The effectiveness and efficiency of alliance-portfolio governance mechanisms in mMNE's – A game theoretical analysis[1]

Dipl. Oec. Muhamed Kudic
Halle Institute of Economic Research (IWH-Halle)
Department of Structural Economics

Dipl. Oec. Marc Banaszak
Chemnitz University of Technology
Department of Marketing/ SAXEED

Abstract:
Even though small- and medium-sized firms (SMEs) were believed not to proceed beyond exporting in their internationalization routes, we can observe new types of cooperation intensive entrepreneurial firms – so called "micromultinational enterprises" (mMNEs) – entering the global landscape. These firms face the challenge to manage and control a portfolio of national and international alliances simultaneously (ego-network). The aim of the paper is to provide game theoretically consolidated conditions to analyze the effectiveness and efficiency of interorganizational sanction mechanisms in an alliance portfolio setting. A game theoretical framework is developed over three stages with increasing complexity. Results show that two out of six analyzed sanction mechanisms do not fulfill the game theoretical condition for effectiveness. The efficiency analysis sensibilize for discretionary elements in governance structures and demonstrates that not one single sanction mechanism but rather the right choice and combination of different types of sanction mechanisms leads to efficient results. We contribute to the international business, alliance and network literature in several ways by focusing on alliance portfolios held by mMNEs. In doing so, we move beyond the dyadic level and analyze sanction mechanisms from an ego network perspective, a widely underemphasized topic in the literature.

Key Words: alliance portfolio, governance mechanisms, sanctions, game theory

---

1.   Introduction

Small and medium-sized firms (SMEs) were believed not to proceed beyond exporting in their internationalization routes. However, we can observe the emergence of new types of entrepreneurial firms – so-called "micromultinationals" (mMNEs) – entering the global competitive landscape in the recent past (Ibeh et al., 2004; Dimitratos et al., 2003). One specific feature that qualifies mMNEs as an object of investigation is the fact that these firms control and manage value-added activities through constellation and investment modes in more than one country (Dimitratos et al., 2003, p. 165). Despite comparatively high resource restrictions, these organizations have to compete on international markets and cover multiple activities along the industry value chain in order to confine the known "liability of smallness" (Freeman et al., 1983; Brüderl/Schüssler, 1990; Ranger-Moore, 1997) and "liability of foreignness" (Zaheer/Mosakowski, 1997; Miller/Parkhe, 2002) problems. The establishment of strategic alliances with national and international partner organizations is an important instrument for mMNEs to overcome this challenge.

In contrast to the superordinated network perspective, an alliance portfolio is defined from the focal actor's perspective and encompasses all direct ties between the focal actor and partner organizations as well as all indirect ties among the partner organizations directly connected to the focal actor. On the one hand, multiple interorganizational relations enable mMNEs to cover a broad range of activities and shift the constraints and restrictions of these types of organizations. On the other hand, management and control costs increase with the number of alliances. To assure that alliance-portfolio-related benefits exceed governance costs, an effective and efficient governance structure is, especially for mMNEs, of vital importance while enabling the focal actor to realize superior collaboration-related rents and, thus, generating a competitive advantage. According to Oxley and Sampson (2004, pp. 723-724),

2

we differentiate between three types of governance mechanisms in an alliance portfolio setting: choice of organizational form, choice of control mechanism and choice of sanction mechanism. However, the latter governance mechanism has been widely neglected, especially in an alliance portfolio setting (Phelan et al., 2005, p. 341).

We seek to answer the following research questions: (I) What are game theoretically consolidated conditions for the effectiveness and the efficiency of alliance portfolio sanction mechanisms? (II) What types of alliance portfolio sanction mechanism are effective and efficient? While answering these questions we contribute to the international business, alliance and network literature in several ways. Firstly, we contribute to the international entrepreneurship literature by focusing on collaboration intensive international new ventures, so called micromultinantionals. Secondly, we analyse alliance portfolio sanction mechanisms, a widely underemphasized topic in literature on interorganizational governance structures. We break new ground by applying a game theoretical approach to analyze the effectiveness and efficiency of alliance portfolio sanction mechanisms. Thirdly, we shed light on implementation issues with regard to governance and control mechanisms in alliance portfolios of mMNEs and formulate collaboration-related managerial decision-making recommendations for practitioners.

The paper is organized as follows: in section 2, we provide a conventional review of the recent literature and outline the research gap. In section 3, we introduce a game theoretical model over three stages with increasing complexity. In section 4, we apply the model to analyze the effectiveness and efficiency of six selective types of alliance portfolio sanction mechanisms. Section 5 provides the results and a detailed discussion. Finally, in the last section of the paper, we draw a conclusion and outline perspectives.

2. Theory and literature review

This section is organized around three streams of literature: We begin with a brief overview and some introductive insights into international entrepreneurship literature in order to provide a theoretical base for one specific type of organization – micromultinational enterprises (mMNEs). Then, we outline theoretical selective aspects within the broad field of alliance and network research. Following that, we discuss the theoretical underpins of governance mechanisms in hybrid organizational structures.

2.1. Theoretical background: new type of organization on the international landscape – mMNEs

In the late 70s, two Swedish researchers (Uppsala School) developed one of the most influential internationalization models that describes the foreign market access of firms as an incremental learning process along several internationalization stages (Johanson/Vahlen, 1977, 1990, 2001, 2003). However, critics (Oviatt/McDougal, 1994; McDougall et al., 1994) have emphasized that none of these approaches can explain the existence of young and small internationally-operating firms that skip different stages of the internationalization process or are global from day one[2]. This critique led to a new stream of literature in the field of international business research.

International entrepreneurship[3] has linked the paths of research in international business and entrepreneurship in order to place emphasis on the relevance of small firms – so-called "born globals" or "international new ventures" – in the increasing globalization of markets (McDougall/Oviatt, 2000; Oviatt/McDougall, 2005). These firms can, in principle, use the same strategies – ranging from export modes to international alliances and joint ventures to

---

2   Rialp et al. (2005) provides a comprehensive comparison of classifying features of "being international firms" and "going international firms".

3   Similar definitions have been proposed by McDougall (1989), Zahra (1993), Oviatt/McDougall (1994) and McDougall/Oviatt (1996, 2000). For a comprehensive overview of the status of the field, see Zahra/George (2002).

internationalize business – as large multinational enterprises, even though resource restrictions and the inexperience in entering new markets are comparatively high in young entrepreneurial firms. Another group of Swedish researchers (Johanson/Mattsson, 1988) emphasized the relevance of interorganizational networks (Thorelli, 1986; Jarillo, 1988) as an important strategic option for small firms to enter international markets. Researchers in international business (Forsgren, 1989; Axelsson/Easton, 1992; Sharma/Blomstermo 2003; Covellio 2006; Gassmann/Keupp 2007) as well as entrepreneurship scholars (Larson, 1992; Larson/Starr, 1993; Andersson/Wictor 2003) support this view. In the following, we focus on one specific type of young entrepreneurial firms, so-called micromultinational enterprises (mMNEs) (Dimitratos et al., 2003; Ibeh et al., 2004). These firms are defined as a "small and medium-sized firm that controls and manages value-added activities through constellation and investment modes in more than one country" (Dimitratos et al., 2003). Literature provides some evidence that mMNEs are engaged in multiple international alliances simultaneously (Ibeh et al., 2004; Dimitratos et al., 2003; McDougall et al., 1994). Thus, mMNEs face the challenge of having to manage and control a portfolio of national and international alliances rather than using FDI or exporting modes in order to enter foreign markets.

2.2. Characterizing hybrid structures: strategic alliances, networks and alliance portfolios

Strategic alliances can be defined as "[…] voluntary arrangements between firms involving exchange, sharing, or co-development of products, technologies, or services. They can occur as a result of a wide range of motives and goals, take a variety of forms, and occur across vertical and horizontal boundaries" (Gulati, 1998). The most important motives behind these collaborative agreements are: cost savings (Hagedoorn, 2002), risk reduction (Hagedoorn, 1993; Sivadas/Dwyer, 2000), time savings (Mowery et al., 1996, p. 79), reputation and status

(Stuart, 1998; Stuart et al., 1999; Stuart, 2000; Gulati et al., 2000), knowledge access (Rothaermel, 2001; Grant/Baden-Fuller, 2004), interorganizational learning (Hamel, 1991; Khanna et al., 1998; Kale et al., 2000) and access to national and international markets (Perlmutter/Heenan, 1986; Johanson/Mattsson, 1988). The structural forms behind these collaborative agreements range from short-term supply contracts, licensing and franchise agreements, consultancy contracts to consortia, long-term partnerships and joint ventures (Podolny/Page, 1998; Brass et al., 2004). Furthermore, collaborative agreements can encompass two or more partners. In the first case we refer to these hybrids as dyadic alliances and in the second case as multi-partner alliances. Companies face the challenge of managing more than one alliance simultaneously (Dysters et al., 1999; Hoffmann 2005; Lavie 2007). Thus, instead of investigating single dyadic alliances, the whole network shall be considered (Gulati, 1998, 2007). From a structural network perspective (Wasserman/Faust, 1994; Degenne/Forse, 1999; Carrington et al., 2004), strategic alliances are elementary building blocks of interorganizational networks, consisting of at least two nodes ("organizations") and connections between these nodes ("collaborative agreements"). Brass et al. (2004) define a network "[…] as a set of nodes and the set of ties representing some relationship, or lack of relationship, between the nodes." In this paper we are interested in specific types of network structures, so-called "ego networks". Companies possess ego networks consisting of multiple dyadic alliances simultaneously, touching almost every field of a firm's value chain activities, such as R&D, production, logistics or marketing, which have been shown to provide a range of benefits to the agreed partners and the respective branches of industries – this applies to both established, large multinationals as well as new ventures (Rao et al., 2008; Powell et al., 1996; Grant/Baden-Fuller, 2004; Hagedoorn, 2002). An ego network (cf. figure 1) is defined from the focal actor's perspective and consists of a set of direct, dyadic ties between the focal

6

actor and the alters and indirect ties between the alters (Wasserman/Faust, 1994; Ahuja 2000; Hite/Hesterly, 2001). Ego networks do not include second-tier ties or second-step ties to which the focal actor is not directly connected (Hite/Hesterly, 2001).

