Implications of game theory for theoretical underpinning of cooperative relations in workplace partnership
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ABSTRACT
This article clarifies the ongoing debate over the key factors underpinning cooperative relations between management and trade unions by drawing on the once-off and repeated prisoner’s dilemma models. It argues that the lower the risk to achieve a ‘win-win’ outcome and the longer the time horizon for workplace partnership, the more likely is for the two parties to cooperate.

1 INTRODUCTION
Workplace partnership refers to an approach to organisational governance which is based on predominantly cooperative relations between management and trade unions and which seeks to add value for all stakeholders (Guest and Peccei, 2001; Kochan and Osterman, 1994). Three main theories have been used to explain workplace partnership: rational choice, bounded rationality and institutional theory. While there is consensus among these three theories that the parties are likely to cooperate only if the benefits of cooperation are higher than the costs, there are considerable debates about the conditions under which management and trade unions are likely to adopt and sustain cooperative relations (Butler et al., 2011; Cooke, 1990; Streeck, 1992). In particular, there are debates about the impact of the level of competitive pressure and the industrial relations (IR) climate (voluntary versus statutory mechanisms of employee participation) on the relationship between management and unions (Cooke, 1990; Kochan et al., 2008; Roche and Geary, 2006; Streeck, 1992). Cooke (1990) is arguably the most influential scholar to have utilised the rational choice theory to explain workplace partnership. Based on the rational choice theory, cooperative relations between management and trade union are self-interestedly adopted. Cooke (1990) indicates that under a ‘cooperation’ strategy, both parties gain more than they would under the alternative adversarial or ‘union avoidance’ strategy because the total outcome is increased through cooperation and this ‘larger pie’ is available to be distributed between management and employees. Nevertheless, he argues that only under specific conditions can the two parties adopt a cooperative
strategy. First, he claims that the higher the competitive pressure, the more likely that the parties would cooperate to deal with increased market competition. Second, the prospect that parties adopt a cooperative approach varies depending on the perception of each party that the costs of relying on relative power options (the perceived amount of power of unions in relation to management) are higher than the benefits.

There is a degree of overlap between the explanation of workplace partnership provided by the rational choice theory and the bounded rationality theory. Both argue that self-interested voluntary cooperation between management and unions is possible under certain conditions, but the scholars in the bounded rationality camp identify a broader set of internal and external factors that affect the strategies of the two parties (Butler et al., 2011; Kochan and Osterman, 1994; Kochan et al., 2008). Furthermore, and more importantly, bounded rationality scholars have different expectations regarding the impact of competitive pressures and the IR climate on the strategies selected by the two parties. Cutcher-Gershenfeld and Verma (1994) indicate that too much market competition is likely to lead to adversarial relations. This contradicts the rational choice argument that the greater the competitive threats, the more likely it is for management and trade unions to cooperate. As regards the IR climate, the bounded rationality scholars claim that a cooperation strategy is more likely to be adopted in companies where there is a high level of interdependence and trust between management and employees and there are strong unions involved in joint decision making at different levels in the company (Butler et al., 2011; Kochan et al., 2009).

Institutional theory questions the potential to develop long-term voluntary cooperation between management and unions based on rational self-interest. Streeck (1992) claims that market-driven voluntary cooperation between employers and unions, grounded in the rational self-interest of each party, is possible but not sustainable. According to Streeck (1992: 323), there are two main conditions for the development of sustainable cooperation between employers and unions at workplace level: (i) legislation that secures the rights of trade unions to exist and (ii) legal obligations on the parties to cooperate. He argues that without these two legal constraints, the unions would not trust employers to cooperate. Streeck (1992: 323–324) indicates that:

The reason why in Germany cooperation between management and labour looks and works as though it was voluntary is precisely because it is not. What appears like ‘the rational thing to do’ for both sides might cease to appear so if its non-voluntary institutional underpinnings were removed or weakened.

In contrast to the rational choice theory, Streeck argues that high competitive pressures give the power to make strategic choices to management and rarely provide opportunities for cooperation between management and labour. Management can choose alternative approaches to increase profitability that do not require labour cooperation such as moving production to a different country with lower labour costs: capital is more mobile than labour (Dobbins and Gunnigle, 2009). In contrast, ‘the only way labour can ensure that management continues to find voluntary cooperation in its best interest is by good behaviour’ (Streeck, 1992: 326). The institutional theory therefore questions the very basis of voluntary cooperation that underpins both the rational choice and the bounded rationality theories.

This article adds clarity to the ongoing debates among the three theories of partnership by using concepts from game theory (in particular, the prisoner’s dilemma and the folk theorem) to help understand the key factors underpinning cooperative
relations in workplace partnership. It confirms that the perceived outcomes for the two parties are vital for the adoption of cooperative relations between management and trade union, while it adds that the perceived effects of market competition and the IR climate have a crucial impact on the stances adopted by the parties. It elucidates the debate between rational choice theory (Cooke, 1990) and the different views of those supporting the bounded rationality theory (Cutcher-Gershenfeld and Verma, 1994; Dobbins and Gunnigle, 2009; Kochan et al., 2009) by demonstrating that high and low market competition may have the same effect on the level of risk involved in achieving the potential outcomes. Also, it clarifies the disagreements concerning the need for voluntary or statutory mechanisms of employee participation by demonstrating that the effects of both can lead to cooperation between the two parties, but the time horizon of partnership is shorter in the case of voluntary employee participation mechanisms than in the case of statutory mechanisms.

The article provides new insights into the key factors that affect the stances of the parties with respect to cooperation, but it is not an alternative theory for workplace partnership. It argues that there are three interrelated conditions that underpin cooperation between management and trade unions, namely: (i) the higher the potential benefits of cooperation for each party, the more likely it is that the parties will cooperate; (ii) the lower the risk to achieve the expected benefits, the more likely it is that the parties will cooperate; and (iii) the higher the potential for future benefits of cooperation, the more likely it is that the parties would adopt and sustain cooperative relations. This article supports the view that an institutional theoretic approach provides the best opportunity for achieving a ‘win-win’ outcome in IR, given that it has a long-term horizon of partnership and the institutional constraints may reduce the risk to achieve the expected benefits for the two parties (Streeck, 1992).

