’s ‘upgrading’ of the social and educational background of its executives certainly contributed to a more sophisticated and ‘fair’ competition by this leading firm. However, this only partially altered the long established behavioral codes in the sector as a whole. The stevedores’ agreements functioned much more in an atmosphere of animosity and distrust and generated more quarrels over side-payments than those in liner shipping (an external accountant was hired by the three large stevedores to fix the side-payments of their 1923 pool agreement every three months). The profit pool of the three large stevedores was a way of ‘buying off’ the competition of a potentially aggressive party with the smallest market share (Quick Dispatch, the general goods stevedoring firm of Frans Swarttouw) by two larger stevedores (Cornelis Swarttouw and Thomsen). Side-payments to the same party for a period of nearly 40 years would not have been accepted in liner shipping. In other words, the stevedores reached only a partial agreement on procedures and mutual task performance prior to the container era. The three large stevedores did not extend their pool agreement in 1961, though the reason is not clear. The VRS cartel was disbanded in 1965, when, for the first time since the war, a severe overcapacity became evident.

Containerization significantly increased the risk of stevedoring. Investments per berth were approximately twice as high as before. In Rotterdam, most stevedores doubted the prospects of container transport. In the beginning, two directors of Thomsen’s Havenbedrijf, the largest and most prominent Rotterdam stevedoring firm, and Quick Dispatch, the fifth largest, were the only ones who truly believed in the future of containerization. When

these two firms published their intent to found a joint venture in October 1965, the other large stevedoring firms did not want to be excluded from container handling. In 1966, the five largest stevedores agreed to assign all their future container handling activities to the joint venture Europe Container Terminus (ECT). Although all participants were eager to reduce the risks and avoid mutual competition, unlike the formation of container consortia in liner shipping, this comprehensive collusive agreement was not a self-evident affair. It was enforced by the municipal port authority, monopolist in renting terminal space, which was more sensitive to the internationally competitive position of the Rotterdam port than the stevedores themselves. There was, in fact, less continuity to be expected between the collusion in the old and the new industry than in liner shipping. The VRS cartel had regulated all stevedoring activities, and it was practically impossible for the stevedores to match the logic of the process of containerization by making collusive agreements per liner trade. Furthermore, the smaller VRS members were not invited to join ECT: another indication that the large stevedores were not really committed to a live-and-let-live form of competition. Finally, the existing lack of agreement on procedures was evident in the division of shares in ECT. It was not based on existing market shares or shares assessed earlier by the VRS pool, but was the result of hard bargaining.

Owing to scarcity of terminal space, no real newcomers emerged in the early years of containerization in Rotterdam stevedoring. Unitcentre, another joint venture of established Rotterdam harbor interests, appeared as the second largest container stevedoring company in Rotterdam in 1968. Notwithstanding the high stability in industry membership and transparency, group development was slow. Initially, ECT and its shareholders claimed the monopoly on the handling of deep-sea container ships, and the strategy in the 1970s was, albeit not directly, to drive Unitcentre out of the market (the conflict stage). When the latter showed more persistence than expected, ECT came to accept Unitcentre as a good second. Unitcentre, on the other hand, had never questioned the leadership of ECT. Interaction between the two companies became more intense at the end of the 1970s. The developing live-and-let-live form of competition was more or less formalized in a market division of 75 percent for ECT and 25 percent for Unitcentre in the early 1980s. Collusion was also revealed by the fact that no known transfers of customers occurred provoked by the two stevedores themselves. By this time, the cohesion/task-performing stage had been reached. In comparison with the still active conventional and multi-purpose stevedores, achieving this advanced stage of group development was easier because the managers of ECT and Unitcentre shared no extensive history of customer transfers and other 'unpleasant' affairs. Containerization brought about a partial change in the background of the managers. Academically trained engineers took over the general management of ECT in the 1970s. Unitcentre was led in a more traditional manner by executives who made their career from the bottom up and had often been officers in deep-sea shipping. This difference in manager background caused a certain amount of tension between the 'arrogant' ECT and the more down-to-earth Unitcentre, but ultimately did not hinder collusion, when both stevedores were faced with the threat of the capacity transfer and expansion plans of the municipal port authority in the late 1970s. Finally, ECT and Unitcentre merged in 1993.

