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The Economic Optimality of Sanction Mechanisms in Interorganizational Ego Networks – A Game Theoretical Analysis –

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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 co-operation 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 this paper is to provide game theoretically consolidated conditions in order 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 sensibilizes 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 still widely underemphasized topic in the literature.

JEL-Classification: L14, L22, L24, M21

Keywords: alliance portfolio, ego network, governance, sanctions, game theory

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Zusammenfassung

Obwohl bisher vielfach davon ausgegangen wurde, dass die Internationalisierungspfade kleiner und mittlerer Unternehmen (KMU) über Exportaktivitäten nicht hinausgehen, lässt sich das Erscheinen einer neuen Gattung von global agierenden Gründungsunternehmen, die intensive Kooperationskonstellationen unterhalten – so genannte „micro-multinational enterprises“ (mMNEs), – beobachten. Diese Unternehmen stehen vor der Herausforderung, ein Portfolio, bestehend aus einer Vielzahl nationaler und internationaler Allianzen, simultan zu koordinieren (Egonetzwerk). Diese Arbeit verfolgt das Ziel, spieltheoretische Bedingungen zur Analyse der Effektivität und Effizienz von Sanktionsmechanismen in Allianzportfolios herzuleiten. Zu diesem Zweck verwenden wir ein einfaches spieltheoretisches Grundmodell und erweitern dieses über drei Stufen mit steigender Komplexität. Die Ergebnisse zeigen, dass zwei von sechs analysierten Sanktionsmechanismen die spieltheoretische Effektivitätsbedingung nicht erfüllen. Die Effizienzanalyse sensibilisiert für Problematiken, die mit diskretionären Elementen in Governance-Strukturen verbunden sind, und zeigt, dass nicht ein einzelner Sanktionsmechanismus, sondern die richtige Wahl und Kombination verschiedener Sanktionen zu effizienten Resultaten führt. Wir tragen mit unserer Arbeit zur Internationalen Business, Allianz- und Netzwerkliteratur bei, indem wir den Fokus auf Allianzportfolios in mMNEs lenken. Statt einer dyadisch orientierten Perspektive legen wir bei der Analyse von Sanktionsmechanismen eine Egonetzwerkperspektive zugrunde und wenden uns damit einem bisher weitestgehend unbehandelten Themenkomplex zu.

JEL-Klassifikation: L14, L22, L24, M21

Schlüsselwörter: Allianzportfolio, Egonetzwerk, Governance, Sanktionen, Spieltheorie

The Economic Optimality of Sanction Mechanisms in Interorganizational Ego Networks – A Game Theoretical Analysis[1]–

1 Introduction

The economy in the eastern part of Germany is characterized by a high number of small entrepreneurial firms. This becomes apparent in high-tech sectors like the photovoltaic industry (Brachert and Hornych 2009), biotech industry (Kaiser and Prange 2004; Gassmann and Keupp 2007) but also in rapidly emerging technological fields like nanoscience and nanochechnology (Henn 2007; Blind and Gauch 2009). These 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 "micromultinational enterprises" (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, Carroll and Hannan 1983; Brüderl and Schüssler 1990; Ranger-Moore 1997) and "liability of foreignness" (Zaheer and Mosakowski 1997; Miller and 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 rela-

1 This research project was supported by the Halle Institute for Economic Research (IWH), structural economics department and the Chemnitz University of Technology, marketing department. For many helpful comments on an early draft of the paper, we are grateful to Jutta Guenther, Bjoern Jindra, Natalie Oliver and Katja Wilde. We are also indebted to Toralf Push and Yiping Zhiu for reviewing the paper and providing critical comments and helpful suggestions. We have benefited from comments from the audience at the research seminars given at IWH. We thank Samuel Chibuzor for interesting discussions on the topic and Andreas Al-Laham for some general remarks on a first draft of the abstract. We assume responsibility for all errors.

tions 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. According to Oxley and Sampson (2004, pp. 723-724), 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, Arend and Seale 2005, p. 341).

We seek to answer the following research questions by referring to several streams of literature and utilizing a game theory approach: (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? (III) Do we need different types of sanction mechanisms in one alliance portfolio or can all alliance portfolio partners be controlled and sanctioned in the same way? While answering these questions we contribute to the international business, alliance and network literature in several ways. Firstly, we focus on the analysis of alliance portfolio sanction mechanisms, a widely underemphasized subject in the literature. Secondly, we apply a game theoretical approach to analyze the effectiveness and efficiency of an alliance portfolio sanction mechanism. 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 and policy makers.

The paper is organized as follows: in Section 2, we provide a conventional review of the recent literature. 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 limitations and perspectives.

2 Theory and Literature Review

This section is organized around three streams of literature: we begin with a brief overview of 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 describe the foreign market access of firms as an incremental learning process along several internationalization stages (Johanson and Vahlen 1977, 1990, 2001, 2003). However, critics (Oviatt and McDougal 1994; McDougall, Shane and Oviatt 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 and Oviatt 2000; Oviatt and McDougall 2005). These firms can, in principle, use the same strategies – ranging from export modes to international alliances and joint ventures to internationalize business – as large multinational enterprises, even though resource restrictions and the inexperience in entering new markets are comparatively high in young entrepreneurial firms.[4] Another group of Swedish researchers (Johanson and 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 and Easton 1992; Sharma and Blomstermo 2003; Covellio 2006; Gassmann and Keupp 2007) as well as entrepreneurship scholars (Larson 1992; Larson and Starr 1993; Andersson and 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, Shane and Oviatt 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.

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

3 Several definitions have been recommended, the most influential are provided by *McDougall* (1989), *Zahra* (1993), *Oviatt and McDougall* (1994) and *McDougall and Oviatt* (1996, 2000). For a comprehensive overview and the current status of the field, see *Zahra and George* (2002).

4 Especially the "liability of smallness" (*Freeman, Carroll and Hannan* 1983; *Brüderl and Schüssler* 1990; *Ranger-Moore* 1997) and the liability of foreignness" (*Zaheer and Mosakowski* 1997; *Miller and Parkhe* 2002) phenomena are relevant in this context. For an overview of organization ecology research and different types of liabilities, see *Amburgey and Rao* (1996).

