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The impact of social and human capital on individual cooperative behaviour

Implications for international strategic alliances

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Abstract

Purpose – The purpose of this study is to analyse whether, and if so, how, personal background and intellectual assets determine individual cooperation.

Design/methodology/approach – The purpose of this paper is to analyse whether, and if so, how, social and human capital determine cooperation.

Findings – The empirical results show that variations in human and social capital offer a substantial explanation for the likelihood of cooperative behaviour in people involved in social dilemma situations.

Research limitations/implications – Testing the model in an international setting with non-student subjects (managers, policymakers) would allow us to explore the consequences of cross-national differences in various forms of capital.

Practical implications – Successful implementation of strategic change requires leaders who are able to effectively communicate and motivate employees. The study highlights what factors makes some leaders more cooperative and, hence, potentially more successful in supervising corporate change than others.

Social implications – For sustainable growth, countries need leaders who are willing and able to collaborate not only with other international leaders but also within their public administration. This paper offers explanations why some political leaders more than others are able to successfully collaborate with their political opponents.

Originality/value – The added value of mainstream economics to understand key elements of international business is limited due to their stringent behavioural assumptions. The research is original in that it shows that individuals make decisions not like rational machines but like real human beings.

Keywords Alliances, Institutions, International business, Critical management

Paper type Research paper



Introduction

Cooperative behaviour has long been a topic of research in international business (IB) studies (Bachmann, 2001; Dörrenbächer and Gammelgaard, 2010; Porter and Kramer, 2011). Research on international strategic alliances, for example, extensively studies the impact of trust or contracts on the performance of inter-firm cooperation (De Jong and Nooteboom, 2000; Klein Woolthuis *et al.*, 2005). IB research shows an increase in the number of international strategic alliances between firms, but also that few of them are

truly successful (Nooteboom, 2004). This implies that the determinants of successful international collaboration between firms are in need of more research. Notwithstanding substantial progress, the author suggests that IB research may benefit from a different set of lenses to understand cooperative behaviour. The author argues that international cooperation is an inherent individual-level phenomenon. The individual should therefore be the unit of analysis. This study explores whether, and if so how, individual characteristics determine cooperative behaviour of individuals. Few IB studies explicitly analyse why, for example, some managers are more successful in collaboration with other individuals in international strategic alliances than others. This study aims to fill this research gap.

The author analyses the role of individual characteristics in cooperative behaviour in the setting of social dilemma games. Social dilemma games offer an ideal micro-level context to understand the individual-level antecedents of competitive *vis-à-vis* cooperative behaviour. A well-known example of a social dilemma game is the *Prisoner's Dilemma* (PD). The author uses the PD game to analyse the impact of social and human capital on cooperative behaviour. In the experimental literature, it has often been observed that people cooperate more than they would be expected to according to standard assumptions of individual rationality (Annen, 2003; Paldam, 2000). This so-called “excess cooperation” result has also been confirmed in various experiments, even for players who do not know each other and play only once (Burks *et al.*, 2003; Schramm, 1998; Tan and Zizzo, 2008; Brosig, 2002). This study seeks to unlock the black box that the players in PD games represent by considering that every individual builds social and human capital over time. These intangible forms of capital drive cooperative behaviour of individuals and could explain why people in the “real world” – unlike the “rational machines” in game theory – are predisposed towards cooperation.

The rationality of individual behaviour receives mixed empirical support and is therefore subject to ongoing debate (Gächter *et al.*, 2004; Glaeser *et al.*, 2002; Fan, 2008). It is generally accepted that when every player in a “one-shot” game has a dominant strategy, as in the PD, then these strategies will be the ones chosen. This hypothesis has empirical support (Rasmussen, 1990), but other findings have also been reported. Andreoni and Miller (1993), for example, show that some subjects always choose to cooperate, while others choose not to cooperate or play a mixed strategy (Fehr and List, 2004). Research in game theory is far from blind to the “excess cooperation” findings but predominantly studies the elements of the game such as the number of players, the payoff structure or the information rules. In a PD game setting, Frey and Bohnet (1995), for example, report that pre-play communication increases the number of decisions to cooperate. For a large part, however, mainstream game theory and economics maintain the notion of *homo economicus* and incorporate behavioural assumptions, such as self-centred behaviour, that facilitate and enable logically rigorous theoretical models of cooperative behaviour on the one hand but, on the other hand, seem to cause the empirical anomalies of excess cooperation.

Experimental economics research has challenged the self-interest assumption and established that roughly 40-50 per cent of people are completely selfish, while the remainder exhibit egalitarian preferences (share profits equally among parties), surplus maximizing (maximize joint profits even to their own detriment) or altruistic preferences (Sally, 1995, 2001; Fehr *et al.*, 2007). In other words, there is now evidence that, for example, fairness (Fehr and Schmidt, 1999), reciprocity (Falk and Fischbacher, 2006),

culture (Boone and Van Witteloostuijn, 1999; Cox *et al.*, 1991), altruism (Fehr and Gächter, 2000; Andreoni and Miller, 2002), trust (Fehr and List, 2004), credible signals (Brosig, 2002) and harmony (Tan and Zizzo, 2008) could explain why people decide to cooperate and that some of this behaviour has neurological foundations (Spitzer *et al.*, 2007; Fehr and Camarero, 2007; Fehr and Rockenbach, 2004). This behaviour has been identified in many different game settings, such as PD, ultimatum, “dictator”, trust and public goods games (Schmid, 2004).

This study aims to contribute to the understanding of cooperation by individuals in PD situations. More particularly, the author empirically tests the proposition that individuals’ social and educational backgrounds explain cooperation differentials in otherwise identical situations. This study makes two contributions to the literature. The first contribution concerns the notion of individual social capital. Social capital is usually broadly defined as an asset inherent to social relationships and networks (Burt, 1997): it reflects the ability of actors to secure benefits by virtue of membership in social networks and other structures (Coleman, 1990). Many studies consider social capital to be a network phenomenon, but the author argues that this intangible resource could also be embodied in individuals and could therefore induce cooperation by individuals. The author studies three important sources of individual social capital, namely, religion, family background and community structures. Social capital is important in studies of international strategic alliances, particularly with respect to a network of international alliances (Nooteboom, 2004). The author explicitly accounts for this in the study as well. By doing so, the author also aligns the research with scholars arguing for studies of social capital at the level of individuals (Crudeli, 2006). The second contribution concerns the role of human capital. Human capital consists of all knowledge and skills acquired as a result of formal education and experience (Becker, 1975). This is important because people with superior human capital endowments are better at learning complex situations, such as repeated PD games, and are better able to adapt their behaviour to environmental contingencies (Boone *et al.*, 2002). Like social capital, human capital is also created through a path-dependent socialization process, and the author suggests that differences in human capital explain why some people choose to cooperate, whereas others do not.