4.3. Rotterdam road haulage industry

In road haulage the costs of material and personnel are fixed to a lesser extent than in liner shipping, since it is rather easy to farm out trucking orders. Entry barriers were and are low: one truck is enough to get started. As a result, stability in industry membership is relatively low. In addition, competition between road haulage firms is rather fragmented as they, in general, perform the bulk of their work for one or a few customers. From a local perspective, the industry was more transparent. Nevertheless, in Dutch road haulage, no sustained sector-wide collusion was reached before containerization, with as far as I know the exception of local haulage within the Rotterdam region (including intraharbor transport). Unfortunately, we do not know under what circumstances this collusive system was founded. In any case, from around 1930 until the beginning of containerization, the exchange of work, and, more important, the fixing of prices and customer lists were successfully centrally coordinated in what resembled the cohesion/task-performing stage by the Central Post of Rotterdam. The larger Rotterdam road haulers were prepared to grant the mass of small truckers a relatively high revenue for their (subcontracting) activities, preferring this live-and-let-live form of competition to potential price-cutting by the small firms. The few large Rotterdam harbor haulers had attained a certain status before the transformation to motorized transport and the start-up of the Central Post. Since this was not unusual, it is hard to see how this social factor could have had a decisive influence on the unusually broad interpretation of their own interests. The same holds true for the regional chauvinism fed by the geographical proximity of the Rotterdam truckers. Finally, the fact that the overwhelming majority of Central Post members were self-employed haulers and, therefore, expected to be ‘street fighters’ rather than ‘gentlemen’ does not seem compatible with the successful collusion.

Containerization did not significantly increase the level of risk in road haulage. Participation in container transport required relatively low investments in new equipment in small units, trucks and chassis, which were not necessarily dedicated. Nevertheless, the expected simplification of work by containerization and the vertical integration by shipping lines, which threatened the position of established trucking firms, led to feelings of uncertainty and anxiety. In June 1966, around 70 Dutch road transport companies from all parts of the country, most of them large, founded the Combinatie voor het Containervervoer (Combicon) to regulate and monopolize international transport of containers by exchange of work and price fixing. Combicon was practically liquidated in 1976, without having functioned in a real sense. Most members had had a low commitment to Combicon because containerization would not significantly affect their existing operations. This was not the case with the members of the Rotterdam Central Post organization, who, in 1967, tried to cover container transportation within the existing collusive system of live-and-let-live. Compared with the stevedoring industry, a transfer of the old system to the new industry seemed more natural and easier. No joint ventures, with a selective number of members, were necessary to transport containers by road; the regulations of the Central Post could simply be applied to the new industry.

Nevertheless, this attempt also failed. The advanced stage of group development reached within the Central Post prior to containerization quickly lost its relevance. As expected,

containerization lowered the entry barriers to almost nothing. Many firms temporarily joined this ‘wild west’ market to utilize excess capacity then subsequently retreated from the industry, when higher standard and better paid haulage work became available. As a result of this instability in industry membership and non-transparency, collusion was not possible in the first ten to 15 years of container trucking. It was very difficult for container truckers to learn from interactions and hearsay about their fellow industry members and their acts. It was crucial to reach a certain level of mutual trust, especially because the exchange of trucking orders among road transport firms (in order to cope with fluctuations in demand) always carries the risk of losing customers to the partner. In other words, it was hard to move from the orientation stage to more advanced stages of group development. Only in 1981, at the time of the foundation of the trade association *Vereniging van Zeecontainervervoerders (VZV)*, was the industry transparent enough to permit organization of the container truckers. The initiators of the VZV thought they were now able to identify specialist market players, whom they invited to join the VZV, from among the casual container truckers. Easy access to the container trucking market was not only an indication of instability but also of heterogeneity in background. However, most of the founding members of the VZV were heads of medium-sized family firms with their head office or at least a branch in the Rotterdam area. This shared social background and geographical proximity proved to be a better starting point for cooperation than in the case of the failed Combicon adventure of a socially and geographically more heterogeneous set of executives.

By interacting in the VZV, mutual understanding is enhanced. The VZV has also developed task-performing activities. It issues tariff surcharges in case of sudden rises in fuel costs and unjustified waiting times at seaport container terminals (the latter was the impetus for founding the VZV). However, price competition in container haulage has remained extremely fierce. Container haulage is still a fragmented, non-transparent industry with dozens of specialized and hundreds of casual Dutch suppliers (a submarket department of container transport of the general trade association *Transport en Logistiek Nederland* created in 1994 attracted 700 members in a short period). The 45 members of VZV do not represent all significant container truckers.

