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TWO-LEVEL COLLECTIVE ACTION AND GROUP IDENTITY

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ABSTRACT

We examine how group membership influences individual decisions with respect to joining a mass political struggle, under the assumption that group members have a strong group identity, expressed by a strong commitment to group decisions. We suggest a two-level theoretical game model in which, in the first stage, an individual calculates the costs and benefits of participation at the group level and then he/she calculates the costs and benefits of the group's participation in mass collective action. The model shows that when the costs of action are low and the expected benefits are high, there are two equilibria – one with high and the other with low probability of collective action. It also shows that the chances of achieving political change through mass mobilization are lower when individuals are members of two sub-groups that act separately, than when they are members of one group only. The model is applied to the socio-political processes in Poland between 1976 and 1981.

KEY WORDS • collective action • group identity • Solidarity • threshold

1. Introduction

The dynamics of mass political mobilization are usually aimed at influencing politicians' decisions and changing public policy. Social activists raise demands for certain changes and the government responds by acceptance or rejection. Since politicians will only accept demands if it is too costly not to do so, social activists ought to coordinate social efforts that increase such costs. Yet, assuming that individuals are rational players who seek to maximize their self-interest, they will attempt to enjoy the benefits of policy changes without participating in the collective efforts which have brought them about (Downs, 1957; Olson, 1965). In order to mobilize a mass political movement, social activists need to overcome the collective action problem – which characterizes many human interactions as well as processes of social or political change and, therefore, is in the frontline for social research (Dowding, 1991).

Rational choice and game theorists have developed numerous rationales and models for analyzing the different aspects of the collective action problem (Hardin, 1982; Axelrod, 1984; Taylor, 1987; Ostrom, 1990; Chong, 1991). Many of them study the ways in which social activists, usually termed entrepreneurs, mobilize interest groups or mass movements for their own gain – whether material, social or psychological (Olson, 1965; Frohlich et al., 1971; Chong, 1991: 125; Calvart, 1992; Ainsworth and Sened, 1993; Lohmann, 1993; Colomer, 1995).

In analyzing the dynamics of mass political mobilization, it is often argued that a high degree of internal interaction, between small organized groups that compose a large social group, helps to mobilize, and therefore explains, some forms of mass collective action (Dowding, 1994). This argument relies on the rationale that mobilizing individuals is easier in small groups than in large groups in three respects. First, in a small group, where the contribution of each individual is more apparent than in large groups, factors such as social pressure play a major role (Olson, 1965: 53–5; Ostrom, 1990; Chong, 1991: 41). Second, in small groups there are more chances than in large groups that an individual will believe that he or she is the decisive player for collective success (Taylor, 1987: 45–8). Third, the fact that in small groups people recognize their contribution to the collective goal, their participation is appreciated by others and there are social pressures strengthens group identity. The combination of these factors has recently been noted as an important determinant in the formation of one's interests (see also Citrin et al., 1990; Bobo and Gilliam, 1990; Koch, 1991; Brand et al., 1994; Cornell, 1995; Grafstein, 1995; Kuran, 1995; Lichbach, 1995; Gartner and Segura, 1997). Such an identity develops, for example, within socially specified groups on the basis of connection, ethnicity, class or religion.

This line of argumentation implies that group size and group identity can be used by social activists to shape beliefs through the formation of small, closely related, organized groups based on social affiliation.

In this paper, we examine how group membership influences individual decisions in respect to joining a mass political struggle under the assumption that group members have a strong group identity expressed by a strong commitment to group decisions. We suggest a two-level theoretical game model to estimate the probability of a group initiating or joining a mass political struggle, given that there are other groups that may or may not join the struggle. At the first stage, an individual calculates the costs and benefits of participation at the group level and then he/she calculates the costs and benefits of the group's participation in the mass collective action.

The model shows that group identity within small groups does not necessarily reduce the so-called 'free-rider' problem at the social level. That is, even when people feel committed to a small group to which they belong, they may prefer that other groups pay the costs of action rather than themselves. Furthermore, the model shows that when politicians reduce the costs of action by legitimizing a mass movement, individuals' willingness to take action, as well as the level of coordination, may decline, although the collective goals have not been achieved. Thus, the creation of many small groups with a strong group identity may tactically help in mobilizing a mass political movement, but since it does not necessarily reduce the free-rider problem at the social level, discoordination within the movement may evolve when specific interests are negotiated.

This intriguing conclusion can be clearly exemplified by the development of the Polish independent labor union, Solidarity, between August 1980 and December 1981. This movement evolved after Polish workers and intellectuals had mobilized a nation-wide strike, forcing the government to enter negotiations in August 1980. This strike, together with many other mobilization initiatives, succeeded during 1976–80, although the costs of collective action under communist rule were high (Ascherson, 1981). The government recognized the workers' movement as well as the workers' right to strike, thus reducing the costs of collective action. However, in the following months, the level of coordination between workers deteriorated, finally leading to the imposition of martial law in December 1981. These processes will be explained when we develop the mathematical rationales.

In Section 2, we review the literature related to collective action dynamics under probabilistic decision rules. The model and the empirical example are elaborated in Section 3. Section 4 concludes the analysis.