FIGURE 1 ABOUT HERE

In the following, we use the terms ego network, alliance constellation (Das/Teng, 2002) and alliance portfolio (Hoffmann 2005; Lavie, 2007) synonymously. While alliance costs increase with the number of alliances, benefits have to add up at a higher pace in an alliance portfolio setting. Evidence to explain the existence of portfolios in the case of interorganizational alliances can be drawn from two argumentative lines. By actively managing and controlling a portfolio of alliances, risk can be reduced and synergy effects can be realized. Given potentially high rates of failure in achieving risk reduction in dyadic alliances (Bleeke/Ernst, 1991; Sivadas/Dwyer, 2000), spreading out the risk over a portfolio of alliances by which variances in expected returns are evened out increases the chance of risk reduction. A theoretical explanation for the aggregation of dyadic alliances can be found in terms of Markowitz (1952) as a portfolio in which a focal actor tries to yield higher expected returns by diversifying the risk. The existence of ties – direct and indirect – between the actors in an alliance portfolio generates synergy effects by reducing management and governance costs between independent entities (Burt, 1995; Ahuja, 2000; Borgatti/Foster, 2003). This perspective provides a strong argument why it is in a company's interest to engage in numerous alliances. Furthermore, synergy in interorganizational collaboration may result in relational rents delivered by complementary resource combinations (Dyer/Singh, 1998) knowledge transfer and interorganizational learning effects (Grant/Baden-Fuller, 2004). Such relational rents can only be generated by contributions joined idiosyncratically by specific alliance partners and represent a supernormal profit none of the partners could generate on

their own or in other market-based relationships. In conclusion, an alliance portfolio is more than the simple aggregation of dyadic partnerships.

2.3. Theoretical background: governance mechanisms and types of sanction in hybrid structures

Scholars from various disciplines and theoretical backgrounds have contributed to the literature on interorganizational governance (cf. Heide, 1994; Provan et al., 2007, Provan/Kenis, 2007; Park, 1996). For a comprehensive overview of network-level theories, see Provan et al. (2007). Provan and Kenis (2007) focus on the network-level, propose a combined network analytic and governance perspective and differentiate between three types of governance in networks – shared governance, lead organization governance and network administrative organization. However, we utilize a different perspective while arguing that it is every organization's primary interest to manage and control interorganizational partnerships proactively to reach strategic goals. Therefore, we apply an ego network perspective (Ahuja, 2000) and argue that the focal actor plays a lead role, irrespective of size, age, status or other organizational level attributes.

2.3.1. Theoretical underpins of interorganizational governance

The analysis of interorganizational governance mechanisms is highly relevant but still an underemphasized topic in alliance and network research (Provan/Kenis, 2007; Grabher/Powell, 2004). Heide (1994, p. 74) defines interorganizational governance as "a multidimensional phenomenon, encompassing the initiation, termination and ongoing relationship maintenance between a set of parties" (Heide 1994, p. 72). Governance has been highlighted under aspects of effectiveness in resource dependency theory (e.g. Pfeffer/ Salancik, 1978; Ulrich/Barney, 1984) and efficiency in transaction cost theory (e.g. Williamson, 1975; Williamson, 1991; Klein et al., 1978; Alchian/Demsetz, 1972; Williamson,

8

1985; Rubin, 1990; Ring/Van de Ven, 1992; Heide, 1994; Dyer, 1996). Relational contracting, distinguishing between discrete and relational exchange norms, views a mutuality of interests as a guidepost towards bilateral governance in interorganizational relationships which depend on the social embeddedness (Granovetter, 1988; Uzzi, 1996, 1997) of the actors providing opportunities and limitations for development (Macneil, 1980; Dwyer et al., 1987). Social network approaches apply the relational view of governance to a network perspective in which behavioral expectations, such as trustworthiness of partners, influence the interorganizational relationship and the expected value of relational rents are a source of competitive advantage and, therefore, form the strategic objective which the focal actor tries to achieve (Ahuja, 2000; Brass et al., 2004; Dyer/Singh, 1998; Borgatti/Foster, 2003; Hoffmann, 2005). Following Oxley and Sampson (2004) the framework for managing the governance structure can be summarized as consisting of:

- the choice of the organizational form
- the choice of control mechanisms, and
- the choice of sanctions.

We focus exclusively on the choice of sanctions in hybrid organizational structures.

2.3.2. Characteristic features of sanction mechanisms in hybrid structures

Sanctions as a manner of safeguarding the governance structure from opportunism can be classified twofold as there are agreements enforced by a third party, for example, authorities, or by self-enforcing agreements in the range of formal or informal specific investments (Dyer, 1996). Nonetheless there are numerous possible safeguards that could result in a sanction to penalize an alter's opportunistic behavior. Kronman (1985) or Subramani and Venkatraman (2003), for example, provide an overview of possibilities. To follow our prior argumentation, we will include formal contracts as well as safeguards consisting of mutual hostages as

bilateral idiosyncratic tangible and intangible investments, quasi integration, joint decision making and loss of reputation in our further discussion.

Formal contracts are legally enforceable agreements with which the partners bind themselves to the omission of opportunistic behavior or otherwise must face a penalty when brought to a court of justice (Joskow, 1988). The decision to mutually invest tangibly or intangibly specifically in an interorganizational relationship safeguards an alliance linkage by the credible commitment of both parties against opportunism by allocating motivation to abide to what was agreed (Anderson, 1992; Williamson, 1983; Jap/Anderson, 2003). The nature of those investments, which are not easy to deploy alternatively as they may only have a marginal market value (Kronman, 1985, pp. 12-13), is, however, different. This means that seizing the idiosyncratic investment as a sanction consequently has to analyze both possibilities separately and, therefore, represents two separate sanctions that rely on bilateral agreements. Besides mutually investing in each other, idiosyncratic relation-specific investments which neither party is obliged to make may also be devoted unidirectionally in an interorganizational relation to safeguard opportunism in a situation of asymmetric bargaining power by signaling commitment and fellow-feeling to this linkage and can be identified in literature as quasi integration (Blois, 1972; Subramani/Venkatraman, 2003) or union (Kronman, 1985). The seizing of such an investment already made by an alter, notwithstanding unilaterally, and received by the focal actor as an act of penalizing opportunism, thus, describes one of the latter two sanctions. The decision to refuse any further optional specific investments in the alliance damaged by opportunism differs from these as the deployment is a separate act of governing the alliance portfolio the focal actor may undertake to loosen or at least not further strengthen the quasi integration and, therefore, constitutes a sanction of its own. Joint decision making about key elements of a relationship, on the

10

contrary, works as a safeguard to secure the relation-specific assets made (Subramani/Venkatraman, 2003). The hierarchic command to exclude an alter from key decisions as a sanctioning act applied by a focal actor, therefore, represents a unilateral element of governance with single-sided enforceability mutually agreed on (Heide, 1994, Macneil 1981). Finally, hands-tying (Kronman, 1985) embodies a sanction, where the promisor hands over an asset that is of substantial value out of the interorganizational relation, here the loss of a company's reputation on the market, to the nterna and has been considered as such in alliances by several scholars (e.g. Ring/VandeVen, 1994; Sharma, 1998; Robinson/Stuart, 2007). The focal actor attains the empowerment over his alliance partners very own alliance behavioral reputation and, by spreading the word, may damage the publicly perceived trustworthiness of the alter in an act of opportunistic behavior so that it will be very difficult to find alternative alliance partners in the future.

2.4.   Research focus and methodology

Little is known about the choice of optimal governance structures in dyadic alliances and even less, if anything, is known about the effectiveness and efficiency of sanction mechanisms in hybrid structures that move beyond the dyadic level. However, to the best of our knowledge, no research has been undertaken on the choice of sanctions concerning the phenomenon of governance structure in the setting of an alliance portfolio until now. Thus, we will concentrate on one specific type of organization – so called micromultinational enterprises (mMNEs) – to specify the focal node in the center of the ego network. With regard to the content of collaboration, we allow for a heterogeneous alliance-portfolio structure composed of different types of direct and indirect ties. We focus exclusively on the choice of sanctions in ego-network structures in which the focal actor is governing the alliance portfolio proactively. With regard to methodological aspects, it is notable that several scholars analyze the choice of

sanctions in dyadic settings based on a static or iterated prisoner's dilemma (Phelan et al., 1993; Arend/Seale, 2005; Phelan et al., 2005). Whilst the game theoretical approach is common to some of the research on the choice of sanctions and seems an appropriate method to research the problem, prior research solely concentrates on the dyadic setting of strategic alliances. We extend that perspective by explicitly integrating portfolio effects in our game theoretical model.

3. The game theoretical model

We apply a game theoretical approach (Saloner, 1991; Parkhe, 1993; Caves, 1994) to answer the research questions raised and to analyze the effectiveness and the efficiency of the implemented sanction mechanism in alliance portfolios of mMNEs. In a first step, we have to expose the general assumptions for the supposed non-cooperative game structure[4] and introduce general premises for a cooperative solution of the game. Following that, we develop a model over three stages with increasing complexity. The basic structure of our model refers to a model introduced[5] by Ohr and Schmidt (2003). As explained before, alliance portfolios are defined from the focal actors perspective and consist of more than one cooperative agreement between the focal actor (ego) and other types of national or international organizations (alters) and encompass direct cooperative ties as well as indirect connections between the alters involved. In an alliance portfolio setting, non-cooperative behavior of a defector will always be sanctioned by the focal actor. The specific feature in an alliance portfolio setting is that not only the defector is affected in the case of non-cooperative behavior but also the other alters are affected in both cases, namely enforcement and release from sanctioning.

---

[4] For a comprehensive overview on the developments in non cooperative games see Myerson (1999).

[5] The model was originally utilized to analyze cooperative and non cooperative behavior of member states in a monetary union. Basic assumtions and parts of the model are adapted. We have enhanced the model and apply it to an alliance portfolio setting.

3.1. General assumptions and development of the baseline model

As shown by Parkhe (1993) and others (e.g. Larsson et al. 1998) strategic interactions in collaborative constellations can be characterized by a typical prisoner dilemma game structure. Assumption (1) determines the payoff structure for a dyadic "prisoner dilemma" game in which (ε) represents the exploitation gains for unilateral defection, (λ) stands for net payments in case mutual cooperation, (ρ) typifies the net payments for mutual defection of both actors and (δ) captures the detriment for unilateral cooperation.

$$(1): \quad \varepsilon > \lambda > \rho > \delta$$

Figure (2a) shows the initial situation of the baseline model and two solutions of the game. Without sanction mechanisms (Fig. 2b) we achieve a solution in the form of the well-known "Nash equilibrium" in quadrant (IV). In this case the "Pareto optimum" is instable. In order to maintain mutual cooperative behavior we have to implement a sanction mechanism with a fixed sanction value (β) and transform the initial non-cooperative game structure in a cooperative game.

$$(2): \quad \lambda > \varepsilon - \beta > \rho - \beta > \delta$$

Figure (2c) shows that if assumption (2) is fulfilled we retain the stable "Pareto optimum" solution in quadrant (I). The sanction (β) must be at least so high that the alliance partners are indifferent between cooperative and non-cooperative behavior.