The outline of this study is as follows. The author will begin by reviewing research done on social and human capital and use this to ground hypotheses about the effects of each form of capital on cooperative behaviour. The author focuses on main effects, given that the author is among the first to explicitly combine particular dimensions of individual social and human capital in a model to explain individual cooperation. The author aims to build foundations that can be used for more complex models in future research. The author will then provide details of the games, experimental procedure and measures, and then report the results of this study. The author will conclude, finally, by discussing the wider implications of the findings for IB research with respect to international strategic alliances.

Social capital

Social capital is the first source included in the model to explain individual cooperative behaviour. Scholars have broadly conceptualized social capital as the benefit that social actors derive from their social structures (Coleman, 1990; Burt, 1997). Within this conceptualization, the literature offers many definitions, measures and perspectives, i.e. researchers vary in their views regarding the concept’s content, its level of analysis and

its determinants and consequences, as well as the forms in which it exists (see, e.g., [Crudeli, 2006](#), for an excellent overview and discussion).

Social capital theory was originally developed by sociologists to explain the role of family in the development of neighbourhoods ([Carroll and Stanfield, 2003](#)). In the late 1960s and early 1970s, Bourdieu argued that culture was not only dynamic and creative but also a structured phenomenon. [Bourdieu \(1985\)](#) loosely defined social capital as the aggregate of the actual or potential socialized relationship resources between groups and classes. [Coleman \(1988\)](#) expanded this definition by emphasizing three separate spheres of social capital: obligations and expectations, information channels and social norms. Social capital is useful because it provides structure to functional decision-making, i.e. like other forms of capital, social capital is productive, enabling the achievement of certain ends that in its absence would not be possible ([Coleman, 1990](#)). Hence, social capital becomes an enabling link between agents in a social setting. [Putnam \(1993\)](#) continued the enabling emphasis and defined social capital as comprising the features of social organization such as networks, norms and social trust, which together facilitate coordination and cooperation for mutual benefit. Over the years, the theory has been expanded to explain a variety of outcomes at different levels, including venture success ([Honig, 1998](#); [Florin et al., 2003](#)), industry creation ([Aldrich and Fiol, 1994](#)), firm growth ([Ostgaard and Birley, 1994](#); [Kostova and Roth, 2003](#)) and career success ([Seibert et al., 2001](#)). Many of these studies concentrate on the positive consequences of social capital, albeit it having been noted that social capital may be harmful in some cases, even if it is productive and benign in other cases ([Adler and Kwon, 2002](#); [Annen, 2003](#) [Portes, 1998](#)).

Social capital reflects the ability of actors to secure benefits by virtue of membership in social networks or other social structures ([Durlauf, 2002](#)). It incorporates the beliefs and attitudes that social actors hold and have towards each other. Such beliefs and attitudes may include trust and trustworthiness ([Putnam, 1993](#)), norms and sanctions ([Coleman, 1990](#)) and obligations and expectations ([Burt, 1992](#); [Granovetter, 1973](#)). These are likely to lead to cooperative behaviour, as they create a psychological environment conducive to collaboration and mutual support ([Fukuyama, 1999](#)) that is also highlighted in international strategic alliance research ([Zaheer et al., 1998](#)). Social capital refers to trust, concern for one's associates, a willingness to live by the norms of one's community and to punish those who do not ([Bowles and Gintis, 2001](#)).

This study considers social capital at the level of the individual. The author defines social capital as an *instantiated* set of informal values or norms for cooperation. In terms of game theory, social capital is the *propensity* to play the cooperative solution even if it is not the Nash equilibrium[1]. The question arises of where this "propensity to cooperate" comes from. What are the foundations underpinning individuals exhibiting such "irrational" behaviour and how should we measure this? Social capital, as defined by the author, emerges in people involved in trust-based relationships that reward them for taking on and paying back mutual obligations. Social capital is developed in a learning process within communities through democratic principles and by rewarding members for cooperatively and democratically working together ([Lemmel, 2001](#)). Hence, the social background of respondents is one of the most convenient instruments used by researchers when measuring social capital as an explanatory variable for specific issues ([Ang et al., 2002](#)). In this study, the author will incorporate three features of the respondents' social background that are generally perceived as determining social capital, i.e. religion, familial background and community structures.

Religion

This study relates to the economics of religion (Heath *et al.*, 1995; Hull and Bold, 1995; Lelkes, 2006; Brown and Taylor, 2007). A religion is a shared set of beliefs, activities and institutions premised upon faith in supernatural forces. Ever since the first publication by Weber (1905), it has generally been acknowledged that religion can affect the economic attitudes of individuals, because many religions emphasize, for example, hard work, honesty and responsibility (Iannaccone, 1992, 1998; Lipfort and Tollison, 2003). Weber attributes the emergence of the spirit of capitalism to the development of a Protestant ethic that results from the interaction of the doctrine of salvation and the concept of good works. Although different religions may have different effects on people's attitudes, on average, religion is associated positively with attitudes that are conducive to cooperative behaviour (Guiso *et al.*, 2003). Religious people trust others more, trust the government and the legal system more, are less willing to break the law and are more likely to believe that the outcome of markets is fair (Fan, 2008). The author therefore hypothesizes that individuals who are from religious families and thus have been exposed to the norms and values of religion will exhibit more cooperative behaviour than those who are not. The first hypothesis is expressed as:

H1a. People from religious families will demonstrate more cooperative behaviour than those who are not.

Family background

Social capital theory implies that family and community structures are important in the creation of social capital (Morgan, 2000; Anderson and Miller, 2003; Glaeser *et al.*, 2002). Loury (1987), for instance, posits that an individual's achievement is conditioned by the social context in which the individual matures, i.e. the family, community and/or municipality. Schiff (1992) and Coleman (1988) express a similar view, arguing that an individual's social capital results from the socially complex and historically unique configuration of human and social resources. Hence, the values and norms of young adults that lead to cooperating or not cooperating are created, strengthened and internalized in their primary-school years through close interactions with parents and other siblings, and through community networks of schools and other institutions. These socialization perspectives are incorporated in this study.

