

## **Economic Conflicts: A Hawk-Dove Explanation**

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### **Abstract**

Being an evolutionary process, there may be many immediate as well as long term causes of violence or conflicts. Conflicts need resources like arms, people, food, capital, time and many such resources which are spent by the groups in order to obtain economic control and political influences. This non-productive spending of inputs and resources can be considered as a social cost with a negative growth effect on the economy. The persistence of conflict is mainly due to relative deprivation of one or more sections against another. The capability of weaker sections (Doves) should be raised by increasing their social, economic and political possession up to such a level that they become able to fight against exploitation by Hawks independently. Present conflicts observed in various regions are different from traditional Hawk-Hawk conflict, that is, conflict for higher power and control. The conflicts are mainly between mobilised Doves and the elites who are in power and authorities.

### **1. Introduction**

Human society which settles and structures itself in the form of groups, experiences conflicts over resources among these various groups. Being a group of rational beings, these social groups also develop a cooperative and acceptance approach. Whether the conflicts or cooperation will dominate is determined by the 'Institutions' or 'Rules of the Game' present in the society as they guide the behaviour of the people.

Being an evolutionary process, there may be many immediate as well as long term causes of violence or conflicts. For example, horizontal inequality has been identified as one prime cause of conflicts in social science literature (Henrich, J and Boyd, 2008, Freeman, D; Langer, A. 2004). A comparative unequal society with horizontal inequalities and relative deprivation experiences frequent and persistent conflicts. Hence the notion that ethnicity or identity necessitates conflict may not be true as they also evolve over time.

Although the literature of conflicts is vast in political science and other social sciences, economists have also paid attention to this. In fact, it is rarely possible to disentangle political, cultural and economic elements as each is embedded in another. Conflicts need resources like arms, people, food, capital, time and many such resources which are spent by the groups in order to obtain economic control and political influences. This non-productive spending of inputs and resources

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can be considered as a social cost with a negative growth effect on the economy. The time, labour, capital and many such resources get wasted which could be used otherwise. Moreover, conflicts cause instability and uncertainty which reduce investment and therefore development.

Several approaches have been used in social sciences to understand and explain the societal conflicts. The paper uses the theoretical literature background and takes the help of Hawk-Dove model to develop an explanatory insight into the social and economic disagreements and strife. Though the use of the Hawk-Dove game in social conflict is not new, this paper attempts to provide some extensions incorporating “Non-Hawks and Non-Doves” in the model. The aim is to reflect the situation that competition of power, control over resources and relative deprivation of some communities over others are more dominant causes of persistent conflicts rather than identity or ethnic issues. The paper argues that the changing economic positions of the different social groups change their strategies and it is the strategy and position which matters. Further, the paper aims to provide insight into the situation of persistence of conflicts rather than to specify any model. It also does not attempt to explain any equilibrium, but the process of continuation of conflicts.

## 2. Hawk-Dove Explanation

John Maynard Smith and George Price have given the model of the Hawk-Dove game in the context of animal conflict. This model also has positive relevance in case of social and economic conflict that human society experiences across the time (Mc Adams R. & Nadler, J. 2003). In this model, there are two players and two strategies Hawk and Dove. Hawk always fights and plays the “attacking” game, while Dove always plays “defensive” game and runs away if attacked. When two hawks meet, a fight ensues and generates a cost. On the other hand, when a Hawk meets a Dove, the Hawk gets the resource and Dove gets nothing. But when a Dove meets another Dove, they share the resources. The payoff matrix of the traditional Hawk Dove game is:

	<b>Hawk</b>	<b>Dove</b>
<b>Hawk</b>	$(v-c)/2, (v-c)/2$	$v, 0$
<b>Dove</b>	$0, v$	$v/2, v/2$

Where,

$v$ =value of the resource

$c$ =cost of the fight

$V(H/H) = (v-c)/2$ ,  $V(H/D) = v$ ,  $V(D/H) = 0$  and  $V(D/D) = v/2$  are the payoffs of

individual strategies i.e. Hawk against Hawk, Hawk against Dove, Dove against Hawk and Dove against Dove respectively.