FIGURE 2 ABOUT HERE

3.2. First modification of the baseline model

Firstly, we imply risk neutral behavior and assume that a reasonable alliance partner will cooperate if the expected profit in the case of cooperative behavior equals or exceeds the

expected profit in the case of non-cooperative behavior. This leads to assumption (3a) and (3b) respectively.

$$(3a): \quad E(coop.) \geq E(non-coop.) \quad \underline{\text{with:}} \quad E(coop.) = p\lambda + (1-p)\delta$$
$$E(non\text{-}coop.) = p(\varepsilon - \beta) + (1-p)(\rho - \beta)$$
$$(3b): \quad p\lambda + (1-p)\delta \geq p(\varepsilon - \beta) + (1-p)(\rho - \beta)$$

Parkhe et al. (1993, p. 532) name the exploitation gains (ε) the "temptation". Accordingly, we introduce the general addiction of alliance portfolio partners to "resist temptation" or to "give in temptation" respectively. The level of the sanction (β) is no longer a fixed value and depends besides individual characteristics of the direct collaborative partners[6] predominantly on the ability to resist the temptation. Consequently, the sanction mechanism is modeled as a function of the probability (p) (with $0 \leq p \leq 1$). The slope of the sanction curve is determined by the characteristics of the underlying type of sanction mechanism and depends on the ratio between ($\varepsilon - \lambda$) and ($\rho - \delta$). With an increasing probability (p), the potential benefits of opportunistic behavior of one single player can both rise but also fall in value. We can interpret ($\varepsilon - \lambda$) as the net profit of the focal actor in an alliance portfolio in the case of cooperative behavior of an alter. Accordingly, the difference ($\rho - \delta$) represents the net profit of the focal actor in an alliance portfolio in the case of non-cooperative behavior of an alter. We solve the inequation (3b) for (β) and obtain a linear relationship as indicated by inequation (4). In the following, we will refer to the linear critical sanction curve as (β').

$$(4): \quad \beta' \geq p(\varepsilon - \lambda) + (1-p)(\rho - \delta)$$

In this case, the return of an enforced sanction inures solely to the benefit of the focal actor. Admittedly, this linear relationship applies to some, but not all, types of alliance portfolio sanction mechanisms. In some cases we have to consider that not only the defector but also

---

6   Axelrod (1984, p.17) notes that the matrix of the prisoner dilemma not necessarily has to be symmetric.

14

other alliance portfolio members are affected in the case of non-cooperative behavior. The level of sanction depends on the probability (p), whereby all alliance portfolio members benefit from returns that arise from enforced sanctions, which means that the returns from an enforced sanction also have to be shared among all alliance portfolio members[7]. Inequation (5) illustrates the non-linear critical sanction curve. In the following, we will refer to the non-linear critical sanction curve as (β*).

$$(5):\ \beta^* \geq \frac{1}{2-p}\left[p(\varepsilon - \lambda) + (1-p)(\rho - \delta)\right]$$

Figure (3) illustrates linear and non-linear critical sanction curves in an alliance portfolio setting.

FIGURE 3 ABOUT HERE

In other words, inequation (4) and (5) represent game theoretically consolidated conditions that enable us to identify effective sanction mechanisms for two different types of sanction mechanisms in an alliance portfolio setting. What happens if sanctions are negotiable or recognized non-cooperative behavior is not sanctioned at all?

3.3. Second modification of the baseline model

The main objective of the second modification is to derive a game theoretically consolidated condition that enables us identify the most efficient sanction mechanisms of all effective types of sanction. The level of the sanction depends on (p) and also on the probability (q) with ($0 \leq q \leq 1$) that even recognized non-cooperative behavior will not be sanctioned. Inequation (6) captures the linear case and inequation (7) captures the non-linear case respectively. Hence, the linear critical sanction curve (β'') as well as the non-linear critical sanction curve (β**) are

---

[7]   This modification leads to another payoff structure in the baseline model. Appendix 1 illustrates the new payoff structure when sanctions are shared among partners in case of non-cooperative behavior.

function of the probabilities (p) and (q), the slope of both curves is determined by the ratio between $(\varepsilon - \lambda)$ and $(\rho - \delta)$.

$$(6): \beta'' \geq \frac{p}{q}(\varepsilon - \lambda) + \frac{(1-p)}{q}(\rho - \delta)$$

$$(7): \beta^{**} \geq \frac{p}{q(2-p)}(\varepsilon - \lambda) + \frac{(1-p)}{q(2-p)}(\rho - \delta)$$

Figure (4) illustrates a linear and a non-linear critical sanction curve, dependent on (p) and (q). At first, in both cases it is assumed that $q_1 = 1$, which means there is no option to negotiate sanctions in the case of defection. Therefore, the linear critical sanction curve (β_1'') and the non-linear curve (β_1^{**}) are considered to be the most effective sanction mechanism. The costs of sanctioning in the case of defection are minimal for q=1.

FIGURE 4 ABOUT HERE

In other words, we obtain two optimal reference constructs to evaluate the efficiency of sanction mechanisms with q < 1. A variation of (q) causes two effects that are, in principle, similar for the linear case (Fig. 4a) and the non-linear case (Fig. 4b). In both cases, the first effect causes a parallel shift while the second effect leads to a rotation of the sanction curve.

As mentioned above, the slope of both curves is determined by the ratio between $(\varepsilon - \lambda)$ and $(\rho - \delta)$. For the linear case we refer to this ratio as Diff(β'') and in the non-linear case as Diff(β^{**}) respectively. Figure (5) illustrates the consequences of variations in Diff(β'') and Diff(β^{**}).

FIGURE 5 ABOUT HERE

To summarize, for the linear case [non-linear case], a sanction is considered as effective if the level of sanction (β') [β^*] as defined in inequation (4) [5] equals or exceeds the expected profit in the case of non-cooperative behavior of an alliance portfolio member and, thus, transforms the initial "prisoner dilemma" in a cooperative game structure (cf. Fig.1).

16

Additionally, the closer a de facto critical sanction curve (with: $q<1$) is to the optimal reference construct (with: $q=1$) the more efficient the examined sanction mechanism is. The slope of the linear and non-linear critical sanction curve is not necessarily positive (cf. Fig.5a/5b).

4.   Game theoretical analysis of sanction mechanisms

In order to specify which of the sanctions – formal contracts, mutual hostages as bilateral idiosyncratic tangible and intangible investments, quasi integration, joint decision making and loss of reputation is effective and efficient, we have to test each sanction against our stated rules in the first and the second stage of model.

In the effectiveness analysis, we firstly differentiate sanctions with regard to applicability for R&D alliances and franchising alliance. Then, we emphasize the consequences in the case of defection for directly affected as well as indirectly affected portfolio partners in order to relate the previously discussed sanction mechanisms to the model and substantiate the supposed curve progression for every type of sanction. The objective of the first model stage is to test which type of sanction mechanism fulfills the game theoretically consolidated effectiveness condition. In the efficiency analysis, we examine to what extent effective sanctions fulfill the efficiency conditions outlined in the second stage of the model. In doing so, we test every effective sanction against the optimal reference constructs with $q=1$ for both, the linear and the non-linear case.

4.1.   Analyzing the effectiveness of sanction mechanisms

A formal contract used as a safeguard represents the compensation a legal court of justice may order in favor of the claimant in a proven case of breach of contract, resulting from an opportunistic act formerly ruled out, explicitly verbalized and mutually agreed on in this very contract (Parkhe et al., 1993, Rosenthal/Chandran 1993). A contractual penalty clause is a

common mode of sanctioning. The compensation, thus, represents a monetary value of (β) that diminishes the potential exploitation gains (ε) the defector, here the non-cooperative alter, could expect in a case of opportunistic behavior. The penalty the court would adjudicate, therefore, falls solely in the hands of the focal actor and other members of the portfolio are not directly affected. Thus, formal contracts can be modeled as a linear sanction curve. In order to decide whether the slope of the linear sanction curve is positive or negative, we have to look at the alter's incentives to defect in the case of extremely low and extremely high p-values. However, opportunistic breaches of contract still occur under circumstances of opportunism in alliances (Wathne/Heide, 2000, p. 38). Formulating sanctioning rules in a contract can, therefore, be seen as stating a level of distrust between the parties. Furthermore, foreseeing all possible forms of opportunism is not possible with the result that constant adjustments to the contracts have to be made to adapt to changes in the environment (Dyer/Singh, 1998). The incentive of a contract partner to defect rises with an increasing probability to resist temptation of alliance portfolio partners because potential exploitation gains rise as well. In other words, avoiding the risk to be cheated on, therefore, has to lead to ever higher sanctioning levels of (β') with higher levels of the likelihood to resist temptation (p). The level of uncertainty reduced by such a contract are, thus, limited (Thomas/Trevino, 1993), which forces the linear sanctioning curve into a positive upwards slope with increasing values of p (with $0 \leq p \leq 1$).

Mutually-agreed, bilateral tangible and intangible idiosyncratic investments represent credible commitments that serve as a hostage to safeguard an interorganizational relationship and cannot be easily redeployed and, therefore, are of marginal market value (Anderson/Weitz, 1992; Williamson 1983; Kronman, 1985). The net loss, in terms of individual sunk costs, has to even out the incentives for non cooperative behavior. Since the discretionary elements are

assumed to be significantly lower compared to contractual sanctions, in both cases β values are comparatively lower, but above zero, for small p values. For tangible and intangible idiosyncratic investments it is appropriate to assume a negative slope for the sanction curve. This is because the higher the bilateral investment is, the higher commitment of both partners. In other words, the incentive of the direct partner to defect decreases with an increasing p values because potential exploitation gains diminish, which is in line with research suggesting that higher levels of specific investments may foster relationships (Gundlach et al., 1995; Zaheer/Mosakowski, 1997).

It is necessary to distinguish between tangible and intangible investments with regard to how they affect other members of the portfolio in the case of defection. Tangible bilateral investments that serve as hostages may, for example, be a manufacturing facility, a specific tool, or a machine (Jap/Anderson, 2003, p. 1687). The specificity of these investments serving the relationship between focal actor and alter and their tangibility has the effect that seizing them as a manner of sanctioning the opportunistic behavior only affects the dyad as redeploying those investments to other members of the portfolio is of no further use. We argue in the following that loss of bilateral tangible idiosyncratic investments has purely direct dyadic level effects. Similar to a contract, sanctioning by generating sunk costs in bilateral tangible investment constellations follows a linear case. The slope of the linear sanctioning curve, however, in this case faces downwards for increasing values of $0 \leq p \leq 1$, the ratio between $(\varepsilon - \lambda)$ and $(\rho - \delta)$ being smaller than 1. This results, as shown in figure (5a), in $(\rho - \delta)$ forming the limiting value for (β') for p=1 and $(\varepsilon - \lambda)$ the limiting value for p=0 delivering a Pareto-optimal outcome of the game and, thus, an effective sanctioning mechanism.