2. Collective Action under Probabilistic Decision Rules

Collective action problems often evolve due to some kind of uncertainty. In analyzing the paradox of voting, which raises similar participation problems to those under discussion, Palfrey and Rosenthal (1985) suggest a threefold typology of uncertainty. The first concerns uncertainty over alternative outcomes, the second results from voters not knowing whether other citizens will vote or abstain and the third type of uncertainty relates to lack of information about the voting (or participation) costs and the preferences of other voters, which leads to a game of incomplete information. Following Ledyard (1984), Palfrey and Rosenthal (1985) then concentrate on the third type of uncertainty in their analysis. Ainsworth and Sened (1993) and Lohmann (1993) adopt a similar approach.

In this paper, we focus on the second type of uncertainty – i.e., when individuals are not certain whether other players will join collective action or not. This type of problem is usually analyzed by a participation game or an n-person 'chicken' game, showing that the probability of participation grows as the costs of action decrease, the benefits from the collective good increase and the probability of a player being decisive increases (Palfrey and Rosenthal, 1983; Taylor, 1987). These studies either concentrate on the group level (Taylor, 1987; Grafstein, 1995; Lichbach, 1995; Gartner and Segura, 1997) or suggest basic models, such as the participation game or the prisoner's dilemma, to analyze the two-level interaction in specific activities such as voting (Palfrey and Rosenthal, 1983).

Our model suggests a different viewpoint, supported by a complex framework, as compared to these studies. It develops a systematic two-level model that explains the possible impact of strong group identity on the ability to mobilize mass collective action. The fact that each group is characterized by a strong group identity implies that its interests and preferences are widely known to other groups. Each group is well informed about the preferences of other groups and the costs of action, which allows us to construct a game with complete information.[1] Yet, since groups are not certain whether other players will join collective action or not, we use a mixed-strategy approach to analyze the two-level collective action dynamic.

The limited explanatory power of current studies can be clearly exemplified by reference to the Polish case. Between 1976 and 1980, Polish social entrepreneurs mobilized a large number of social organizations that operated as a basis for mass mobilization. Basically, this strategy can be explained by the rationale that mobilizing small groups is easier than mobilizing large ones (Olson, 1965; Taylor, 1987, Grafstein, 1995). However, in July 1980, social leaders in Poland believed that society was not ready for a high-cost struggle (Garton Ash, 1983: 38; Kemp-Welch, 1991: 17). Therefore, the simple rationale of reducing the costs of action by creating a strong group identity in small groups cannot explain the mass mobilization in Poland in August 1980. Later in the analysis, we will develop a rationale to explain that event.

Furthermore, the rationale provided by current studies implies that as the costs of action decrease and group members understand the need to participate in the group's activity, mass collective action will succeed. However, in Poland, after the government recognized the workers' movement and decreased the costs of activity, the level of mobilization deteriorated. In our model we suggest an explanation for this process.

Hence, the model developed in this paper aims both to contribute new theoretical insights and to provide explanatory tools for various dynamics of mass collective action.

1. This rationale explains the assumption of complete information. Further modeling will try to explain the two-level interaction under incomplete information. We thank the referees for raising this possibility.

3. A Model of Two-Level Collective Action

The model is elaborated in four stages. First, we present the components and the structure of the game. Second, we explain the conditions for an individual to support a public campaign when the group with which he/she is identified can achieve the total critical number required for political change by mobilizing its own members. Third, we analyze individual behavior when this condition is not fulfilled. Finally, we compare the chances of achieving political change when groups are united and when they act separately.

3.1. The Components and Structure of the Game

We model the problem of mobilizing mass collective action when there are organized groups with a socially based network, meaning that social activists can get an indication of their followers' intentions. In return, a follower can potentially influence the group's decision as well as the social outcome.

We model an interaction between K groups: each group k has N_k followers (henceforth, members), where $k = 1,...,K$. At the first stage of the game, each member i in each group k simultaneously decides whether he/she wants the group to start (or join) a public campaign or not. Let us denote the decision of member i in group k as X_{ik} where $X_{ik} = 1$ and $X_{ik} = 0$ if the player is for or against a public campaign respectively.

The decision of each group k to start a public campaign or not depends on a critical number of members who support a public campaign, n_k. If the number of those who actually support a public campaign is equal to or greater than n_k, then all N_k members participate in the group's public struggle. In other words, the decision rule of a group k, where $k = 1,...,$K, is to start a public campaign if

$$\sum_{i=1}^{N_k} X_{ik} \geq n_k,$$

but if

$$\sum_{i=1}^{N_k} X_{ik} < n_k,$$

then the group does not initiate such a campaign.[2]

The decisions in each one of the K groups are accepted simultaneously. We assume that members are strongly identified with the group and therefore feel obligated. Such strong self-identification with a group is most apparent when the group is established around fundamental political issues

2. Note that if the group decides by the majority rule then $n_k = \left[\frac{N_k}{2}\right]$.

with direct impact on people's lives. Thus, our analysis applies to situations in which group members are obligated to accept the group's decision, because they benefit a lot from membership while disobedience will cause sanctions. This means that there are strong mechanisms such as norms and identity that impose obedience under the given decision rule.[3] For example, in revolutionary groups, as well as in other small groups, the costs of disobedience are extremely high (Taylor, 1988).[4]

Thus, if a group decides to initiate or join a struggle, all its members participate, because the costs of leaving the group are higher than the costs of participation. Likewise, if a group decides against initiating or joining a public campaign, then none of its members will act against the government. Let us denote the decision of a group k to initiate or join a public campaign by $S_k = 1$, and the decision not to do so by $S_k = 0$.

