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THEORY OF CIVIL WAR UNDER ASYMMETRIC INFORMATION

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Abstract

In this paper, we consider a model that suggests that the theory of exchange with asymmetric information seems suitable to provide a possible model of occurrence and duration of civil wars. We show that although civil conflicts are not Pareto optimal ex post they may be Pareto optimal ex ante, in the way that every alternative leaves either the government or the rebellion worse off in some contingency which cannot be ruled out on the basis of the information which is common to both sides. Therefore, the critical determinants of the occurrence of civil conflicts appear to be arising as consequences of asymmetries in the amount of information about some relevant variables available to bargaining parties. Indeed, the civil war commitment is used as device of division of rents accruing to rebellion and the ruling government elite.

Key Words: Civil Wars, Transfers, Conflict Duration, Asymmetric Information, Rents, Mechanism Design

JEL: D72,D74, O17

1.Introduction

''War is always a Bargaining Process''

T . Schelling (1966)

Why do civil wars occur ? this question seems similar to the occurrence of Dispute-Strikes question which has attracted the attention of labour economists fairly intensively recently. Indeed , many theories have been advanced to explain the occurrence of strikes during contract bargaining with some trouble as stated by O.Hart (1989 p.25) *''the difficulty is to understand why rational parties should resort to a wasteful mechanism as a way of distributing the gains from trade . Why could not both parties be made better of by moving to the final distribution of surplus immediately ,.and sharing the benefits from increased production ? ..''*

This statement is also called the Hicks paradox (Kennan ,1986). If we accept the analogy between the occurrence of strikes and occurrence of civil wars, this paradox has been resolved by resorting to informational imperfection, in particular asymmetric information. Indeed, it is often thought that there are no other possible culprits for the inefficiencies associated to the difficulty to see why the concerned parties in conflict they fail to reach a Pareto optimal outcome

Recently, game theoretical bargaining models have been developed that offer potential new insights into why Dispute-Strikes take place. The intuition behind these models is quite simple.

The function of the dispute process is to establish a division of the rents accruing to the bargaining pair of parties in conflict (land pressure, contest for natural resources , see Collier and Hoeffler 1998 for the case of civil wars in Africa) .Despite the bilateral monopoly situation that exists , if both are fully informed , then the bargaining should not lead to a conflict since with full information one be able to capture all the bargaining surplus. In contrast, the emergence of conflicts appears to be arising as consequences of asymmetries in the amount of information about some relevant variables, available to bargainers. Although precise details vary from one model to another in the received literature, the basic idea is that one player (employer or ruling elite..) possesses a large information set than the other (rebels for instance.) and that the bargaining process serves as a learning device in which the less informed party infers information regarding the other's position by observing his or her behaviour during conflict period.

Therefore, periods of conflict are assumed to continue as long as the value of the information which expected to be gleaned from further period of conflict outweighs the additional costs. From an economic viewpoint, a critical determinant of the occurrence of wasteful conflict seems to be the presence of uncertainty or no transparency about the relevant economic data.

We propose a model that suggests that the theory of exchange with asymmetric information seems suitable to provide a possible model of occurrence and duration of civil wars . We have to show that although civil conflicts are not

Pareto optimal ex post they may be Pareto optimal ex ante, in the way that every alternative leaves either the government or the rebellion worse off in some contingency which cannot be ruled out on the basis of the information which is common to both sides.

The rebellion acts as Principal in the bargaining game while the government acts as an Agent. The game involves the determination of a transfer from the government to rebels and a conflict duration given the announced information by the government. Furthermore, this paradigm may be suitable to ask how can an external agency intervene in this situation with asymmetric information in order to change the allocation of the conflict in a desired way given her preferences. Thus this external agency may act as super Principal of the conflict hierarchy in question or as supervisor (mediator). Finally, we think that the models of the theory of exchange under asymmetric information which are characterized in terms of their predictions about the incidence, mean duration and settlement rates of disputes and the sharing allocation are useful in studying the civil wars and their precise formulation allow empirical and policy studies to be based on explicit assumptions.

Therefore in order to be more precise about the usefulness of the paradigm of the informational theory, we present a preliminary analytical setting which deals with the incidence and the duration of civil conflict and which may be extended to analyze the impact of the external interventions on the issue of the conflict.

1- The Model

We assume that a possible explanation of inefficient civil wars between rational actors may be suggested by the occurrence of strikes under incomplete information (see H. Wagner 1998 for a detailed discussion on this equivalence) Indeed a union may seek to increase his gains by preventing the owners from profiting of the firm until they agree to terms that are more favourable for the workers . However the strike may also harm the workers , hence the strike is costly for both parties and both would have been better of accepting the agreement before the strike rather after it (with possible external mediation .) Given asymmetric information on various aspects of bargaining , strikes can be explained as a mechanism that union uses to gain information that the firm possesses .

