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# Repeated Tender Market Shares: A Simple Model to Simulate Competitive Bidding in a Closed Market

Yves Caseau<sup>\*1</sup>

<sup>1</sup>Bouygues Telecom – Bouygues – 82 rue H. Farman, 92447 Issy-les-Moulineaux Cedex, France

## Résumé

A repeated tender is an auction between the same set of bidders that occurs repeatedly during a fixed period of time. Our research goal is to find the equivalent of a Cournot oligopoly model: a simple model which takes production costs into account and which can be simulated or solved to yield market share distribution results. We suppose that each bidder has both fixed costs and variable costs which are proportional to the business that is won.

A lot of work is available regarding auctions and competitive bidding, but less is known about repeated tenders in a closed market (with the same players). More precisely, there are many economy papers with empirical studies that give very good insights, but without a tractable model and papers that apply game theory to characterize the bidders' strategies but which start with a qualitative / high-level description of the strategies.

This paper presents a first step towards our goal: a simple model (RTMS: Repeated Tender Market Shares) which describes bidding strategies in a closed market and which may be used to characterize market share equilibriums through evolutionary game theory using the GTES framework [4]. We represent bidding strategies with a 2x2 matrix and show that the best-response-fixed-point loop finds Nash equilibriums in most situations. When this is not the case, we have implemented a "Forward Nash Equilibrium" [4] method, based on MaxMin evaluation of local moves.

This preliminary work is promising because RTMS is a simple model which exhibits many properties of tenders as observed in real life, such as the value of collusion or bluffing for weaker players, as well as the cost of monopoly avoidance for the client company.

**Mots-Clés:** Evolutionary game theory, Repeated Tenders, Competitive Tendering

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<sup>\*</sup>Intervenant