In the case of bilateral intangible idiosyncratic investments we have to differentiate between a knowledge-accessing and knowledge-acquiring setting (Grant/Baden-Fuller, 2004). Again,

only two partners are affected in the case of defection because stopping the mutual knowledge-transfer processes is of utmost importance for the direct partner but inconsiderable for the other portfolio members. This leads to a similar model specification as described for tangible bilateral investments with a linear sanctioning curve that faces downwards.

In contrast, bilateral intangible investments may appear in terms of tacit knowledge or a specific knowledge intensive technology (Jap/Anderson, 2003, p. 1687). Tacit knowledge cannot be transferred across organizational boundaries without difficulties. The complexity of tacit knowledge stocks means that interorganizational learning processes between strategic partner organizations are required. We argue that interorganizational learning processes between two partner organizations are expected to generate positive external effects. Thus, not only direct partners but also indirectly connected partners are affected in case of sanctioning. This, however, results in a non-linear critical sanction curve in the first modification model as specific investments of an intangible nature represent a value to other members of the alliance portfolio as well. As knowledge is difficult to protect, especially in R&D, across company boundaries (Liebeskind, 1996), it can reasonably be argued that sanctioning idiosyncratic intangible investments represents sufficient values of (β*) to effectively countermand the value gained by defection. The slope of the non-linear sanctioning curve faces downwards.

Quasi integration employed by smaller companies due to their vulnerability in relationships with asymmetric bargaining power as a governance mechanism (Blois, 1972; Subramani/Venkataraman, 2003; Dewald et al., 2007) may result in building trust between partners and, thus, safeguard behavioral uncertainties (Subramani/Venkataraman, 2003; Dyer, 1997; Dyer/Chu, 2003). By this an idiosyncratic specific investment is devoted unidirectionally in the hands of the more potent partner to signalize commitment. Quasi integration is associated with increasing opportunistic expectations and provides benefits for

20

vulnerable and dominant firms alike (Dewald et al., 2007). Used as a sanctioning mechanism, the line of argumentation can, as denoted earlier, be twofold. If the focal actor ex-post has received an investment, and therefore is the more potent side in the relationship with the alter wanting to quasi-integrate, it can be seized. This does not represent any other manner of sanctioning than was recorded in the case of bilateral idiosyncratic investments and further analysis is not necessary. Quasi integration, especially of interest as an ex-ante mechanism of governance, to sanction the opportunistic behavior also depicts the discontinuation of further single-sided specific investments by the vulnerable firm, in this case the focal actor. As an mMNE is an SME, quasi integration may be installed as a safeguard against opportunism where bargaining power is asymmetrically shifted towards the alter. However, in the definition of the safeguarding mechanism those further investments were never agreed on. In terms of the prisoner dilemma, this implies that there is no value for (β) the defector has to face. Therefore, an ex-ante mechanism of quasi integration cannot successfully rule out the crossover of an alter from cooperative towards non-cooperative action and is not an effective sanctioning mechanism.

Joint decision making installed as a safeguard to protect own interests in an interorganizational relationship can be defined "as the degree to which a supplier firm and its dominant buyer jointly make decisions about key issues in the relationship" (Subramani/Venkataraman, 2003, p. 48) and on the dyadic level constitutes a central element of cooperative strategy (Dyer/Singh, 1998). The mMNE, as a network seeker, benefits from foreign explicit market knowledge the alter may supply to the relationship and, in turn, relies on this very knowledge to establish his decisions (Dimitratos et al., 2003). It is, thus, very likely that key decisions in foreign markets which the mMNE has no other access to are made conjointly. As a sanctioning mechanism to govern franchising links, where unilateral

specifications commonly exist (Rubin, 1978; Rubin, 1990), restraining opportunistic behavior by the threat to hierarchically command the loss of this decision making can, therefore, constitute the sanctioning value of (β). As an alliance portfolio is managed by alignment of strategies (Hoffmann, 2005), key elements of the dyadic relationship will closely relate to other dyadic relationships in the portfolio. Therefore, decisions about key elements interrelate and affect other members of the portfolio as each of them gains a greater share in the decision process when a single actor drops out. The slope of this curve is negative because joint decision making is positively related to flexibility, which incorporates the belief that neither party will take opportunistic advantage when the other is vulnerable (Subramani/Venkataraman, 2003; Heide, 1994). Hence, the loss of joint decision making follows the non-linear critical sanction curve as an effective sanctioning mechanism of franchising alliances.

Finally, under aspects of effectiveness of this model, the threat to destroy a partner's reputation has to be dissected. Gulati (1998) argues that this threat works as a natural deterrent against opportunism in networks and the success of an alliance is more likely. Following this argumentation, (β) then represents an effective value to deter an alter seduced by exploitation gains from defection. However, we also have to take into account that an mMNE is an entrepreneurial new venture. Such new ventures may acquire external legitimacy by forming alliances with established partners and through this can be more successful in reaching their strategic goals (Rao, Chandy and Prabhu 2008). As the own company's status, here the reputational status of the defecting alter, is a function of the partner's status and only transferred if noticed by a third party outside a dyadic relationship (Podolny 1994; Podolny and Phillips 1996) we have to assume that the direction of this transfer is directed towards the entrepreneurial company. This reputational status is also dependent on historical performance

22

(Fombrun and Shanley 1990), a history an mMNE must lack as it represents a new venture and cannot build upon historic records. We argue, that under the conditions named an mMNE cannot reach a value of (β) high enough to diminish the exploitation gains the defector may expect. The function of the partner's status is not sufficiently affected. This results in hands-tying on the basis of the alter's reputation will not work as an effective sanctioning mechanism. The non-linear case with a positive slope is yet not represented by any of the sanctioning mechanisms. This obvious limitation can be healed, if we assume that an agreement between focal actor and members of the portfolio exists, by which a penalty ruled out by court order in the case of defection of any alter is distributed amongst the others. This assumption does not affect the effectiveness of such a contract, as the penalty representing (β) which diminishes the exploitation gains is not affected by such a clause.

FIGURE 6 ABOUT HERE

To summarize, sanctioning contracts, bilateral specific investments of tangible and intangible nature, as in knowledge transfer, as well as ex-post quasi integration are effective mechanisms. Sanctioning intangible specific investments, as in interorganizational learning processes, is of special interest for R&D links and joint decision making for franchising. Quasi integration and loss of reputation as sanctioning mechanisms, however, do not endure the effectiveness analysis and are eliminated as ineffective modes of governance in an alliance portfolio with an mMNE as focal actor.

4.2. Analyzing the efficiency of sanction mechanisms

In this section, we analyze the efficiency of sanction mechanisms in two stages. The first stage of the analysis is concerned with a comparison of theoretically possible combinations of

sanction mechanisms with regard to efficiency implications. By simulating various model constellations and comparing these models, we show under which conditions sanction mechanisms perform better than others. In the second stage, we show that the superiority of sanction mechanisms can change, even though q-values are do not change. This leads to the conclusion that a combination of mechanisms, rather than one single sanction, leads to the most efficient results for the whole bandwidth of p-values.

In this analysis, we declare a sanction mechanism as efficient if for changing values of q (with $0 \leq q \leq 1$), representing the probability that even recognized non-cooperative behavior will not be sanctioned, it has the smallest distance to the reference construct (with q=1) when compared with the other sanction mechanisms (with q<1). As outlined before, the sanction curves shift (Fig 4, first effect) and rotate (Fig 4, second effect) when q is reduced to smaller q-values. In other words, sanction mechanisms that generate the least possible costs in case of sanctioning for directly involved partners (linear case) or all alliance-portfolio members (nonlinear case) are considered to be efficient. Optimal sanctions with a q-value equal to 1 will never be observed in reality because discretionary elements are inherent to every type of sanction mechanism. The question is under which constellation sanction mechanisms outperform others in terms of efficiency. To answer this question we have simulated and compared various model constellations by systematically changing p-values and q-values for the linear case and the nonlinear case. Only effective sanction mechanisms were considered. Not surprisingly simulation results show that sanction mechanisms with significantly lower q-values perform better in terms of efficiency. This is true for the comparison of positive linear and positive nonlinear sanction mechanisms as well as negative linear and non-linear sanctions (cf. app 2). In summary, sanction mechanisms that are more susceptible to occupy discretionary elements lead to suboptimal sanctioning results. Simulation results demonstrate

24

clearly that linear as well as nonlinear mechanisms that do not allow debilitation of the enforcement of sanctions in the case of opportunistic behavior perform in general better.

Even more interesting at this point is the comparison of different types of sanction mechanisms with same q-values. This leads to the second stage of the analysis. Simulation results show that the superiority of sanction mechanisms can change with the same q-values but different p-values (cf. appendix 3). This adds up to some interesting efficiency considerations with regard to sanction mechanisms in an alliance portfolio composed of R&D alliances and franchising alliances. As argued before, a large number of effective sanction mechanisms (cf. figure 6) are available for both R&D alliances and franchising alliances. Contracts follow a curve progression in either the linear or the non-linear case with a positive slope. Bilateral tangible and intangible (explicit knowledge) idiosyncratic investments as well as the ex-post sanctioning of quasi-integration do follow the linear curve with a negative slope. Finally, a distinction can be made with regard to the applicability of sanctioning mechanisms in R&D alliances or franchising alliances (cf. figure 6). Loss of idiosyncratic intangible investments (implicit knowledge) as well as loss of decision making power can be modeled as non-linear sanction mechanisms with a negative slope.

FIGURE 7 ABOUT HERE

Hence, sanction mechanisms which are represented by a sanction curve with a positive slope lead to efficient results for small p-values whereas sanction curves with a negative slope are superior results for high p-values. Figure 7 substantiates this point by illustrating an exemplary combination or sanction for R&D alliances and franchising alliances, respectively. As shown in Appendix 3 we can name combined sanction curves that perform less efficiently for very high p-values (e.g. Appendix 3, case G) or even better for very low p-values (e.g. Appendix 3, case F). However, the most substantial implication at this point is that a

combination of positively and negatively sloping sancation curves leads to significant impprovments in terms of efficiency. To summarize, not one single sanction mechanism but rather the right choice and combination of different types of sanction mechanisms, leads to the most efficient results along the whole bandwidth of p-values.