The article is laid out as follows: section 2 introduces game theory and the prisoner’s dilemma model; section 3 discusses cooperative relations between management and trade unions viewed through a game theoretic lens; section 4 concludes.

2 GAME THEORY AND COOPERATIVE RELATIONS BETWEEN MANAGEMENT AND TRADE UNIONS

This article suggests that game theory may be able to play a role in clarifying the main debates between these three existing theories, thereby contributing to a better understanding of the theoretical underpinning of cooperation between management and trade unions. The article is not putting game theory itself forward as an alternative theory for workplace partnership. What it does do is provide a simplified explanation of the very complex reality of the ongoing interactions between management and trade unions at the workplace level. This simplified explanation can assist in providing insight into this complex reality.

Game theory itself goes back to the early 20th century where it was developed as a mathematically based theory of strategic decision making involving multiple rational decision makers (von Neumann and Morgenstern, 1944); it has since been applied in fields as diverse as economics, politics and biology (Brandenburger and Nalebuff, 1996; Dixit and Nalebuff, 1991). Game theory is now the dominant paradigm in the field of industrial organisation economics (Martin, 2002: 8), and formal game theoretic modelling is steadily adding rigour in the strategy field (Besanko et al., 2010; Costa et al., 2013; Saloner et al., 2001). That 10 recent Nobel prize winners in Economics are game theorists underlines the significance and importance of the
theory to that field (Nash, Selten and Harsanyi in 1994; Schelling and Aumann in 2005; Hurwicz, Maskin and Myerson in 2007; Shapley and Roth in 2012). Inherent in the theory of games are the underlying concepts of cooperation (Axelrod, 1984), bargaining (Coddington, 1967; Harsanyi, 1961; Nash, 1950), conflict of interest (Luce and Raiffa, 1957) and asymmetry of outcomes. Such asymmetry of outcomes can allow the ‘exploitation of potential force’ whereby one or other of the decision making parties exercises their power through use of deterrents, threats or promises (Schelling, 1980:5). These concepts of cooperation, bargaining power and conflicts of interest are also fundamentally important in the field of IR (Danford et al., 2005; Kochan et al., 2008). This article proposes that adopting the lens of game theory will help shed new light on the main conditions under which management and trade unions are likely to cooperate.

Game theoretic concepts are not new in the field of IR. Workplace partnership is regularly associated with game theory terminology such as mutual gains, ‘win-win’ game and ‘non zero sum’ game. Partnership draws on a game theoretic principle when it suggests that cooperative relations can lead to a better outcome for each party than alternative options under specific conditions (Geary and Trif, 2011; Guest and Peccei, 2001; Huzzard et al. 2004; Kochan et al., 2009). Surprisingly, however, no study was found that sought to formalise the use of game theory to explain the conditions under which management and trade unions are likely to cooperate. Nevertheless, some studies utilised game theory to explain the broader stockholders–employee cooperation within a firm (Aoki, 1980), while Freeman and Lazear (1995) did an economic analysis of works councils. This article uses the prisoner’s dilemma game and the folk theorem to clarify the debates between the three main theories of partnership. In particular, the article examines the role that outcomes, competitive pressures and IR climate play in adopting and sustaining cooperative relations between management and trade unions.

Viewed from a game theory perspective, management and trade unions act as independent decision makers in a situation where the outcome depends on the decisions made by the two parties. The decision making situation is therefore characterised as one where the parties are both independent and also interdependent. The article assumes that management and trade unions act as the representatives of the company and employees, respectively. Similar to previous studies, it considers that managers’ main interest is to maximise the wealth of the firm, while trade unions’ interest is to maximise the wealth of their members (Aoki, 1980: 601). Workplace partnership is examined as a two-player game between the representatives of those who control the capital (alias Charles in the prisoner’s dilemma game) and labour (alias Laura in the prisoner’s dilemma game), which are generally regarded as the two main actors who decide whether or not to adopt cooperative relations at the workplace.

The story of the prisoner’s dilemma is that two suspects, Charles and Laura, have been arrested by the police for robbing a bank and placed in separate isolation cells and then interrogated by the police. If both suspects stay silent then both will be convicted but only for a minor offence and so given a light sentence; this situation is represented by scenario (a) shown in Table 1. However, if Laura confesses but Charles stays silent then Laura’s confession is used to convict Charles of robbing the bank. Charles receives a large sentence and Laura gets off scot free due to her cooperation with the police. This situation is represented by scenario (b). Scenario (c) represents the identical situation but where Charles confesses and Laura stays silent.
When both Laura and Charles confess, then both are convicted, but because they confessed and put the court to less trouble they get somewhat lighter sentences than if they stayed silent. This situation is represented by scenario (d). This last cell represents the prisoner’s dilemma. Game theory suggests that both players will be driven through self-interest to confess, thus ending up with significant sentences, even though a better deal for both of them exists, namely scenario (a). For both Laura and Charles, confession is a dominant strategy: it is better for them to confess irrespective of what the other person does. Rational choice therefore leads both players to make choices such that they arrive in a position that is not optimal for them either individually or collectively.

Workplace partnership and prisoner’s dilemma share the fundamental principle that cooperation can lead to a better outcome for each party than alternative options. In the prisoner’s situation, if Laura and Charles trust each other completely and each is perfectly confident that the other will never confess, then each may independently choose to stay silent. Both then will achieve the outcomes shown in cell (a) where both are better off. This could be regarded as a win-win situation for both of them. However, for independent decision makers to come to the conclusion to trust each other, and therefore stay silent, some future benefit must accrue to each of them. In the prisoner’s situation, for example, after each spending six months in jail, Laura and Charles can team up once again to rob another bank. It is this future benefit that makes it worthwhile for each of them to stay silent and forego the chance to walk free in the short run.

The theory of infinitely repeated games offers an explanation of cooperation in ongoing relationships. The folk theorem says that in a repeated game many more equilibrium possibilities exist than in a once-off game (Lambertini, 2011: 73). Even perfectly rational (i.e. self-interested) decision makers can achieve an improved outcome for both when the game is infinitely repeated. This means that mutual cooperation can arise as an equilibrium in a prisoner’s dilemma game that is repeated indefinitely. Just as the once-off prisoner’s dilemma gives insight into the nature of a single partnership episode, this property of repeated games may provide insight into ongoing relations between management and trade unions.

