## Comments on "Endogenous timing in quality choices and price competition" by Lambertina and Tampieri

## Summary

The authors add a stage in which firms time their adoption of quality (early or late) before they engage in the vertically differentiated duopoly of Aoki (2003), in which qualities are set before prices. Aoki already analyzed sequential and simultaneous quality choices under partial market coverage, where the sequence is exogenous.

Under endogenous timing and partial market coverage, sequential quality choices result in two pure Nash equilibria and a mixed Nash equilibrium because the timing decisions form a coordination game. The profits needed to feed the first-stage matrix game describing endogenous timing come directly from Aoki.

Under endogenous timing and full market coverage, the equilibrium and its profits become independent of the timing of quality choice and, hence, the timing stage of the game becomes irrelevant. For this case, the authors derive formulas for the equilibrium pricing and quality strategies.

## Major comments

The paper does not aim at technical innovation, which is reflected in the analysis. The analysis for the partial market coverage simply applies results from Aoki. The other results follow trivially. For full market coverage, standard application of subgame perfect equilibrium suffices. In terms of the level of analysis, it is a straightforward exercise in game theory.

The important question is what is the main contribution of this note? The authors do not motivate this. Is there a connection to the contest literature (being Stackelberg leader gives higher profits) or Hawk-Dove games? Nothing is said about this either.

## Minor comments

- The description of the game is unclear because the three stages are not carefully described. Also, it is unexplained why Matrix 1 is stated in terms of players H and L instead of player 1 and 2. Somehow, reference to the later equilibrium seems to enter the description of the model.
- Motivate why you want a convex cost function if quality has only two levels: H and L. Why can't you use c\_H > c\_L? Is parameter n in the cost function a natural number? And if so why n at least 2 and not at least 1, the latter being the condition for convexity?
- p. 4 "then the leader is the high quality firm" should be something like "then the leader chooses to become the high quality firm"
- Calling simultaneous choice a mistake is normative use of language and should be avoided.
  Perhaps you mean lack of coordination on a sequential decision structure.
- Corollary 2 reverses the implication of the > 0 in (7)
- The exposition could be made clearer by separating the two cases into two subsections, the second starting after Corollary 2.
- Why write theta\_0 = theta\_1 1 instead of the easier to read theta\_1 = theta\_0 + 1?
- (8) to (17) can also be expressed in terms of theta\_0. For example, 2\*theta\_1 1 = theta\_0 + theta\_1 in (12).
- Always perform a spelling check to the final version.