

ETHICAL CONSIDERATION OF CONSTRUCTION UNION STRATEGIES IN JURISDICTIONAL DISPUTES BASED ON AN AGENT-BASED MODELING (ABM) AND A GAME THEORY

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ABSTRACT: Union-related conflicts, building trade unions jurisdictional disputes in particular, have a long history in the US construction industry since the establishment of the unions. Jurisdictional boundaries constantly change and craft jurisdictional privileges are occasionally encroached. The outcomes of these conflicts and confrontations are pricy because they affect local and regional construction markets negatively. Yet explanation of this phenomenon is not a trivial matter since trade unions, their members, and employers constantly interact and affect each other. Based on a recent jurisdictional dispute case, an agent-based model (ABM) is used in this paper to examine various strategic decisions by the unions to show jurisdictional fluctuation. The model focuses on emergent patterns of union interactions based on their chosen strategies, which shows how policies and strategies affect the jurisdictional boundary and why their decisions should be based on professional ethics.

Keywords: *Union Disputes, Ethics, Prisoner's Dilemma, Game Theory, Agent Based Modeling (ABM)*

1. INTRODUCTION

Union-related conflicts, building trade unions jurisdictional disputes in particular, have a long history in the US construction industry since the establishment of the unions. Jurisdictional boundaries constantly change and craft jurisdictional privileges are occasionally encroached (Clough and Sears 1994).

There could be several reasons for the encroachment by the unions who (1) try to maintain national dominance; (2) try to secure “additional bargaining strength”; (3) try to increase “employment opportunities” (demarcation dispute); and (4) are affected by “technology changes in materials and processes (Barnett 1931).

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Based on a recent jurisdictional dispute case, an agent-based model (ABM) will be used in this paper to examine various strategic decisions by the unions to show jurisdictional fluctuation. The model focuses on emergent patterns of union interactions based on their chosen strategies, which shows how policies and strategies affect the jurisdictional boundary and why their decisions should be based on professional ethics.

2. UNION DIPUTE CASE

The Carpenters District Council of St. Louis, USA (CDC-SL) has had conflicts with the International Brotherhood of Electrical Workers Local 1 (IBEW-1) in St. Louis since 2007 (Heaster 2010). Initially CDC-SL was in contention with IBEW-1 for a certain portion of a big casino project in downtown St. Louis. The carpenter’s union felt that the job could be handled by themselves even though this kind of work had been traditionally done by the electrical union workers. To compete for similar jobs, CDC-SL eventually, in 2008, created a union alternative, the Associated

Electrical Contractors Local 57 of St. Louis (AEC-57), signing up non-union electrical contractors that essentially allowed union carpenters do electrical work. Several cases of vandalism were reported for the properties of the firms signed by ACE-57. This negatively impacted the reputation of all the union workers involved.

The expansion of the St. Louis' carpenters' union (CDC-SL) has continued within its jurisdictional boundary and beyond. In July 2010, they announced a merger that would expand its reach into Kansas City, Kansas and Southern Illinois (Giegerich 2010). This created tension in those areas since they worried the carpenter union would take over their jobs. All the local unions displayed their strong distaste on this move by the CDC-SL. This even created negative public perception on the unions, which could impact unions' abilities of landing jobs for their member workers (Giegerich 2010; Heaster 2010).

3. PRISONER'S DILEMMA FOR TWO UNION PARTIES & STRATEGIES

The jurisdictional frictions depicted in the previous section involved various building unions but certainly it was initiated and developed by the carpenters' union in St. Louis (CDC-SL) adopting an aggressive strategy against the electricians' union (IBEW-1) to expand their market share when they could have taken a more peaceful strategy. On the other hand, IBEW-1 could be engaged in the same aggressive tactic against CDC-SL in future. This brings up an interesting observation made by Barnett (1931), who asked "Building trade unions tread on each other's toes somewhere every day. How have those trades come into existence?" The answer to this question can be found by applying the prisoners' dilemma (PD). The PD is a classical example of a game theory, which explains why two parties may decide to not cooperate even if it is their collective interest to do so (Darwen and Yao 2002; EPSRC). The PD in the two unions' current context can be explained as follows.