### 3 KEY FACTORS UNDERPINNING COOPERATIVE RELATIONS BETWEEN MANAGEMENT AND TRADE UNIONS

This section examines the current debates about the main conditions under which management and trade unions are likely to cooperate, and then discusses the implications of the prisoner’s dilemma game and the folk theorem for clarifying the theoretical underpinning of cooperative relations in workplace partnership. Table 2

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**Table 1: The prisoner’s dilemma**

| Laura (L) stays silent | Laura confesses | Charles (C) stays silent | Charles confesses |
|-----------------------|----------------|-------------------------|------------------|
| (a) C = gets six months | (c) C = gets 10 years | (b) L = gets six months | (d) C = gets five years |
| (b) C = walks free   | (d) L = walks free |

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Table 2: Theoretical underpinning of cooperative relations in workplace partnership

| Key factors                  | Rational choice theory                                                                 | Bounded rationality theory                                                                 | Institutional theory                                                                 |
|------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Outcomes                     | Short-term perceived benefits higher than costs (win-win game)                         | Short-term perceived benefits higher than costs; focus on ‘mutual gains’ (‘win-win’ game in favourable conditions); limited reference to potential ‘mutual pain/costs’ | Long-term perceived benefits higher than costs and social considerations               |
|                              | Mutual cooperation leads to increased size of the total outcome.                       |                                                                                          |                                                                                      |
| Competitive pressures        | The higher the competitive threats, the more likely a cooperative approach will be taken.| Disagreement about the impact of competition on relations between the two parties         | High level of competition based on quality of products/services and need for fast changes/innovation |
|                              |                                                                                       | Emphasis on innovation and quality rather than cost reduction                            |                                                                                      |
| Industrial relations climate | Tendency to resort to normal competition when costs of relying on perceived power of unions in relation to management are higher than the benefits | Interdependence and mutual trust; strong trade union; joint decision making structures; commitment of top leaders | Legal support of trade unions and legal obligation to engage in long-term cooperation |
|                              |                                                                                       | External institutional support (i.e. social pacts that grant support for training, financial support, etc.) facilitates partnership. |                                                                                      |
presents a summary of the three main sets of factors that affect their cooperative
relations according to rational choice, bounded rationality and institutional theories,
while Table 3 depicts the main implications of game theory with respect to these
factors.

3.1 Outcomes

Rational choice, bounded rationality and institutional theories share the view that the
raison d’être of workplace partnership is to add value for both parties (Cooke, 1990;
Kochan et al., 2009; Streeck, 1992). Accordingly, in order to move from adversarial
relations to cooperative relations, both parties have to perceive that the benefits of
cooperation are higher than the costs (Table 2). However, their theoretical expecta-
tions are not always confirmed by empirical evidence and other limitations exist.

Based on rational choice theory, Cooke (1990) indicates that under a ‘cooperation’
strategy both parties gain more than they would under the alternative adversarial
strategy. This is because the total outcome is increased through cooperation and this
‘larger pie’ is available to be distributed between management and employees. In
contrast to Cooke’s expectation, Danford et al.’s (2005) findings revealed that adver-
sarial relations between management and unions lead to better outcomes for employ-
ees than cooperative relations. They investigated two companies from the UK
aerospace industry whose approach to trade unions was broadly cooperative. In each
case, employees were members of two trade unions that had a similar number of
union members in each company. In both cases one union adopted a cooperative
stance whereas the other union took an adversarial approach. This setting provided
an opportunity to examine how different trade union stances can influence outcomes
for trade union members. Their survey findings demonstrate that members of the
unions that took an adversarial stance perceived that their union had a higher influ-
ence on pay and conditions than did the union that cooperated with the management.

Despite complying with the two main conditions specified by Cooke (see Table 2),
mutual cooperation did not lead to increased gain for labour. Adversarial relations
between trade unions and management were perceived to serve the interests of labour
more than did cooperative relations in a context of similar competitive pressures and
similar relative power of unions in relation to management. Danford et al. (2005)
therefore argued that employees would be better off if the trade unions continued to
adopt their traditional adversarial stances. However, their study investigated compa-
nies where managers adopted a cooperative approach. It is unclear whether these
findings would hold up in organisations where management adopted an adversarial
approach to employment relations. None of the three theories—rational choice,
bounded rationality, institutional—explains what happens when one party wishes to
cooperate but the other party retains an adversarial stance.

Furthermore, if cooperation between management and unions is beneficial for both
parties, it would be expected that most companies would adopt this approach.
Empirical studies found that only in a minority of companies in Anglo-Saxon coun-
tries did management cooperate with trade unions (Dobbins and Gunnigle, 2009;
Kochan et al., 2009; Roche and Teague, 2013). A representative survey conducted in
Ireland in 2003 revealed that 23 per cent of companies have an established partnership
committee, but only 4 per cent of firms have adopted a formal agreement (Geary,
2008). The low number of companies adopting cooperative relations in Ireland was
confirmed by O’Dowd’s (2006) study, which identified only 135 companies in the
| Key factors | Rational choice theory | Bounded rationality theory | Institutional theory |
|-------------|------------------------|---------------------------|----------------------|
| Outcomes    | **Prisoner's dilemma outcomes**<br>Parties likely to take adversarial stance which is the only Nash equilibrium | **Avoid prisoner's dilemma outcomes in specific conditions**<br>Mutual trust allows both parties to move from once-off to repeated games, leading to a new win-win type equilibrium. | **Avoid prisoner's dilemma outcomes**<br>The institutional framework shifts the game from once-off to infinitely repeated games, creating additional Nash equilibria. |
| Level of risk (effects of competitive pressures) | **High risk**<br>Parties expected to change stances if competitive pressures (or relative power) are altered<br>No guarantee that each party will gain equally from the increase in the total outcome | **Medium risk**<br>Increasing competitive pressures reduces the time horizon within which partnership is viewed, turning the game from repeated to once-off and making it more difficult to avoid the prisoner’s dilemma. | **Low risk**<br>Changing competitive pressures do not change the parties’ view of the partnership horizon as this is defined by the institutional framework. |
| Time horizon (effects of IR climate) | **Short-term horizon**<br>– once-off game<br>To prevent opportunistic behaviour by one party, pay-offs should be such that the party taking up an adversarial stance does not gain disproportionately compared with the party taking a cooperative stance. | **Medium-term horizon**<br>Relatively high levels of trust lead to a strong possibility of mutual cooperation occurring with consequent win-win outcome for both parties. Small wins facilitate the development of mutual trust. Development of mutual trust extends out the time horizon of the game. | **Long-term horizon**<br>The climate is defined more by outside (i.e. by the institutional framework) than by internal conditions. Parties do not have to continually interpret the other parties’ stance and thus mutual cooperation is more likely to arise. |
unionised sector which had adopted partnership arrangements during the late 1990s and early 2000s, during the economic boom and national social pacts. Rational choice and bounded rationality theories do not fully explain why so few companies adopt voluntary partnership, despite the fact that it has the potential to add more value for both parties than adversarial relations.