2.2 Theoretical Background: the Existence of Hybrid Organizational Structures

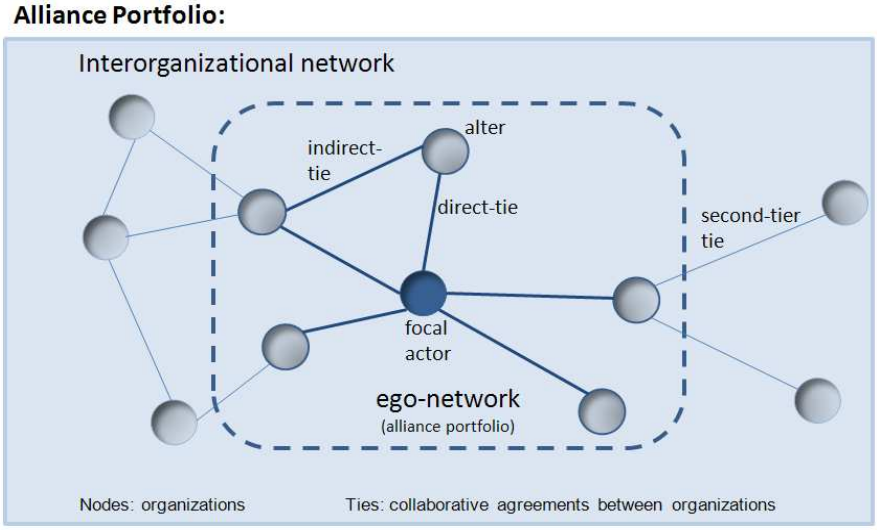
After Salancik's influential appeal "WANTED: A good Network Theory of Organization" (Salancik 1995), scholars from various disciplines made important contributions. For a comprehensive overview of theoretical standpoints and debates in alliance and network literature, see Hagedoorn (1993, p. 372), Brass et al. (2004), Parkhe, Wasserman and Ralston (2006). Here, we concentrate on two broad theoretical streams in the field of alliance and network research that seek to explain the existence of hybrid organizational structures – economic theories and sociological theories (Al-Laham and Kudic 2008). Economists (Tirole 1988; Milgrom and Roberts 1992; Thorelli 1986; Jarillo 1988; Williamson 1991) utilize predominantly transaction-cost-based arguments and state that hybrids are an organizational form positioned intermediately between markets and hierarchies. Sociologists emphasize the relevance of social embeddedness of economic activities (Granovetter 1985; Uzzi 1996), discuss problematic aspects, such as overembeddedness (Uzzi 1997), and provide another explanation while arguing that hybrids are unique organizational structures and, thus, have to be named as an organizational form of their own (Powell 1990; White 2005; White and Lui 2005). However, there is some evidence that the latter stream prevailed (Borgatti and Foster 2003).

2.3 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, p. 293). The most important motives behind these collaborative agreements are: cost savings (Hagedoorn 2002), risk reduction (Hagedoorn 1993; Sivadas and Dwyer 2000), time savings (Mowery, Oxley and Silverman 1996, p. 79), reputation and status (Stuart 1998; Stuart, Hoang and Hybles 1998; Stuart 2000; Gulati, Nohria and Zaheer, 2000), knowledge access (Rothaermel 2001; Grant and Baden-Fuller 2004; Al-Laham and Kudic 2008), interorganizational learning (Hamel 1991; Khanna, Gulati and Nohria 1998; Kale, Singh and Perlmutter 2000; Al-Laham and Kudic 2008) and access to national and international markets (Perlmutter and Heenan 1986; Johanson and Mattsson 1988; Chetty and Holm 2000). 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 and 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 and Faust 1994; Degenne and Forse 1999; Carrington, Scott and Wasserman 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, p. 795) 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, Chandy and Prabhu 2008; Powell, Koput and Smith-Doerr 1996; Grant and Baden-Fuller 2004; Hagedoorn 2002; Gulati, Nohria and Zaheer 2000). An ego network is defined from the focal actor's perspective and consists of a set of direct, dyadic ties between the focal actor and the alters and indirect ties between the alters (Wasserman and Faust 1994; Ahuja 2000; Hite and Hesterly 2001). Ego networks do not include second-tier ties or second-step ties to which the focal actor is not directly connected (Hite and Hesterly 2001). Figure 1 illustrates a typical ego network structure with one focal actor, five directly connected alters and one indirect connection. In the following, we use the terms ego network, alliance constellation (Das and Teng 2002) and alliance portfolio (Hoffmann 2005; Lavie 2007) synonymously.

Figure 1:
Ego network structures in interorganizational networks



Source: Authors' own illustration.

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 and Ernst 1991; Sivadas and 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, 1992; Ahuja 2000; Borgatti and 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, knowledge transfer and interorganizational learning effects (Dyer and Singh 1998; Grant and Baden-Fuller 2004; Al-Laham and Kudic 2008). 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 (Dyer and Singh 1998).

In conclusion, an alliance portfolio is more than the simple aggregation of dyadic partnerships. Risk diversification effects and synergy effects can explain superior cost-benefit relations in a portfolio setting. To ensure that benefits of an alliance portfolio add up at a higher pace than costs, the implementation of an effective and efficient interorganizational governance structure is crucial.

2.4 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 and Kenis 2007; Park 1996). For a comprehensive overview of network-level theories, see Provan, Fish and Sydow (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[5] and network administrative organization. However, we utilize a different

[5] It is notable that, for example, lead organization governance (*Dhanaraj and Parkhe* 2006; *Provan Fish and Sydow* 2007; *Provan and Kenis* 2007) assumes that only large, powerful organizations with sufficient resources and legitimacy play a significant role.

perspective while arguing that it is every organization's primary interest to manage and control interorganizational partnerships proactively in order to reach strategic goals (Gulati, Nohria and Zaheer 2000). 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.