The literature contains various empirical studies that analyse the role of family size in relation to performance, such as educational attainment (Conley, 2002; Guo and Van Wey, 1999; Powel and Steelman, 1993) or labour market success (Ashenfelter and Rouse, 1998; Altonji and Dunn, 1996). These studies have found that individuals who come from larger families – that is, have more siblings – do worse in school and achieve lower labour market earnings. The results generally hold even when other factors such as the socioeconomic status of the parents, parental education, rural/urban background and family intactness are accounted for.

Family size has negative effects on child and adult achievement outcomes, mainly because of a dilution of the familial resources available to children in large families, and a concentration of such resources in small ones (Blake, 1980). As family size increases, parents have less time and fewer economic resources for each child, i.e. parents talk less to each child about school, have lower educational expectations, save less for college and have fewer educational materials available. Hence, the dilution involves the parents' time, emotional and physical energy, attention and the ability to interact with children

as individuals (Blake, 1980). It appears that being brought up in a larger family dilutes young people's sense of urgency about playing and associating outside the family group, thereby making young people from large families more parochial and limited in their understanding of a variety of social roles (de Haan, 2010). Children from small families can extract more individual attention and interaction from parents than the latter might have voluntarily provided, given what they might prefer to do. In line with the dilution hypothesis, the author expects that family size will have a negative effect on cooperative behaviour. The author therefore hypothesizes:

H1b. People from large families will be less inclined to cooperate.

Community structures

In addition to families, communities are also important in the creation of social capital (Furstenberg and Hughes, 1995; Morgan, 2000). In their early years, young adults learn values and norms through interaction in social networks with other pupils, teachers, parents and other adults who together construct the social setting (community) in which the young adult matures. Various studies have reported the norm-enforcing effects of communities with a strong social closure environment (Putnam, 1993; La Porta *et al.*, 1997). More specifically, it has been argued that there are important differences between so-called southern and northern types of communities. Low trust among citizens, threats of repercussion in case of social defection and low levels of active public participation in civic activities, among others, characterize southern types of communities. In his study of development across Italy, for instance, Putnam (1993) finds these characteristics to prevail in southern regions and to crucially explain the relatively low levels of economic regional performance in south Italy compared to north Italy. In a cross-country study, La Porta *et al.* (1997) and Inglehart (1999) found evidence for this main proposition (Stulz and Williamson, 2001). In line with this, the author expects that people from southern community types are socialized in environments with low trust, low civic participation and high threats of repercussions. Hence, the author arrives at:

H1c. People from southern community types will be less inclined to cooperate.

Human capital

In the study of the determinants of cooperation, the author next analyses the role of human capital. It has been frequently pointed out that differences in success for an individual, group or population reflect differences in human capital endowments (Becker, 1975; Mincer, 1970). Human capital endowments are attributes such as education and experience. These attributes reflect the level of an individual's investment in formal school education and/or work experience (Becker and Murphy, 2000).

Human capital theory has been particularly applied to understanding differentials in organizational performance (Ang *et al.*, 2002; Buchholtz *et al.*, 2003; Watson *et al.*, 2003). Given its intangible nature ("causal ambiguity"), human capital resources are difficult to imitate and copy. For that reason, they are considered to be essential for the long-term survival and growth of organizations (Pennings *et al.*, 1998). Organizations endowed with superior human capital are better able to effectively plan and solve problems (Florin *et al.*, 2003), are better able to adapt to environmental contingencies (Snell and Dean, 1992; Youndt *et al.*, 1996) and continuously find new ways to increase customer benefits (Chandler and

Hanks, 1998). Therefore, a large number of empirical studies indicate that the performance of organizations is directly determined by human capital endowments.

It is a question of understanding which indicators of human capital are of interest in the analysis of cooperative behaviour within the context of PD situations. In this study, the author will focus on education because education is the most indicative of the abilities and skills of young adults (Boone and Van Witteloostuijn, 1999; Gächter *et al.*, 2004; Fan, 2008). Given their age, most young adults lack substantial experience capable of co-determining their cooperative behaviour. The author allows education to have a twofold role in the model of cooperative behaviour. This twofold role matches the peculiarities of the subjects involved in the experiments, i.e. second-year Dutch university students majoring in management and organization. First, the study must discount for differences in the type of high schools Dutch students attended prior to their enrolment in university programmes. Generally, Dutch high school students either attend “alpha” classes with a focus on languages or “beta” classes with a focus on mathematics and science. Language students will develop communication skills – a set of competencies difficult to use in the PD situation, given its prerequisite of “incommunicado”. Science students, however, are extensively trained to study, design, develop and solve complex problems. As a result, it is expected that beta students will be better at comprehending the PD situation, discovering the optimal, mutual cooperation solution and adapting their behaviour accordingly. The author therefore hypothesizes:

H2a. People with prior exposure to science education will be more inclined to cooperate in PD games.

Second, the experiments of Frank *et al.* (1993) showed that economics students behave more self-interestedly than their colleagues studying other majors. In other words, exposure to the self-interest models commonly used in economics alters the extent to which individuals behave self-interestedly. Boone and Van Witteloostuijn (1999), however, argue that not every student is exposed to self-interest models to the same extent and that this could even vary within major programmes. Some students follow “hard core” economics courses, whereas others choose business courses with elements of sociology and/or psychology. Therefore, in line with Boone and Van Witteloostuijn (1999), the author expects that the likelihood of cooperation increases with the number of courses students have followed in which cooperation is emphasized, and decreases with the number of courses in which competition is emphasized. Taking these arguments into account, the author arrives at:

H2b. People with prior exposure to cooperative courses will be very inclined to cooperate.

H2c. People with prior exposure to competitive courses will be less inclined to cooperate.

Research methods

Games

As is common in experimental research, the author used undergraduate students as the study subjects (for a discussion about the use of undergraduate students in research see, for example, Boone *et al.*, 1999a, 1999b, 2002; Frank *et al.*, 1993; Schlenker *et al.*, 1973; Tan and Zizzo, 2008). The experiment was conducted during a four-week course on

statistical methods for second-year students of management and organization at the Dutch University of Groningen. The four-week course was part of a new curriculum, and only those students who had passed the first-year programme were allowed to participate. At the outset of the experiment, students filled out a digital questionnaire, revealing background and personality information. The experiment was conducted during the first week of the course, and saw 182 management and organization students play five different PD games in a row. The average age of the subjects was 19.65 years, and 66 per cent of the participants were male. The students were only told that the experiment was designed to deepen their and the author's understanding of behaviour in a game theory setting. The students were promised feedback on the main findings of the research project after completion of the four-week course. The author also guaranteed strict confidentiality of the questionnaire information. The five PDs were presented to the subjects in a fixed order for the sake of simplicity. The order of presentation and the main characteristics of the games are summarized in [Table I](#).