4.4. Rhine shipping

Before containerization, the risks of Rhine shipping were comparable to those of deep-sea shipping to a limited degree. Liner services were of minor importance in Rhine shipping, and, therefore, the level of fixed costs was lower. Entry barriers to Rhine shipping were not much higher than for road transport: the main financial requirement was one ship. Instability in industry membership prevailed, and competition among the numerous Rhine shippers was fragmented, although the fact that the rather stable subset of large firms of different nationalities competed for the most voluminous orders gave the interaction among its executives an embedded character. In most cases, the founders of the firms with several ships and an administrative and commercial office on land (called ‘*rederijen*’ in Dutch) had (family) backgrounds in production, trade, and/or transport of (bulk) goods. This necessarily rather vague description – the history of Rhine shipping is complex in this respect – suggests a more varied pattern than for deep-sea liner shipping. A particular effect of this social factor

on the cooperativeness of the executives is not identifiable. Alarmed by the disastrous effects of price wars, the large firms have colluded in so-called conventions and pools since the beginning of this century. The most important long-standing agreements concerned shipping to and from Switzerland (the first one was founded in 1929), the shipping of general goods, steel, and chemicals on the German Rhine (1951) and coal shipping (1956). Executives of the ‘rederijen’ and the self-employed shippers (‘particulieren’, mostly of modest origin) operated in different social spheres, with separate trade associations; the ‘particulieren’ were generally not involved in the collusive agreements of the ‘rederijen’.

In comparison with deep-sea liner shipping, the collusive agreements focussed more on shipping certain goods than on complete trade lanes. This was a logical consequence of the fact that Rhine shipping was predominantly tramp shipping; perceptions of ‘national rights’, notions of home ports, and sentiments of ‘national flags’ based on regular services were much weaker than in deep-sea liner shipping. As a consequence, the consolidation of firms has not followed national lines. For instance, through share holding relations and other links, no clear division between the large Dutch and German Rhine shipping firms was identifiable at the onset of containerization. In this way, geographical proximity failed to lead to nationalistic feelings comparable to Dutch deep-sea liner shipping.

In short, collusion in Rhine shipping appeared later, was less extensive, and had less continuity than deep-sea liner shipping. Cohesion and mutual task performance were only partially achieved. At the end of the 1960s, before containerization became established on the Rhine, overcapacity and fierce price competition occurred between large and small firms alike.

In Rhine container shipping, large investments in new ships designed for container transport were not strictly necessary, but incumbent firms perceived investments in heavy transshipment equipment along the Rhine and the exploitation of real liner services as serious risks. Moreover, they considered inland container shipping too slow to compete with road and rail transport. However, when five firms, including three of the largest ones, started talking about a cooperative venture in 1968, almost none of the remaining large Rhine shipping companies wanted to be left out. The Rhine Container Line (RCL), founded in January 1969, eventually numbered 15 large Rhine shipping companies from five countries. The RCL was, among other things, an instrument for fixing prices and sharing the market.

Prior agreement on procedures, for instance as reflected in the division of shares in existing pools characterized by the type of goods shipped, had little relevance to Rhine container shipping, which had to be developed by liner services and was, therefore, considered a completely new activity. The RCL was not particularly vital to its members, because they estimated containerizable goods to represent no more than a small percentage of the total tonnage transported along the Rhine. When the RCL was liquidated in 1975, its members had performed virtually no container activity.

In the mid-1970s, when Rhine container shipping was becoming more competitive, several new companies entered the industry. The two most prominent operators, Combined Container Service or CCS (founded in 1976) and Rhinecontainer (1978), were both cooperative ventures of one or two large incumbent German/Dutch Rhine shipping companies previously involved in the RCL (Stinnes Reederei in CCS, EWT and, from 1980 on, Koenigsfeld/Rhenania in Rhinecontainer) and a German road transport or forwarding company (Kieserling in CCS and Kühne & Nagel in Rhinecontainer). Notwithstanding the

prevailing high transparency, competition between the two firms was fierce for a number of years. Existing relations between the executives of the incumbent Rhine shipping firms involved were not relevant because the managers of both cooperative ventures did not know each other and had no contact during their first years of tenure, so not even the orientation stage was reached.

Rhine container shipping required only general transportation skills. Therefore, although in some cases the large incumbent Rhine shipping firms could deny outsiders access to the terminals along the Rhine, stability in industry membership and transparency was relatively low for a number of years. The backgrounds of the executives of the firms which began to operate container services were rather varied. Apart from the executives of established Rhine shipping companies and larger firms active in various transport activities, a contractor (Kayser), owners of German road transport and forwarding family firms (Kieserling and Frankenbach), a former commercial director of ECT (Eurobarge) and two ‘particulier’ Dutch shippers (Dubbelman and Danser) became involved. Kayser, Frankenbach, Dubbelman and, particularly, Eurobarge were considered ‘mavericks’. It took several years for them to be recognized as legitimate industry members or, in other words, as potential partners in collusive agreements.