Initially, we discuss general governance issues by referring to four theoretical streams: resource dependency theory, transaction cost theory as well as relational contracting and social network approaches. Then, we focus on sanctions as one specific element of interorganizational governance. Moving on from this, we sharpen our argumentative line and focus exclusively on the choice of sanctions in hybrid organizational structures, which represent one of three central elements of alliance and network governance according to Oxley and Sampson (2004).

2.4.1 Theoretical Underpins of Interorganizational Governance

Governance of interorganizational relationships is a complex multidimensional managerial task that encompasses the configuration, implementation and repeated adaptations of collaborative rules and means to control them as well as the choice of safeguarding mechanisms in order to minimize the threat of opportunistic exploitation in collaborative partnerships. Originally, governance was a topic that was studied in the organizational context. For a comprehensive overview of organizational level and network governance, see Provan and Kenis (2007). The analysis of interorganizational governance mechanisms is highly relevant but still an underemphasized topic in alliance and network research (Grabher and 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 in the light of resource dependency theory is based on the assumption that, by actively shaping inter-firm relationships with formal or semiformal links, companies pose the strategic response to reduce uncertainty resulting from their dependence on resources that have to be acquired from outside their own entity under aspects of effectiveness (Pfeffer and Salancik 1978; Ulrich and Barney 1984). The management can, therefore, effectively manipulate this uncertainty and dependence as part of their strategic roadmap in a variety of inter-firm links by actively coordinating their exchange partners. In an alliance portfolio, this results in strategic flexibility of splitting the risk and increasing the possibility of reverse investment decisions between the focal actor and the voluntary alters (Pfeffer and Salancik 1978; Heide 1994; Hoffmann 2005). Transaction cost theory observes inter-firm governance between the extremes of markets and hierarchies under considerations of efficiency in the dimensions of idiosyncratic transaction-specific investments and external and internal uncertainty (Williamson 1975, 1991). Owing to the introduction of bounded rationality and opportunism that result in costs for safeguarding those investments, incomplete contracts that cannot include all eventualities of the environment and prohibitively high monitoring costs for the control

of their full compliance, transaction cost considerations may result in efficient inter-firm governance structures as the hybrid of an alliance (Williamson 1975; Williamson 1991; Klein, Crawford and Alchian 1978; Alchian and Demsetz 1972; Williamson 1985; Rubin 1990; Ring and van de Ven 1992; Heide 1994; Dyer 1996). Whereas effectiveness and efficiency of inter-firm governance derive from resource dependency and transaction cost theory, relational contracting theory and social network approaches broaden the view of governance towards social structures. Relational contracting, distinguishing between discrete and relational exchange norms, views a mutuality of interests as a guidepost towards bilateral governance in inter-firm relationships which depend on the social embeddedness (Granovetter 1985; Uzzi 1996, 1997) of the actors providing opportunities and limitations for development (Macneil 1980; Dwyer, Schurr and Oh 1987). Meanwhile, it is important to remark that bilateral governance may also contain unilateral elements of governance as Heide (Heide 1994) notes when developing a more recent stream of theory which concludes elements previously discussed. Also recognized by Macneil (Macneil 1981), hierarchic commands, as can be identified in franchising, where partial single-sided enforceability is common and agreed on, are thus not ruled out (Heide 1994). Social network approaches apply the relational view of governance to a network perspective in which behavioral expectations, such as trustworthiness of partners, influence the inter-firm 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 by managing an alliance portfolio (Ahuja 2000; Brass et al. 2004; Dyer and Singh 1998; Borgatti and Foster 2003; Hoffmann 2005).

Following Oxley and Sampson (2004), and based on the presented review on the theory of alliances and governance, 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.

In the following, we focus exclusively on the choice of sanctions in hybrid organizational structures. However, before drawing attention to the analysis of the economic optimality of sanction mechanisms in an alliance-portfolio setting, we have to discuss some elementary types and characteristic features of sanction mechanisms at a dyadic level.

2.4.2 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 and 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 inter-firm 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 contrary, works as a safeguard to secure the relation-specific assets made (Subramani and 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). Finally, hands-tying (Kronman 1985) embodies a sanction, where the promisor hands over an asset that is of substantial value out of the inter-firm relation, here the loss of a company's reputation on the market, to the promisee and has been considered as such in alliances by several scholars (e.g. Ring and van de Ven 1994; Gulati 1998; Sharma 1998; Robinson and 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.

2.5 Research Focus, Methodology and Research Gap

In this paper 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. These firms are well suited for our purpose because by definition mMNEs rather utilize interorganizational alliances instead of exporting modes or FDI modes in order to enter foreign markets (Dimitratos et al. 2003). The alters can be any other kind of organization. With regard to the content of collaboration, we allow for a heterogeneous alliance portfolio structure composed of different types of direct and indirect ties, while the focus is clearly upon research and development as well as marketing and distribution collaborations. Hence, the scope of our research concentrates on alliances, that can also be distinguished as links positioned near the front and back end of a value chain, in the occurrence of R&D and franchising alliances. We focus exclusively on the choice of sanctions in ego network structures in which the focal actor is governing the alliance portfolio proactively. As outlined before, sanctions as a manner of safeguarding the governance structure from opportunism can be classified in two broad categories – self-enforcing agreements and agreements enforced by a third party – both categories will be considered in the following. As we will show in Sections 3.3 and 3.4 the effectiveness and the efficiency of sanction mechanisms implemented in one dyadic agreement between the focal actor and alter depends not only on the choice and configuration of a specific sanction mechanism but also on the embeddedness of these actors in a higher order network structure. Thus, the previously outlined governance issues in dyadic settings become vital tasks in an alliance portfolio, while additional network effects have to be considered explicitly (Hoffmann 2005; Pietras and Stormer 2001; Parkhe, Rosenthal and Chandran 1993; Phelan, Arend and Seale 2005; Ahuja 2000). 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 (Parkhe, Rosenthal and Chandran 1993; Arend and Seale 2005; Phelan, Arend and Seale 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, research also solely concentrates on the dyadic setting of strategic alliances.