		IBEW-1	
		Cooperate	Defect
CDC-SL	Cooperate	R = 3 R = 3	T = 5 S = 0
	Defect	S = 0 T = 5	P = 1 P = 1

Fig 1. Prisoner's Dilemma (PD) in the Union Dispute Case

Let's assume at one point in time of the current market there are total 6 jobs available for both CDC-SL and IBEW-1. This is realized when both IBEW-1 and CDC-SL work within their disciplinary boundaries, meaning they cooperate and respect each other's work. Each union has 3 jobs for themselves. In Fig 1, this is shown as R (reward) = 3 with IBEW-1's cooperation and R = 3 with the CDC-SL's cooperation.

However, when one union, for example, CDC-SL decides to not cooperate with IBEW-1, in other words, invading the work area of IBEW, they get 5 jobs (T, temptation = 5) for themselves. And IBEW consequently loses all the jobs (S, sucker = 0) because it remains the same with the intention to work within its boundary. In this situation, the total number of job available for them is 5 because the market reacts negatively due to their jurisdictional conflict (in fact, a job lost may have gone to a non-union contractor).

In the worst situation, let's assume both unions decide to step on each other's toes. In this case, the market reacts more negatively, providing only total 2 jobs, which is divided by the two unions (P, penalty = 1 for both).

The dilemma is that when one union decides its strategy, it doesn't know what strategy the other union is going to employ. So if the decision is strictly made based on a market share motivation and not on professional ethics, the unions have to consider what the other union is going to do, either cooperating or defecting. Specifically, let's get into the CDC-SL's thought process. It could assume, first, IBEW-1 would cooperate. In this case, between the two strategies of cooperation and defection, CDC-SL would choose to defect because with the assumption of IBEW-1's

cooperation, the “Defect” option would pay more dividend (5 jobs) than what “Cooperate” strategy could bring (3 jobs). On the other hand, if CDC-SL assumes IBEW-1 would defect, CDC-SL would still choose to defect because knowing IBEW-1 defecting, it will be better off with the defection decision giving them more job ($P = 1$) than the cooperation ($S = 0$).

The same can be said for IBEW-1. No matter what CDC-SL decides to do, based on the market share drive and no ethics consideration, IBEW-1 would choose to defect as well.

Therefore, as long as the strategic interactions are based on the payoff structure such as in Fig 1 and no professional ethics consideration, promoting cooperation between the two unions would be a mere hope; in reality, a temptation to defect wins over willingness to cooperate all the time: each union ends up getting 1 job each.