Bounded rationality theory claims that the perceived benefits of cooperation are likely to be higher than the costs only when there are internal and external favourable conditions (Guest and Peccei, 2001; Oxenbridge and Brown, 2002). The main antecedents that are likely to lead to the adoption of cooperative relations are a business strategy focused on quality and innovation, high level of trust between union and management, and employee input into decision making at multiple levels (Kochan et al., 2009; Roche and Teague, 2013). Additionally, economic growth and external support for cooperative relations at workplace level, such as national social pacts, are considered essential for successful adoption and sustainability of cooperative relations between management and trade unions (Oxenbridge and Brown, 2002; Roche and Teague, 2013). Empirical studies confirm that both parties can gain as a result of partnership in a context of favourable conditions (Butler et al., 2011; Dobbins and Gunnigle, 2009). However, most empirical studies indicate that the balance of advantage is in favour of the company (Geary and Trif, 2011; Guest and Peccei, 2001; Kelly, 2004).

Bounded rationality theory identifies a number of potential costs for labour, in particular that employees share the risk by having their income dependent on company performance (Kochan and Osterman, 1994), and increased workload and stress on employees (Geary and Trif, 2011; Guest and Peccei, 2001; Roche and Geary, 2006). Nonetheless, a number of seminal studies on partnership, such as those of Rubinstein and Kochan (2001) in the United States and Guest and Peccei (2001) in the UK, make limited reference to the potential costs of cooperative relations for the company. Potential costs include, for example, the time required to train managers and employees to cooperate, the cost of time off for staff and senior management to attend partnership meetings, and the slowing down of the decision making process (Kochan et al., 2009; Roche and Geary, 2006). The supporters of the institutional theory also emphasise the costs for labour (Dobbins, 2010; Streeck, 1992). Hence, it is worthwhile examining this ‘cost’ of cooperative relations between management and trade unions more carefully.

The prisoner’s dilemma confirms that the perceived benefits for the parties have to be higher than the costs in order to make the cooperation game a better option than the alternative solutions. Nevertheless, the prisoner’s dilemma highlights that there are costs for the company and employees as a result of partnership even in a mutual gains’ or ‘win-win’ game as per scenario (a) in Table 1. More specifically, if Charles and Laura trust each other and stay silent, they each get six months in jail: they do not ‘walk free’. They each must move from a choice (confess) that potentially allows them to gain their highest pay-off. Thus, the prisoner’s dilemma highlights a notional cost of cooperation even in the best case scenario.

Additionally, and more critically, the prisoner’s dilemma shows that voluntary cooperation between trade unions and management is not a Nash equilibrium.1 Even

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1 A Nash equilibrium represents a decision making situation involving a number of parties whereby no party can improve its pay-off given the stances taken by the other parties. See Nash (1951) for a technical definition and Gibbons (1997) for a discussion.
when the two players end up in the ‘win-win’ mutual gain scenario, they leave on the table the pay-off that is most advantageous to them: ‘walking free’. However, that pay-off is very unlikely to be achieved in practice. For Laura (Labour) to ‘walk free’, she would have to choose to abdicate trust in Charles (Capital) and confess, that is, take up a non-trusting position. If she was likely to do this, then Charles (Capital) would never take up a trust position either and both would find themselves in the outcome with poorest pay-offs for both of them. Achieving this ‘walk free’ pay-off is not one that either party can achieve by themselves. So, while technically they are each leaving it on the table, in practice they are very unlikely to achieve it. While it may appear that leaving such an attractive pay-off on the table represents a high cost, in reality it does not because this most attractive pay-off of walking free is very unlikely to be achieved.

The prisoner’s dilemma shows that in a once-off episode the only Nash equilibrium is adversarial relations between labour and management in a voluntary workplace partnership. This appears to be the main reason why the majority of companies did not develop cooperative arrangements between management and labour in Anglo-Saxon countries that have a voluntarist approach to employment relations. Also, it explicates why exemplary cases of voluntary workplace partnership arrangements such as those at Saturn in the United States and Aer Rianta in Ireland are not sustainable (Roche and Geary, 2006; Rubinstein and Kochan, 2001).

In line with the institutional theory, the prisoner’s dilemma highlights that some form of constraints are needed to achieve long-term cooperation between management and labour (Freeman and Lazear, 1995; Streeck, 1992). Repeated game theory provides support for the institutional framework in that the existence of formal legislation and mandated cooperation acts as a mechanism to shift the time horizon of the game from once-off to infinitely repeated. This brings into existence additional Nash equilibria that allow the parties to avoid the unattractive prisoner’s dilemma outcome, that is, unions and management can find a better outcome such as that represented by scenario d) in Table 1. This improved outcome is unavailable in a lone IR episode but becomes available in a repeated situation.

The supporters of the rational choice theory are generally the strongest advocates of partnership and they highlight the benefits for both parties (Cooke, 1990). Game theory tells us two things that are relevant to the rational choice theory. First, there is no guarantee that the total outcome will actually expand. The size of the outcome depends on the combination of decisions made by the two parties and the total outcome may contract or expand depending on those decisions. Second, there is no guarantee that each party will gain equally from the expansion. As can be seen from Table 1, the outcome varies according to the combination of decisions made; the pay-offs for each player can be strongly asymmetric as is the case for scenarios (b) and (c). Finally, to avoid opportunistic behaviour, it is important to ensure that the party taking up an adversarial stance does not gain disproportionately compared with the party taking a cooperative stance. In Table 1, it is the existence of the strong asymmetry in pay-offs in scenarios (b) and (c) that forces the players into the prisoner’s dilemma situation (d).