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, in this paper we seek to answer three research questions. Firstly, what are game theoretically consolidated conditions for the effectiveness and the efficiency of alliance portfolio sanction mechanisms? Secondly, what type of alliance portfolio sanction mechanism is effective and efficient? Thirdly, do we need different types of sanction mechanisms in one alliance portfolio or can all alliance portfolio partners be treated in the same way? By answering these questions we contribute to the alliance and net-

work literature from a theoretical and methodological standpoint. Furthermore, we shed light on management and governance issues of specific types of internationally operating firms – so-called micromultinational enterprises (mMNEs) – and thus contribute to international entrepreneurship literature.

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[6] 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[7] introduced by Ohr and Schmidt (2003).[8] In the first stage ("baseline model"), we implement a sanction mechanism in which the critical level of the sanction (β) is fixed and depends only on net payments of the players deciding whether to cooperate or to defect (Figure 2). In the next stage ("first modification"), we introduce the so called "temptation to resist non-cooperative behavior" and model the sanction as a function of the probability (p). Subsequently, we model two general types of sanction mechanisms for non-cooperative behavior in an alliance portfolio as a function of (p) and derive a "linear critical sanction curve" and a "non-linear critical sanction curve". The primary objective of the second stage is to derive a game theoretically consolidated condition that enables us to identify effective sanction mechanisms. In the final stage ("second modification"), we additionally introduce the probability (q) and include a model component which accounts for the eventuality that even recognized non-cooperative behavior will not be sanctioned in the case of defection. Initially, we construct the theoretically optimal sanction curve for the linear and the non-linear case. Both ideal types of critical sanction curves serve only as reference constructs to evaluate the efficiency of the sanction mechanisms to be examined. Subsequently, we analyze all sanction mechanisms declared as "effective" with regard to efficiency aspects. Thus, the

6 For a comprehensive overview on the developments in non-cooperative games see *Myerson* (1999).

7 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.

8 To answer our research questions and keep complexity at the same time limited a single-periodic game is incorporated. Alternative research settings could be applied like for example: strategies in repeted games (cf. *Axelrod* 1984), chain store paradox in finitely repeated games (cf. *Selten* 1978) and reputational games (cf. *Kreps and Wilson* 1982; *Raub and Weesie* 1990) or evolutionary game thoetical approaches (*Taylor and Jonker* 1978; *Weibull* 1995; *Cressman* 2003).

main objective of the last stage is to derive a game theoretically consolidated condition that enables us identify efficient sanctions.

3.1. Cooperative and Non-cooperative Games in an Alliance Portfolios

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.

3.2. General Assumptions and Development of the Baseline Model

We start the development of our baseline model with a classic non-cooperative game in an alliance portfolio setting. 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.

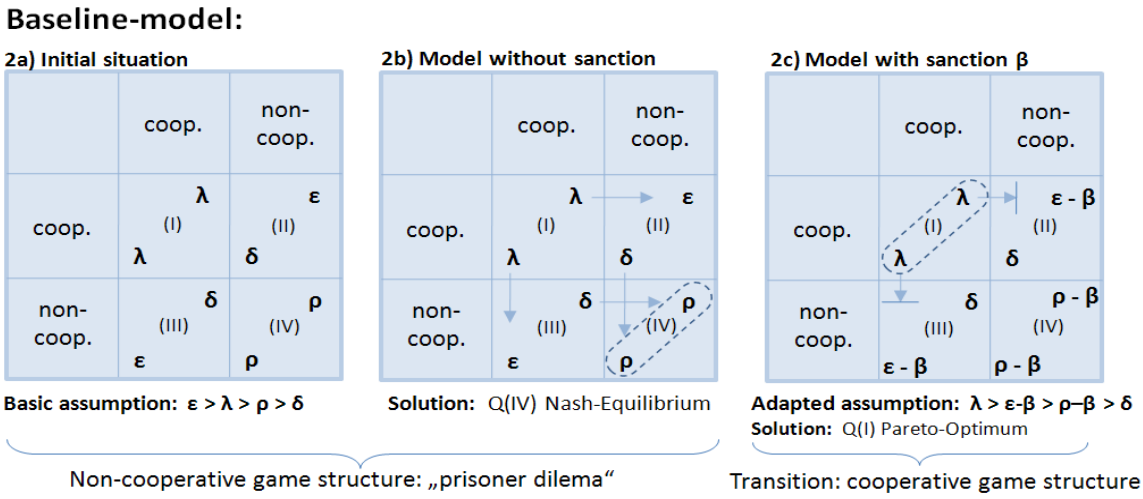
$$\varepsilon > \lambda > \rho > \delta \tag{1}$$

Figure 2a shows the initial situation of the baseline model and two solutions of the game. Without sanction mechanisms (Figure 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.

$$\lambda > \varepsilon - \beta > \rho - \beta > \delta \tag{2}$$

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:
Initial situation and non-cooperative and cooperative solutions of the baseline model



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

3.3. 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.

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

$$p\lambda+(1-p)\delta \geq p(\varepsilon-\beta)+(1-p)(\rho-\beta) \quad (3b)$$

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[9] 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

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

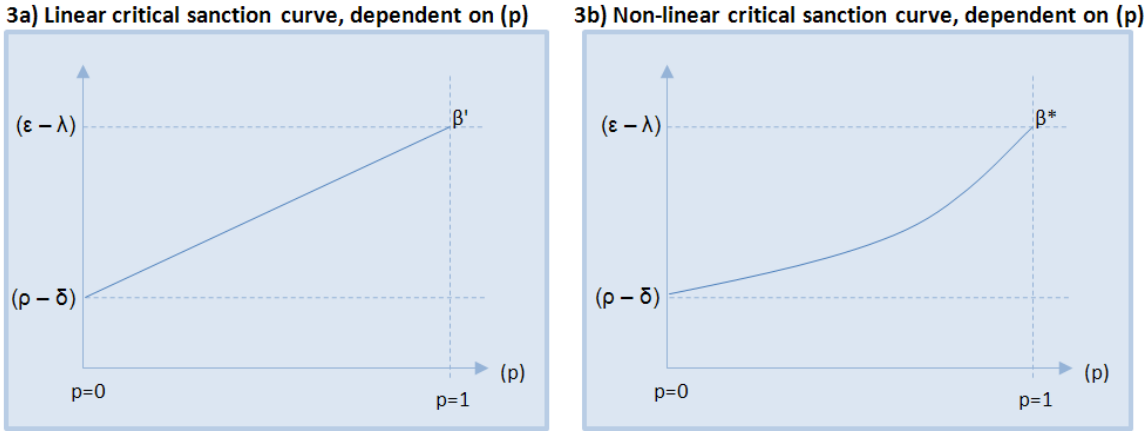
player can both rise but also fall in value. We can interpret $(\varepsilon - \lambda)$ as the net profit of the focal actor in an alliance portfolio in the case of cooperative behavior of an alter. Accordingly, the difference $(\rho - \delta)$ represents the net profit of the focal actor in an alliance 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').