In 1984, the leading Swiss Rhine shipping company SRN tried to establish itself in upper Rhine container shipping, but concluded there was no room for another service in addition to Danser Container Line, founded in 1982. Therefore, at the end of 1985, SRN accepted a proposal by Danser, a ‘particulier’ subcontractor of the Swiss company, to join forces. The French national Rhine shipping company CFNR got involved, because it had subcontracted its entire container transport to Danser, and, together with two other Swiss firms, Natural van Dam and Conteba, the Fahrgemeinschaft Oberrhein was founded in 1986. In this way, the past experiences of the ‘rederijen’ SRN and CFNR with Danser as a subcontractor led to a collusive agreement with the Dutch ‘particulier’. Compared to deep-sea liner shipping at the beginning of containerization, a stronger economic need to cooperate in a consortium-like fashion was necessary to compensate for social differences. The Fahrgemeinschaft consisted of a joint sailing schedule combined with a profit pool and is comparable to a consortium in deep-sea liner shipping. As a result, the five members nearly monopolized container shipping on the upper Rhine.

With around 10–15 market members, the Rhine container shipping industry remained much more transparent and stable in membership than container trucking. Nevertheless, it took a comparable amount of time for group development to occur. In the mid-1980s, when tariffs and profits began to fall, interactions between Rhine container operators intensified. In 1988, they founded a container shipping department of the Dutch Rhine shipping companies’ trade association, Centraal Bureau voor de Rijn- en Binnenvaart (CBRB). Soon, virtually all Rhine container shipping operators became members of this organization. Certain elements of the task-performing stage have become identifiable. The CBRB department has introduced special surcharges for rising bunker costs and extreme low water levels on the Rhine. The surcharges had greater practical impact than the comparable VZV measures in container trucking, probably because there were fewer market members.

In 1992, a significant collusion was reached on lower Rhine trade with the founding of another Fahrgemeinschaft. For the first time, Rhinecontainer and CCS cooperated in a joint sailing schedule and profit pool. The other partners were Haniel and Haeger &

Schmidt, two relatively new parties in the trade, which boasted a long tradition and good reputation in Rhine shipping and, therefore, took significantly less time to achieve the status of recognized industry members than the mavericks mentioned above. The main reason for the collusion was that all four operators were incurring losses as a result of serious overcapacity.

In 1994, one of the two largest operators, CCS, made its entrance on the upper Rhine, by cooperating with Haniel and Dubbelman (which had been active in this segment before). At that time, CCS no longer felt bound by the agreement made in 1986 between CCS, Rhinecontainer and Frankenbach on one hand, and the Fahrgemeinschaft Oberrhein (now called Penta) not to enter each others' markets, because of an alleged 'unfriendly' act by the latter. Furthermore, the most voluminous trade, on the middle Rhine, is still not regulated by a (formal) cooperative agreement. On the other hand, in Danube-Rhine container shipping, Rhinecontainer/Penta and CCS joined forces at the end of 1995 because of the unsatisfactory financial results in this new market. All in all, competition no longer seems to be a matter of life and death.

This discussion of collusion and group development in the four transportation industries leads us to the following conclusions. The high risk elements of unforeseeable strong fluctuations in demand and high fixed cost levels did not prevent sustained collusion. Uncertainty stimulated the search for collusion during the introduction stage in all four industries, even when containerization did not significantly increase risk. This tendency towards bandwagon behavior did not always result in successful collusion between incumbents. The case of deep-sea liner shipping illustrates how achieving the cohesion/task-performing stage of group development among executives before containerization helped perpetuate a live-and-let-live form of competition in the new industry. It is likely that the same would have happened in Rotterdam road haulage if the industry had not been invaded by newcomers. On the other hand, where agreement on procedures and group feelings were less developed, collusion between incumbents in the new industry was unsuccessful (Rhine shipping) or could only be realized by third party intervention (Rotterdam stevedoring). Therefore, Hypothesis 1 is supported by the data. However, the empirical analysis also reveals that the geographical structure of an industry influences the relevance of existing group development by incumbents for collusion in a newly formed industry. When the innovation can be implemented in a way that is compatible with the existing social organization of collusion (as in deep-sea liner shipping and Rotterdam road haulage), continuation of collusion into the new era is more natural in the eyes of incumbents and more easily realized than in the opposite case (Rotterdam stevedoring and Rhine shipping).