At the second stage of the game, all the groups that decide for a public campaign take to the streets, thus indicating to the government the total number of players who wish to change the status quo. At the third stage, if this number is bigger than a certain threshold number, $n*$, the government chooses an alternative, A. Otherwise the government keeps the status quo, Q. In fact, the government's decision rule is to keep the status quo, Q, if

$$\sum_{k=1}^{K} S_k N_k < n*,$$

but to change policy into an alternative A if

$$\sum_{k=1}^{K} S_k N_k \geq n*.$$

Looking at an individual player, the personal cost of participation is denoted by C, which is the same for all players, while T_Q and T_A are the personal benefits from the status quo and alternative A, respectively. We assume that $T_Q < T_A$ and $C < T_A - T_Q$, because otherwise no one will benefit from political change. The utility of a player i in a group k as a function of the group's decision, S_k, is given by

3. We should emphasize that the mechanism that determines the group's decision is not necessarily based on voting. Rather, we try to model the interaction as if there were such a mechanism. In practice, however, each member forms beliefs and expectations about other players' behaviour and decides on his/her actions.

4. The fact that group decisions are strongly imposed does not mean that the decision rule excludes many members but, rather, it indicates strong respect for procedures. For example, strong democracies are based on the principle of respect to majority will.

$$U_{ik} = \begin{cases} T_A - C & \text{if} \quad S_k = 1 \quad \text{and} \quad \sum_{j=1}^{K} S_j N_j \geq n^* \\ T_Q - C & \text{if} \quad S_k = 1 \quad \text{and} \quad \sum_{j=1}^{K} S_j N_j < n^* \\ T_A & \text{if} \quad S_k = 0 \quad \text{and} \quad \sum_{j=1}^{K} S_j N_j \geq n^* \\ T_Q & \text{if} \quad S_k = 0 \quad \text{and} \quad \sum_{j=1}^{K} S_j N_j < n^* \end{cases}$$

Given these characteristics for the game, it is easy to show that in pure strategies there is Nash equilibrium, depending on whether or not the player's decision influences the group's decision. If the decision of a member i in a group k does not influence the group's decision, then member i will follow the group's decision. On the other hand, if player i's decision influences the group's decision and $T_Q < T_A - C$, then an individual will decide for a public campaign if he/she is the decisive player. If players do not believe that they are decisive, the group will not initiate or join a public campaign.

A similar rationale has been shown by Taylor (1987: 40–9), yet he does not consider the problem of two-level collective action nor does he offer a mixed-strategy analysis. We suggest such an equilibrium analysis under mixed strategies given the previously specified conditions.

3.2. A Model of Two-Level Collective Action with Mixed Strategies

In our analysis, we assume that players use mixed strategies, meaning that their decisions are probabilistic. They attempt to maximize the expected utility and this can be accomplished by adding the probabilities of each strategy achieving the best outcome. This leads to a probabilistic prediction, meaning that the equilibrium solution assigns a probability to players' actions. For this reason, we construct the model using the expected utility concept.

Let α_{ik} be the probability of player i in group k choosing to support a public campaign, namely $\alpha_{ik} = \Pr(X_{ik} = 1)$. Denote

$$P_k = \Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^* - N_k\right)$$

$$\overline{P_k} = \Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^*\right)$$

where P_k is the probability of achieving the total critical number of participants, n^*, if group k participates; and $\overline{P_k}$ is the probability that such a critical number, n^*, can be achieved without the participation of group k.

PROPOSITION 1. *The first-order condition for equilibrium is given by*

$$(P_k - \overline{P}_k)(T_A - T_Q) = C$$

Proof. See Appendix.

This condition shows that the marginal utility of a member i in group k – because the group supports the collective action – equals the costs of participation. Since for every player i in group k this condition holds, it implies that there is a symmetric solution where all α_{ik} are the same for the players in the group. Thus, we limit our analysis to this solution where $\alpha_{ik} = \alpha_{lk}$ for every i and l. We denote this probability by α_k. Let q_k be the probability that group k will choose to act,

$$q_k = \sum_{m=n_k}^{N_k} \binom{N_k}{m} \alpha_k^m (1 - \alpha_k)^{N_k - m}$$

PROPOSITION 2. *If for every k, where $k = 1,..,K$, $N_k \geq n^*$, then for every l and k*

$$q_k = q_l = 1 - \left(\frac{C}{T_A - T_Q}\right)^{\frac{1}{K-1}}.$$

Proof. See Appendix.