$$\beta' \geq p(\varepsilon - \lambda) + (1 - p)(\rho - \delta) \tag{4}$$

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 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[10]. Inequation (5) illustrates the non-linear critical sanction curve. In the following, we will refer to the non-linear critical sanction curve as (β^*). Figure 3 illustrates linear and non-linear critical sanction curves in an alliance portfolio setting.

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

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



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

10 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.

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?

3.4. 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. For this purpose, we extend the model and make allowance for negotiability of sanctioning in the case of defection. The level of the sanction depends on (p) and also on the probability (q) with ($0 \leq q \leq 1$) that even recognized opportunistic 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 function of the probabilities (p) and (q), the slope of both curves is determined by the ratio between ($\varepsilon - \lambda$) and ($\rho - \delta$).

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

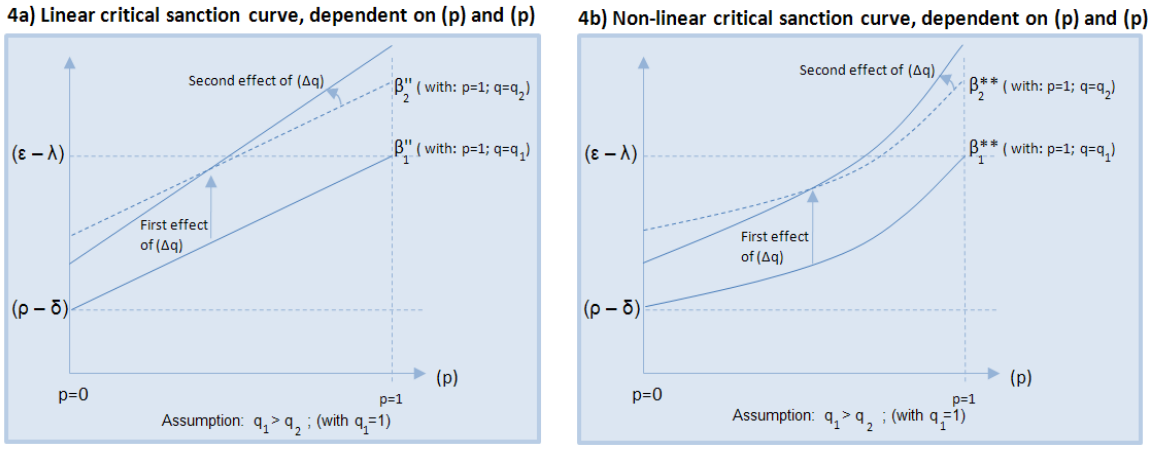
$$\beta^{**} \geq \frac{p}{q(2-p)}(\varepsilon - \lambda) + \frac{(1-p)}{q(2-p)}(\rho - \delta) \tag{7}$$

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 $q1=1$, which means there is no option to negotiate sanctions in the case of defection. Therefore, the linear critical sanction curve ($\beta 1''$) and the non-linear curve ($\beta 1^{**}$) are considered to be the most effective sanction mechanism. The costs of sanctioning in the case of defection are minimal for $q = 1$.

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 (Figure 4a) and the non-linear case (Figure 4b). In both cases, the first effect causes a parallel shift while the second effect leads to a rotation of the critical 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^{**}).

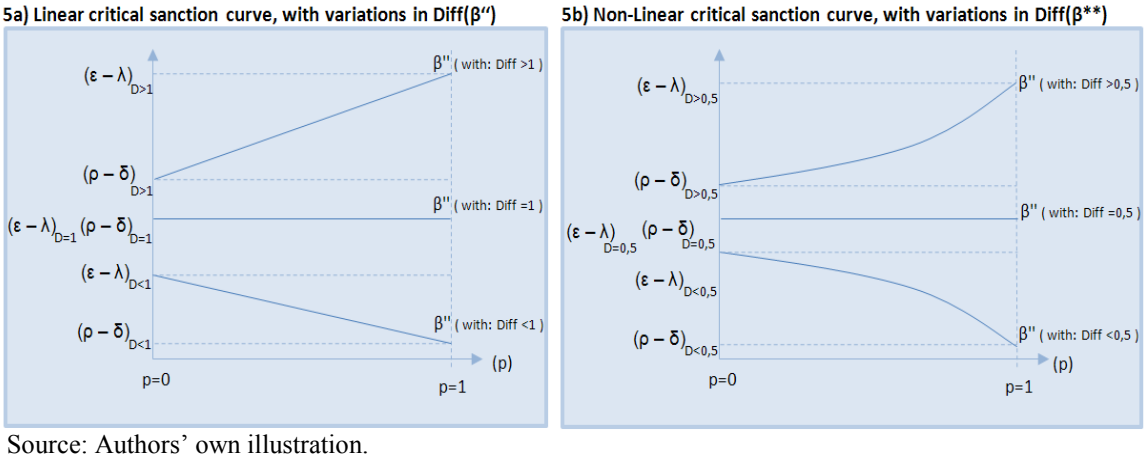
Figure 4:
Linear and non-linear critical sanction curve, dependent on (p) and (q)



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

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. Figure 1). 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. Figure 5a and 5b).

Figure 5:
Linear and non-linear critical sanction curve, with variations in Diff(β'') and Diff(β**)



Source: Authors' own illustration.