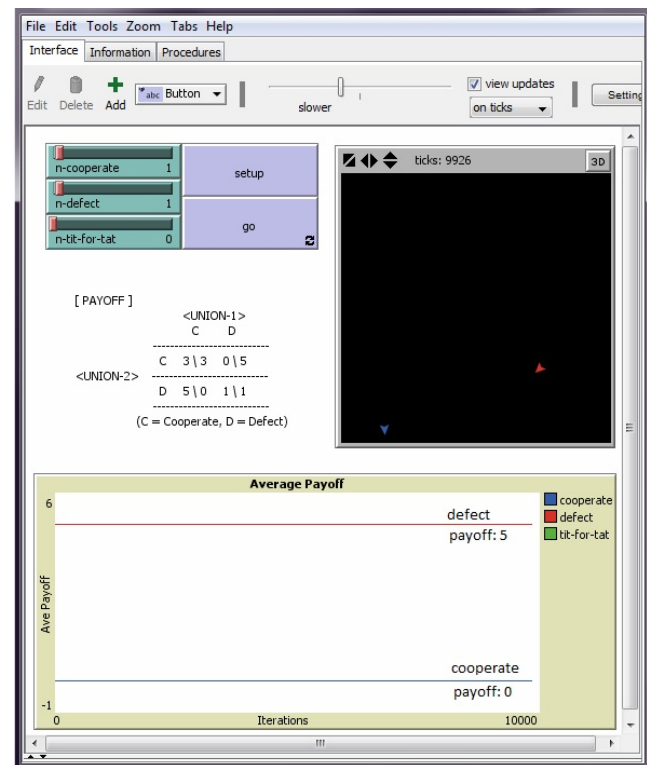
4. ITERATIVE MULTI-PARTY PRISONER’S DILEMMA FOR UNION JURISDICTIONAL STRATEGIES

Unlike the one-time strategic decision-making situation described in the previous section, in reality, however, things are getting complicated because 1) these unions keep interacting each other repeatedly; 2) as such, they have the knowledge of the decision the other union made in the previous interactions; 3) there are more unions to interact with; and 4) the unions could make alternative strategic decisions other than “Cooperate” and “Defect”. In other words, the simple two-person prisoner’s dilemma becomes a multi-party iterative prisoner’s dilemma, which involves more computing power to analyze the interactions properly. To this end, in this paper, the author modified the agent-based modeling (ABM) program of the N-person iterated prisoner’s dilemma developed by Wilensky (1999; 2002). The screenshot of the program is shown in Fig 2.

In the ABM environment, each union is represented as an independent agent who makes a decision based on a set of

rules (either “Cooperate” or “Defect”) and interacts repeatedly with other agents (i.e. unions in this paper) (Bonabeau 2002). This modeling technique has been used successfully in various applications to capture emergent phenomena by letting individual agents’ behaviors describe the system’s behavior. From this view, the ABM is a descriptive approach as opposed to the prescriptive approach (Macal and North 2009).

4.1 Two-Party Iterative Jurisdictional Disputes



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Fig 2. Agent-Based Modeling (ABM) of Two Union Dispute between Cooperate vs Defect Strategies

Fig 2 shows the program interface where two agents, one with the “Defect” strategy and the other with the “Cooperate” strategy, interact repeatedly. The results (payoff: 5 for the defecting union & payoff: 0 for the cooperating union) confirms the earlier discussion in the previous section.

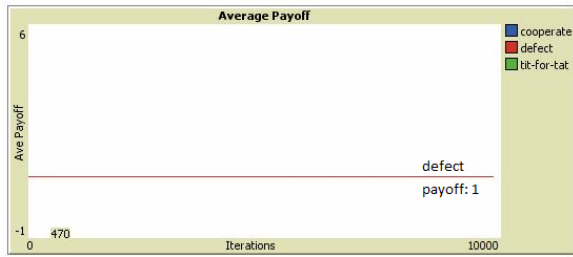


Fig 3. Payoff of Defect vs Defect Strategies

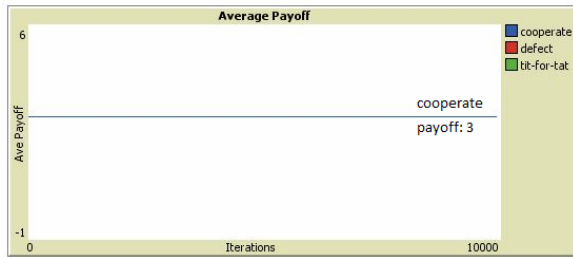


Fig 4. Payoff of Cooperate vs Cooperate Strategies

	C & D		Self Match		Self Match	
	No of unions	Payoff	No of unions	Payoff	No of unions	Payoff
Cooperate	1	0.0			2	3.0
Defect	1	5.0	2	1.0		

Fig 5. Payoff Results on Two Union Disputes

The outcomes of the different strategic combinations of the original two-union disputes are described in Fig 3 and Fig 4. Fig 5 summarizes what already discussed in the previous section: the defecting union always wins over the cooperating union. Therefore, because of this advantage, they tend to go with the “Defect” strategy, which gets each of them the lowest payoff (1 job for each) as shown in Fig 5. Not only each union loses potential job opportunities, it loses “face” by playing the “unethical” defection strategy, which makes their market share effort a lot tougher.

4.2 Multi-Strategy Iterative Jurisdictional Disputes from an Ethics Perspective

In reality the unions have more choices in their strategic decision other than “Cooperate” and “Defect” because they repeatedly interact with others. One of them is known to be the “Tit-for-Tat” strategy where you cooperate if the other party cooperates or you defect if the other defects (Darwen

and Yao 2002; EPSRC). In this strategy you start out cooperating and always adjust your decision (either cooperate or defect) by reacting to the strategic decisions made by others.