IN WORDS. *If each one of the groups can achieve the total critical number, n^*, by mobilizing its own members, then the probability that it will initiate a public campaign increases as the costs of action decrease, the payoffs from alternative A increase and the total number of groups that may possibly participate decreases.*[5]

This proposition implies that groups with strong group identity are playing a participation game. It follows that the probability of achieving political change, when each group can achieve the total critical threshold by itself, is

$$1 - \left(\frac{C}{T_A - T_Q}\right)^{\frac{K}{K-1}}.$$

Proposition 2 shows that as the number of groups that may possibly participate increases, the probability of at least one group participating declines and asymptotically approaches

$$1 - \frac{C}{T_A - T_C}.$$

Hence, even if group members are disciplined but know that their group, as

5. Note that the accurate size of each group does not influence the outcome. It is enough that each group has the total critical number of members.

well as all other groups, can achieve by itself the total threshold, they may prefer that other groups take action when the ratio

$$\frac{C}{T_A - T_C}$$

is not sufficiently small. In that case, similarly to the original free-rider problem, group members think that the costs of action are too high compared to the expected benefits and they prefer that other groups carry out the struggle.

The situation is different, however, when more than one group is needed in order to achieve the total critical number, n^*. From now on, we limit our analysis to equal size groups, namely $N_k = N$ for all k, where $k = 1,..,K$.[6] In this case, we look for symmetric solutions where $q_k = q$ for all k, where $k = 1,..,K$. Under this assumption, the equilibrium equation is given by

$$\binom{K-1}{t-1} q^{t-1}(1-q)^{K-t} = \frac{C}{T_A - T_Q}$$

where t is the number of groups required to achieve the total critical number, n^*.

There are two solutions to this equation if $t \geq 2$ and the ratio

$$\frac{C}{T_A - T_Q}$$

is not too large.[7] Let us find the equilibrium when the costs of action are high. In principle, there are two solutions but as the costs of action increase the two solutions approach

$$\frac{t-1}{k-1}.$$

As explained earlier (see footnote 7), if

$$\binom{K-1}{t-1} \frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^K} = \frac{C}{T_A - T_Q}$$

there is only one solution. Let us find this solution.

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6. This is done to simplify the analysis. The important point here is not the size of a group but, rather, its marginality. Even if the groups are not equal in size, the analysis holds as long as the same number of groups can achieve the total critical number.

7. It is easy to verify that if

$$\binom{K-1}{t-1} \frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^{K-1}} > \frac{C}{T_A - T_Q}$$

there are two solutions to the problem. If

$$\binom{K-1}{t-1} \frac{(t-1)^{k-1}(K-t)^{K-t}}{(K-1)^{K-1}} < \frac{C}{T_A - T_Q}$$

there is no solution and at the apex there is only one solution.

PROPOSITION 3. *If*

$$\frac{C}{T_A - T_Q} \to \binom{K-1}{t-1}\frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^{K-1}} \qquad then \qquad q \to \frac{t-1}{K-1}$$

Proof. See Appendix.

This proposition implies that as the costs of action increase and the number of groups required to achieve the total critical number approaches the total number of groups operating in the social scene, the probability of a group deciding to take action increases.[8] This result seems counter-intuitive, because when many groups are required to achieve the total critical number, a player may believe that there is a low chance that any one group will be the decisive player. Adding the high costs of action, intuition may lead to the expectation that a group will not take action.

We rationalize this result as follows. If $t = K$, there is only one solution in mixed strategies where $q \to 1$. In this case, all the groups will take action and achieve the critical mass. Obviously, when $q \to 1$ the probability that an individual in a group k will support the action, α_k, increases, such that $\alpha_k \to 1$. In such a case, each group is actually the decisive player, because without it the total critical threshold cannot be achieved. In other words, as long as $t < K$, the groups are playing a form of participation game but when $t = K$, they are playing a coordination game where the free-rider problem does not exist. In addition, players are likely to believe that the total population is required to achieve political change, when the costs of action are high as conditioned in Proposition 3. For example, if there are 20 groups playing in the social scene and only ten of them are required to achieve the total critical threshold, the groups are playing a participation game where they can free-ride (see Proposition 2). But, when the costs of action are very high, all 20 groups are required to achieve the total critical threshold, meaning that the groups are playing a coordination game where free-riding is not beneficial. Rather, each group is decisive for achieving the collective goal.

These results can be exemplified by the collective action dynamics in Poland between 1976 and 1980 when Polish social activists succeeded in mobilizing a mass movement through organizing small groups with a strong group identity.

In Poland, the social leadership itself was composed of small groups – a small group of intellectuals who had acted nation-wide since the 1950s and several small groups of local worker activists who were attempting to change policy (Lipski, 1984: 310–13). On 23 September 1976, this small group of Polish intellectuals formed an open dissent organization – the

8. Note that it does not matter how many groups operate. The crucial point is that the probability of a group participating increases as t approaches K; i.e., $t \to K$.

Workers' Defense Committee (the KOR). The principle of mobilizing small groups also guided these intellectuals and their worker allies in their activity regarding society. They did not immediately try to form a national movement but, rather, concentrated on strengthening support at the local and sectional levels (Zuzowski, 1992: 87).