We can exploit this framework in order to explain possibly the occurrence of civil wars , their durations and the effects of an external intervention by a third party . Therefore we can extend the paper of Card (1988) (see also Hayes 1984) to include the possible participation in the conflict of external agency under asymmetric information and its effects , subject which have not been explored to our knowledge .

The simple setting of the occurrence of civil war is based on the hypothesis that a rebellion (its leader in fact..) uses the conflict (war duration , or anarchical period preventing the exploitation of the resources of the country

and so on..) commitment as device of division of rents (associated to values of the country resources ..) accruing to rebellion and the ruling elite as incumbent who is the government and possessing private information on the amount the values of the resources (all variables which are sources of rents , prices , stocks of natural resources , offices of political power and so forth ..) .

This situation is a classical Principal-Agent relationship where the rebellion is the Principal and the government acts as an Agent who is informed. In this environment, let the parameter θ denoting the value of resources or other rents which assumed to be a random variable whose realization is known to the government, but unknown to rebellion.

This parameter is assumed to be distributed on the interval $\Omega = [\theta_0, \theta_1]$ with a distribution function $F(\theta)$ and a positive density $f(\theta)$.

We assume the classical hypothesis :

$$\frac{d}{d\theta} \left(\frac{1-F(\theta)}{f(\theta)} \right) \leq 0 \quad \text{which is the monotone hazard rate .}$$

The timing structure of moves in the model is given by the following sequence:

- (i) The parameter θ is revealed to the government only.
- (ii) The rebellion proposes a complete contract to the government.
- (iii) The government accepts or rejects the contract.
- (iv) The payoffs for both players are determined.

In this setting, the rebellion's problem is to design a compensation structure that maximizes his expected utility while guarantying the government at least

his reservation utility. We define the government's reservation utility as the level of satisfaction that she will obtain if he refuses the proposed contract.

From the literature on incentive contracting and the revelation principle (Laffont and Tirole 1993), it is well known that, without loss of generality, one can restrict the search to the class of mechanisms that induce a truthful revelation of the government's private information rent parameter.

In the context of our model, any optimal mechanism M that induces a truthful reporting can be represented as the following allocation:

$$M = \langle r(\theta), s(\theta) \rangle, \quad \forall \theta \in \Omega \quad .$$

Indeed, the conflict involves the determination of a transfer r from the government to rebellion and a length of conflict $s \leq T$, where T is the maximum length (probably related to life expectancy of the leaders in conflict one can normalize this time horizon..) of the conflict.

We assume that during the period of conflict, the government earns an exogenous income y (implicitly, the exploitation of resources or more generally the economic activity, is stopped, but one can easily consider more general case where a fraction of the value of resources is kept by the government because more protected ..).

Hence, the utilities of the government and rebellion are respectively given by :

$$V = (T - s)(\theta - r) + sy \quad (1)$$

$$U = (T - s)r + sw - \Psi(s) \quad (2)$$

where U is the utility of the rebellion with w an exogenous income during conflict, while the function $\Psi(s)$ represents the cost of a conflict of duration s , which is an increasing convex function.

Further, we suppose that $\theta \geq y+w$, and finally the problem of the rebellion is to design a transfer structure that maximizes its expected utility while giving to the government at least his reservation utility normalized to zero for simplicity.

Let $s(\theta)$ the length of the conflict when θ is realized and announced by the government and $r(\theta)$ the corresponding transfer from the government to rebellion, the conflict-bargaining mechanism is :

$$M = \langle r(\theta), s(\theta) \rangle, \quad \forall \theta \in \Omega.$$

2 - Benchmark Case : Symmetric information

Here the rebellion knows the value of θ , therefore there is no problem of adverse selection (hidden information) and the allocation is the first Best given by the following proposition.

Proposition 1

There is no civil war and the rebellion captures the rent of the government $s(\theta) = 0 \quad \forall \theta \in \Omega$ and $r(\theta) = \theta, \quad \forall \theta \in \Omega$.

In fact, in this context there is not informational rent for the ruling elite and the rebellion captures all surplus by binding the participation constraint for all types of government in optimum .

Corollary1

The likelihood of civil wars occurrence is lower for the countries displaying more transparency.