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, or, indeed, whether any of them is, 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. In other words, it is crucial to differentiate whether the value of a sanction in the case of defection falls solely in the hands of the focal actor and, therefore, represents a value of (β') in the linear case, or is shared amongst those affected in the alliance portfolio and, therefore, represents a value of [β*] in the non-linear case. 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, Rosenthal and Chandran 1993). A contractual penalty clause is a common mode of sanctioning in both R&D alliances as well as franchising partnerships. 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, i.e. breaching the contract that the link between focal actor and alter is based upon. 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 and Heide 2000, p. 38). Formulating sanctioning rules in a contract can, therefore, be seen as stating a level of distrust between the parties, expecting that either of them will, under certain circumstances, defect

and try to achieve exploitation gains (ε). In terms of the first modification model, this represents a value of (β') that even for the smallest values of (p) the difference of ($\rho - \delta$) is well above zero. 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 and Singh 1998). The incentive of a contract partner to defect rises with an increasing probability to resist temptation of 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 and Trevino 1993), which forces the linear sanctioning curve into a positive upwards slope with increasing values of p (with $0 \leq p \leq 1$). The system of legal courts enforcing contractual provisions and the widely-stated use of contracting in alliances researched (e.g. Parkhe 1993; Osborn and Baughn 1990) is ample evidence for the effectiveness of contracts as a sanctioning safeguard with values of (β) diminishing the expected exploitation gains and, thus, delivering Pareto optimality of the outcome of the game.

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 and Weitz 1992; Williamson 1983; Kronman 1985). As a requirement to apply these types of safeguards as sanction mechanisms, we have to assume that there has been a mutual agreement on specific investments, while potential sunk costs in the case of defection have to be high enough to comply with the Inequation (4) in the linear or (5) in the non-linear case. The net loss, in terms of individual sunk costs, the defector would have to face in the case of defection 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 an inter-firm relationship (Gundlach, Achrol and Mentzer 1995; Zaheer and Mosakowski 1995).

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 and 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 and represents a common mode of sanctioning in both cases R&D alliances as well as franchising alliances. Similar to a contract, sanctioning by generating sunk costs in bilateral tangible investment constellations or interrupting knowledge transfer processes follows the curve in the 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. Thus the net profit of the focal actor in the case of cooperative behavior of an alter $(\varepsilon - \lambda)$ is smaller than the net profit of the focal actor in the case of non-cooperative behavior of an alter $(\rho - \delta)$ in an alliance portfolio. 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.

In the case of bilateral intangible idiosyncratic investments we have to differentiate between a knowledge-accessing and knowledge-acquiring setting (Grant and Baden-Fuller 2004). An interruption of knowledge-transfer processes (for example simply transferring complementary stocks of codified knowledge) can serve as a sanction mechanism in franchising as well as R&D alliances. 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 for increasing values of $0 \leq p \leq 1$.

In contrast, bilateral intangible investments may appear in terms of tacit knowledge or a specific knowledge intensive technology (Jap and 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 (for example generating new knowledge trough joint leaning processes) between strategic partner organizations are required. The interruption of interorganizational learning processes can serve, especially in R&D alliances, as a sanction mechanism. 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 for increasing values of $0 \leq p \leq 1$, as in the linear case. The ratio in the non-linear case between $(\varepsilon - \lambda)$ and $(\rho - \delta)$ is, however, smaller than in the linear case at values below 0.5 resulting in an effective sanctioning mechanism for R&D linkages in a portfolio.

Quasi integration employed by smaller companies due to their vulnerability in relationships with asymmetric bargaining power as a governance mechanism (Blois 1972; Subramani and Venkataraman 2003; Dewald et al. 2007) may result in building trust between partners and, thus, safeguard behavioral uncertainties (Subramani and Venkataraman 2003; Dyer 1997; Dyer and 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 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 if his behavior is non-cooperative. 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. In conclusion, an ex-post sanctioning of quasi integration is an effective mechanism whilst ex-ante it does not represent a threat to the defector and is not an effective mechanism and leads to the Nash equilibrium.

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 and Venkataraman 2003, p. 48) and on the dyadic level constitutes a central element of cooperative strategy (Dyer and 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 for increasing values of $0 \leq p \leq 1$ 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 and 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 in an alliance portfolio.

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 (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.

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 to govern a portfolio of alliances. 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 the focal actor.

Figure 6:
Results effectiveness analysis

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

Source: Authors' own illustration.

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.

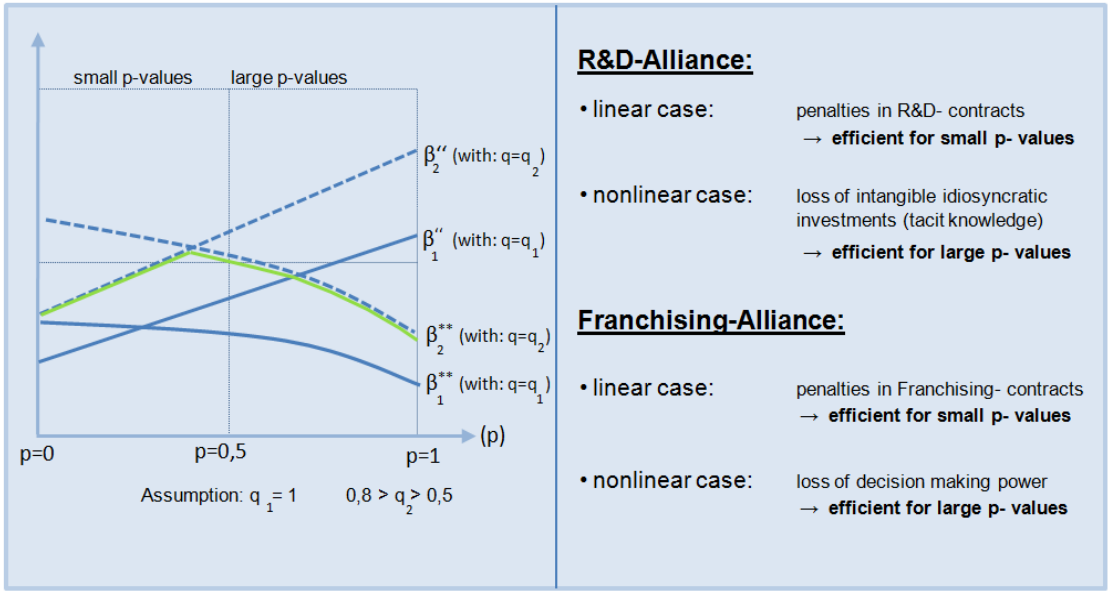
In this analysis, we declare a sanction mechanism as efficient if for changing values of q (with $0 \leq q \leq 1$), representing the probability that even recognized non-cooperative behavior will not be sanctioned, it has the smallest distance to the reference construct (with $q = 1$) when compared with the other sanction mechanisms (with $q < 1$). As outlined before, the sanction curves shift (Figure 4, first effect) and rotate (Figure 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 nonlinear sanctions (cf. Appendix 2). In summary, sanction mechanisms that are more susceptible to occupy discretionary elements lead to suboptimal sanctioning results. Simulation results demonstrate clearly that linear as well as nonlinear sanction mechanisms that do not allow debilitation of the enforcement of sanctions in the case of non-cooperative behavior perform in general better than others.