Most advocates of institutional theory are critics of voluntary workplace partnership. They claim that scenario (b) in Table 1 is the most likely outcome of cooperative relations between management and trade unions: the company wins and labour loses (Kelly, 2004; Streeck, 1992). This is primarily due to power disparity:
typically the company has more power than employees and their representatives. Let us return to Danford et al.’s (2005) case study which suggested that adversarial relations are more beneficial for labour than cooperative relations. They assessed the outcomes for employees in two case studies where management took a cooperative approach towards employees, while one union had a cooperative relation with the management and another union had an adversarial approach towards the management. Based on the prisoner’s dilemma, Danford et al. (2005) compared scenario (a) with scenario (c), while the interpretation of empirical data suggests that they compared scenario (a) with scenario (d) (i.e. where both parties ‘defect’). Their main argument is that adversarial relations between the company and unions are more beneficial for employees than cooperative relations. While this is technically true, it is unlikely to happen in practice as management, realising that labour has taken an adversarial stance, would also wish to switch its stance to adversarial. Both parties would then end up once again in the prisoner’s dilemma situation. Also, in this case, it is likely that the company took a cooperative stance because the first union took a cooperative stance, and the second union was able to exploit this situation by taking an adversarial stance. If only one union existed in this situation, it is unlikely that the company would have taken a cooperative stance.

Thus, the type of game played and the expectations regarding the outcomes of cooperative and adversarial relations are not always explicit in the literature on workplace partnership.

Game theory also gives useful insights with respect to outcomes under the bounded rationality theory. First, a situation of mutual trust allows both parties to take a longer-term view of the partnership situation (Dietz, 2004; Kochan et al., 2008), turning the game from once-off to repeated game. However, under bounded rationality theory, the time horizon is dependent on interpersonal or inter-institutional relationships and therefore may not be as long term as under the institutional theory which is underpinned by legislation. Mutual trust may weaken or break down, thus foreshortening the perspective of players on the future (Deakin et al. 2005). This shorter perspective may lead unions and management to revert to an opportunistic (adversarial) stance in the present, making the undesirable prisoner’s dilemma outcome once again a real possibility.

Summing up, game theory confirms that the higher the potential benefits of cooperation for each party the more likely it is that the parties would cooperate, while it emphasises the potential costs for both parties, which in turn highlights that some form of constraints are needed for long-term cooperation between management and labour. Additionally, game theory highlights the different length of the time horizon of partnership under the three theories (see Table 3). Rational choice theory focuses on short-term benefits for the two parties, where parties are likely to take an adversarial stance and get into the prisoner’s dilemma situation. Under the bounded rationality theory, the development of mutual trust allows both parties to take a longer-term view to avoid prisoner’s dilemma in specific conditions. However, this is a weak long-term view and one that can easily become foreshortened should the environment become more uncertain. Institutional theory emphasises the long-term benefits for both parties grounded in rational self-interest as well as social considerations, such as fairness and equity (Streeck, 1992). The institutional constraints, such as mandatory obligation for management and trade unions to cooperate, extend the time horizon with certainty and thereby create more Nash equilibria, thereby allowing the two parties to avoid the prisoner’s dilemma outcome.
3.2 Competitive pressures

The three theories of partnership share the view that cooperative relations between management and unions are more likely in companies whose business strategy emphasises high quality and innovation (Butler et al., 2011; Streeck, 1992), but there is an ongoing debate about the impact of the level of competitive pressures on the likelihood of adopting and sustaining cooperative relations (see Table 2). Grounded in the rational choice theory, Cooke (1990) argues that the greater the competitive threats, the more likely it is that company management will adopt a cooperative approach with labour. Increasing external risk therefore facilitates parties in accepting internal risk. In contrast, scholars from the bounded rationality camp, such as Cutcher-Gershenfeld and Verma (1994), claim that too much (or too little) competition is likely to lead to adversarial relations. Their view is supported by Kochan et al.’s (2009) seminal study of partnership at Kaiser Permanente in the United States, which demonstrated that high economic pressures at a level not threatening its survival were crucial for the initiation of this partnership. Nevertheless, there are disagreements in the bounded rationality camp, as Dobbins and Gunnigle (2009: 568) show that the insulation from market pressures is critical for the success and durability of voluntary workplace partnership. A number of empirical studies have demonstrated that a sudden expansion of the market for a particular product as well as acute financial crises can lead to the development of workplace partnership (Huzzard et al. 2004; Oxenbridge and Brown, 2002; Rubinstein and Kochan, 2001). An acute crisis can lead to cooperation between the two parties if the alternative solution is perceived to be more costly. For instance, if a company is on the verge of becoming bankrupt, management and labour may cooperate to save it because the alternative option is for employees to lose their jobs and the company to lose its capital. Game theory gives some insight here: changing competitive circumstances are seen as altering the pay-offs for players under the various decision scenarios. A new equilibrium, for example mutual cooperation, may become available, offering both players improved pay-offs.

However, game theory gives different insights with respect to the different theories. Under the rational choice theory, the game is largely seen by the parties as once-off, and so changing competitive pressures have less influence on the parties’ perspectives of the partnership horizon. Neither does changing competitive pressures alter the parties’ view of the partnership horizon under the institutional theory as this is firmly defined by the legal and regulatory framework and is always seen as long term. However, changing competitive pressures may alter the time horizon under the bounded rationality theory. Increasing competitive pressures may lead to difficulty maintaining mutual trust, thereby reducing the time horizon within which partnership is viewed turning the game from repeated to once-off and making it more difficult to avoid the prisoner’s dilemma. In an economic recession characterised by high uncertainty, the parties are more likely to select the less risky option of adversarial relations. In contrast, a sudden expansion of the market for a product or service and low levels of competition reduce the risks of cooperation as there is more certainty that their total outcome would increase. Furthermore, the parties need each other to take advantage of this opportunity and this can foster trust and consequent cooperation.