This small group of KOR members established a social institutional setting – independent of the state – which included an information network and many social organizations. The information network was based on an independent newspaper – *Robotnik* – which was circulated in factories. Many other professional groups followed this example and by 1979 there were already more than 30 independent newspapers in Poland (Lipski, 1984: 310).

The large network of social organizations was composed of workers' free trade unions in factories, students' organizations and farmers' free unions. Through these organizations, KOR also provided financial aid to worker activists. This was the largest item on the KOR budget, based on contributions from Polish individuals and organizations all over the world (Zuzowski, 1992: 88–97). KOR also coordinated the establishment of discussion clubs and suggested alternative forms of education for youth and students.

Thus, in order to create a momentum for social movement, KOR members provided various selective incentives. Nevertheless, the mass of workers mainly benefited in terms of alternative education and participation in discussion clubs – that is, social and expressive benefits. Since the additional material payoffs from cooperation were marginal as compared to the expected cost of a political struggle, Polish social leaders believed that, in July 1980, society was not ready for a high-cost struggle (Garton Ash, 1983: 38; Kemp-Welch, 1991: 17).

Despite these difficult conditions, Polish social entrepreneurs succeeded in mobilizing a nation-wide strike in August 1980. This situation can be explained by the fact that the members of all the social groups believed that the costs of action were high and that the number of groups required to achieve change approached the number of the total population. As a result, all the groups believed that they were decisive players in a coordination game and joined collective action. Note that in this mechanism, the participation game is transformed into a coordination game by causing players to believe that there are bad starting conditions, rather than by provision of selective incentives as suggested by Chong (1991).

This analysis also shows that in certain cases it is better for a government to signal that it has a low threshold so that $t < k$, thus intensifying the incentives to free-ride, rather than creating the impression that it will only change the status quo if all groups take to the streets.

Thus far, we have analyzed the solution when the relative costs of action are high. When such a solution succeeds and the government changes the status quo, it practically reduces the costs of action. Let us find the solutions of the two-level dynamic when the relative cost is low.

PROPOSITION 4. *If* $\dfrac{C}{T_A - T_Q} \to 0$, *then the two equilibrium points satisfy*

$$q \simeq \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}} \right]^{\frac{1}{t-1}} \tag{1}$$

$$q \simeq 1 - \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}} \right]^{\frac{1}{K-t}} \tag{2}$$

Proof. See Appendix.

IN WORDS. *If the costs of action are low and the benefits from alternative A are high compared to the benefits from the status quo, then there are two possible equilibria. In one, the probability of group k starting or joining a public campaign is very low and, in the other, that probability is very high.*

This proposition shows that even if the costs of action are relatively very low and the benefits from changing the status quo are high, there is still an equilibrium where the probability of a group taking action is close to zero. In this case, each group is waiting for the other groups to act. In other words, Proposition 4 explains the motivation of groups to free-ride, although within the groups themselves the collective action problem has been solved.

This result can be exemplified by the sociopolitical processes in Poland between September 1980 and December 1981, after the government had legitimized protest activity and allowed Solidarity to act as a free and independent trade union. By legitimizing the movement in the August 1980 agreement, the Polish Government practically reduced the costs of collective action. According to Proposition 4, that move could have encouraged or discouraged collective action. In Poland, the reduced cost of activity discouraged coordination and the level of mobilization deteriorated.

Between September 1980 and December 1981 Solidarity gradually lost its mobilization ability, thus clearing the grounds for sectional groups to act separately and locally. Such activity only had a marginal effect on the government. It became clear that the cooperation between intellectuals and workers, as well as with other groups, was tactical, while they had some basic disagreements with respect to the final goals (Garton Ash, 1983). Intellectuals wanted to open the political system, while worker groups concentrated on improving working conditions and achieving local interests. Thus, we may argue that the mobilization strategy used by Polish social activists created the potential for discoordination at the social level; as a result, the level of coordination within the Polish mass movement deteriorated. Applying Proposition 4, Polish society reached that equilibrium because the free-rider problem had not really been eliminated through the mobilization of small groups prior to August 1980.

Extrapolating that rationale from our specific model, we may conclude that politicians who identify a potential of mass collective action and want to discourage it may try to reduce the costs of action. According to Proposition 4, this might either encourage or discourage collective action. If it intensifies collective action, then the politicians' goal is not achieved and they may use other means. But, it is certainly possible that the intensity of collective action will decline. Thus, lowering the costs of collective action in a two-level dynamic may lead players to defect, although the benefits from the change are high.

Proposition 4 allows us to derive the probability of achieving a political change – i.e., the probability that the total critical number, n^*, will be achieved.[9] It is easy to verify that when $q \to 0$, the probability of achieving political change asymptotically behaves as

$$\binom{K}{t} q^t, \qquad \text{that is } \Pr\left(\sum_{j=1}^{K} S_j N_j \geq n^*\right) \sim \binom{K}{t} \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right]^{\frac{t}{t-1}}$$

9. We may expand the calculations to find the probability of a member in group k deciding to support a public campaign, α_k, when $q \to 0$ and $q \to 1$. Since

$$q = \sum_{m=n}^{N} \binom{N}{m} \alpha_k^m (1-\alpha_k)^{N-m}, \qquad \alpha_k \to 0 \text{ when } q \to 0.$$

Thus $q \sim \binom{N}{n} \alpha_k^n$.