From an ethical perspective, this “Tit-for-Tat” strategy is somewhere between being 100% ethical (“Cooperate” strategy) and 100% unethical (“Defect” strategy). It may be considered a “Shrewd” tactic. Fig 6 and Fig 7 show the payoff results when the Tit-for-Tat strategy is used in the union disputes.

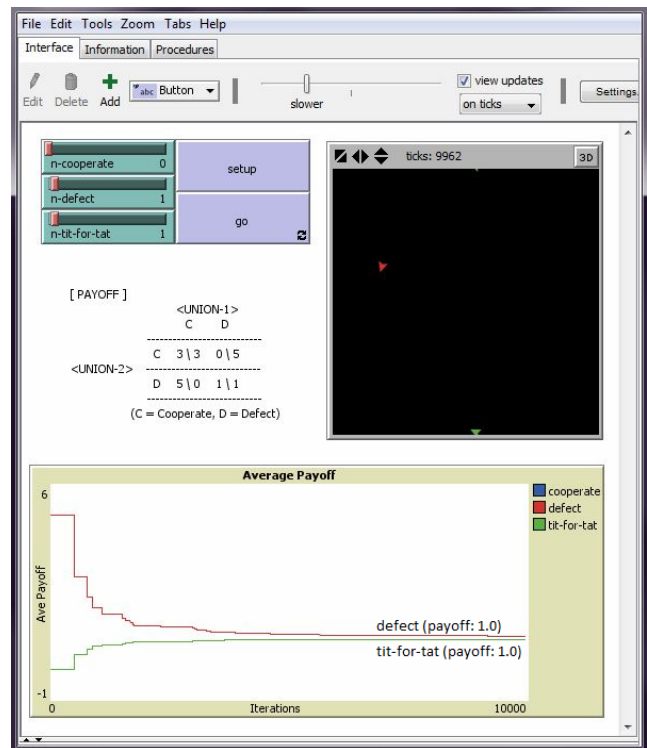


Fig 6. Payoff of Cooperate vs Tit-for-Tat Strategies

	D & T		C & T		Self Match	
	No of unions	Payoff	No of unions	Payoff	No of unions	Payoff
Cooperate			1	3.0		
Defect	1	1.0				
Tit for Tat	1	1.0	1	3.0	2	3.0

Fig 7. Payoff Results on Two Union Disputes when Tit-for-Tat Strategy Used

Unlike the “Cooperate” strategy, when confronted with the “Defect” strategy, the Tif-for-Tat is as effective. And it produces the best payoff outcome when dealing with a

union with the “Cooperate” strategy or the same “Tit-for-Tat” strategy. Therefore, this semi-ethical strategy turns out to be the strongest strategy in the repeated two-party union disputes. It is not as ethical an approach as the “Cooperate” strategy but it maintains somewhat ethical integrity.

4.3 Multi-Strategy & Multi-Party Iterative Jurisdictional Disputes from an Ethics Perspective

Jurisdictional disputes are not confined only to two union trades. Union trades have interactions all the time with other trades within their jurisdictional boundaries. Jurisdictional disputes are always possible (Erlich and Grabelsky 2005). To demonstrate the effect of this multi-party strategic decisions, let’s consider in this section 3 union trades adopting one of three strategic tactics either “Cooperate”, “Defect” or “Tif-for-Tat”.