Game theory clarifies the debate about the impact of the level of competitive pressures between the rational choice and bounded rationality theories and the disagreements within the bounded rationality camp (see Table 2). It demonstrates that it is not the level of market competition or type of business strategy per se that affect the
cooperative relations, but their effect on the level of certainty for achieving win-win outcomes. More specifically, it argues that the lower the risk to achieve the expected benefits, the more likely it is that the parties would cooperate. It confirms that companies focusing on high quality and innovation are more likely to adopt cooperative relations, because there is generally high interdependence between the company and its employees; the company needs the specific skills, knowledge and discretionary behaviour of employees to achieve the positive outcomes, while on the other hand employees are tied to the firm as they may not be able to easily transfer their specific competences elsewhere. Accordingly, a competitive strategy emphasising high quality and innovation is also likely to reduce the risk of changing stances and in turn, increase the level of certainty of achieving the expected benefits.

3.3 IR climate

IR climate refers to the state and quality of union–management relations in an organisation. It includes workplace aspects, such as ‘the atmosphere, norms, attitudes and behaviours reflecting and underpinning how workers, unions and managers interact collectively with each other in the workplace’ (Pyman et al., 2010: 463), as well as other contextual factors such as laws that regulate the interaction between managers and unions. The three theories of partnership agree that a cooperative approach is possible only in a context where a degree of mutual trust exists between management and unions. However, there is disagreement about the mechanisms or joint decision structures required for sustainable cooperation between management and unions (see Table 2). Rational choice scholars and many scholars in the bounded rationality camp argue that voluntary cooperation between management and unions is possible (Butler et al., 2011; Cooke, 1990), while the institutional theory states that long-term cooperation requires statutory support (Dobbins, 2010).

Rational choice theory indicates that management and unions are likely to adopt cooperative relations if the costs of relying on relative power options (the perceived amount of power of unions in relation to management) are higher than the benefits. Cooke (1990) argues that shifts in relative power may occur and the party gaining power invariably will be inclined to use it to its advantage. He predicts that the parties are likely to change their strategy from cooperation to adversarial relations in the vice versa scenario, namely the costs of relying on relative power options are lower than the benefits. This is also referred to as ‘normal competition theory’ (Roche and Geary, 2006). However, rational choice theory does not specify how the two parties can achieve mutual trust to enable the adoption of cooperative relations between management and unions if the above conditions are met.

Bounded rationality theory indicates that strong trade unions and other mechanisms of employee participation in decision making are required, along with mechanisms to deal with grievances for a gradual development of mutual trust (Butler et al., 2011). Also, having visionary and charismatic leaders in senior management and trade unions is a great advantage in achieving successful cooperation between management and labour (Kochan et al., 2009; Oxenbridge and Brown, 2002; Roche and Geary, 2006). Furthermore, the institutional theory argues that legal support for trade unions is needed to ensure their survival, and legislation that obliges the parties to cooperate, such as the laws on works councils, is necessary to achieve long-term cooperation (Streeck, 1992).
The prisoner’s dilemma confirms that mutual trust is required to develop cooperative relations (Table 3). Additionally, it highlights the need for a belief of the parties in the future benefits of cooperation. Under the bounded rationality theory, high levels of trust lead to mutual cooperation with consequent win-win outcome for both parties (Dietz, 2004; Kochan and Osterman, 1994). Small wins facilitate the development of mutual trust (Butler et al., 2011; Geary and Trif, 2011). Development of mutual trust extends out the time horizon of the game (Deakin et al. 2005; Roche and Teague, 2013). On the other hand, a breach of trust is likely to lead to a sudden collapse of cooperative relations (Roche and Geary, 2006), unless there are institutional constraints that oblige the parties to cooperate. However, with ongoing institutional support the two parties may be able to convert the mutual gains outcome into a Nash equilibrium, thereby creating a mutually beneficial but also sustainable outcome. The IR climate is defined more by outside (i.e. by the institutional framework) than by internal conditions and these outside conditions are more certain. Parties do not have to continually interpret each other’s stance and thus mutual cooperation is more likely to arise.

The article identifies the time horizon of partnership as a critical factor in achieving long-term cooperation. The rational choice theory has a short-term horizon; the bounded rationality theory has a medium-term focus, while the institutional theory has a long-time horizon. It shows that the rational choice short-term voluntary cooperation between management and unions is not sustainable, as it is not a Nash equilibrium. However, the time horizon of partnership may be extended by voluntary joint decision making structures which act as beneficial constraints (Butler et al., 2011; Kochan et al., 2009). Nevertheless, our study provides consistent support for the arguments advanced by the institutional theory (Streeck, 1992) which suggests that legal constraints provide a framework that allows the development of long-term cooperation between management and unions, while it adds that it is not the type or the structure of employee participation mechanism that affects the choices of the parties, but their effect in extending the time horizon of workplace partnership and reducing uncertainty.

4 CONCLUSION

The article identifies three interrelated conditions that underpin cooperation between management and trade unions associated with the main contingencies discussed above. These are summarised in the form of three tentative propositions. The first proposition states that the higher the potential benefits of cooperation for each party, the more likely it is that the parties will cooperate. Game theory confirms that benefits of cooperation have to be higher than the costs for each party, while it highlights the potential costs for both parties. The prisoner’s dilemma reveals that even in the best case scenario (scenario (a) in Table 1: prisoners trust each other and stay silent), the two parties must leave a better pay-off on the table (i.e. they accept ‘six months in prison’ although there exists an option whereby they could ‘walk free’). This suggests that there exists a cost to cooperation between management and trade unions even in the best case scenario. The temptation to achieve the highest pay-off available can lead a party to take up an adversarial stance; however, this payoff is not achievable unilaterally, but only as a result of their joint decisions. And, should both parties give into such temptation, then they both will end up in the unsatisfactory prisoner’s dilemma situation.
Our second proposition states that the lower the risk to achieve the expected benefits for each party, the more likely it is that the parties will cooperate. In contrast to Cooke’s (1990) and Cutcher-Gershfenfeld and Verma’s (1994) arguments, game theory illustrates that it is not the level of competition per se that affects whether or not the two parties cooperate, but the consequences of the market competition on the perceived level of risk to achieve potential benefits. The article clarifies the disagreements concerning the impact of the level of competitive threats on the stance of the two parties predicted by rational choice and bounded rationality. Sometimes low market competition due to a sudden increase in demand led to cooperation in order to exploit new market opportunities, while at other times the high market competition that pushed a company to the verge of bankruptcy led to cooperation (Butler et al., 2011). Both reduced the risk of cooperation; in the first case, the risk is reduced by increasing the total outcome, while in the second case, the very survival of the parties was at stake. Nevertheless, this cooperative game may be sustainable only as long as the extreme economic conditions are in place. While parties may cooperate in order to increase the total outcome, this cooperation may end suddenly if the increased outcome is divided in a manner perceived to be unfair by one of the parties. Thus, an acute crisis or a sudden expansion can temporarily reduce the risk of the cooperative game.