5. Results and discussion

This study raised two research questions which we answered from the perspective of an international entrepreneurial firm. The game theoretical model can help us to understand what the conditions for effective and efficient alliance portfolio sanctioning mechanisms are. On behalf of effectiveness a sanctioning mechanism requires a penalty that forces a prisoner dilemma's outcome in the Pareto-optimal solution. The sanction then diminishes the exploitation gains a defector could expect if the rules set between the partners in an alliance are violated. This was tested incorporating the probability to resist or give in temptation. If a sanctioning mechanism cannot comply with this requirement the game will end in the not desirable Nash-equilibrium and the governance structure is not adequate for the management of an alliance portfolio. However predictable the answer to this part of the first research question appears at first sight from a game theoretical standpoint, the results of the effectiveness analysis are remarkeable. The corresponding part of the second research question delivers the result that two of the sanctioning mechanisms show their ineffectiveness when tested on a game theoretical basis. Tying an alter's hands as in destroying the reputation the firm features on the market as a trustworthy partner is a sanctioning mechanism not applicable for a micromultinational enterprise as it poses an empty threat because the sanction will not reach a sufficient level. This theoretical study stays in line with empiric research already undertaken (Rao, Chandy and Prabhu 2008; Podolny 1994; Podolny and Phillips 1996; Fombrun and Shanley 1990) and poses therefore an advance in international

entrepreneurship research. It shows that governance issues have to be tested for their reliability whenever a new venture tries to safeguard own affairs. The study also names sanctioning on the basis of ex-ante quasi-integration as a second mechanism testing ineffectively under game theoretical considerations. However positive the results as a safeguard building trust between partners may be (Dewald et al. 2007), the noncommittal nature of the mechanism is not convenient to manage an alliance portfolio from this ex-ante perspective. The use of this safeguard should not be rejected, though. It is interesting to note, that from an ex-post perspective the commitments delivered turn into hostages which can effectively be sanctioned upon. Alike other hostages, as tested in the specification of mutually agreed tangible and intangible relation specific investments, they, as well as contractual sanctioning and constraining joint decision making, fittingly diminish the exploitation gains and are effective mechanisms to govern an alliance portfolio. The efficiency condition of a sanctioning mechanism is fulfilled in this study, if the mechanism generates the least possible costs when applied. Important for this condition and the simulations the analysis is based upon is the introduction of the probability that even recognized non-cooperative behavior will not be sanctioned. The theoretical study already shows, that the lower this probability is kept, that is the more strictly the sanctioning of defection is enforced, the more efficient is the sanctioning mechanism. This is interesting, as efficiency does not depend on the amount, for example monetary losses, the defector has to face as a remedy. As long as the penalty is sufficiently high enough to be regarded as effective it can also be efficient if the parties are convinced of its enforcement. The mMNE managing the alliance portfolio should, therefore, not concentrate on the design and assertion during alliance-building negotiations of ever higher defection based penalties. To assure an efficient management of the alliance portfolio valuable resources should be concentrated towards the design and enforcement of real threats.

Every single of the sanctioning mechanisms tested effectively may demonstrate such a threat if the named probability is variegated. Albeit values for this probability cannot be confirmed, it is more realistic to consider the enforcement of a sanction to differ amongst the various mechanisms. However, if the probability that even recognized non-cooperative behavior will not be sanctioned is kept the same amongst the sanctioning mechanisms, efficiency depends on the level of the probability to resist temptation. The study shows, that contracts can be an efficient sanctioning mechanism whenever it is very likely, that the partners in an alliance portfolio do not cooperate. Therefore, this study can show from game theoretical foundations that contracts do not necessarily are inadequate to govern aspects in an alliance portfolio. Under the circumstances described it differs from other declarations of contracts as governance structures and mechanisms (Dwyer et al., 1987; Sharma, 1998), although the results are only of a theoretical nature. If the probability for cooperative behavior rises the mechanisms that test efficiently change. In a curve simulation the sanctioning mechanisms of mutually agreed tangible and intangible relation specific investments and ex-post sanctioning of quasi integration as well as constraining joint decision making show a downward slope. This confirms these mechanisms under the conditions set as efficient whenever the probability for cooperative behavior is high. Moreover, we also observe a differentiation between R&D alliances and franchising alliances. There is a tendency that specialized sanctioning mechanisms that affect other members of the portfolio are superior to those only affecting the dyad between focal actor and defective alter. For R&D based alliance portfolios the interruption of interorganizational learning processes in the occurrence of sanctioning on bilateral intangible investments of tacit knowledge is applicable as a sanctioning mechanism. On the contrary, unilaterally constraining the right to joint decision making in franchising alliances may be installed to manage and penalize defection of a portfolio partner efficiently.

28

These results are in line with the literature on dyadic strategic alliances that alliance partners rely on other governance mechanisms than legal enforcement (Ring/Van de Ven, 1992, 1994).

6.   Limitations and further research

The primary limitation of this study is the sole theoretical and literature foundation of the presumptions leading to the results. An empiric study, especially to acquire realistic values for the probabilities used is inevitable. An empirically substantiated quantification of p-values and q-values is needed to deepen the finding of our analysis. This research is currently undergoing. It would be also interesting, to test further modes of sanctioning on their effectiveness and efficiency. This would be especially of interest in some different alliance portfolio linkages along the value chain. A more concise picture of alliance portfolio management could be drawn from such research. The research should as well not stop on game theoretical considerations. It would be interesting to understand, whether and how sanctioning mechanisms when applied may affect each other, a question this study cannot answer. Overall, this study shows a mere first step in closing the research gap.

Literature:

Ahuja, G. (2000) Collaboration Networks, Structural Holes, and Innovation: A Longitudinal Study. *Administrative Science Quarterly* 45: 425-455.

Alchian, A.A. and Demsetz, H. (1972) Production, Information Costs, and Economic Organization. *American Economic Review* 62(5): 777–795.

Anderson, E. and Weitz, B. (1992) The Use of Pledges to build and Sustain Commitment in distribution channels. *Journal of Marketing Research* (JMR) 29(1): 18–34.

Andersson, S. and Wictor, I. (2003): Innovative internationalization in new firms: born globals – the Swedish case. Journal of International Entrepreneurship, 1(3): 249-276.

Arend, R.J. and Seale, D.A. (2005) Modeling Alliance Activity: An Iterated Prisoners' Dilemma With Exit Option. *Strategic Management Journal* 26: 1057-1074.

Axelrod, R. (1984): The evolution of cooperation. New York.

Axelsson, B. and Easton, G. (eds.) (1992) *Industrial Networks: A New View of Reality.* London: Routledge.

Bilkey, W.J. and Tesar, G. (1977): The Export Behavior of Smaller Sized Wisconsin Manufacturing firms. Journal of International Business Studies, 8(1): 93-98.

Bleeke, J. and Ernst, D. (1991) The Way to Win in Cross-Border Alliances. *Harvard Business Review* 69(6): 127-135.

Blois, K.J. (1972) Vertical quasi-integration. *Journal of Industrial Economics*. 20(3): 253-272.

Brass, D.J., Galaskiewicz, J., Greve, H.R. and Tsai, W. (2004) Taking Stock of Networks and Organizations: A Multilevel Perspective. *Academy of Management Journal* 47(6): 795-817.

Brüderl, J. and Schüssler, R. (1990) Organizational Mortality: The Liabilities of Newness and Adolescence. *Administrative Science Quarterly* 35(3): 530-547.

Burt, R.S. (1995; 1992) *Structural holes. The social structure of competition. 1st ed. 1992, 2nd print.* Cambridge MA: Harvard University Press.

Borgatti, S.P. and Foster, P.C. (2003) The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management* 29(6): 991-1013.

Carrington, P.J., Scott, J. and Wasserman, S. (2004) *Models and Methods in Social Networks Analysis.* Cambridge: Cambridge University Press.

Caves, R.E. (1994) Game Theory, Industrial Organization and Business Strategy. *Journal of Economics and Business* 1(1): 11-14.

Chetty, S. and Holm, D. B. (2000): Internationalisation of small to medium- sized nternational firms: a network approach, in: International Business Review, 9: 77-93.

Coviello, N. E. (2006): The network dynamics of international new ventures, in: Journal   of International Business Studies, 37: 713-731.

Das, T.K. and Teng, B.-S. (2002) The Dynamics of Alliance Conditions in the Alliance Development Process. *Journal of Management Studies* 39: 725-746.

Degenne, A. and Forse, M. (1999) *Introducing Social Networks, Sage-Publications*. London.

Dewald, J. R., Hall, J., Chrisman, J. J. and Kellermanns, F. W. (2007) The Governance Paradox: Preferences of Small Vulnerable Firms in the Homebuilding Industry. Entrepreneurship. *Theory & Practice* 31(2): 279–297.

Dimitratos, P., Johnson, J., Slow, J. and Young, S.(2003) Micromultinationals: New Types of Firms for the Global Competitive Landscape. *European Management Journal* 21(2): 164-174.

Dwyer, F. R., Schurr, P. H. and Oh, S. (1987) Developing Buyer-Seller Relationships. *Journal of Marketing* 51(2): 11–27.

Dyer, J. H. (1996) Does Governance Matter? Keiretsu Alliances and Asset Specificity as Sources of Japanese Competitive Advantage. *Organization Science* 7(6) 649–666.

Dyer, J. H. and Singh, H. (1998) The relational view. Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review*. 23(4): 660–679.

Freeman, J., Carroll, G.R. and Hannan, M.T. (1983) The Liability of Newness: Age Dependence: Organizational Death Rates. *American Sociological Review* 48(5): 692-710.

Fombrun, C. and Shanley, M (1990): What's in a name? Reputation building and corporate strategy, in: Academy of Management Journal, 33 (2): 233-258.

Forsgren, M. (1989) Foreign acquisitions: Internationalization or network dependency. In: T.S. Cavusgil, L. Hallen and J. Johanson (eds.) *Advances in International Marketing – A Research Annual*. Greenwich: JAI Press, 3, pp. 121-139.

Gassmann, O. and Keupp, M. M. (2007): The competitive advantage of early and rapidly nternationalizing SMEs in the biotechnology industry: A knowledge-based view. Journal of World Business, 42: 350-366.

Grabher, G. and Powell, W.W. (2004) Introduction. In: G. Grabher and W.W. Powell (eds.) *Networks, vol. 1: xi-xxxi*. Cheltenham: UK. Elgar.

Grant, R.M. and Baden-Fuller, C. (2004) A Knowledge Accessing Theory of Strategic Alliances, *Journal of Management Studies*, 41(1): 61–84.

Granovetter, M. (1988) Economic Action and Social Structure: The Problem of Embeddedness. *American Journal of Sociology* 91: 481-510.

Gulati, R. (1998) Alliances and networks. *Strategic Management Journal* 19(4): 293-317.

Gulati, R., Nohria, N. and Zaheer, A. (2000) Strategic Networks. *Strategic Management Journal* 21: 203-215.

Gulati, R. (2007) *Managing Network Resources- Alliances, Affiliations, And Other Relational Assets*. Oxford: Oxford.

Gundlach, G.T., Achrol, R.S. and Mentzer, J.T. (1995) The structure of commitment in exchange. *Journal of Marketing* 59(1): 78-92.

Hagedoorn, J. (1993) Understanding the Rational of Strategic Technology Partnering-Organizational Modes of Cooperation and Sectoral Differences. *Strategic Management Journal* 14(5): 371-385.