From Proposition 3 it follows that

$$\binom{N}{n} \alpha_k^n \sim \left(\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right)^{\frac{1}{t-1}}$$

Rearranging yields

$$\alpha_k \sim \left(\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right)^{\frac{1}{n(t-1)}} \binom{N}{n}^{-\frac{1}{n}},$$

Similarly, as $q \to 1$ $q \sim \alpha_k^N$ and from Proposition 3 we get

$$\alpha_k \sim \left\{1 - \left(\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right)^{\frac{1}{K-t}}\right\}^{\frac{1}{N}}.$$

and when $q \to 1$, the probability of achieving political change asymptotically behaves as q^K, that is

$$\Pr\left(\sum_{j=1}^{K} S_j N_j \geq n^*\right) \sim \left\{1 - \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right]^{\frac{1}{K-t}}\right\}^K$$

Finally, we analyze the special case in which each group can, by itself, achieve the total critical number, i.e., $t = 1$, but each group splits into two subgroups. Let $\sigma = \langle K,t,x \rangle$, where

$$x = \frac{C}{T_A - T_Q}$$

and σ represents the collective action environment under the assumption of equal size groups. Let

$$P_\sigma = \Pr\left(\sum_{j=1}^{K} S_j \geq t\right),$$

namely, the probability of achieving the total critical number in equilibrium.

THEOREM 1. $P_{\langle K,1,x \rangle} > P_{\langle 2K,2,x \rangle}$.

Proof. See Appendix.

IN WORDS. *The probability of achieving the total critical number is higher when each group can achieve the total critical number by itself than when there is a need for two groups to achieve the critical number.*

This theorem shows that the probability of mobilizing a critical mass and achieving political change is lower when individuals are members of two subgroups, which act separately, than when they are members of one group. We rationalize this result as follows. Recall that, in our model, group members have a strong group identity, meaning that they are obligated by the group's decisions. When they are members of such a group, able to achieve the total critical number by mobilizing its own members, strong group identity reduces the players' uncertainty about each other's actions and therefore the free-rider problem is reduced. However, when the same mechanism operates in two separate groups, each with a strong group identity, within the original group, this normative setting may lower the chances that the two groups will join forces. As long as the two identities do not cohere, the free-rider problem will not be reduced. In that respect, a strong group identity within small groups encourages distrust in each other's intentions, thus also intensifying the motivation to free-ride.

This result strengthens the rationales developed by Proposition 4 and supports the empirical analysis of the Polish case. Since sectional groups were coordinated on the basis of strong and different group identities, the united movement – Solidarity – could not carry out longstanding activity over agreed goals between September 1980 and December 1981.

4. Conclusion

The belief that mobilizing a mass movement is easier through the coordination of small groups with a strong group identity can explain the strategy of social activists in many processes of collective action. The model developed in this paper explains the conditions for mobilizing mass collective action using a two-level strategy – i.e., through creating small groups with a strong group identity. When the costs of action are high, group members are likely to believe that the participation of the whole population is required to achieve change. In this case, each group is the decisive player, meaning that it will join collective action. Social entrepreneurs who create such beliefs in society transform the game between the groups from a participation game into a coordination game. Note that this can be done without providing selective incentives as suggested by Chong (1991).

Yet, the model elaborated here accentuates the possible disadvantages of such a strategy. The creation of small groups, each with a strong group identity, makes it harder to create a consensus between the groups themselves concerning the goals of the mass political struggle. This strengthens the potential for discoordination between the groups as compared to the case of mobilizing large groups over the same goal.

Theorem 1 proves that a strong group identity does not eliminate the free-rider problem between groups. Proposition 4 shows that when the costs of action are low and the benefits from political change are high, there is still an equilibrium where the level of coordination between groups is very low. Thus, once the specific goals and interests of each group are at stake, the fact that each group has a strong identity of its own may discourage participation in mass collective action.

This framework highlights the theoretical and practical problems in applying micro-level models to the macro-level. When the application is not done carefully enough, the analysis may reach inaccurate conclusions. We have developed a systematic model of a two-level collective action that allows such a careful application. As exemplified by reference to the Polish case, the theoretical rationales also have significant explanatory power.

Further research will study the ways in which learning processes under incomplete information affect such dynamics.

APPENDIX

PROPOSITION 1. *The first-order condition for equilibrium is given by*

$$(P_k - \overline{P}_k)(T_A - T_Q) = C$$

Proof. Let us write the expected utility of player i in group k, EU_{ik}:

$$\begin{aligned}
EU_{ik} = {} & \Pr\left(S_k = 1, \sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^*\right)(T_A - C) + \Pr\left(S_k = 1, \sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j < n^*\right)(T_Q - C) + \\
& \Pr\left(S_k = 0, \sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^*\right)T_A + \Pr\left(S_k = 0, \sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j < n^*\right)T_Q \\
= {} & \Pr\left(\sum_{m=1}^{N_k} X_{mk} \geq n_k\right) Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^* - N_k\right)(T_A - C) + \\
& \Pr\left(\sum_{m=1}^{N_k} X_{mk} \geq n_k\right) \Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j < n^* - N_k\right)(T_Q - C) + \\
& \Pr\left(\sum_{m=1}^{N_k} X_{mk} < n_k\right) \Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j \geq n^*\right)T_A + \Pr\left(\sum_{m=1}^{N_k} X_{mk} < n_k\right) Pr\left(\sum_{\substack{j=1 \\ j\neq k}}^{K} S_j N_j < n^*\right)T_Q
\end{aligned}$$