Indeed , countries with more improved political rights prevent generally civil wars from being realized since politician is viewed as an informed supervisor (Laffont 1999).His role is to partially bridge the constitution's informational gap by obtaining an informative signal. Indeed politicians supply informational services to poorly voters in exchange of benefits from office (Caillaud and Tirole 1999) .

Corollary 2

The young States are more likely to experience civil wars .

Indeed if our informational approach is suitable, it may explain us why the 1996s represent a beginning of increased state conflict following independence of many states in LDC (Elbadawi, 1999) .In fact these countries, given their young constitutions display poor information diffusion about all relevant economic variables or data which may induce suspicion about the hidden behaviour of the ruling elite and trigger civil conflicts as device of potential redistribution of the rents.

3. Civil War Under Asymmetric Information

Considering an incentive mechanism $M(\theta)$, let $V(\theta, \tilde{\theta})$ be the level of satisfaction that is achieved by the government of type θ if he reports the type $\tilde{\theta}$ given his reservation payoff.

Hence $V(\theta, \tilde{\theta})$ may be expressed as:

$$\begin{aligned} \forall \theta, \tilde{\theta} \in \Omega \\ V(\theta, \tilde{\theta}) &= (T - s(\tilde{\theta}))(\theta - r(\tilde{\theta})) + s(\tilde{\theta})y \end{aligned} \quad (3)$$

We note $V(\theta) = V(\theta, \theta)$ the situation where the government's utility is truthfully reported. The requirement of truthful reporting gives us the incentive compatibility constraint (IC):

$$\forall \theta, \tilde{\theta} \in \Omega \quad V(\theta, \theta) \geq V(\theta, \tilde{\theta}) \quad (4)$$

Moreover, imposing the condition of individual rationality (IR), we have:

$$\forall \theta \in \Omega \quad V(\theta, \theta) \geq 0 \quad (5)$$

In this setting, the rebellion's problem is given by the maximization of his expected utility under the incentive compatibility and the individual rationality constraints:

$$\text{Max}_{s(\cdot)} U = \int_{\underline{\theta}}^{\bar{\theta}} [(T - s(\theta))r(\theta) + s(\theta)w - \Psi(s(\theta))] dF(\theta) \quad (6)$$

s.t:

$$\begin{aligned} \forall \theta, \tilde{\theta} \in \Omega \quad & V(\theta, \theta) \geq V(\theta, \tilde{\theta}) \\ \forall \theta \in \Omega \quad & V(\theta, \theta) \geq 0 \end{aligned}$$

We are now able to solve this model of conflict bargaining with asymmetric information between the government and rebellion. To find the optimal solutions of the bargaining contract profile, we begin by characterizing the class of familial contracts that satisfies the incentive constraints in order to implement the mechanism $M(\theta)$ in a dominant strategy.

The characterization of this incentive mechanism is given by the following proposition.

Proposition 2

The bargaining contract $M(\theta)$ satisfies the incentive constraints if and only if:

- i) $V(\theta) = \int_{\underline{\theta}}^{\theta} (T - s(x)) dx$
- ii) $s'(\theta) \leq 0 \quad \forall \theta \in \Omega$

Proof:

From the definition of $V(\theta)$ such that:

$$V(\theta) = \max_{\tilde{\theta}} V(\theta, \tilde{\theta}) = (T - s(\tilde{\theta}))(\theta - r(\tilde{\theta})) + s(\tilde{\theta})y$$

$V(\theta)$ is an upper envelope of a linear function in ; then it is convex, and we have almost everywhere using the envelope theorem:

$$\forall \theta \in \Omega, V'(\theta) = T - s(\theta) \geq 0 \quad \text{and} \quad V''(\theta) = -s'(\theta) \geq 0$$

which implies that: $s'(\theta) \leq 0 \quad \forall \theta \in \Omega$.

Now, by integration of $V'(\theta) = T - s(\theta)$ such that $V(\underline{\theta}) = 0$, we obtain the announcer result : $V(\theta) = \int_{\underline{\theta}}^{\theta} (T - s(x)) dx$. Q.E.D

From this result, the important term $V(\theta) = \int_{\underline{\theta}}^{\theta} (T - s(x)) dx$ corresponds to the informational rent left to the government by the rebellion.

Indeed, because of asymmetric information about the government's privacy resources parameter, the rebellion is forced to give up a costly rent to the ruling elite of the government in the case of a bargaining under incomplete information. This informational rent is used by the rebellion to discipline the government into revealing his true resources parameter.

The results of our proposition 2 give us two additional pieces of information about the occurrence of civil war and the subsequent informational rent.

On the one hand, we remark that the informational rent $V(\theta)$ from the rebellion is an increasing function of the privacy resources parameter θ .