Hagedoorn, J. (2002) Inter-Firm R&R partnership: An overview of major trends and patterns since 1960. *Research Policy* 31: 477-492.

Hamel, G. (1991) Competition for Competence and Inter-Partner Learning Within International Strategic Alliances. *Strategic Management Journal* 12: 83-103.

Heckscher, E.F. (1949) The Effects of Foreign Trade on the Distribution of Income. In H.S. Ellis, H.S. and L.A. Metzler (eds.) *Readings in the Theory of International Trade.* Philadelphia: Blakiston, pp. 272ff.

Heide, J.B. (1994) Interorganizational governance in marketing channels. *Journal of Marketing* 58(1): 71–85.

Hite, J.M. and Hesterly, W.S. (2001) Research Notes and Commentaries – The Evolution of Firm Networks: From Emergence to Early Growth of the Firm. *Strategic Management Journal* 22: 275-286.

Hoffmann, W. H. (2005) How to Manage a Portfolio of Alliances, *Long Range Planning* 38(2): 121–143.

Ibeh, K., Johnson, J.E., Dimitratos, P. and Slow, J. (2004) Micromultinationals: Some Preliminary Evidence on an Emergent 'Star' of the International Entrepreneurship Field. *Journal of International Entrepreneurship* 2: 289-303.

Jap, S.D. and Anderson, E. (2003) Safeguarding Interorganizational Performance and Continuity under Ex Post Opportunism. *Management Science* 49(12): 1684–1701.

Jarillo, J.C. (1988) On Strategic Networks. *Strategic Management Journal* 9: 31-41.

Johanson, J. and Mattsson, L.–G. (1988) Internationalization in industrial systems – A network approach. In N. Hood, J.-E Vahlne and Croom Helm (eds.) *Strategies in Global Competition.* London: Routledge, pp. 287-314.

Johanson, J. and Vahlen, J.-E. (1977) The internationalization process of the firm: A model of knowledge development and increasing foreign market commitment. *Journal of International Business Studies* 4: 20-29.

Johanson, J. and Vahlne, J.-E. (1990) The mechanism of internationalization. *International Marketing Review* 7: 11-24.

Johanson, J. and Vahlne, J.-E. (2001) The Mechanism of Internationalisation. *International Marketing Review* 7(4): 11-24.

Johanson, J. and Vahlne, J.-E. (2003) Business relationship learning and commitment in the Internationalization process. *Journal of International Entrepreneurship* 1: 83-101.

Joskow, P.L. (1988) Asset Specificity and the Structure of Vertical Relationships: Empirical Evidence. *Journal of Law, Economics & Organization* 4(1): 95-117.

Kale, P., Singh, H. and Perlmutter, H. (2000) Learning and Protection of Proprietary Assets in Strategic Alliances: Building Relational Capital. *Strategic Management Journal* 21: 217-237.

Khanna, T., Gulati, R. and Nohria, N. (1998) The Dynamics of Learning Alliances: Competition, Cooperation, and Relative Scope. *Strategic Management Journal* 19: 193-210.

Klein, B., Crawford, R.G. and Alchian, A.A. (1978) Vertical integration, appropriable rents, and the competitive contracting process. *Journal of Law & Economics* 21(2): 297–326.

Kronman, A.T. (1985) Contract Law and the State of Nature. Journal of Law. *Economics & Organization* 1(1): 5-32.

Larson, A. (1992) Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Administrative Science Quarterly* 37: 76-104.

Larson, A. and Starr, J.A. (1993) A network model of organization formation. *Entrepreneurship Theory & Practice* 1993: 5-15.

Larsson, R., Bengtsson, L., Henriksson, K. and Sparks, J. (1998): The Interorganizational Learning Dilemma: Collective Knowledge Development in Strategic Alliances. Organization Science, 9(3): 285-305.

Lavie, D. (2007) Alliance Portfolios and Firm Performance: A Study of Value Creation and Appropriation in the U.S. Software Industry. *Strategic Management Journal* 28: 1187–1212

Liebeskind, J.P. (1996) Knowledge, strategy, and the theory of the firm. *Strategic Management Journal* 17: 93–107.

Macneil, I.R. (1980) *The new social contract. An inquiry into modern contractual relations*, New Haven: Yale University Press.

Macneil, I.R. (1981) Economic Analysis of Contractual Relations: It's Shortfalls and the Need for a 'Rich Classificatory Apparatus'. *Northwestern University Law Review* 75(6): 1018–1063.

Markowitz, H. (1952) Portfolio selection. *Journal of Finance* 7(1): 77–91.

McDougall, P.P., Covin, J.G., Robinson, R.B., J.R. and Herron, L. (1994) The effects of industry growth and strategic breadth on new venture performance and strategy content. *Strategic Management Journal* 15(7): 537–554.

McDougall, P.P., Shane, S. and Oviatt, B.M. (1994) Explaining the formation of international new ventures: The limits of theories from international business research. *Journal of Business Venturing* 9: 469-487.

McDougall, P.P. and Oviatt, B.M. (2000) International entrepreneurship: The intersection of two research paths. *Academy of Management Journal* 43: 902-908.

Mowery, D. C., Oxley, J. E. and Silverman, B. S. (1996) Strategic Alliances and Interfirm Knowledge Transfer. *Strategic Management Journal* 17(2): 77-92.

Myerson, R. B. (1999): Nash Equilibrium and the History of Economic Theory, in: Journal of Economic Literature, 37: 1067-1082.

Ohr, R. and Schmidt, A. (2003) Der Stabilitäts- und Wachstumspakt im Zielkonflikt zwischen fiskalischer Flexibilität und Glaubwürdigkeit: Ein Reformansatz unter Berücksichtigung konstitutionen- und institutionenökonomischer Aspekten, CeGE-Discussion Paper no. 19.

Oviatt, B. M. and McDougall, P. P. (1994) Toward a Theory of International New Ventures. *Journal of International Business Studies* 1: 45-64.

Oviatt, B. M. and McDougall, P. P. (2005) Defining International Entrepreneurship and Modeling the Speed of Internationalization. *Entrepreneurship. Theory & Practice* 29(5): 537–553.

Oxley, J.E. and Sampson, R.C. (2004) The Scope and Governance of International R&D Alliances. *Strategic Management Journal* 25: 723-749.

Park, S. H. (1996) Managing an Interorganizational Network: A Framework of the Institutional Mechanism for Network Control. *Organization Studies* 17(5): 795-824.

Parkhe, A (1993) Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation. *Academy of Management Journal* 36(4): 794-829.

Parkhe, A., Rosenthal, E. C. and Chandran, R. (1993) Prisoner's dilemma payoff structure in interfirm strategic alliances: An empirical test. *Omega* 21(5): 531–539.

Perlmutter, H. V. and Heenan, D. A. (1986) Cooperate to compete globally. *Harvard Business Review*: 136-152.

Pfeffer, J. and Salancik, G. R (1978) *The external control of organizations. A resource dependence perspective*. New York, NY: Harper and Row.

Phelan, S.E., Arend, R.J. and Seale, D.A. (2005) Using an Iterated Prisoner's Dilemma with Exit Option to Study Alliance Behavior: Results for a Tournament and Simulation. Computational & Mathematical Organization Theory 11: 339-356.

Podolny J.M. (1994): Market uncertainty and the social character of economic exchange, in: Administrative Science Quarterly, (39): 458–483.

Podolny, J.M. and Phillips, D. (1996): The Dynamics of Organizational Status, in: Industrial & Corporate Change; 5 (2): 453-471.

Podolny, J.M. and Page, K.L. (1998) Network Forms of Organization. *Annual Review of Sociology* 24: 57-76.

Powell, W.W., Koput, K. and Smith-Doerr, L. (1996) Interorganizational Collaboration and the Locus of Innovation- Networks of Learning in Biotechnology. *Administrative Science Quarterly*. 41(1): 116-145.

Provan, K.G., Fish, A. and Sydow, J. (2007) Interorganizational Networks at the Network Level: A Review of the Empirical Literature on Whole Networks. *Journal of Management* 33(3): 479-516.

Provan, K.G. and Kenis, P. (2007) Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration and Theory* 18: 229-252.

Ranger-Moore, J. (1997) Bigger May Be Better But Is Older Wiser? Organizational Age and Size in the New York Life Insurance Industry. *American Sociological Review* 62(6): 903-920.

Rao, R. S., Chandy, R. K. and Prabhu, J. C. (2008) The Fruits of Legitimacy: Why Some New Ventures Gain More from Innovation Than Others. *Journal of Marketing*. 72(4): 58–75.

Ring, P.S. and van de Ven, A.H. (1992) Structuring cooperative relationships between organizations. *Strategic Management Journal* 13(7): 483–498.

Ring, P.S. and Van De Ven, A.H. (1994) Developmental Processes of Cooperative Interorganizational Relationships. *Academy of Management Review* 19(1): 90-118.

Rothaermel, F.T. (2001) Research Note – Incumbent's Advantage Through Exploiting Complementary Assets Via Interfirm Cooperation. *Strategic Management Journal* 22: 687-699.

Robinson, D.T. and Stuart, T.E. (2007) Network Effects in the Governance of Strategic Alliances. *Journal of Law, Economics & Organization* 23(1): 242–273.

Rubin, P.H. (1978) The Theory of the firm and the structure of the franchise contract. *Journal of Law & Economics* 21(1): 223–233.

Rubin, P.H. (1990) *Managing business transactions. Controlling the cost of coordinating, communicating, and decision making*. New York, Toronto, New York: Free Press, Collier Macmillan Canada, Maxwell Macmillan International.

Saloner, G. (1991) Modelling, Game Theory and Strategic Management. *Strategic Management Journal*, 12(2): 119-136.

Samuelson, P. (1971) Ohlin Was Right. *Swedish Journal of Economics* 73: 365-384.

Selten, R. (1978): The chain store paradox. Theory and Decision, 9 (2): 127-159.

Sharma, D.D. (1998) Alliance capitalism. *Journal of Business & Industrial Marketing*: 13(6): 511–528.

Sharma, D.D. and Blomstermo, A. (2003): The internationalization process of born globals: a network view. International Business Review, 12(6): 739–753.

Sivadas, E. and Dwyer, F.R. (2000) An Examination of Organizational Factors Influencing New Product Success in Internal and Alliance-Based Processes. *Journal of Marketing* 64(1): 31–49.

Stuart, T.E., Hoang, H. and Hybles, R.C. (1999) Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*. 44(2): 315-349.

Stuart, T.E. (1998) Network Positions and Propensities to Collaborate: An Investigation of Strategic Alliance Formation in High Technology Industry. *Administrative Science Quarterly* 43: 668-698.