Each game consists of 12 rounds of choosing, except for Game III that has an unknown horizon, ending at random after 13 rounds. In the first two games, subjects played against a fictitious party, receiving no information about the choices made by that party in each round. Therefore, these games were essentially "one-shot" or non-interactive games. In the last three games, dyads were randomly formed and the subjects played interactive repeated games. Here, choices were made simultaneously and independently in each round, after which the subjects were informed of the choice made by the other party. Game III has a so-called infinite horizon, as the subjects were not informed about the game's end round (i.e. Game III ended at random). The fourth game was similar to Game III, except for the announcement in advance that the game would end in round 12. In the last game, the author changed the values of the payoff matrix used in all the other games so that the incentive to cooperate might increase in the eyes of the players. The horizon of game V was, again, finite and known to be 12 rounds. The instructions and game payoff matrices can be found in the [Appendix](#).

The first two non-interactive games can be considered as baseline measures of cooperative behaviour. Both measures give an impression of the subjects' basic inclination to pursue a competitive or a cooperative strategy. In the second game, the

Game #	Type of game	Main characteristics of game
I	"One-shot"	12 choices (low or high price) against fictitious party No information on past behaviour of other party Baseline game
II	"One-shot"	12 choices (low or high price) against fictitious party Information on past behaviour of other party
III	Repeated	Subjects make independent and simultaneous choices in each round Exchange of choices made by other parties after each round Unknown horizon ("infinite" game) Final payoff equals sum of payoff in each round
IV	Repeated	Same as Game III, except horizon which is finite and known (12 rounds)
V	Repeated	Same as Game IV, except payoff matrix which is changed to elicit cooperation

Table I.
Main characteristics
of experimental
games

author manipulated the reputation of the other fictitious party by suggesting that this party was trustworthy because he or she had made cooperative choices in each of the 12 rounds in the previous encounter (i.e. cooperative feedback). The author expected baseline cooperation to drop because opportunism is rooted in Western societies (Boone and Van Witteloostuijn, 1999). Subsequently, in the last three repeated games, the author expected cooperation on average to gradually gain importance. When players are engaged in repeated interaction with another party, they quickly learn to cooperate, and often enter into tacit collusion, irrespective of whether the game's horizon is known or not.

Experimental procedure

The experiments were conducted in a large room. In the room, there were three groups and each group had three rows of paired tables. The pairs of tables were separated by the space of one table. When entering the room, the students were randomly distributed across the three groups and within the three groups using the seats available. Pairs of subjects were formed to play the repeated PD games (i.e. the last three games in Experiments I and II). These dyads consisted of students sitting side-by-side. One experimenter and two assistants, identifiable by their similar shirts, guided each of the three groups. The assistants handed out the various information forms, while the experimenter remained in front of the group for the entire experiment. All the groups started the experiment at the same clock time.

The PD was presented as an oligopoly-pricing problem. The experimenter first announced that five games were to be played, and that detailed information about each game would be provided just before that game started. He then presented and explained the general payoff structure of the first game (Appendix). The subjects could make two choices: setting a low price (corresponding to a competitive choice) or setting a high price (corresponding to a cooperative choice). The instructional phase fully and redundantly explained the interdependent nature of the payoffs, so that the consequences of different combinations of choices were clearly understood. The author avoided the use of terms like “compete”, “cooperate”, “defect” and “sucker”, so as to ensure a neutral instructional setting.

The experimenter, who gave instructions as to when and how to make choices in each game, strictly controlled the pace of the experiment. The subjects received a booklet with the instructions for each game and a corresponding response sheet. With the use of slides, the experimenter clarified each instruction at the beginning of each game. As mentioned above, Games I and II involved making 12 choices in a row against a fictitious party. At the beginning of Game III, the experimenter announced each subject's opponent/partner for the three repeated games. The subjects each received a booklet with small blank sheets of notepaper and were instructed in each round to choose independently and simultaneously. Next, the subjects had to write down their choice on the aforementioned blank paper. Once each subject had written down his or her choice, the experimenter instructed the parties to exchange notes. Following this exchange, the subjects noted their own choice, their opponent's choice and their payoff on a response sheet. This procedure was repeated for each round in the three interactive games. Of course, apart from the exchange of notes, no communication was allowed.

Following standard experimental gaming (Boone *et al.*, 1999a; Schlenker *et al.*, 1973; Pruitt and Kimmel, 1977; Gächter *et al.*, 2004), the subjects were instructed to maximize

their payoff during the experiment. Additionally, although experimental psychology has repeatedly revealed that subjects take experiments very seriously in any event, the author introduced an extra motivational incentive by announcing that the top five players in accumulated payoff terms would receive a music voucher. The author also appealed to a social prestige motive by telling the subjects that the ranking of payoffs, including the players' names, would be announced in public in a final plenary session at the end of the four-week course, both on a bulletin board and on the Faculty's student Internet homepages.

Measures

Independent variable. Following other researchers (Boone *et al.*, 1999a, 1999b; Uejio and Wrightsman, 1967; Cox *et al.*, 1991), the author computed the total number of cooperative choices in each game as the measure of the independent variable: cooperative behaviour. Recall that 13 rounds were played in Game III. To standardize measures over the five games, the author multiplied the total number of cooperative choices in Game III by the ratio 12/13.

Social capital. The author constructed three measures for each of the three social capital dimensions. First, the author asked the student to indicate the religion of his or her family, choosing from one of the five main religious categories in The Netherlands. From this, the author constructed a binary variable measuring whether or not the respondent had been exposed to religion (coded as 1, 0 otherwise). Second, large family size was measured by a binary variable determining whether or not the respondent came from a family with one or more siblings (coded as 1, 0 otherwise). Third, membership of a southern community type was measured using the province where the respondent received kindergarten and elementary education. The Netherlands has 12 provinces and the author decided that the southern three (i.e. South Limburg, North Brabant and Gelderland) represented southern-type communities (coded as 1, 0 otherwise). These provinces are known for their Catholic heritage, reflected in many aspects of their society (churches, sports, music and other social groups). Where more than one province was provided, the author asked the respondent to indicate the province in which he or she had lived the longest.