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.

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.

Figure 7:
Exemplary illustration of a combined efficient sanction curve



Source: Authors' own illustration.

5. Results and Discussion

This study raised three successive 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 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 strictily 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, Schurr and Oh 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 in-

tegration 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. These results are in line with the literature on dyadic strategic alliances that alliance partners rely on other governance mechanisms than legal enforcement (cf. for example Ring and Van de Ven 1992; Ring and Van de Ven 1994).

This leads to the conclusion in answering the third research question, that we do need different sanctioning mechanisms to effectively and efficiently manage an alliance portfolio. Firstly, we have to differentiate between R&D and franchising alliance linkages. We have shown that there indeed are different modes of sanctioning that can be applied in order to yield an effective outcome. An alliance portfolio consisting of different linkages should, therefore, not be governed by the very same sanctioning mechanisms. The nature of the alliance linkage in focus should be considered very well in order to install the "right" mechanism. We conclude this as a situational fit within the alliance portfolio. Secondly, we have also shown that in order to gain efficiency within those linkages in the portfolio the focal actor should install a combination of sanctioning mechanisms. This holds on the basis of our model for R&D as well as franchising. The focal actor should install sanctioning mechanisms that for specificly given probabilities of cooperative behavior and enforcement prove effective and efficient. To an entrepreneurial new venture these can be different mechanisms than for larger and established firms. Thirdly, this leads to the question whether different sanctioning mechanisms can be installed within a single alliance portfolio simultaneously. Literature, for example Dyer (1996), presents a positive answer to this. We are also convinced, that examples of this can be found in broad variety alliances. Different mechanisms of governance can be observed in alliances, for example contracts, we suppress the level of their complexity for a moment, usually build up some basis for most alliances. Regardeless of their existence, some other mechanisms in order to sanction a partner's defection have been developed over time and been installed to safeguard, as a judge's decision may not always be predictable.

Concluding all, it is, therefore, the choice and combination of mechanisms which leads to effective and efficient governance.

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.

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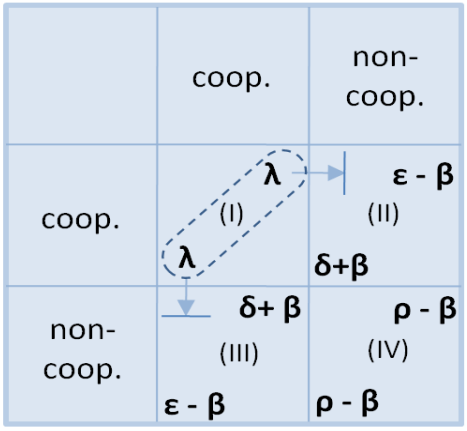
Appendix 1

Model with shared sanctions



Adapted assumption: λ > ε-β > ρ–β > δ+ β

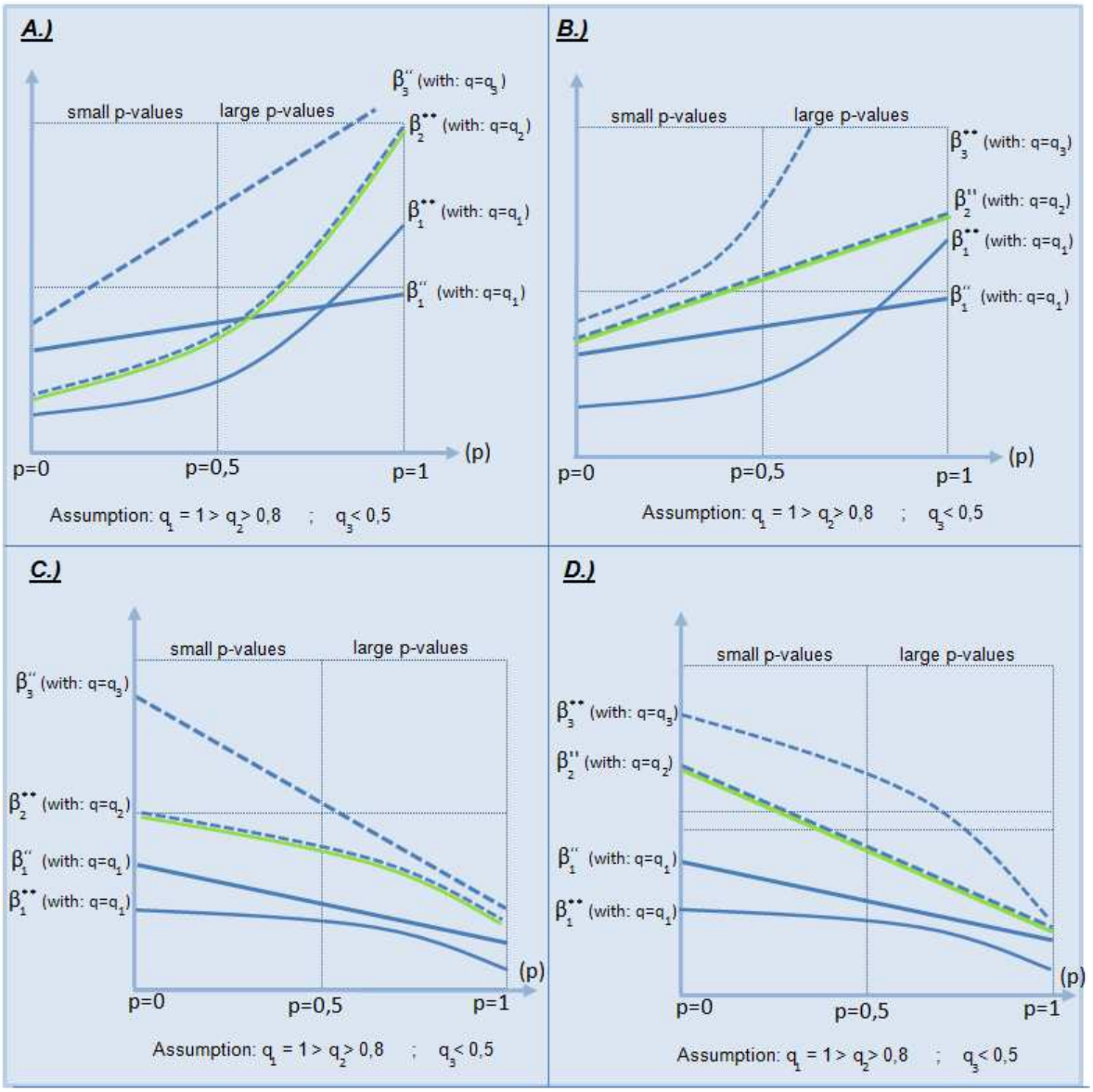
$$E(coop.) \geq E(non-coop.)$$ with: E(coop.) = pλ+(1-p)(δ+β)

