

# Reply to ‘The Paradox of Inelastic Sports Pricing’

## INTRODUCTION

Philip Porter (2007) argues that my piece in *MDE* (Fort, 2004) is in error. In that piece, I try to do two things. First, I present some forgotten literature on optimal inelastic pricing at the gate in sports. Just resurrecting that forgotten work provides a missing justification for inelastic ticket pricing that is consistent with profit maximization. Second, I attempt to demonstrate that this type of pricing actually adheres to first-order conditions for maximizing profits, based on work in Fort and Quirk (1995, henceforth FQ).

Porter points out that, while the object of analysis is the elasticity of attendance with respect to ticket price, I turn to the elasticity of attendance with respect to talent. He then states that I have not settled the paradox because, essentially, I looked in the wrong place. He also provides a model that shows marginal revenue generated by talent cannot be negative.

My thanks go to Porter for his careful consideration of my *MDE* piece. I respond that while I think my approach is correct, it could have been presented in a clearer fashion. There is an underlying relationship between revenue and attendance that I did not stress that saves the earlier work so that it does, indeed, bear on the elasticity of attendance with respect to ticket price. The lack of clarity was entirely my fault but the misunderstanding is easily cleared up. I also suggest that Porter’s finding that marginal revenue from talent cannot be negative is a result of a limitation in his model not shared by the model I employed and not supported by the empirical work in my *MDE* piece.

But even had my empirical effort been swept away by Porter’s argument, the reminder in my *MDE* piece of the forgotten theoretical work of El Hodiri and Quirk (1974) and Heilmann and Wendling (1976) still would have helped researchers deal with ‘the paradox.’ Future researchers have an explanation for inelastic ticket pricing that is consistent with profit maximization.

## CLARIFICATION

The empirical effort in my *MDE* piece is launched from FQ’s expression (6) that describes marginal gate revenue with respect to the talent choice of a team owner. The elasticity of attendance with respect to ticket price would involve the marginal gate revenue with respect to attendance. FQ had other aims and subsumed the relationship between winning, attendance, and gate revenue, and I could have been clearer. To make amends, I offer the following.

Without any harm at all to the discussion, just the home gate portion of revenue in the FQ specification is

$$R = \alpha \sum_{j \neq i}^n R^{ij}(Z^{ij}(t), A). \quad (1)$$

The home team’s share of gate revenue is  $\alpha$ . The revenue for team  $i$  from home games against the other  $j$  teams is  $R^{ij}$ ,  $i = 1, \dots, n$ , teams in the league. That revenue depends on  $Z^{ij}$ , the winning percent of team  $i$  against team  $j$ , in turn determined by team  $i$ ’s talent choice,  $t$ . The remaining parameter  $A$  is the size of team  $i$ ’s drawing area. Marginal gate revenue with respect to talent is

$$\text{MRG} = \alpha \sum_{j \neq i}^n \frac{\partial R^{ij}}{\partial Z^{ij}} \frac{\partial Z^{ij}}{\partial t}. \quad (2)$$

And here is where I could have been clearer. The theoretical point of this FQ specification was to show the link between the long-run quality choice  $Z^{ij}$  and the gate revenues  $R^{ij}$ . We simply subsumed the relationship between team quality and attendance. A more explicit statement could have appeared in the *MDE* piece to remind the reader that quality impacts the gate revenues through attendance itself. Making this relationship explicit, expression (1) becomes

$$R = \alpha \sum_{j \neq i}^n R^{ij}(G^{ij}(Z^{ij}(t)), A), \quad (3)$$

where  $G^{ij}$  is gate attendance when team  $i$  plays team  $j$ . With this more explicit specification of the route that quality takes through attendance to home gate revenues, marginal gate revenue is

$$\text{MRG} = \alpha \sum_{j \neq i}^n \frac{\partial R^{ij}}{\partial G^{ij}} \frac{\partial G^{ij}}{\partial Z^{ij}} \frac{\partial Z^{ij}}{\partial t}. \quad (4)$$

$\partial G / \partial Z^{ij} > 0$  as long as fans prefer higher quality to lower quality.  $\partial Z^{ij} / \partial t > 0$  as long as the marginal product of talent is positive. So, if ticket price is chosen in the inelastic portion of attendance demand, then marginal revenue with respect to attendance is less than zero, that is,  $\partial R^{ij} / \partial G < 0$ , and it follows that  $\text{MRG} < 0$ . Empirically investigating the cases where  $\text{MRG} < 0$  shines empirical light on pricing in the inelastic portion of attendance with respect to ticket price. So, the error in my *MDE* piece is a lack of clarity, not confusion between price and talent impacts.

But how does this square with Porter's model where the marginal revenue derived at the gate from talent cannot be negative? My answer is that his model (somewhat ironically, given the criticism of my *MDE* piece) does not include the functional relationship between talent and attendance (their expression (3)). The model in FQ has that flexibility. FQ subsumed it and I failed to make it explicit in my *MDE* piece.

So Porter's expression (5b) is not (as he states on p. 158) 'the equation Fort uses with  $\alpha = 1$ .' His is an alternative to the ones I know in the sports economics literature. In those models, quality is the long-run choice of team owners. Each quality level dictates a particular short-run revenue (demand function) and cost function for the owner and a particular profit maximizing choice of attendance and ticket price. The owner chooses the level of quality and, consequently, a level of attendance and price that maximizes long-run profits.

The empirical work in my *MDE* piece, based on the model that dominates the sports economics literature, already rejects the implications of Porter's alternative model. But perhaps his model will prove efficacious compared to the ones more commonly in use; that is the whole point of producing theoretical models. But only future empirical work will tell.

## CONCLUSION

I thank Philip Porter for his thoughtful consideration and apologize to the readers of *MDE* for the lack of clarification in my piece on 'Inelastic Sports Pricing.' But the issues raised by Porter are easily clarified and I do so here. Further, and contrary to Porter's claims, in a model that fully captures the relationship between the long-run quality decision and the profit maximizing level of short-run attendance, marginal revenue at the gate with respect to talent can be less than zero. And it *will be* less than zero when pricing at the gate is in the inelastic portion of attendance demand.

I hasten to emphasize that, even if the empirical findings in my *MDE* piece had been swept aside, there would still have been an important contribution (in my opinion). By resurrecting El Hodiri and Quirk (1974) and Heilmann and Wendling (1976), future researchers have been reminded of an explanation of inelastic gate pricing consistent with profit maximizing behavior. But it ends up that my empirical work demonstrating support for the theoretical implications in the forgotten works is alright after all, restoring confidence in the profit maximization abstraction used by some to gain analytical leverage over the sports business.

## REFERENCES

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