Human capital. Three binary indicators were created to capture the respondents' human capital. The first indicator measured whether the respondent attended a science-type high school prior to enrolment at university on a single binary variable (coded as 1, 0 otherwise). Prior knowledge and exposure to competition or cooperation was measured with two variables. The students received a list of nine courses and they were asked to mark the courses they had already followed. The assessment of the course content revealed that three courses (i.e. economic principles, law principles and transactions) emphasized the self-interest economic model (i.e. competition), whereas three other courses (i.e. organizational behaviour, international transformation processes and communication) also stressed the importance of cooperation in economic life. The author used two ordinal measures (ranging from 0 to 3) to measure exposure to competitive or cooperative courses.

Control variables

The author included two sets of control variables. The first set of control variables includes two subject characteristics that are widely recognized as having influence on

cooperative behaviour, i.e. age and gender. Based on cognitive-developmental theories, the author expected that cooperation increases with age (Cook and Sloane, 1985): the older people are, the more likely they are to believe that others try to be fair or helpful (Gächter *et al.*, 2004). With respect to gender differences, the majority of the findings supported the widely held belief that females are more cooperative than males (Mason *et al.*, 1991; for contradictory findings, see Cook and Sloane, 1985). In the present study, males were coded as 0 and females as 1.

The second set of control variables includes four types of personality traits: *locus* of control, self-monitoring, Type-A behaviour and sensation seeking. Boone *et al.* (1999b) have shown that these four personality traits are stable human characteristics that have a relevant effect on cooperative behaviour. First, *locus* of control refers to the individual's generalized belief in internal versus external control of reinforcements (Rotter, 1966). Those who believe in external control ("externals") see themselves as relatively passive agents and believe that the events in their lives are due to uncontrollable forces. Those who believe in internal control ("internals") see themselves as active agents; they feel that they are masters of their fates and they trust their capacity to influence their environment. Empirical results suggest that internals are more cooperative than externals (Boone and Van Witteloostuijn, 1999; Boone *et al.*, 2002). The author measured *locus* of control with an adapted version of Rotter's original scale that contains 37 forced items (23 of those items being designed to measure *locus* of control expectancies and 14 being filler items that conceal the purpose of the test). Each item consists of a pair of statements where the respondent has to choose between an "internal" and an "external" alternative. A total *locus* of control score is obtained by counting the number of external alternatives chosen (with minimum 0 and maximum 23). The Cronbach's alpha of 0.65 is well above the lower limits of acceptability in experimental research, generally considered to be in the 0.50-0.60 range (Rotter, 1966; Robinson and Shaver, 1973; Nunnally, 1978).

The next control variable considers that people may differ in the extent to which they observe and control their expressive behaviour and self-presentation (Snyder, 1974, 1987). Individuals high in self-monitoring are thought to regulate their expressive self-presentation for the sake of desired public appearances. They are therefore highly responsive to social and interpersonal situationally appropriate performance cues (Snyder and Gangestad, 1986). Individuals low in self-monitoring are thought to lack either the ability or the motivation to regulate their expressive self-presentations. Research suggests that high self-monitors are more cooperative than low self-monitors, given their sensitivity to others' goals (Baron, 1989). The author used Snyder and Gangestad's (1986) 18-item scale to measure self-monitoring. For each of the 18 items, respondents are asked to indicate whether the statement is true, mostly true, rarely true or false as applied to their lives. The items are keyed towards high self-monitoring. A total score is obtained by counting the number of high self-monitoring answers (with minimum 0 and maximum 18). The Cronbach's alpha of 0.63 is satisfactory.

The following control variable accounts for the fact that the degree of cooperative behaviour is higher for Type-B than for Type-A individuals. Type-A behaviour is referred to as the behaviour of an individual who is involved in an aggressive and incessant struggle to achieve more and more in less and less time (Friedman and Rosenman, 1974; Friedman and Booth-Kewly, 1987; Appels *et al.*, 1985; Glass, 1983). Those who have not developed such a behavioural pattern are called Type-B persons.

Due to their impatience and competitiveness, Type-A persons are less likely to show cooperative behaviour than Type-B individuals (Kabanoff, 1987). The author used the 24-item Jenkins Activity Survey (Jenkins *et al.*, 1979) to measure Type-A behaviour. The Cronbach's alpha of 0.73 is acceptable.

Sensation seeking is the final control variable and refers to the seeking of novel and intensive experiences, including the willingness to take risks for the sake of such experience (Zuckerman, 1979a, 1979b; Feij and Van Zuilen, 1984). Research has suggested a genetic determination basis for sensation seeking (De Brabander *et al.*, 1992, 1995; Zuckerman, 1994) and found relationships with risk-taking behaviour such as drug use and gambling (Bratko and Butkovic, 2002; Thornquist *et al.*, 1991; Glicksohn and Golan, 2001). Because of the risks involved in cooperating in PD games, high sensation seekers will be more cooperative than their counterparts. The author assessed sensation seeking with a Dutch version of Zuckerman's (1979a) measure (Feij and Van Zuilen, 1984). The respondents were asked to indicate on a 5-point Likert scale to what extent they agreed (1 = strongly disagree and 5 = strongly agree) with 67 statements (of which 16 are filler items). The Cronbach's alpha of 0.83 for the overall sensation-seeking composite is satisfactory.

Empirical results

The dependent variable is the discrete choice of each individual in each of the 37 attempts of the last three games (0 = competitive choice and 1 = cooperative choice). In line with other studies, hierarchical logistic regressions were performed to predict the likelihood of individual cooperation in each attempt (Boone *et al.*, 2002, 1999a, 1999b). That is, the author interpreted the data of the three repeated games as a pooled cross-section/time-series sample (Mason *et al.*, 1991). This procedure allowed us to investigate the dynamics of game behaviour and the unique contribution of each individual capital variable to the explanation of cooperative behaviour. The author included two variables to account for the dynamics of game behaviour: a trial number and the other party's choice in the previous round. A trial number was incorporated to account for the finding that cooperation increases steadily over Games III to V due to differences in the games' nature. The second variable was included to account for the history of the game. That is, although individuals make independent choices in each round, these choices are not independent of the choices made by the other party in previous rounds. By incorporating the game's history – that is, the other party's choice in the previous round – the author was able to assess whether human and social capital matter, irrespective of the other party's strategy. The summary statistics and correlation coefficients are in Table II. The regressions results are in Table III. In addition to Model 1 – which includes the control variables and the variables that account for the dynamics of game behaviour – the author subsequently added social capital (Model 2) and human capital (Model 3) to the first model to assess the unique contribution of each form of capital in predicting cooperative choices.