E(non-coop.) = p(ε-β) + (1-p)(ρ-β)

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

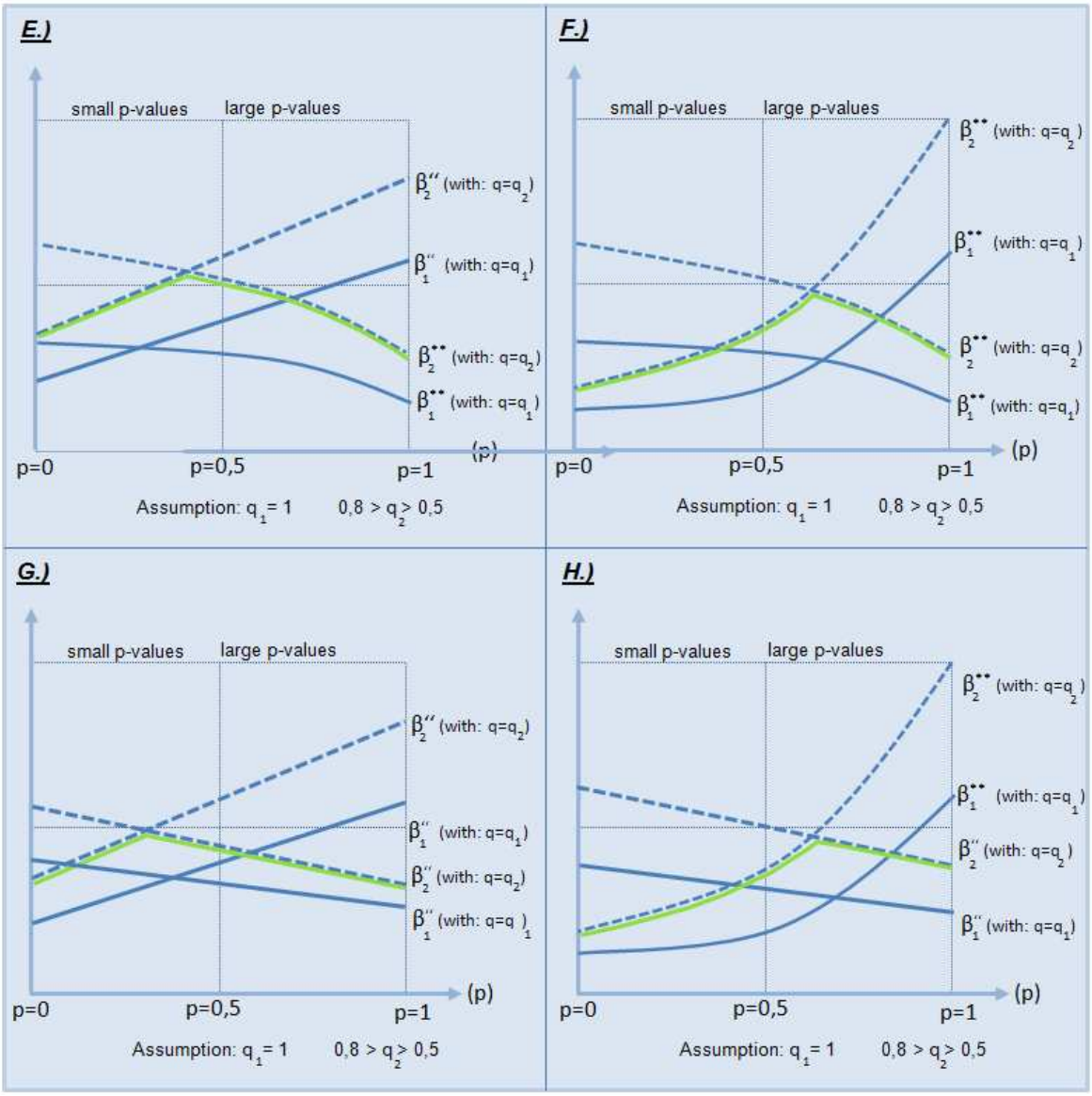
Source: Appendix 1 according to Ohr and Schmidt (2003), modified.

Appendix 2



Source: Authors' own illustration.

Appendix 3



Source: Authors' own illustration.