

# Referee report

“Essays on Economics of Advertising”

by Azamat Valei

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The thesis by Azamat Valei consists of three chapters analyzing various aspects of advertising, in particular in the presence of network externalities. This situation is indeed of practical relevance, since many markets exhibit these features. At the same time the relevant literature is rather sparse.

The thesis consists of three chapters, each being a separate paper, analyzing advertising under a different market structure. The three chapters are preceded by an abstract and a general introduction. Since there is some repetition involved, I would suggest to shorten the abstract so that it gives only basic information about each chapter. The introduction should be also written in a less technical way, without describing the details about the models and the results. I think it could be directed to a general economist or even general academic reader. An interested reader can still read the introductions to the chapters.

## Chapter 1

The chapter considers a monopolist who faces consumers with network externalities and imperfect information about their valuation and the price. The consumers can learn the valuation and the price and via search or via advertising. The advertising is informative and the monopolist can decide which information to provide to the consumers. The chapter allows for both positive and negative externalities, referred here as a bandwagon effect and a snob effect, respectively. The chapter then analyzes how the advertising decision depends on the sign and the magnitude of network externalities.

## Comments

**1.1.** In the introduction, the author should provide some examples as well as some basic intuition for the results. In which markets are the relevant aspects of the model present? Are there some interesting phenomenons in these markets that the results of the chapter can explain? Are there some interesting implications of the results for these markets?

**1.2.** It would be also good to improve on the purpose of the paper. As currently written, it is more driven by the literature.

**1.3.** Explain better what advertising of  $\theta$  means. Provide some examples of such advertising.

**1.4.** The model involves a rather extensive discussion with 8 cases: 4 types of advertising and 2 types of search costs specifications. For submission to a journal, it would be good to limit the number of cases. One possibility would be to present homogeneous costs as basic model and heterogeneous costs as an extension. Another possibility would be to unify some cases, as proposed in the comment 1.7 below. Yet another possibility would be to remove one aspect of advertising (for instance, consumers are informed about the price, but about their valuation).

**1.5.** The chapter focuses on the case of uniform distributions. This is a limitation. The author should be clear about this and maybe even discuss what are the difficulties in generalizing it to general distributions.

**1.6.** (p. 16): The author claims that for homogeneous visiting costs, the “search decisions of all consumers coincide”. This may not be the case if consumers are indifferent. The author should comment on this issue.

**1.7.** (p. 19) Assuming that the search costs are distributed on the interval  $[0, 1]$  is a restriction. Would it be possible to consider uniform distribution on some interval  $[0, \bar{c}]$  instead? The current specifications would be special cases when  $\bar{c} = 1$  and when  $\bar{c}$  converges to 0.

**1.8.** I am not sure whether the reference to the Diamond paradox is correct. Usually Diamond paradox refers to the result of monopoly price in the case of oligopoly with consumer search. The logic here is similar, nevertheless it would be good to verify and clarify it.

**1.9.** The interpretations in Appendix 1B are nice and interesting. However, it is not clear how they integrate into the chapter/paper (except a short reference in footnote 8). The author should also make clear to which extend is this follows Leibenstein (1950).

## Chapter 2

Chapter 2 analyzes a similar question as Chapter 1, but instead of monopoly considers a duopoly. The consumers have again imperfect information about the price and their valuations. However, firms can only advertise the price and the consumers still need to visit the shop in order to learn their valuation. The chapter characterizes how the advertising decision depends on the relation between sensitivity to the network externality and the degree of differentiation.

## Comments

**2.1.** The introduction is rather long. The author should say very early, what is the main question and the main result of the paper. Also it would be good to give some intuition for the results.

**2.2.** Similarly, as in Chapter 1, it would be good to improve the motivation to be less driven by the literature.

**2.3.** The definition of the parameter  $t$  should be more explicit. Actually, it is without loss of generality to set either  $b = 1$  or  $\mu = 1$ . I would suggest to use this normalization (unless there is some specific reason not to do so).

**2.4.** It seems that the model in the chapter is similar to the Hotelling model. Maybe discuss their relation in a footnote.

**2.5.** Is it possible for a consumer to buy without searching?

**2.6.** At some point it would be good to compare Chapter 1 and 2. In particular, it is interesting to discuss what are the additional effects and how the advertising behavior is affected when moving from monopoly to duopoly.

**2.7.** Is it possible to generalize the model to more firms? It is not necessary to do so for the thesis, but it could make the paper stronger if submitted to a journal. If the answer is negative, it would be good to at least discuss difficulties that arise in such a model.

**2.8.** It would be good to provide some justification for the leadership in case C in stage 2. One could, for instance, claim that advertising gives the firm some kind of commitment over the price.

**2.9.** In order to streamline the exposition, it might be helpful to move part of the formal analysis in Section 2.3.1 to the Appendix.

**2.10.** The author claims in the conclusion that there are four main results. It would be better to have only one or two really main results.

## Chapter 3

Chapter 3 studies advertising under the possibility of entry. Compared to the previous two chapters, there are no network externalities involved. There are two models considered: a Hotelling model with two firms and a Cournot model with  $N$  firms. The chapter then provides a characterization of the incumbent's advertising decision under accommodation using the taxonomy of Fudenberg and Tirole (1984).

## Comments

**3.1.** Compared to the previous two chapters, this one is well motivated using some empirical evidence. It would be also good if the author can revisit this empirical evidence at some later point in the paper and relate it to the results.

**3.2.** The chapter considers two separate models: a Hotelling model with 2 firms and a Cournot model with  $N$  firms. This gives the impression that the results are a collection of separate cases. I think there are two ways how to address this: First, one could present a general model of competition among  $N$  firms. Second, one could focus only on one of them (and potentially present the second one in an supplementary appendix). In that case it would be also good to generalize the specification, for instance having a general distribution of consumers in the Hotelling model or general (not just linear) demand functions in the Cournot model.

**3.3.** There is a typo in the name “Tirole” (missing “e” at the end).

**3.4.** The modeling of informative advertising is slightly inconsistent with other cases, as it involves additional consumers. If possible, it would be better to nest all forms of advertising in a single framework.

**3.5.** Similarly to my comments to the previous chapters, it would be helpful to have a general message, and not just a collection of results for the separate cases.

## Conclusion and grading

In general, the thesis is quite well written. The arguments can be mostly followed. The thesis studies an interesting topic that is addressed in all chapters in different environments. However, the main text is mostly formal and I would appreciate, if the author could expand on the motivation, intuition (for instance, for the results formulated in propositions), as well as examples.

Overall, the thesis satisfies formal and content requirements for a PhD thesis in economics and I recommend the dissertation for a defense.

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