But in economics and social sciences, conflicts often occur between more than two players and are different from the animal conflicts. Most of the economic and social conflicts often occur between groups rather than between individuals. In any economy, Hawks refer to the group of individuals who are possessor of the economic, social and political power ( $w_H$ ) at period 't' and will possess it with greater likelihood than any other player in the period 't+1'. The reason behind this is that the control over the gains of economic exploitation of available resources as well as over the state apparatus itself tends to reinforce continuity in the power for these elite groups (Alesina et al, 2003; Ashraf Q & Galor, o, 2011; caselli, F & Colemar, W.J, 2013). On the other side, Doves are non-possessors or have little possession ( $w_D$ ) and always have a threat to their possession. Hawks have a high endowment ' $w_H$ ' either as a group or individual, while Doves have comparatively very low access to resources and political participation ' $w_D$ '. Therefore, unlike traditional Hawk-Dove game we have a situation where  $w_H \neq w_D$ . There is one more type of players we do experience in real life who are neither pure Hawks nor pure Doves, as they play Dove strategy with strong elites and Hawk strategy with the marginalised Doves (Kamphorst, J.J. A. & Vander Laan, G., 2006). Their endowment can be expressed as:  $w_H > w_N > w_D$  and their role is important. The 'Non-Hawk Non-Dove' players wait for the resources given up by the Hawks and are unable to fight with the Hawks. They may even abandon their resources if attacked by strong elites (Hawks). But these players are capable enough to exploit the poor Doves and are full of ambitions. They always try to improve their endowment.

Unlike Doves, Hawks (elites) do not struggle for survival and fight for small resources rather they struggle for state controlled vast and valuable resources. Extending the Hawk- Dove model from two players to more than two players ( $n > 2$ ) one may consider several elite players (Hawks) competing for the same resource i.e. control of the state or other such controls. In  $n > 2$  players game let 'p' be the number of Hawks and 'v' be the value of these resources they (elites) are competing for. Therefore, the payoff for each Hawk is 'v' with probability  $1/p$  otherwise it costs '-c' where 'c' is the cost of the fight. Hawks may fight individually or in the form of various elite groups, but whenever they fight by forming elite sub-groups, they may be considered as single player with one objective as we observe cartels in oligopoly.

There are possibilities of conflicts between Hawks in a conventional way, that is, between individuals, but Doves and 'Non-Hawks Non-Doves' often attempt to

fight in the form of groups for their improvement in case they involve in conflicts with other groups or individuals. The endowment ' $w_H$ ', ' $w_N$ ' and ' $w_D$ ' determines the strategy followed by different players. Hawks having high social, political and economic possession ' $w_H$ ' fight for higher control and luxuries while Doves having little resources ' $w_D$ ' in hand struggle for existence and betterment with their limited resource access. Non-Hawks Non-Doves players try to imitate Hawks and therefore attempt to gain more in case whenever they meet Doves. On the basis of these specifications the persistence and evolution of conflicts can be explained through various postulated stages:

### 2.1 Stage of few Hawks

Initially, one may start with the assumption of a society with a small number of powerful possessors (Hawks) with a very high endowment ' $w_H$ ' and a large population of Doves with a comparatively low endowment ' $w_D$ '. The endowment of Doves may be equal to or slightly higher than the subsistence level depending upon the social and political institutions of the time. There may be one strongest Hawk at the top, but for a generalisation small number of Hawks is used. These assumptions don't seem unreasonable as most of the societies have experienced some or other types of monarchy in the past. Since the number of Hawks is small, the cost of identification of other Hawks is very low which provides the opportunity to avoid the cost of the fight. But the possibilities of the fight always remain there in the expectation of higher control and possession. The expected payoff of Hawk in this stage is:

$$W(H) = w_H + (1/p)v - \{1-1/p\}c \dots \dots \dots (1)$$

The smaller ' $p$ ' increases the expected value of resources and lowers the cost of the fight for the Hawks. In the case of co-ordination or agreement of not fighting, the payoff becomes:

$$W(\tilde{H}) = w_H + v/p \dots \dots \dots (2)$$

Since  $W(\tilde{H}) > W(H)$  because of  $c > 0$ , it induces the Hawks to co-operate. Hawks may agree not to fight and enjoy the possession they have at optimum because of their small numbers. But any such coordination will be a temporary equilibrium rather than evolutionary stable strategies, though it may last longer. The distribution of resource ' $v$ ' among the Hawks may be vertical or horizontal depending on the institutional context. On the other side, due to the large number of Doves ( $k = n-p$ ) the payoff of Dove is very small:

$$W(D) = w_D + v/k \dots \dots \dots (3)$$

$v$  = value of the resources left by Hawks

$k$  = number of Doves

Now let's consider some players who have higher endowment ' $w_N > w_D$ '. These players may be explained as the group of individuals who enjoy some favour and extra resources from Hawks in comparison to poor Doves. They may be referred as the Non-Hawks Non-Doves. The strategy of Non-Hawks Non-doves is different from Hawks. The aim of such players is to increase their endowment rather than the strategy of sharing like Doves. They don't have the resources ( $w_N < w_H$ ) to engage in a fight with the Hawks, but, are in a position to exploit Doves. Therefore, such players play 'Hawk' strategy with the players other than the Hawks. If 'q' is the population of these Non-Hawks Non-Doves out of  $k = n - p$ , where 'n' is the total population and 'p' is the number of Hawks, the expected payoff for them become:

$$W(N) = w_N + q/k \{(v - c)/2\} + \{(k - q)/k\}v \dots \dots \dots (4)$$

$q/k$  = probability of meeting another similar player (Non-Hawks Non-Doves)

$\{(k - q)/k\}$  = probability of meeting Doves

With the introduction of these new Non-Hawks Non-Doves players in the extended model the payoff of Dove becomes:

$$W(D) = w_D + \{v / (k - q)\} \dots \dots \dots (5)$$

$q$  = number of Non-Hawks Non-Doves

$k - q$  = population of Doves

## 2.2 Stage of Hawk-Hawk fight

A large endowment ' $w_H$ ' and higher expected payoff ' $W(H)$ ' attract some new players to adopt Hawk strategy, i.e. to enter into the arena of political and economic control. In economics, evolutionary game theoretic literature adopts the replicator dynamics. It assumes that the share of the population using each strategy grows at a rate proportional to how well the agents using the strategy are doing relative to the whole population. Therefore, in this stage there is a rise in the population of the Hawks. But the question is who would be these players.

Due to repetition of the game, there is a learning rule. Learning takes the form of actions. Although learning takes place by all the agents, only some become able to bring it in action. Mostly the players who had  $w_N > w_D$  and  $w_N > c$  can play the action that was chosen by the player with the highest payoff (Hawks). Here ' $w_N$ ' refers to the endowment of Non-Hawks Non-Doves which has improved over

time. Such players turn themselves from 'Non-Hawks Non-Doves' and adopt 'Imitate the Best Behaviour (IBA)' strategy and are referred as IBA players. The rise in the population of Hawks 'p' reduces the expected value of resources and increases the expected cost for the Hawks<sup>2</sup>. Additionally, it also increases the transaction cost of identification of Hawks and bargaining with large numbers of such Hawks. Due to decrease in the expected value of resources or increase in the cost of fighting as well as becoming identification of Hawks and agreement difficult, it may lead to coordination failure among the Hawks (possessors). This renders paradoxical strategies where possession reduces the chances of future ownership and the temporary equilibrium may get disturbed. Impatience and the risk to future possession may lead to Hawk-Hawk fight. The intensity of fight increases with the number of Hawks 'p' and the cost of Hawk strategy. This stage reflects violent conflict among the Hawks. Any institutional change in favour of new Hawks may make the previous possessors either to surrender or get vanished. The possession ' $w_H$ ' of previous Hawks may decline sharply while new Hawks may gain the possession because of favourable environment. But unfortunately, they also do not care for the masses.

