Journal of Economic Behavior & Organization 92 (2013) 116–126

Contents lists available at SciVerse ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Give peace a chance: The effect of ownership and asymmetric information on peace

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ARTICLE INFO

Article history:
Received 1 March 2012
Received in revised form 6 March 2013
Accepted 24 May 2013
Available online 5 June 2013

JEL classification:
C72
D74
D82

Keywords:
Peace
War
Asymmetric information
Contests
Litigation

ABSTRACT

We study the possibility of peace when two countries fight a war over the ownership of a resource. War is always the outcome of the game played by rational countries – under complete or asymmetric information – when there is no pre-established distribution of the resource among countries. When there is such a distribution of the resource, under complete information peace is feasible for some initial distributions of the resource, whereas under asymmetric information there are two classes of equilibria: *Peaceful Equilibria*, in which peace has a positive probability, and *Aggressive Equilibria*, which assign probability one to war. Surprisingly, a little asymmetric information may yield war.

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1. Introduction

Rationalist theories explain war as the rational choice of countries (see Hirshleifer, 1991; Skaperdas, 2002 and surveys by Garfinkel and Skaperdas, 2007; Jackson and Morelli, 2011). This approach shows how factors such as trade, long-term relations, political bias or the distribution of the resource disputed may amplify or efface the incentives for war (see Skaperdas and Syropoulos, 1996, 2001; Garfinkel and Skaperdas, 2000; Jackson and Morelli, 2007; Beviá and Corchón, 2010).[1]

In this paper, we consider a conflict arising between two countries for the control of a resource. Our emphasis will be on the effects of asymmetric information and the distribution of the resource prior to the conflict. To address the second issue, we consider two setups: the Undistributed Resource (UR) Game, where countries have no prior ownership of the resource, and the Fully Distributed Resource (FDR) Game, where there is a pre-existing distribution of the resource. Examples of the first situation are the Scramble for Africa between all major European powers in 1881–1914 and the Great Game played by British and Russian empires in 1813–1907 for the control of Afghanistan. With respect to the second setup, the distribution of the resource may be achieved by an agreement (such as the treaty of Tordesillas, 1494, in which Spain and Portugal divided South America according to a suggestion made by the Pope), by cultural reasons (language, history), geographical features (a river, a strait, a mountain chain) or by a previous conflict as in the case of Cyprus.[2]

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[1] A forerunner of this approach is Clausewitz (1832, Chapter 1), who noted that "War is akin to a card game".

[2] For a recent application of mediation to war, see Horner et al. (2011).

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http://dx.doi.org/10.1016/j.jebo.2013.05.013

Other than the initial position, UR and FDR are identical two-stage games. In the first stage, countries decide if they declare war or not. If one of the countries declares war, war occurs in the second stage. If both countries decide not to fight, there is peace and they get zero payoff in UR, and their prior distribution of the resource in FDR.

We first study complete information which serves us as a benchmark case. For UR, war is the only equilibrium outcome. The explanation is that since peace yields the status quo, i.e., zero payoff outcome, a rational country always prefers conflict. For FDR, we show that there is a set of divisions of the resource such that, in equilibrium, both countries will choose peace. The reason is that the status quo for each country is her share of the resource. The possibility of losing this share makes countries reluctant to go to war.

Next, we consider asymmetric information. We assume that country one has private information on how valuable the resource is for her and may have a high or a low valuation (type) of the resource at stake. Country two has only a prior probability that country one is of the high or the low type. As an illustration, we may suppose that country one has done research on the existence of a valuable resource in a territory under dispute and the results of this research are in the hands of this country only. Also, a country might be uncertain about the willingness of the other country to fight. However, by observing the declaration of her rival, country two has the possibility of inferring the type she faces at war.

We prove for UR that war is the unique Perfect Bayesian equilibrium outcome of the asymmetric information game. For FDR, we find that there are two classes of equilibria. The first class, Peaceful Equilibria, contains equilibria that assigns at least a positive probability to peace. In the second class, Aggressive Equilibria, all equilibria assign probability one to war.

There are two kinds of Peaceful Equilibria. In the first, the high type declares war and the low type is peaceful while country two is also peaceful. Consequently, when country one declares war, country two infers she is fighting a high type and subsequently countries play under complete information. There are distributions of the resource for which this equilibrium exists except when the valuations of country two and the low type are low. The reason for the lack of existence is due to the ability of the low type to fake a high type when country two is very weak, as this country would be very insufficiently armed in a conflict. If the low type's valuation is high enough, one can find a distribution of the resource to sustain peace as country two would demand a very low share of the resource.

In the second equilibrium, every type and country choose peace. This equilibrium does not exist when all the following possibilities occur jointly:

1. There is a low probability that country one has a high valuation.
2. There is a large dispersion in the possible valuations of country one.
3. The strength and/or valuation of country two is high.

Point 1 is counterintuitive. It says peace cannot be achieved when we are close to complete information! The interpretation is that the share of country one is dictated by the high type's valuation, but when there is a high probability that country one is weak, war looks like a good prospect for country two, especially when the likely low type has a low valuation of the resource (point 2) and country two is powerful or values the resource a lot (point 3). Note that, despite the fact that the high type is unlikely, war occurs with probability one.

We end this section by reviewing the literature. Schelling (1980) and Fearon (1995) suggested that asymmetric information is a possible cause of war. An early model of war including asymmetric information is by Brito and Intriligator (1985). A thorough discussion of the effects of incomplete information on war is in Jackson and Morelli (2011, p. 10). They conclude that "If the cost of war is low enough, then country B is better off simply going to war and taking its chances rather than reaching such an unfavorable bargain." Our findings complete this intuition by showing a list of the causes of war and by highlighting the role of the initial share in the resource. In particular, our results show that *relative* magnitudes matter, namely the dispersion of valuations in country one, the relative strength of country two, and that a low probability that country one has a high valuation is also bad for peace.

The rest of the paper goes as follows. Section 2 spells out the model. Section 3 studies the full information case. Section 4 considers asymmetric information. Finally, Section 5 presents our final comments.

2. The model

Two countries dispute a divisible resource which they value as V_1 and V_2, respectively. In case of war, they incur sunk expenses of g_1 and g_2. Let p_i be the probability that i obtains the resource after the war.[3] p_i is determined by an asymmetric contest success function of the following form:

$$p_i = \begin{cases} \dfrac{\beta_i g_i}{\sum_{j=1}^{2} \beta_j g_j} & \text{if } g_1 + g_2 > 0 \\ \dfrac{\beta_i}{\beta_i + \beta_j} & \text{if } g_1 + g_2 = 0 \end{cases} \tag{1}$$

[3] p_i may also be equivalently interpreted as the share of the resource obtained. However, for concreteness we will follow the probabilistic interpretation throughout the paper.

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