Our third proposition states that the higher the potential of future benefits of cooperation, the more likely it is that the two parties will adopt and sustain cooperative relations. The analysis identified the time horizon of partnership as a critical factor in achieving long-term cooperation between management and unions. Although this study provides consistent support for the institutional theory (Streeck, 1992), it adds that it is not the type of voluntary or statutory mechanisms of employee participation that affects the choices of the parties, but the effects of those mechanisms on the time horizon of workplace partnership. In coming to this conclusion, we draw on the so-called ‘folk theorem’ from game theory which says that a repeated game allows many more equilibria than does a once-off game (Lambertini, 2011). We suggest that elements of bounded rationality theory, such as small wins and the gradual build-up of trust between parties, also extend the time horizon and consequently the duration of cooperative relations between management and trade unions. These preconditions increase the potential of future benefits of cooperation.

There is a degree of overlap between the effects of competitive pressures and IR climate on cooperative relations. Institutional constraints and the development of increased degrees of mutual trust through ongoing problem solving and information sharing between unions and management can also act as risk reduction mechanisms. Dietz (2004) discusses three cases where the latter has occurred and where partnership evolved. Partnership built up under such a contingency mechanism illustrates a shift outward in time, from once-off discussions between union and management to ongoing or repeated discussions. In game theory parlance this means that the game has moved from once off to repeated, thereby making more Nash equilibria available, including the mutual cooperation outcome. Dietz (2004) points out that as soon as the time horizon shortened, partnership became vulnerable, which fits within the game theoretic explanation for partnership that we put forward in this article. Dobbins (2010) also gave a reducing time horizon, due to increasing competitive pressure and the resignation of key players, as a reason for the termination of partnership in Waterford Crystal. Thus, the effects of competitive pressures and IR climate can affect both the level of risk and the time horizon of partnership.
While this article contributes to a better understanding of the theoretical underpinnings of cooperative relations between management and trade unions, it nevertheless has a number of limitations. First, we identified three propositions concerning the conditions under which two parties are more likely to cooperate, but they have not yet been verified. We must leave it to future empirical research projects to verify the three propositions. Second, the prisoner’s dilemma model allows four outcomes whereas in reality only two outcomes are likely: mutual cooperation or mutual adversity. It is unlikely that asymmetric choices will be made by managers and unions. Nevertheless, there are circumstances such as those examined by Danford et al. (2005) where management took a cooperative stance towards trade unions, while one trade union choose to cooperate, and the other took an adversarial stance. In this case, the prisoner’s dilemma shows that the unions’ adversarial stance leads to benefits for the employees because management took a cooperative stance. However, this does not necessarily mean that adversarial relations between the union and management are generally more beneficial for employees than cooperative relations. Indeed the prisoner’s dilemma game shows that if you perceive the other party is taking an adversarial stance, then you are better off to take an adversarial stance also.

Finally, although the basic assumption of both prisoner’s dilemma and workplace partnership is that both parties seek to further their own interests, the outcomes are known in the prisoner’s dilemma scenarios, while in the ‘game’ between management and trade unions the outcomes for the parties are less certain. Real-life situations rarely fit the strict format of game theory. An extension to this article is to take outcome uncertainty into consideration in a more formal manner. Taking a Bayesian approach to games may provide a route for future research.

The implications of game theory for the theoretical underpinning of cooperative relations between management and trade unions may be applied to other types of partnerships, such as strategic alliances between two companies or the relations between individual employees and their managers. Such contexts may offer avenues for future research into cooperation. This article suggests that the adoption of cooperative relations between two parties depends on the potential benefits for each party, the level of risk in achieving these benefits and the time horizon of the partnership. It highlights that any mechanism that increases the time horizon of partnership by reducing the level of risk to achieve these potential benefits in the long run improves the sustainability of cooperative relations. Also, it shows that the potential to achieve future benefits is crucial for the sustainability of cooperative relations, while a focus on short-term benefits is likely to lead to adversarial relations. Game theory demonstrates that if both players are driven by self-interest to achieve the best possible outcome for themselves in the short term, they may arrive in a prisoner’s dilemma position that is not optimal for them either individually or collectively.