Before containerization, the degree of stability in membership and transparency of the industry had some of the hypothesized effects on group development, but not in a marked way. In the container era, the picture becomes clearer. Except in the case of the Rotterdam stevedoring industry, containerization significantly lowered entry barriers, which created instability in industry membership and decreased transparency. In the absence of existing social relations between executives and past experiences, it took a period of 10–15 years in a new industry to reach elements of the cohesion/task-performing stage. An exception here is liner shipping, where the rise of newcomers eventually destabilized the long-standing collusive system of incumbent firms in the 1980s. In conclusion, Hypothesis 2 finds significant, but no overall support in the data.

The relevance of the degree of variety of social backgrounds became clear in the container era, when entry barriers were lowered, and differences in the backgrounds of executives of incumbent firms and new entrants retarded or regressed group development in all four industries. Different social characteristics contributed to different conceptions of competitive behavior and made it more difficult to create mutual trust. Furthermore, it took time for new firms with no prior reputation or position to prove themselves to competitors as ‘legitimate’ market members, with competitive abilities and long-term objectives, to share in some kind of live-and-let-live competition. Hypothesis 3 is, therefore, strongly supported by the evidence.

A common ‘high’ background of executives seems to have stimulated a collusive attitude in liner shipping. On the other hand, ‘low’ backgrounds were not always incompatible with sustained collusion in the other industries. Therefore, Hypothesis 4 is only partially supported.

The second industry-related social characteristic, geographical proximity, served as a focal point for group development in Dutch liner shipping and to some extent in Rotterdam road haulage. However, in Rhine shipping this effect was not visible, whereas in the Rotterdam stevedoring industry geographical proximity even frustrated group development. Therefore, Hypothesis 5 finds only weak support in the empirical data.

5. Concluding remarks

To conclude the paper, I now present an interdisciplinary framework for studying collusion between firms. Collusion can be equated with successful group development among executives, who adhere to a live-and-let-live kind of competition and who show a propensity towards bandwagon behavior. High levels of risk and/or uncertainty stimulate the search for collusion, but the social relations between executives, group identification, mutual trust, and their views about the proper kind of competition determine whether sustained collusion is actually realized. Group development depends on the social conditions of interaction and the social characteristics of executives. Both factors are related to economic characteristics of an industry, particularly entry barriers and geographical structure. They determine stability of membership and transparency of an industry, which in their turn are linked to a crucial social condition facilitating cooperation, viz., the level of embeddedness of interaction. The industry characteristics are also related to two social characteristics, namely social background and geographical proximity of executives. Similarities in social characteristics function as focal points for the development of social relations and feelings of common identity and trust. Social background is also relevant to an executive’s view of the proper kind of competition: executives with a ‘high’ background are expected to be more inclined to support live-and-let-live competition than those with a ‘low’ background.

Industry characteristics influence the chances of collusion both through the economic and the social factors mentioned. Cost structures not only influence the level of risk, but are also an important component of entry barriers. In their turn, entry barriers shape the social backgrounds of executives. The geographical structure also determines whether the social organization of an existing collusive system is compatible with the new industry. Finally, the alteration of the economic structure of an industry by an innovation, in particular the

level of entry barriers, largely explains stability of membership of the industry (and partly explains its transparency) and the extent to which firms led by executives with no social relations with incumbents, other backgrounds and other views about the preferred kind of competition are able to enter the industry.

Some final remarks on the value of the non-economic concepts used in this paper for studying collusion are in order. The group development model is not entirely appropriate for describing collusive behavior. For instance, when firms agree on a procedure for automatically adjusting prices to reflect rises in fuel costs, but price competition remains severe, elements of both the conflict stage and cohesion/task-performing stage are discernible. Therefore, the group development model should be used in a flexible way. Furthermore, similarity in social background of executives seems more relevant to explain the occurrence of collusion than the kind of background itself. To increase its explanatory power, the classification of backgrounds needs refinement. It is too simple and one-sided to only distinguish between 'low' and 'high' social backgrounds and associate them with uncooperative and cooperative behavior respectively. In addition, an increasing rotation of managers through the different industries makes it more difficult to link their backgrounds to the economic characteristics of the industry in question. Finally, geographical proximity of executives has a rather ambiguous effect on collusion.

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