

Unsystematic risk and coalition formation in product markets

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Abstract

We study the conjecture that increasing market volatility leads to larger coalitions in an oligopoly. Here, coalition formation decisions are made in a noncooperative game by risk averse firms. They use a sequential offer–counter-offer procedure initiated by Selten and Rubinstein. We find that the conjecture generally fails in a small oligopoly whose firms play a unanimity game, but it is validated in an oligopoly that allows open membership. However, it is valid in a small oligopoly if market volatility is sufficiently high, whatever the rule of membership. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

We wish to study the relationship between unsystematic risk in the product market and coalition formation of oligopolistic firms. Specifically, we conjecture that increasing market volatility leads to larger coalitions. Starting from the assumption that firms are risk averse, firms attempt to avoid risk — which we

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identify with market volatility — by sharing it, and they do that by forming coalitions. Coalitions here are taken to be a subset of firms that coordinate their courses of action. Examples include complete mergers and cartels whose self-enforcing actions are coordinated.

Our model is based on the noncooperative game that was initiated by Selten (1981) and Rubinstein (1982): players make sequential proposals to form coalitions. Their decision to participate in a coalition rests on an extensive form game of offers and counter offers. In another branch of the literature, externalities are permitted in such an extensive form game. Bloch (1995) studied associations in a two-stage model that yielded externalities to the participating firms which compete with each other and with outsiders in the market in the second stage. The sequential coalition formation decision is made in the first stage. In another paper, Bloch (1996) considers a more general sequential coalition model, assuming that the division of a coalition's payoff is fixed.

Brown and Chiang study the role of externalities in the form of cost saving in mergers and cartel formation (1997); they also examine managerial incentives and other externalities in mergers and cartels (1998). Conditions for a unique subgame perfect equilibrium of a sequential proposal game with externalities are given by Brown and Chiang (1999). Yi (1997), and Ray and Vohra (1997) make valuable contributions to this literature; they categorize various rules under which non-cooperative sequential games proceed, analyze efficiency, stability, and similar properties of a sequential proposal model that involve externalities.¹

In the externality literature of which this paper is a part, the payoff for each firm in a coalition depends on the coalition structure as a whole. To illustrate the coalition structure, suppose that, *ex ante*, there are three identical firms in an oligopoly. Label them sequentially. Four potential coalition structures can potentially form. One includes Firms 2 and 3 in a coalition and Firm 1 as a singleton; a second has all three firms as singletons; a third coalition structure includes Firms 1 and 2 in a coalition, while Firm 3 is a singleton; and the last is the grand coalition itself. (Symmetry obviates the need to consider the coalition structure in which Firms 1 and 3 coalesce, while Firm 2 remains a singleton.)

Externalities can be expressed as shifts in the payoffs to all three firms in the four coalition structures for given output rates of the firms — for example, the payoff to Firm 1 in the first coalition structure may differ from the payoff to Firm 1 in the second coalition structure. The reason that externalities appear in the sequential coalition formation game is because firms are assumed to be farsighted and consider the consequences of their moves. As their turn to propose or respond to a coalition proposal comes up, they evaluate the effects of the various coalition

¹In an offshoot, Baye et al. (1996) analyze divisionalization and franchising using a simultaneous model rather than a sequential one but also allowing for externalities.

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