Denote

$$\begin{aligned}
V_k &= \Pr\left(\sum_{\substack{m=1 \\ m\neq i}}^{N_k} X_{mk} \geq n_k - 1\right) \\
\overline{V_k} &= \Pr\left(\sum_{\substack{m=1 \\ m\neq i}}^{N_k} X_{mk} \geq n_k\right)
\end{aligned}$$

Thus, substituting P_k, $\overline{P}_k$, V_k and $\overline{V}_k$ yields

$$\begin{aligned}
EU_{ik} = {} & \left(\alpha_{ik} V_k + (1 - \alpha_{ik})\overline{V}_k\right) \times \left\{P_k(T_A - C) + (1 - P_k)(T_Q - C)\right\} + \\
& \left(\alpha_{ik}(1 - V_k) + (1 - \alpha_{ik})(1 - \overline{V}_k)\right) \times \left\{\overline{P}_k T_A + (1 - \overline{P}_k)T_Q\right\}
\end{aligned}$$

Let us find the first-order condition for equilibrium

$$\frac{\partial EU_{ik}}{\partial \alpha_{ik}} = 0.$$

$$\begin{aligned}
\frac{\partial EU_{ik}}{\partial \alpha_{ik}} = {} & (V_k - \overline{V_k}) \times \left\{P_k(T_A - C) + (1 - P_k)(T_Q - C)\right\} - (V_k - \overline{V_k}) \times \\
& (\overline{P}_k T_A + (1 - \overline{P}_k)T_Q) = 0
\end{aligned}$$

After rearranging terms we have

$$(V_k - \overline{V_k}) \times \left\{(P_k - \overline{P}_k)(T_A - T_C) - C\right\} = 0.$$

Since the first expression represents the marginality of player i in group k, it is always positive. Hence,

$$(P_k - \overline{P}_k)(T_A - T_Q) = C. \qquad \square$$

PROPOSITION 2. If for every k where $k = 1,..,K$, $N_k \geq n^*$, then for every l and k

$$q_k = q_l = 1 - \left(\frac{C}{T_A - T_Q}\right)^{\frac{1}{K-1}}$$

Proof. To find q_k, let us first compute the expression $P_k - \overline{P}_k$.

$$\begin{aligned}
P_k - \overline{P}_k &= \Pr\left(\sum_{\substack{j=1\\ j\neq k}}^{K} S_j N_j \geq n^* - N_k\right) - \Pr\left(\sum_{\substack{j=1\\ j\neq k}}^{K} S_j N_j \geq n^*\right)\\
&= \sum_{\sum_{j=1}^{K} S_j N_j \geq n^* - K^k} \left(\prod_{\substack{j=1, S_j=1\\ j\neq k}}^{K} q_j\right)\left(\prod_{\substack{j=1, S_j=0\\ j\neq k}}^{K} (1-q_j)\right) - \sum_{\sum_{j=1}^{K} S_j N_j \geq n^*} \left(\prod_{\substack{j=1, S_j=1\\ j\neq k}}^{K} q_j\right)\left(\prod_{\substack{j=1, S_j=0\\ j\neq k}}^{K} (1-q_j)\right)\\
&= \sum_{n^* > \sum_{j=1}^{K} S_j N_j \geq n^* - N_k} \left(\prod_{\substack{j=1, S_j=1\\ j\neq k}}^{K} q_j\right)\left(\prod_{\substack{j=1, S_j=0\\ j\neq k}}^{K} (1-q_j)\right)
\end{aligned}$$

where $\prod_j q_j$ is the production of $q_1, q_2, ..., q_K$; if $S_j = 0$ for all $j \neq k$, then let $\prod_j q_j \equiv 1$, and if $S_j = 1$ for all $j \neq k$, then let $\prod_j (1 - q_j) \equiv 1$. From the last equation for $P_k - \overline{P}_k$, the condition $n^* > \sum_{\substack{j=1\\ j\neq k}}^{K} S_j N_j \geq n^* - N_k$ holds if and only if $S_j = 0$ for all j, $j \neq k$, thus we have

$$P_k - \overline{P}_k = \prod_{\substack{j=1\\ j\neq k}}^{K} (1 - q_j).$$

From the equilibrium equation $(P_k - \overline{P}_k)(T_A - T_Q) = C$, we find that

$$\prod_{\substack{j=1\\ j\neq k}}^{K} (1 - q_j) = \frac{C}{T_A - T_C}$$
$$\prod_{\substack{j=1\\ j\neq l}}^{K} (1 - q_j) = \frac{C}{T_A - T_C}.$$

We conclude that $q_k = q_l$, substitution and rearranging yields the results. $\square$