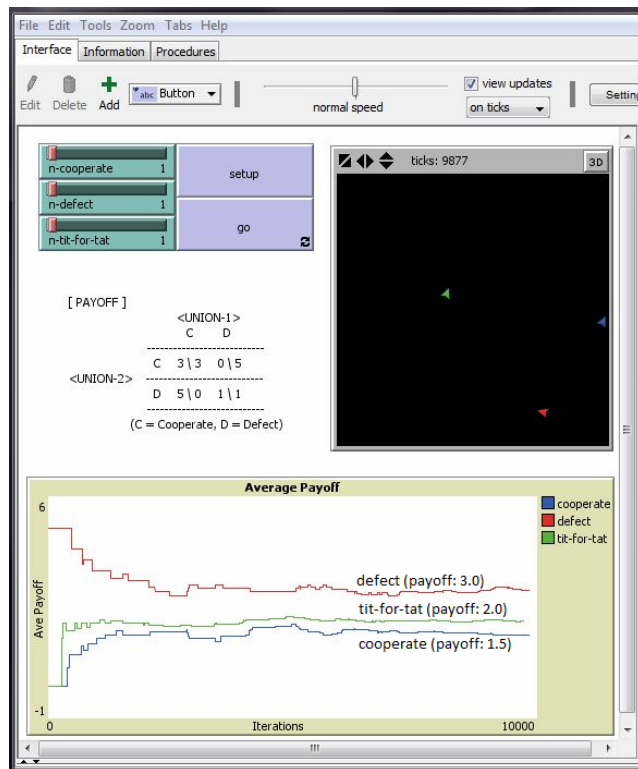


Fig 8. Payoff of Cooperate vs Defect vs Tit-for-Tat Strategies

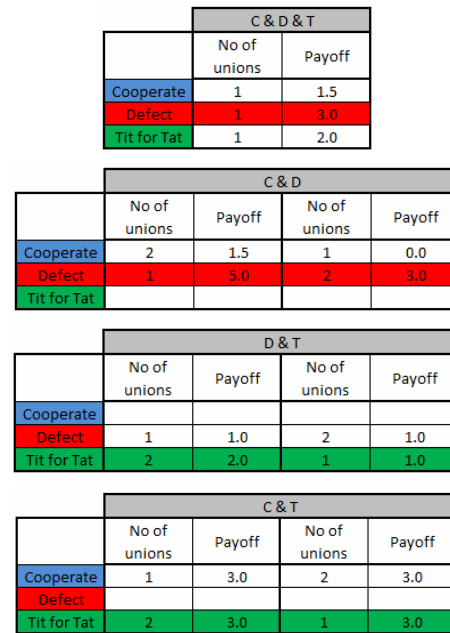


Fig 9. Payoff Results on 3 Union Disputes with 3 Strategies

Fig 8 shows the outcome when all 3 strategies are used by the three unions. The “Defect” strategy is the most effective with the payoff of 3, “Tit-for-Tat” the 2nd most effective with 2.0, and “Cooperate” being the worst with payoff 1.5. This result is shown as well at the top of Fig 9, which summarizes all the interaction outcomes.

The second table of Fig 9 shows that the “Defect” strategy dominates any encounters when the other parties relies on the “Cooperate” strategy. It could be inferred that if the number of unions adopting the defection strategy, their payoff decreases.

The 3rd and 4th tables of Fig 9 indicate that when the “Tit-for-Tat” strategy confronts with one of the other strategies “Cooperate” or “Defect”, it produces the best payoff outcomes all the time. Note that the “Defect” strategy produces almost the same outcome as “Tit-for-Tat” except one interaction.

Once again, as in the cases of the previous sections, not ethical approaches such as “Defect” and “Tit-for-Tat” dominate the market over the ethical approach “Cooperate”. This recognition, interestingly, could make even once-

ethical union(s) switch to those unethical strategies, which makes eventually the overall payoff kept to marginal.

5. CONCLUSION

As demonstrated above, not knowing what the other union(s) would do, if the market share is the only goal of a union, adopting unethical strategies such as “Defect” and “Tit-for-Tat” would put the union relatively in a better position than other union trade(s). This shows the inherent weakness of the unions why they are vulnerable to unethical decision situations. However, if majority of the unions utilize these unethical strategies, the payoff outcome would suffer because the situation now involves the disputes between unethical parties. This is the reason that the parties involved react away from being unethical, providing the balancing force in the unions trying to behave. This analytical analysis coincides with Barnett’s observation that why building trade unions tread on each other’s toes somewhere every day and yet at the same time those trades have come into existence.

For future research, more unions and more ethics-based jurisdictional approaches should be considered. Currently the same approach is used to investigate other construction ethics issues.

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