The hierarchical logistic regressions reveal that all forms of capital have an independent effect on cooperative behaviour when introduced in steps as groups. The addition of the various capital items leads to a significant improvement in the model fit (changes in chi-square are 57.17 and 91.79 with $p < 0.001$ for Models 2 and 3, respectively, with 8, 12 and 15 degrees of freedom, respectively). In what follows, the

Table II.
Summary of
statistics and
correlations^a

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
Cooperation	5.48	2.24	1.00												
Religion	0.67	0.47	0.01	1.00											
Family	0.43	0.50	-0.08	0.19	1.00										
Southern community	0.26	0.44	-0.06	0.13	-0.05	1.00									
Science education exposure	0.30	0.46	0.09	0.02	0.06	0.11	1.00								
Cooperative exposure	2.20	0.96	-0.02	0.01	0.05	-0.02	0.10	1.00							
Competitive exposure	2.18	0.92	-0.09	-0.02	0.10	0.01	0.01	0.53	1.00						
Gender	0.34	0.37	-0.04	0.06	0.07	-0.01	0.02	0.11	0.01	1.00					
Age	19.65	1.04	0.05	-0.12	-0.15	-0.15	0.08	-0.10	-0.05	-0.03	1.00				
Locus of control	11.51	3.37	-0.04	0.03	-0.06	-0.13	0.08	0.09	-0.02	0.17	-0.07	1.00			
Self-monitoring	9.44	2.97	0.04	-0.09	-0.07	0.06	0.09	-0.04	0.02	-0.11	-0.08	-0.14	1.00		
Type-A behaviour	12.28	4.01	-0.05	0.18	0.04	-0.02	0.13	0.10	0.20	0.16	0.04	0.04	0.23	1.00	
Sensation seeking	11.27	1.57	-0.03	0.11	0.05	-0.09	-0.03	0.09	0.07	0.29	0.02	0.06	-0.35	0.20	1.00

Notes: ^aCorrelation coefficients larger than 0.02 and 0.05 are significant at $p < 0.05$ and $p < 0.01$, respectively; $N = 6,734$ [182 subjects \times 37 attempts (1 trial observation lost due to the variable "other person's choice in previous round" per subject)]; the scales of the variables are explained in detail in the text in the section on measurements

Variables	Research Model 1	Research Model 2	Research Model 3
Constant	-3.380*** (0.602)	-2.576*** (0.632)	-1.808** (0.648)
Trail	0.015*** (0.003)	0.015*** (0.003)	0.016*** (0.003)
Other person's choice lagged	1.531*** (0.054)	1.527*** (0.054)	1.520*** (0.055)
Gender	-0.057 (0.061)	-0.028 (0.061)	-0.049 (0.062)
Age	0.116*** (0.026)	0.093*** (0.027)	0.066** (0.027)
Locus of control	-0.001** (-0.008)	-0.012** (-0.008)	-0.023** (0.009)
Self-monitoring	0.040*** (0.010)	0.042*** (0.010)	0.037*** (0.010)
Type AB	-0.035*** (0.007)	-0.042*** (0.007)	-0.041*** (0.007)
Sensation seeking	0.004 (0.019)	-0.009 (0.019)	-0.003 (0.019)
Religion		0.282*** (0.062)	0.274*** (0.062)
Large family		-0.240*** (0.057)	-0.269*** (0.058)
Southern community type		-0.367*** (0.064)	-0.435*** (0.066)
Exposure to science education			0.474*** (0.062)
Exposure to cooperative courses			0.081** (0.034)
Exposure to competitive courses			-0.188*** (0.036)
-2 log likelihood	8,054.57	7,997.40	7,905.61
Model χ^2	1,015.59***	1,072.76***	1,164.55***
Change χ^2	1,015.59***	57.17***	91.79***

Table III.

The impact of social and human capital on cooperative behaviour^{a,b}

Notes: ^a $N = 6,734$ [182 subjects \times 37 attempts (1 trial observation lost due to the variable "other person's choice in previous round" per subject)]; standard error in parentheses; ^b ** and *** indicate statistical significance at the 0.05, 0.01 and 0.001 level, respectively

author discusses the findings for social and human capital with respect to the results for the final Model 3.

The results confirm the fostering effect of exposure to *religion* on cooperative behaviour ($B = 0.274, p < 0.001$). Hence, *H1a* is confirmed. Table III indicates that the effect of a large *family size* negatively impacts on cooperative behaviour ($B = -0.269, p < 0.001$). *H1b* is thus confirmed. Students who have been raised in a *southern community type* express less cooperative behaviour ($B = -0.435, p < 0.001$). This is in line with the author's expectations. *H1c* is therefore confirmed. In line with the author's prediction, students who attended a *science-type* high school are more cooperative than those who did not ($B = 0.474, p < 0.001$). *H2a* is thus confirmed. Table III shows that students who were exposed to *courses* that emphasize *cooperation* are more cooperative than those who had not ($B = 0.081, p < 0.010$). *H2b* is accepted. In line with the author's expectations, the results show that students exposed to *courses* that emphasize *competition* are less cooperative than those who were not ($B = -0.188, p < 0.001$). *H2c* is thus confirmed.

Finally, it is worth mentioning that the results hold while controlling for a substantial number of variables that could also determine cooperative behaviour. The results of Model 3 show the likelihood of cooperation increases as the game proceeds: there is a positive and significant effect of practice ($B = 0.016, p < 0.001$). The parameter estimate of the other's party choice in the previous round is also positive and significant ($B = 1.520, p < 0.001$). The latter result confirms previous experimental findings that cooperation is enhanced when cooperation can be expected from the other party

(Pruitt and Kimmel, 1977; Boone and Van Witteloostuijn, 1999). On average, the subjects opted for a tit-for-tat strategy in the repeated games. The author observed that the estimate of gender parameter's sign is negative in all models (which suggests that males rather than females are somewhat more cooperative in the sample), but it is not significant in the models. The results confirm that the likelihood of cooperative behaviour increases with age ($B = 0.066$ and $p < 0.010$). The results for personality capital are also in line with the author's expectations, by and large. Table III shows that locus-of-control internality ($B = -0.023$, $p < 0.010$) and a high self-monitoring personality trait increase the probability of cooperation ($B = 0.037$, $p < 0.010$). Table III reports that Type-A individuals are more competitive than Type-B persons ($B = -0.041$, $p < 0.001$). The results for sensation seeking are not in line with the author's predictions, but they are also not significant ($B = -0.003$, n.s.). A possible explanation for this is that the author estimated the model using the composite sensation-seeking scale. Sensation seeking includes four sub-dimensions, i.e. thrill and adventure seeking, experience seeking, uninhibitedness and boredom susceptibility. The author re-analysed the model incorporating each of these four dimensions. The results from these additional tests indicate that mutually exclusive effects can be identified, although none are significant: thrill and sensation seeking and uninhibitedness decrease cooperation, whereas experience seeking and boredom susceptibility increase the likelihood of cooperative behaviour.