Stuart, T.E. (2000) Interorganizational Alliances and the Performance of Firms: A Study of Growth and Innovational Rates in a High-Technology Industry. *Strategic Management Journal* 21(8): 791-811.

Subramani, M.R. and Venkatraman, N. (2003) Safeguarding investments in asymmetric interorganizational relationships, theory and evidence. *Academy of Management Journal* 46(1): 46–62.

Taylor P. D. and Jonker L. (1978): Evolutionary stable strategies and game dynamics, Mathematical Biosciences 40: 145–156.

Thomas, J.B. and Trevino, L.K. (1993) Information processes in strategic alliance building: a multiple-case approach. *Journal of Management Studies* 30(5): 779–814.

Thorelli, H.B. (1986) Networks: Between Markets and Hierarchies. *Strategic Management Journal* 7: 37-51.

Ulrich, D. and Barney, J. B. (1984) Perspectives in Organizations: Resource Dependence, Efficiency and Population. *Academy of Management Review* 9(3): 471–481.

Uzzi, B. (1996) The Sources and Consequences of Embeddedness for The Economic Performance of Organizations: The Network Effect. *American Sociological Review* 61(4): 674-698.

Uzzi, B. (1997) Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*: 42(1): 35-67.

Wasserman, S. and Faust, K. (1994) *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.

Wathne, K.H. and Heide, J.B. (2000) Opportunism in Interfirm Relationships: Forms, Outcomes, and Solutions, *Journal of Marketing* 64(4): 36–51.

Weibull, J. (1995): Evolutionary Game Theory. MIT-Press.

Williamson, O.E. (1975) *Markets and hierarchies, analysis and antitrust implications. A study in the economics of internal organization*. New York: Free Press.

Williamson, O.E. (1983) Credible Commitments: Using Hostages to Support Exchange. *American Economic Review* 73(4): 519-540.

Williamson, O. E. (1985) *The economic institutions of capitalism. Firms, markets, relational contracting*. New York, London: Free Press, Collier Macmillan.

Williamson, O.E. (1991) Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*. 36(2): 269-296.

Zaheer, S. and Mosakowski E. (1997) The Dynamics of the Liability of Foreignness: A Global Study of Survival in Financial Services. *Strategic Management Journal,* 18(6): 439-464.

FIGURES:
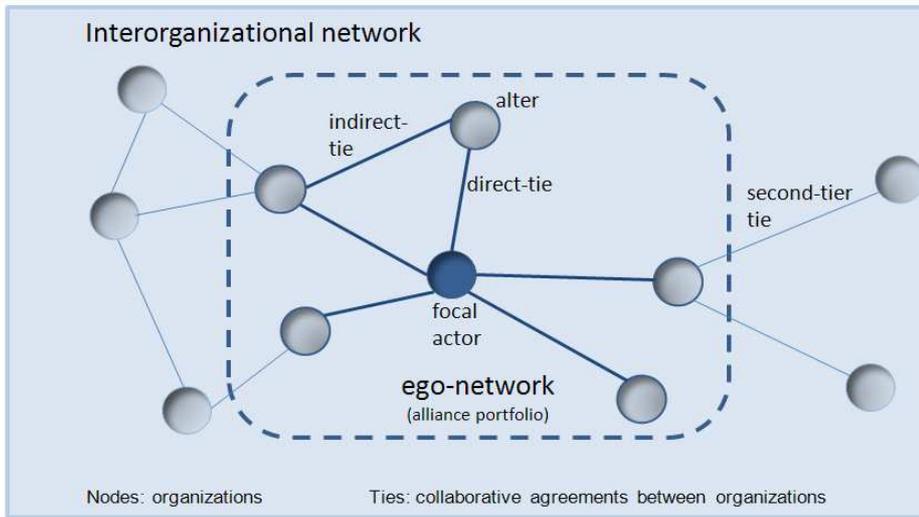
Figure (1): Ego-network structures in interorganizational networks

Source: Authors' own illustration.

Figure (2): Initial situation and non-cooperative and cooperative solutions of the baseline model

Source: Fig. 2a /2b according to Ohr and Schmidt (2003), modified. Fig. 2b Authors' own illustration.

3a) Linear critical sanction curve, dependent on (p)
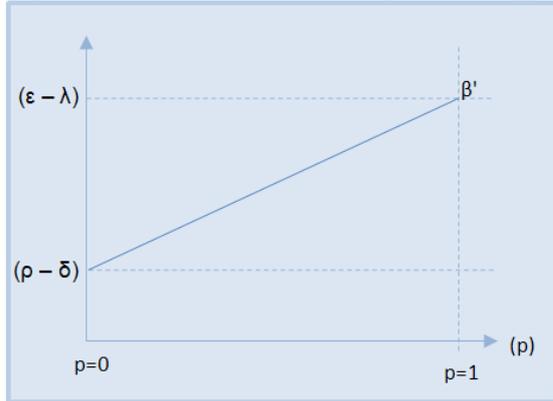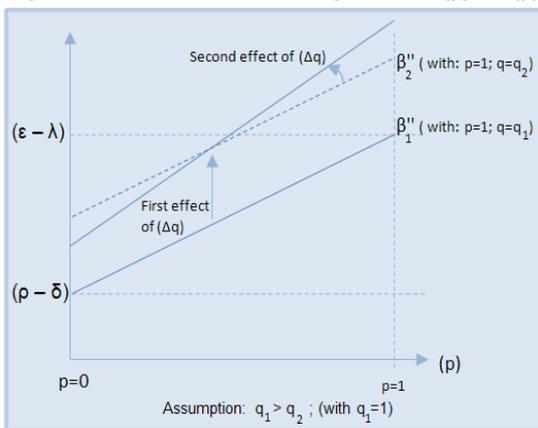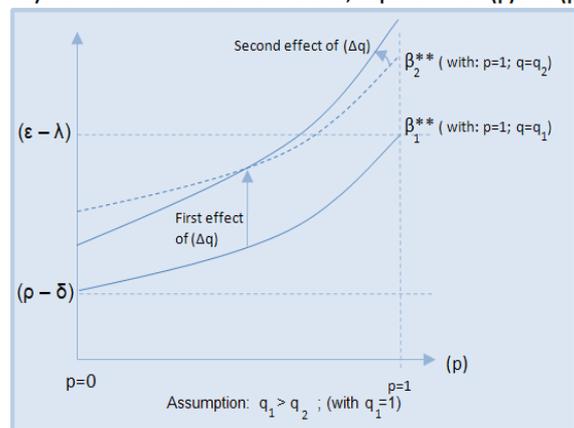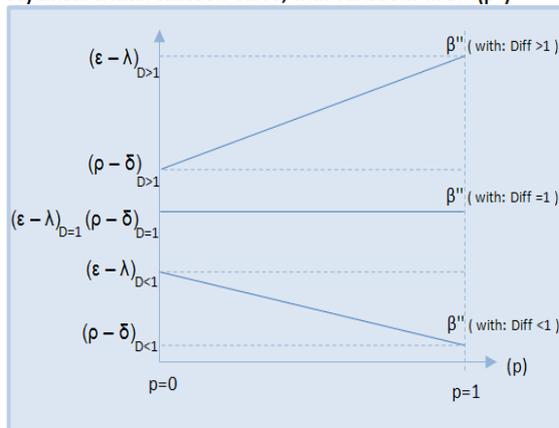
3b) Non-linear critical sanction curve, dependent on (p)
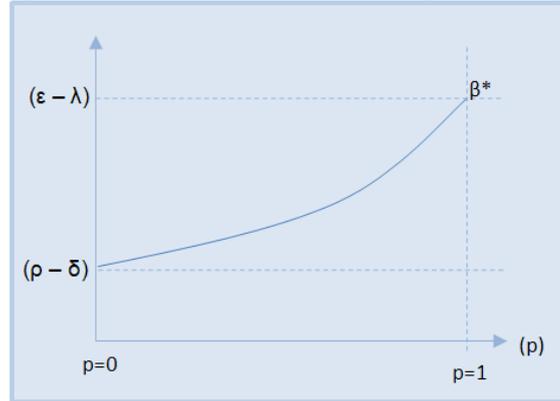
Figure (3): Linear and non-linear critical sanction curve, dependent on (p)

Source: Fig. 3a according to Ohr and Schmidt (2003), modified. Fig. 3b Authors' own illustration.

4a) Linear critical sanction curve, dependent on (p) and (p)

4b) Non-linear critical sanction curve, dependent on (p) and (p)

Figure (4): Linear and non-linear critical sanction curve, dependent on (p) and (q)

Source: Fig. 4a according to Ohr and Schmidt (2003), modified. Fig. 4b Authors' own illustration.

5a) Linear critical sanction curve, with variations in Diff(β'')

5b) Non-Linear critical sanction curve, with variations in Diff(β^{**})
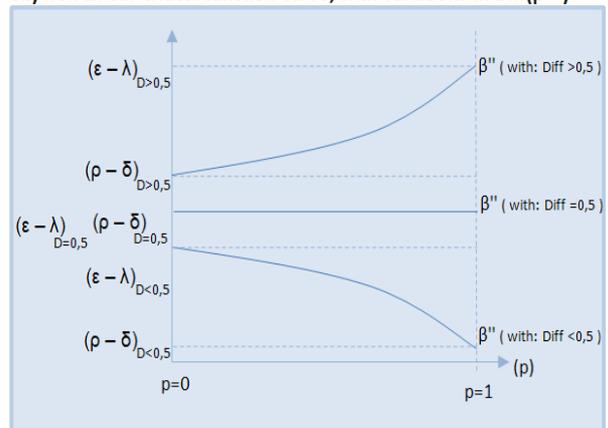
Figure (5): Generalization – Linear and non-linear critical sanction curve, with variations in Diff(β'') and Diff(β^{**})

Source: Authors' own illustration.

Types of sanction-mechanisms	Application of sanction mechanisms	Dyadic-impact (in case of santioning)	All-portfolio Impact (in case of sanctioning)	Model-specification (game theoretical model)	Effectiveness (results: first model modification)
Contractual (type-one specification)	R&D alliances Franchising alliances	YES	NO	- linear case - positive slope	YES
Contractual (type-two specification)	R&D alliances Franchising alliances	YES	YES	- non-linear case - positive slope	YES
Mutual tangible investments	R&D alliances Franchising alliances	YES	YES	- non-linear case - negative slope	YES
Mutual intangible investments (explicit knowledge)	R&D alliances Franchising alliances	YES	NO	- linear case - negative slope	YES
Mutual intangible investments (implicit knowledge)	R&D alliances	YES	YES	- non-linear case - negative slope	YES
Joint Decision Making	Franchising alliances	YES	YES	- non-linear case - negative slope	YES
Quasi-Integration	R&D alliances Franchising alliances	YES	YES	-------	NO
Reputation and Status	R&D alliances Franchising alliances	YES	YES	-------	NO

Figure (6): Results effectiveness analysis

Source: Authors' own illustration.