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References

Aoki, M. (1980), ‘A Model of the Firm As a Stockholder-employee Cooperative Game’, *American Economic Review, 70*, 3, 600–610.
Axelrod, R. (1984), *The Evolution of Cooperation* (New York, Basic Books).
Besanko, D., D. Dranove, M. Shanley and S. Schaefer (2010), *Economics of Strategy* (Hoboken, NJ, Wiley).
Brandenburger, A. and B. Nalebuff (1996), *Co-operation* (New York, Currency Doubleday).
Butler, P., L. Glover and O. Tregaskis (2011), ‘“When the Going Gets Tough” . . . : Recessions and the Resilience of Workplace Partnership’, *British Journal of Industrial Relations, 49*, 4, 666–687.
Coddington, A. (1967), ‘Game Theory, Bargaining Theory, and Strategic Reasoning’, *Journal of Peace Research, 4*, 1, 39–45.
Cooke, W. N. (1990), *Labour-Management Cooperation: New Partnerships or Going in Circles?* (Kalamazoo, MI, Upjohn Institute for Employment Research).
Costa, L. M., K. Cool and I. Dierickx (2013), ‘The Competitive Implications of the Deployment of Unique Resources’, *Strategic Management Journal, 34*, 445–463.
Cutcher-Gershenfeld, J. and A. Verma (1994), ‘Joint Governance in North American Workplaces: A Glimpse of the Future Or the End of An Era?’, *The International Journal of Human Resource Management, 5*, 3, 547–580.
Danford, A. J., M. Richardson, P. Stewart, S. Tailby and M. Upchurch (2005), *Partnership and the High Performance Workplace—A Study of Work and Employment Relations in the Aerospace Industry* (Basingstoke, Palgrave MacMillan).
Deakin, S., R. Hobbs, S. J. Konzelmann and W. Wilkinson (2005), ‘Working corporations: corporate governance and innovation in labour-management partnerships in Britain’, in M. Stuart and M. Martinez Lucio (eds.), *Partnership and Modernisation in Employment Relations* (Basingstoke: Palgrave) pp. 63–82.
Dietz, G. (2004), ‘Partnership and the Development of Trust in British Workplaces’, *Human Resource Management Journal, 14*, 1, 5–24.
Dixit, A. K. and B. J. Nalebuff (1991), *Thinking Strategically: The Competitive Edge in Business, Politics, and Everyday Life* (New York, Norton).
Dobbins, T. (2010), ‘The Case for ‘Beneficial Constraints’: Why Permissive Voluntarism impedes Workplace Cooperation in Ireland’, *Economic and Industrial Democracy, 31*, 4, 497–519.
Dobbins, T. and P. Gunnigle (2009), ‘Can Voluntary Workplace Partnership Deliver Sustainable Mutual Gains?’, *British Journal of Industrial Relations, 47*, 3, 546–570.
Freeman, R. B. and E. P. Lazear (1995), ‘An economic analysis of works councils’. In Rogers, J. and W. Streeck (eds.), *Works Councils—Consultation, Representation and Cooperation in Industrial Relations*. Chicago: University of Chicago Press, pp. 27–52.
Geary, J. (2008), ‘Do Unions Benefit from Working in Partnership with Employers? Evidence from Ireland’, *Industrial Relations: A Journal of Economy and Society, 47*, 4, 530–568.
Geary, J. and A. Trif (2011), ‘Workplace Partnership and the Balance of Advantage: A Critical Case Analysis’, *British Journal of Industrial Relations, 49*, 44–69.
Gibbons, R. (1997), ‘An Introduction to Applicable Game Theory’, *Journal of Economic Perspectives, 11*, 1, 127–149.
Guest, D. E. and R. Peccei (2001), ‘Partnership at Work: Mutuality and the Balance of Advantage’, *British Journal of Industrial Relations, 39*, 2, 207–236.
Harsanyi, J. C. (1961), ‘On the Rationality Postulates Underlying the Theory of Cooperative Games’, *Journal of Conflict Resolution, 5*, 2, 179–196.
Huzzard, T., D. Gregory and R. Scott (2004), *Strategic unionism and partnership: boxing or dancing?* (Houndmills, Basingstoke, Hampshire, Palgrave Macmillan).
Kelly, J. (2004), ‘Social Partnership Agreements in Britain: Labor Cooperation and Compliance’, *Industrial Relations: A Journal of Economy and Society, 43*, 1, 267–292.
Kochan, T., P. Adler, R. McKersie, A. Eaton, P. Segal and P. Gerhart (2008), ‘The Potential and Precariousness of Partnership: The Case of the Kaiser Permanente Labor Management Partnership’, *Industrial Relations: A Journal of Economy and Society, 47*, 36–65.
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Kochan, T., A. Eaton, R. McKersie and P. Adler (2009), Healing Together: The Labor Management Partnership at Kaiser Permanente (Ithaca, Cornell University Press).

Kochan, T. A. and P. Osterman (1994), Mutual Gains Enterprise: Forging A Winning Partnership Among Labor, Management, and Government (Boston, MA, Harvard Business Press).

Lambertini, L. (2011), Game Theory in the Social Sciences: A Reader-friendly Guide (Abingdon, Oxon, Routledge).

Luce, R. D. and H. Raiffa (1957), Games and Decisions: Introduction and Critical Survey (New York, Wiley).

Martin, S. (2002), Advanced Industrial Economics, 2nd edn (Oxford, UK, Blackwell).

Nash, J. (1950), ‘The Bargaining Problem’, Econometrica, 18, 2, 155–162.

Nash, J. (1951), ‘Non-Cooperative Games’ Annals of Mathematics, 54, 2, 286–295.

von Neumann, J. and O. Morgenstern (1944), Theory of Games and Economic Behavior (Princeton, NJ, Princeton University Press).

O’Dowd, J. (2006), ‘Voluntary Management-union Partnerships in Ireland: A Theoretical and Empirical Study.’ PhD dissertation, University College Dublin.

Oxenbridge, S. and W. Brown (2002), ‘The Two Faces of Partnership? An Assessment of Employer/Trade Union Relationships’, Employee Relations, 24, 3, 262–276.

Pyman, A., P. Holland, J. Teicher and B. K. Cooper (2010), ‘Industrial Relations Climate, Employee Voice and Managerial Attitudes to Unions: An Australian Study’, British Journal of Industrial Relations, 48, 460–480.

Roche, W. K. and J. Geary (2006), Partnership at Work: The Quest for Radical Organizational Change (London, Routledge).

Roche, W. K. and P. Teague (2013), ‘Successful but Unappealing: Fifteen Years of Workplace Partnership in Ireland’, International Journal of Human Resource Management, (in press) DOI: 10.1080/09585192.2012.756823.

Rubinstein, S. A. and T. A. Kochan (2001), Learning From Saturn: Possibilities for Corporate Governance and Employee Relations (Ithaca, Cornell University Press).

Saloner, G., A. Shepard and J. Podolny (2001), Strategic Management (New York, Wiley).

Schelling, T. C. (1980), The Strategy of Conflict (Cambridge, MA, Harvard University Press).

Streeck, W. (1992), ‘National Diversity, Regime Competition and Institutional Deadlock: Problems in Forming A European Industrial Relations System’, Journal of Public Policy, 12, 4, 301–330.