Conclusions

The point of departure for this study is the lack of social and human capital dimensions as essential determinants of individual cooperative behaviour in IB research. Alliance research, for example, generally uses the firm as the unit of analysis and seems to ignore the important role of managers self in inter-firm collaboration (Nooteboom, 2004). This omission may have caused IB researchers to under-specify models of cooperation. The purpose of this study, therefore, is to propose and test a research model of individual cooperative behaviour that accounts for social and human capital of individuals. To really understand cooperative behaviour of individuals, one must account for how earlier experience socializes individuals into certain beliefs and unconscious behavioural patterns. This directly relates to the concept of mental programming (Hofstede, 2001) that is key in studies of cross-cultural management; it refers to the glass through which people see life. This study helps to understand why people think differently and assume differently and, hence, can help to explain why people act differently in different cultures.

Hence, the key focus of this study is to understand how socialization in the past can explain cooperative behaviour of individuals in the present. In so doing, the author also aims to explain the excess cooperation observed in reality that rational reasoning would deny existed. To this end, the author studies the effects of two forms of capital, i.e. social and human capital. The empirical results show that these features – in combination with the gender, age and personality capital control variables, and the dynamics of game behaviour – offer a substantial explanation for cooperative behaviour in people involved in PD situations. Clearly, the empirical results provide convincing evidence that people vary considerably in their willingness to cooperate, even under the same environmental conditions (Sally, 1995, 2001; Gintis, 2000; Henrich *et al.*, 2001). By adopting the author's eclectic perspective, the present study belongs to an interdisciplinary research tradition

that aims to account for fundamental mechanisms and processes, other than changing the game elements, that promote the emergence of cooperation (Tan and Zizzo, 2008; Hammerstein, 2003).

Cooperation is contingent on many things, and the two forms of capital are the main, overall exogenous variables that explain this. A first point of departure in this study is that socialization matters. Even within the same nation state, people behave differently because their beliefs, values, preferences and habits have been formed and reformed by continuous participation in groups with different norms and values. The author argues that three key dimensions of social capital – exposure to religion, family background and community structures – influence behaviour in general, and that of an individual's inclination to cooperate in social dilemma situations in particular. The empirical results generally support this. Exposure to religion increases cooperation, whereas being born and raised in large families or a southern community type decreases cooperation. The empirical results also confirm that human capital matters. The type of high school education and the exposure to either competitive or cooperative courses determine cooperative behaviour in line with the author's expectations.

This study has various implications for managers, in particular those directly involved in international strategic alliances. An international strategic alliance is an enduring cooperative agreement in which two separate organizations share input while maintaining their own corporate identities. International strategic alliances can have different governance structures and targets, but they are generally considered to be an important prerequisite for company success: net profits can grow for many years in succession if companies join forces. However, despite the potential added value of an international strategic alliance or the need to team up with other companies, approximately half of the international strategic alliances fail. The author offers two explanations for the failure of international strategic alliances. First, any international strategic alliance is a collaboration between individuals that each, following this study, have their own path-dependent history making people inherently able to cooperate or not. This study highlights the importance to review the *ex ante* incompatibility of any alliance partner, given that a match of inherently collaborating individuals with inherently non-collaborating individuals will not be very successful. International alliance partners should therefore not only focus on firm-specific criteria such as financial or knowledge resources or market opportunities, as is commonly advocated in the alliance literature. This study shows that information about individuals (including their family, community and education background) may help to *ex ante* select partners that foster *ex post* alliance success. Second, this study offers in-depth explanations for relational features – such as a lack of trust and conflicts or dispositional alliance characteristics such as cultural differences – that are put forward for international alliance failure. It is a matter of finding and matching appropriate individuals that will result in, for instance, high trust situations needed for cross-cultural long-term relationships. Additionally, the author would like to mention that in case of a “mismatch” between individuals, there are opportunities to manage the resulting dynamics. Third parties may have a role to play helping such “mismatched” alliances to overcome some of the limitations that result from this. Among others, third parties may help to establish appropriate contracts, provide coordination or impartial and objective information needed for effective monitoring and control or

bridge cognitive distances. Of course, such third parties should meet particular criteria – for example, the third party should not be servicing the interests of one actor more than those of the other and should be trusted in his or her competences and intentions – to make successful interventions for the initiation and application of structural and relational governance mechanisms in misaligned alliances. If so, third parties can help identifying behavioural repertoires and partly solve these. In doing so, they can help to “prime” a successful collaboration or assist to manage international alliances based on appropriate incentives for both sides of the inter-firm agreement.

Hence, this study offers avenues for future IB research that aims to understand the success of cross-cultural inter-firm collaborative efforts. It is a question to what extent firm characteristics or individual features of managers determine international alliance success. Future studies may analyse whether they are complementary, mutually exclusive or interdependent and, in so doing, disentangle the underlying causal structure of cooperation at a different level than what is common in IB research. This study shows that individual characteristics can be measured in a meaningful way. The measurements can be included in surveys or case studies, enabling IB scholars to systematically study cooperative behaviour from a multi-level perspective.

As with any experimental setting, various well-known limitations are applicable to this research. By themselves, these limitations offer challenges and opportunities that can and need to be met in future research. Although many “real-world” situations resemble a PD setting, other situations could align with games that have more than one (Nash) equilibrium. It could also be interesting to use such games in experiments and to explore whether the forms of capital are important in the understanding of individual behaviour. Additionally, testing the model in an international setting with non-student subjects would not only allow us to explore cross-national differences in social capital (the form within which it can be expected that international differences materialize), but would also indicate whether the behaviour of, e.g., managers or policymakers aligns with the theoretical predictions of the present research. Students are often used in experiments and their behaviour is generally considered to be representative, albeit that behaviour of IB executives in naturally occurring environments may be different due to their age or their experience in international negotiations (Fehr and List, 2004). Future studies may address this explicitly by using managers in experiments. Additionally, although many of the measurements have been used in earlier research and as such offer a reliable test of the author’s hypotheses, new research could explore whether or not the present results hold for other measurements for some of the variables, in particular those related to religion. Religion can have differences in depth and breadth for particular persons, and variations in such religiosity can be measured directly and different from what is presented in this study. Below, the author will elaborate on specific limitations of this study, and explore some of the associated suggestions for further research.

