

Comments on “Dynamic Pricing with Reference Price Dependence” for Economics e-journal

June 15, 2016

— Summary —

The paper aims to characterize qualitatively the optimal dynamic pricing rule of a monopolist firm when consumers’ demand is determined by a comparison between the selling price and an anchor. The author refers to the latter as being the consumers’ “reference price”, which is determined by the past history of prices. By assumption, given any fixed selling price, a higher reference price increases the demand. The findings can be summarized as follows: there are four competing effects that determine the optimal price dynamics: two are related with the dynamics of the reference price and the other two with the process of anchoring adjustment. Overall effects are ambiguous. As a consequence, the optimal selling price might not increase with an increase in the reference price. This is in contrast with the intuitive idea that a profit maximising firm wants to price higher than the reference so as to induce higher future reference prices. Indeed, such behaviour would make room for more demand at higher price levels, and thus more profits. Further, the optimal pricing rule is always such that the price elasticity of demand is strictly greater than one.

More specifically, the author makes use of a continuous time setting where at each period a monopolistic firm charges a selling price and faces a general twice-differentiable demand which depends on two variables: the current selling price and the current reference price. As is standard, demand decreases in selling price and increases in reference price. Further, the author assumes the cross derivative to be non-positive. There is a known finite horizon after which the firms ceases to exist. At time zero the reference price is exogenous but then it evolves as a function of past selling prices. In order to solve the problem, the author employs the Pontryagin maximum principle.

— Comments —

- I urge the author to put some effort in making the paper more readable. The writing is in general rusty and hard to follow. Further, the introduction should clearly state what are the main contributions, novelties and what differentiate this paper from the rest of the literature. I see the author touches upon that, but he should put more emphasis;
- it would be nice to have a very brief and simple numerical example where the firm decreases its price at higher reference prices, perhaps with an illustrating graph. Moreover, a motivating real-world example would be very appreciated;

- the assumption of finite horizon is tantamount to say the firm precisely knows when it will die out. On the other hand, an infinite horizon might be interpreted as the firm knowing it will die out at some point but ignoring when. While the former interpretation is quite strong, it may be without loss of generality. It is therefore desirable to see how such assumption is relevant and crucial for the results;
- it seems to me that there is the implicit assumption that consumers are extremely impatient. Otherwise, why consumers do not anticipate the pricing behaviour and wait for lower prices?
- I share the concern of referee 2 about the assumption $\frac{\partial^2 D}{\partial p \partial r} \leq 0$. It implies that the decrease in demand following a price increase is bigger if the reference is higher. Alternatively, the increase in demand following a reference price increase is smaller if selling price is higher. I am not confident such assumption is general, natural and straightforward. Hence, it would be nice to see some discussion about it and check the consequences of its relaxation;
- the References section has to be updated: many entries are registered as forthcoming while are already published;
- why the paper focuses on the monopolistic case? The author should specify the reasons and perhaps give some intuitions about what happens under competition.

— Conclusions —

The paper's research question is indeed interesting and deserves to be properly investigated. There is empirical evidence showing the anchoring effect plays a crucial role on consumers' behaviour. A firm that fails to take it into account would not maximise its profits by losing profitable opportunities. The optimal pricing rule in this context might not be trivial due to intertemporal trade-offs. The author claims to offer a better understanding of a successful pricing policy for a monopolist that accounts for consumers' reference-behaviour.

However, the above points must be addressed before publication. In my opinion, the current version of the paper is not ready for publication despite holding a good potential. I believe that, if the author properly addresses all the above points and both referees' suggestions, this paper would become suitable for the journal's standards and constitute a distinctive contribution in the literature.

In the hope that my comments will spur and incite the author to improve his work, I wish him all the best.