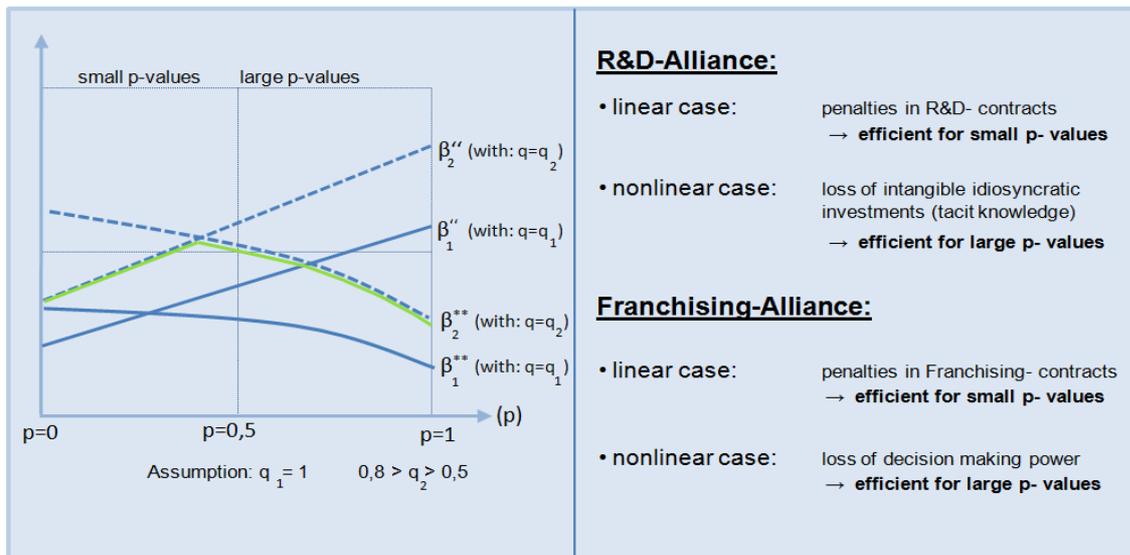*Figure (7): Exemplary illustration of a combined efficient sanction curve*

Source: Authors' own illustration.

Appendix 1.

Model with shared sanctions

	coop.	non-coop.
coop.	λ (I) λ	ε - β (II) δ+β
non-coop.	δ+ β (III) ε - β	ρ - β (IV) ρ - β

Adapted assumption: λ > ε-β > ρ–β > δ+ β
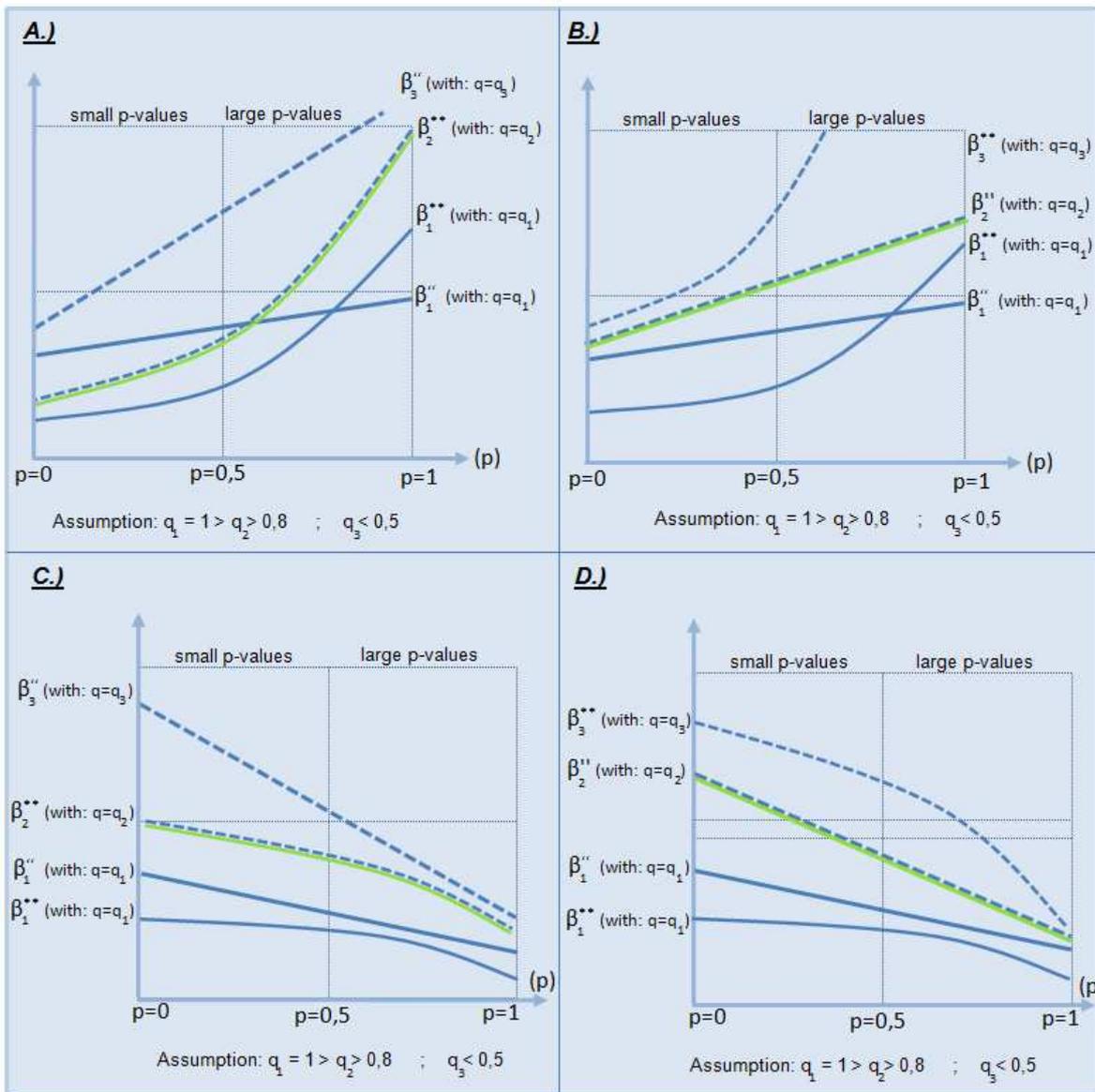
$$E(coop.) \geq E(non-coop.)$$

with:

$E(coop.) = p\lambda+(1-p)(\delta+\beta)$

$E(non\text{-}coop.) = p(\varepsilon\text{-}\beta) + (1-p)(\rho\text{-}\beta)$

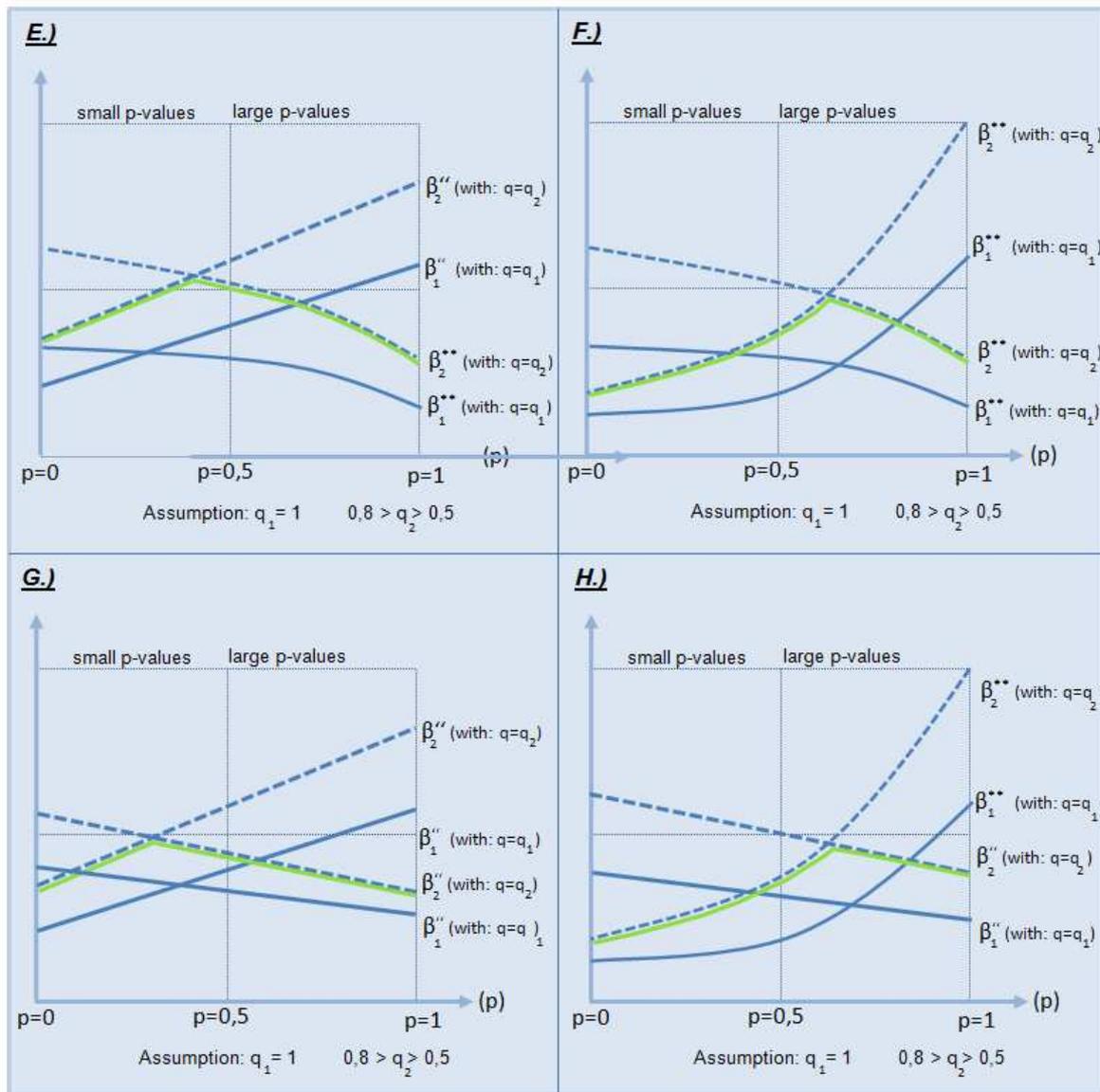$$p\lambda + (1-p)(\delta + \beta) \geq p(\varepsilon - \beta) + (1-p)(\rho - \beta)$$

Source: Appendix 1 according to Ohr and Schmidt (2003), modified.

Source: Authors' own illustration.

Appendix 3.

Source: Authors' own illustration.