First, the author avoided any interaction and/or moderating effects between the independent variables in the model. Although the empirical results suggest important roles for each form of capital in terms of direct effects on cooperative behaviour, the overall underlying causal mechanism of cooperative behaviour in PD situations could

be much more refined than the one the author allowed to operate. Future research could incorporate this perspective and incorporate interaction effects among the constituent variables of cooperative behaviour into the model and, subsequently, enable its relative importance to be estimated. Second, any theoretical model is at best a biased representation of reality, and the present model is no exception. There could be other forms of capital and they may have direct, indirect or moderating effects on cooperative behaviour. Such new forms of capital could be incorporated, as indicated by Zizzo's (2002) work (Fehr and Camarero, 2007; Fehr and Rockenbach, 2004). Zizzo, for example, argues that serotonin works as a form of human capital. Serotonin stabilizes information flows in the neural circuitry to produce appropriate affective and behavioural output. In relation to game-theoretic interactions, this implies that its role is related to the processing of cues relevant to social interaction because serotonin improves the social cognitive skills of agents. It would follow from this argument that pharmacologically induced changes in serotonin levels would increase social competence and, consequently, produce greater social and economic success. Incorporating this form of capital calls for the design of new experimental settings (double-blind placebo studies, functional magnetic resonance imaging techniques, etc.) for which the present study could serve as a point of departure.

In conclusion, cooperation will remain crucially important for managers and firms that operate in the contemporary world economy, and a thorough understanding of the causes and consequences of cooperation on firm behaviour remains central to IB research. With the above limitations acknowledged, the author is confident that this study makes an important contribution to IB research by explaining how the relationship between individual characteristics and individual cooperation varies.

Note

1. In game theory, the Nash equilibrium is a solution concept of a non-cooperative game involving two or more players, in which each player is assumed to know the equilibrium strategies of the other players, and no player has anything to gain by changing only their own strategy unilaterally. If each player has chosen a strategy and no player can benefit by changing strategies while the other players keep theirs unchanged, then the current set of strategy choices and the corresponding payoffs constitute a Nash equilibrium (Rasmussen, 1990).

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Appendix

Game settings

Two firms operate in the same market: Firms I and II. Both firms can choose between two price strategies: setting a low price and setting a high price. The profits depend on the pairs of strategies chosen. In the following payoff matrix, the four possible profit combinations (in thousands of Euros) are reported for Experiment I (P_i stands for the pricing strategy of firm i , with $i = I, II$) (Table AI).

Each cell contains the possible profit combinations (W_I, W_{II}). W_I and W_{II} are the (negative or positive) profits of Firm I and Firm II, respectively. The four profit combinations are as follows:

- (1) $P_I \text{ low} = P_{II} \text{ low}$: Both firms choose to set the same low price. The profit margins are negative. Both firms generate a loss of EUR 30,000.
- (2) $P_I \text{ low} < P_{II} \text{ high}$: Firm I offers a lower price than Firm II. The Firm II's customers prefer to buy from the "cheaper" Firm I. The profit of Firm I is therefore EUR 600,000, and Firm II's losses amount to EUR 600,000.
- (3) $P_I \text{ high} > P_{II} \text{ low}$: Firm II undercuts Firm I. The resulting profit combination is the opposite of the second case. Firm I generates a loss of EUR 600,000 and Firm II a profit of EUR 600,000.
- (4) $P_I \text{ high} = P_{II} \text{ high}$: Both firms choose to set the same high price. The profit margins are positive. Both firms gain a profit of EUR 300,000.

Game I

Imagine you are Chief Executive Officer of Firm I. You decide autonomously on the pricing strategy of your company. You have an appointment with your distributor to fix the future pricing strategy for your product. It is a custom in this industry that contracts with distributors are concluded annually, in which the price level for each month (or round) for the coming year is stipulated in advance. It is impossible to change the terms of the contract afterwards. The Chief Executive Officer of Firm II will simultaneously determine her/his pricing strategy with her/his distributor (a different one from yours) for the following 12 months. You do not know the price intentions of Firm II and vice versa. Indicate your preferred strategy below (L indicates low price; H indicates high price) for each round (month).

Game II

At the end of the contract, you learn that Firm II has consistently chosen to set a high price in each month of the previous contracting period. Now, you have to agree a new contract with

		Firm II	
		Low price	High price
Table AI. Profit combinations for experiment I	<i>Firm I</i> Low price	(-30, -30)	(600, -600)
	High price	(-600, 600)	(300, 300)

		Firm II	
		Low price	High price
Table AII. Profit combinations for experiment V	<i>Firm I</i> Low price	(-20, -20)	(800, -400)
	High price	(-400, 800)	(600, 600)

your distributor for the next 12 months. Indicate again which pricing strategy you prefer for each month.

Game III

Your information on the past intentions and pricing strategy of Firm II has become irrelevant because Firm II has been taken over by another company, which installed a new Chief Executive Officer. The government has also decided that contracts in which prices are set for more than one month in advance are now illegal. Therefore, for the next year you are only allowed to fix your price level for one month, after which you have to decide again for the next round. Decisions are made simultaneously in each month.

You play the game for an unknown number of months (rounds). You do not know in advance how many times you will have to make a decision on your pricing strategy. The game can end any moment after Round 8. The probability that the game ends after Round 8 is 20 per cent. The sequence of decisions/activities you have to perform is as follows:

- at the beginning of each round, the price strategies are set simultaneously and noted on the response sheet;
- subsequently, swap sheets with your counterpart; and
- finally, calculate your own profit, given the strategy of the other firm.

Indicate for each month on your response sheet: the strategy you prefer, the strategy of the other firm and the profit you gained. Except for the exchange of notes after each round, no communication is allowed during the experiment.

Game IV

Repeat Game III, but for 12 months (rounds).

Game V

In the following period of 12 months, demand has increased substantially, along with an increased profit potential. This new situation is reflected in the following profit combinations (profits are in thousands of Euros) (Table AII).

Proceed as in Game IV.

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