### **2.3 Mobilisation**

In the battle of Hawks, the weaker sections of Doves get deprived of due access to land, employment and state benefits over time. People or social groups feel deprived of something they had but subsequently lost or when others have gained relative to them. This deprivation is not a natural phenomenon, but is created and used by political and economic elites in order to maintain their power to control and administrate economic resources. Deprivation may sow the seeds of conflict, but due to low endowment ' $(w_D < c)$ ' individuals do not independently drive to violent means. They may lose whatever small possession they do have in case of a fight. Instead, the continuous pattern of relative deprivation creates an environment primed for conflict and Doves start mobilising themselves for a common political and economic objective. Ethnicity often becomes such an instrument of mobilisation because ethnic groups are often easier to organise and consolidate than interest groups. If the size of ethnic class is small, a broader framework like language, region or religion prevails for mobilisation. Mobilisation on any line whether ethnicity, caste, region or religion also depends on the Hawks against whom the group has to fight. It is worth mentioning here that deprivation rather than ethnicity or poverty is the source of mobilisation and conflict. In this stage Doves organise themselves into a group and become ready to 'fight back'. They start preparation of changing their strategy from Dove to Hawk and willing to have their share in political and economic control. They

desire to have participation and share in state-controlled benefits and resources 'v'. The group formation leads to accumulation of resources to fight against Hawks which was not possible individually because of low 'w<sub>D</sub>'. Now the expected payoff of the mobilised group is:

$$\sum_{i=1}^m wg (1/p) v - \{1-1/p\}c$$

m = Number of members in the group

wg = contribution to the group by individual members

v = value of the resources under the control of Hawks

c = cost of the fight

p = number of Hawks (including the new group)

Doves become able to bear the cost of fight as a group. Individually, they have to lose less 'wg' ( $wg < w_D$ ) on one hand and on the other hand have larger pooled

resources ( $\sum_{i=1}^m wg$ ). This is a stage of transformation of potential strife into actual strife. Perceived benefits of fight outweigh the cost which leads to violence. The success of the group depends on the size and pooled resources of the group. The privileged Hawks fear loss of position as well as possession and therefore have a powerful motive of suppressing such uprisings or opposition and to maintain the power. Those who have the power, have access to organised force (police or army) and to state finances use it for suppression. However, if the group of mobilised Doves is strong and large enough, it becomes difficult for the Hawks to handle the situation. Perceiving the threat to their possession ( $w_H > w_D$ ), Hawks may display the consent to compromise. In the expectation of higher cost of violence and fight in comparison to loss by sharing of the resources 'v', they may become ready to share the political control and the state controlled resources with this organised group. Now, this gives rise to a situation of bargaining between two Hawks: one the previous possessors and second the mobilised and organised Doves. The payoff for each of them will be:

$$W(H) = w_0 + (v-c)/2$$

'w<sub>0</sub>' refers to the endowment of each group w<sub>H</sub> for the Hawks or  $\sum wg$  for the group of Doves. ( $c > 0$ ) induces the adoption of better strategies for the Hawks to share and compromise rather than fight.

$$\{W(H) = w_H + v/2\} > \{W(H) = w_H + (v-c)/2\}$$

W (H) represents a situation of Hawk adopting the Dove strategy. Generally, the elites or possessors may also offer "bribes" to the leaders of mobilised group to stop fighting in the form of power participation, new territorial formation or its

control, wealth and to some extent jobs to the followers as an immediate solution. This leads to negotiation and any agreement leads to a redistribution of resources and their control. But the story does not end here.

There exists a great deal of literature concerning both pros and cons of vertical decentralisation. Local leaders and communities have more information, but there is a greater likelihood that local elites will dominate and a new class of Hawks will rise over time with a new game but smaller territory. It may enhance the possibilities for corruption at the local level often dominated by local elites. There is a high possibility of a new conflict game over time unless there is a change in the “rules of the game”. A mere change of the players at the position of Hawks brings temporary peace and new conflict will arise sooner or later depending upon the recognition of deprivation and time for mobilisation of the exploited groups. Relative deprivation may still persist among the masses and new leaders and followers will rise and conflicts will persist.