Hence, to be willing to reveal his true type, this result means that the higher θ -type of government must be rewarded with a more important informational rent value than the lower θ -type. On the other hand, from the monotonicity condition such that $s'(\theta) \leq 0$, this implies that a government with a higher privacy resources is characterized by an increased probability of short duration of conflict in order to extract informational rent.

Therefore in this contractual and bargaining model the introduction of asymmetric information between government and rebellion allows us to suggest another informational explanation for why some civil wars occur. We now examine in greater detail the optimal solutions for the transfers and resources

sharing, then we have to determine the expected utility function of the rebellion by calculating the expected financial transfer as follows:

From the definition of the informational rent :

$$V(\theta) = (T - s(\theta))(\theta - r(\theta)) + s(\theta)y$$

We have :

$$(T - s(\theta))r(\theta) = (T - s(\theta))\theta + s(\theta)y + V(\theta)$$

Now, we can insert this expression of transfer into the expected utility of the rebellion, which accordingly becomes:

$$U = \int_{\underline{\theta}}^{\bar{\theta}} [(T - s(\theta))\theta + s(\theta)(y + w) - \Psi(s(\theta)) - V(\theta)] dF(\theta) \quad (7)$$

From Proposition 2, we know that the information rent $V(\theta)$ received by the government is defined by:

$$V(\theta) = \int_{\underline{\theta}}^{\theta} (T - s(x)) dx$$

Hence, by integrating by parts, we obtain the following value for the rebellion expected utility U:

$$U = \int_{\underline{\theta}}^{\bar{\theta}} \left[(T - s(\theta))\theta + s(\theta)(y + w) - \Psi(s(\theta)) - \frac{1-F(\theta)}{f(\theta)} (T - s(\theta)) \right] dF(\theta)$$

Therefore, by choosing the optimal duration of conflict (bargaining crisis), the rebellion solves the following optimization program:

$$\text{Max}_{s(\cdot)} U = \int_{\underline{\theta}}^{\bar{\theta}} \left[(T - s(\theta))\theta + s(\theta)(y + w) - \Psi(s(\theta)) - \frac{1-F(\theta)}{f(\theta)} (T - s(\theta)) \right] dF(\theta)$$

(8)

Proposition 3

Under asymmetric information, civil war occurs and its duration is given by the following marginal condition:

$$\Psi'(s(\theta)) = y + w - \theta + \frac{1 - F(\theta)}{f(\theta)}$$

Proof:

we obtain the following derivative from (8):

$$\frac{dU}{ds(\theta)} = -\theta + y + w - \Psi'(s(\theta)) + \frac{1 - F(\theta)}{f(\theta)} = 0$$

from which we obtain the announced result.

Q.E.D

The main message of this fundamental result is as follows:

Let us interpret the characterization of the optimal bargaining contract between the government and the rebellion.

At the equilibrium, let the marginal disutility of civil war $\Psi'(s(\theta))$ is given by the sum of the marginal benefit derived from exogenous income $y + w$ during conflict and the adjusted marginal saving $-\theta + \frac{1-F(\theta)}{f(\theta)}$ derived from the no desire of leaving rent to the government.

Indeed, in order to reduce the information rent of the government, rebellion is induced to trigger civil war.

Corollary 3

The greater are the exogenous income during the conflict greater is the duration of civil war:

$$\frac{ds(\theta)}{d(y+w)} = \frac{1}{\Psi''(s(\theta))} \geq 0$$

Proof:

It is obtained by simple derivation from the optimal condition.

These exogenous incomes may be associated to aid received from foreign agents, thus briefly, this result signals the role of external interventions (El Badawi 1999).

Therefore in this context, an effective external intervention should reduce the exogenous revenues or acts as an auditor to reduce the asymmetric information between the government and the rebels.

4. Conclusion

In this paper, we have proposed a model of Principal-Agent Paradigm that proves that the theory of exchange with asymmetric information appears to be convenient to provide a possible rational explanation model of occurrence and duration of civil wars. We have shown that although civil conflicts are not Pareto optimal ex post they may be Pareto optimal ex ante, in the way that every alternative leaves either the government or the rebellion worse off in some contingency which cannot be ruled out on the basis of the information which is common to both sides. Therefore,

the main factors of the occurrence of civil conflicts appear to be arising as consequences of asymmetries in the amount of relevant information about some economic variables available to bargaining parties in the conflict. Indeed, the civil war commitment is used by rebellion as device of division of rents accruing to rebellion and the ruling government elite. Our current research focuses on extending the model to take into account the strategic behaviour of the external interventions in the management of civil wars.

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