PROPOSITION 3. *If*

$$\frac{C}{T_A - T_Q} \to \binom{K-1}{t-1} \frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^{K-1}} \qquad \textit{then} \qquad q \to \frac{t-1}{K-1}$$

Proof. As we show in Proposition 1, the first-order condition for mixed equilibrium is

$$(P_k - \overline{P}_k)(T_A - T_Q) = C.$$

However, this equation has two solutions, if for some q, $(P_k - \overline{P}_k)(T_A - T_Q) > \mathrm{C}$, and only one solution, if

$$\max_{0 \le q \le 1}\Big((P_k - \overline{P}_k)(T_A - T_Q)\Big) = C$$

(if $(P_k - \overline{P}_k)(T_A - T_Q)$ for all q, there is no solution). Let us find the condition for a unique solution, namely, the q that maximizes

$$\binom{K-1}{t-1} q^{t-1}(1-q)^{K-t}.$$

Let

$$y(q) = \binom{K-1}{t-1} q^{t-1}(1-q)^{K-t}$$

By differentiating with respect to q and equating to zero we find that the maximum attends at

$$q = \frac{t-1}{K-1}.$$

Substituting this q into $y(q)$ yields

$$y = \binom{K-1}{t-1} \frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^{K-1}}$$

that is, the maximum of the left-hand side of the equation $(P_k - \overline{P}_k)(T_A - T_Q) = C$ after division by $T_A - T_Q$. Thus, if

$$\frac{C}{T_A - T_Q} = \binom{K-1}{t-1} \frac{(t-1)^{t-1}(K-t)^{K-t}}{(K-1)^{K-1}},$$

we find that there is a unique q solving the equilibrium equation, where

$$q = \frac{t-1}{K-1}. \qquad \square$$

Proposition 4. *If* $\dfrac{C}{T_A - T_Q} \to 0$, *then the two equilibrium points satisfy*

$$q \sim \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right]^{1/(t-1)} \tag{1}$$

$$q \sim 1 - \left[\frac{C}{(T_A - T_Q)\binom{K-1}{t-1}}\right]^{1/(K-t)} \tag{2}$$

Proof. If

$$\frac{C}{T_A - T_Q} \to 0$$

then either $q \to 0$ or $q \to 1$. In the first case the leading term is q^{t-1} where $(1-q) \to 1$ and, in the second, the leading term is $(1-q)^{K-t}$ where $q \to 1$. In each case, rearranging yields the results. □

THEOREM 1.

$$P_{<K,1,x>} > P_{<2K,2,x>}.$$

Proof. The equilibrium equation for $t = 1$ is

$$(1-a)^{K-1} = x$$

where a is the equilibrium probability that a group decides to take an action. The equation for $t = 2$ is given by

$$(2K-1)q(1-q)^{2K-2} = x$$

where q is the equilibrium probability for $t = 2$.

From these equations we can find the equilibrium probability a as a function of q and K

$$a = 1 - [(2K-1)q]^{\frac{1}{K-1}}(1-q)^2.$$

Next we calculate the probability of achieving the total critical number

$$P_{<K,1,x>} = 1-(1-a)^K = 1-[(2K-1)q]^{\frac{K}{K-1}}(1-q)^{2K}$$

$$P_{<2K,2,x>} = 1-(1-q)^{2K} - \binom{2K}{1} q(1-q)^{2K-1}$$

To show the result, it is sufficient to show that

$$(1-q)^{2K} + \binom{2K}{1} q(1-q)^{2K-1} > [(2K-1)q]^{\frac{K}{K-1}}(1-q)^{2K}$$

or after rearranging and dividing by $(1-q)^{2K-1}$ (recall that $0 < q < 1$) that

$$1 + (2K-1)q > (2K-1)q(2K-1)^{\frac{1}{K-1}} q^{\frac{1}{K-1}}(1-q)$$

It is sufficient to show that for every q, $(2K-1)^{\frac{1}{K-1}} q^{\frac{1}{K-1}}(1-q) < 1$. To prove that, we need to show that the maximum over the left-hand side is less than or equal to 1, where $0 \le q \le 1$. The function $y(q) = q^{\frac{1}{K-1}}(1-q)$ achieves its maximum at $\frac{1}{K}$ and thus its value at that point is

$$y\left(\frac{1}{K}\right) = \frac{K-1}{K^{\frac{1}{K-1}+1}}.$$

It follows from the last inequality that it is sufficient to show that

$$(2K-1)^{\frac{1}{K-1}} \frac{K-1}{K^{\frac{1}{K-1}+1}} < 1.$$

It is easy to verify that for $K = 2$ and $K = 3$ the last inequality holds. For $K > 3$

$$(2K-1)^{\frac{1}{K-1}} \frac{K-1}{K^{\frac{1}{K-1}+1}} < \frac{2^{\frac{1}{K-1}}(K-1)}{K}.$$

The last expression

$$\frac{2^{\frac{1}{K-1}}(K-1)}{K}$$

increasing with K, for $K > 3$ and going to 1 as $K \to \infty$, thus

$$\frac{2^{\frac{1}{K-1}}(K-1)}{K} < 1. \quad \square$$

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