## **2.5 How to Avoid Conflict**

There can be many ways to avoid the violent conflict in the game over resources. One way of avoiding disputes in the conflict game is “penalty attachment”. Any play of the Hawk strategy by any player should be penalised. This penalty will generate extra cost to the Hawk other than the cost of fighting and will reduce his possession. But the formulation of this type of strategy requires third party enforcement. A central and independent authority can be formed as a third party (Laporta, R. et al, 1999). But the unbiasedness of this authority is doubtful as rule makers, enforcers and possessors all belong to the same group of Hawks. It is also difficult to identify each Hawk strategy in case of a large number of players. The second strategy can be a “reward attachment”. Subjects can be promised certain show up reward and informed at the outset that they had the opportunity to earn or lose money, depending on their decisions of cooperation and conflict. All such information should be ex-ante not ex-post. The 'reward' for cooperation may create an incentive to cooperate only if ex-post sharing of money will be just. Both of these strategies have their own problem of identification and enforcement.

There is a third strategy which is termed as “Retaliation”. In a social context Retaliation refers to “Tit for Tat” strategy. In this strategy a threshold level of endowment ' $w_R$ ' is made available to all the players more specifically to Doves so that they can retaliate in case of any exploitation. The capability of weaker sections (Doves) should be raised by increasing their social, economic and political possession up to such a level that they become able to fight against exploitation by Hawks independently. This can only be done by changing the “rules of game”. The payoff matrix in the new context will be:

	<b>Hawk</b> Hawk	<b>Dove</b> Retaliator
Hawk	$(v-c)/2, (v-c)/2$	$(v-c)/2, (v-c)/2$
Retaliator	$(v-c)/2, (v-c)/2$	$v/2, v/2$

$$V(R/R) > V(H/R)$$

$$v/2 > (v-c)/2$$

As  $c > 0$ , there will be only one evolutionary stable strategy 'to cooperate' and share the resources. The payoff in the case of 'n' players will be  $v/n$  for each player. In such situation, Retaliators may have some higher possession, but not enough to exploit the others and capture most of the resources like Hawks. A slightly higher amount of inequality is acceptable in the society and has never been a source of conflict. But chances of turning of Retaliators into Hawks cannot be denied. Unlike the population consisting doves, a population of Retaliators can never be invaded by Hawks. Therefore, the best strategy is to have the population of retaliators and no doves (Wood, D. H., 2012). This equilibrium can be achieved both ways, either by curtailment of  $w_H$  (possession of Hawks) or by raising the possession of Doves  $w_D$  up to  $w_R$ .

### 3. Conclusion

In any society, history and institutions determine the resource distribution and control amongst its members. An unequal access to political and economic power leads to unequal benefits from state resources, which results the establishment and continuation of extractive institutions. In any case of conflict, we can observe lack of political and economic inclusivity. In countries or regions with significant horizontal inequalities, conflicts will persist in various forms unless there is a change in the "rules of the game". Change of the players at the relative position of Hawks and Doves may bring peace for some time, but the conflicts will remerge over the course of time. Concentration of power and wealth can never ensure the security and stability of even those who possess it. The rich want to isolate themselves from poor to escape from redistributive policies and poor wants to be close to the rich. This results a hefty competition over the resources and conflict among the social groups. Resources spent by the groups in order to obtain economic and political influence can be used to empower the population or groups at the margin, which will lead to the evolution of institutions for development in general. Development can help to mitigate the benefits of using violence, by increasing the costs of such action. Societies which are badly affected by strife and violence should empower the marginalised groups and should avoid the formation of fault lines among the various social groups. A threshold level of

possession of resources (economic, social and political) should be made available to all to avoid the conflict. A sustained and broadly shared growth with proportional representation can resist violent uprisings, while spatial segregation and economic deprivation only lead to instability and conflict. From the policy perspective the challenge is to design and implement strategies to avoid the conflict through empowerment of deprived sections with greater economic opportunities and resource control. The role of policy is also to break (or avoid the formation) of ethnic diversity fault lines with segregation and deprivation. Any institutional arrangement which establishes some individuals or social groups at the position of “Hawks” and others at the level of deprivation makes the society and economy less stable. Present conflicts observed in various regions are different from traditional Hawk-Hawk conflict, that is, conflict for higher power and control. The conflicts are mainly between mobilised Doves and the elites who are in power and authorities. The persistence of conflict is mainly due to relative deprivation of one or more sections against another.

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