

Comments: What Drives Television Demand for NPC Rugby Matches?

Rodney Fort
May 18, 2006

Introduction

The Commission provides its study of viewing demand for NPC rugby matches. The overall conclusion is that quality positively impacts viewing while no support is found for the uncertainty of outcome hypothesis (henceforth, UOH). The Commission then asks for comments or questions from interested parties in three areas.

In what follows, I exercise my extensive experience in both creating theoretical and empirical models in sports economics and in reviewing the models of others, to comment on the Commission's rugby match TV model. The issues the Commission models are complex and there is little experience of any modeling at all on these issues, let alone successful modeling. All things considered, the modeling on TV demand, including the model offered by the Commission, cannot reasonably be relied upon for the purpose of current decision making on the NZRU application.

The summary of my comments on these three requests are given here. Detailed discussion comprises the rest of the body of this document.

The Commission seeks comments or questions from interested parties on the methodology it has used in this study to evaluate which are the key drivers of television demand for NPC matches.

Observation 1: I expect that these limited data will stymie any empirical analysis of the demand for NPC rugby matches because of low true degrees of freedom, lack of variation, the chance that unaccounted time elements are important, and an unaccounted underlying selection process. All standard tests of statistical significance will be reduced in power and regression results can even be entirely misleading.

Observation 2: The methodology employed in the report narrowly defines the UOH and misinterprets many of the variables used in the analysis. Arguably, variables used to capture play during the week and during the day, and quality of matches, actually measure match uncertainty. Further, variables used to measure fan identification and match quality actually measure season uncertainty. And the same observation holds for a variable intended to measure match quality that actually measures consecutive season uncertainty.

Observation 3: Income cannot measure price effects and obtaining and specifying cost of viewing data will prove an especially difficult and time consuming task.

Observation 4: The econometric issues involved in the current specification are many. But given Observation 1, it is reasonable to expect that even if some of the specification

issues were overcome, the data would not be up to the task. In such a case, I expect that, while the goodness of fit will be acceptable under this methodology, there will be very few coefficients in the model that will be statistically significant. Finally, by focusing on a previous league structure, the results will only lend indirect insight into a brand new structure of competition.

The commission seeks comments or questions from interested parties on the key results of this study and, in particular, on its finding that the uncertainty of outcome is not a significant determinant of television demand for NPC matches.

Observation 5: The conclusion that uncertainty of outcome is not a significant determinant of TV demand for NPC matches isn't actually supported by the analysis. Econometric issues, rather than true insignificance, explain why 19 of 26 variables have no statistical significance. And two of the five variables that are statistically significant actually support the idea that match uncertainty matters to viewers.

Observation 6: But suppose that it really is true; only quality matters, not the UOH. I hope the Commission recognizes that large parts of my original statement rested on the assertion that the NZRU actions under consideration will enhance quality. And the study shows that quality matters to viewers. Further, my original statement suggests that the NZRU actions should increase the quality of NZRU players for Super15 and AllBlacks. If viewers of matches also respond to quality, still further benefits will be forthcoming.

The Commission seeks comments from interested parties on its finding that the quality of contest appears to be a significant driver of television demand for NPC matches. If it is a significant driver, how should this effect be quantified when assessing the public benefits likely to flow from implementing the proposed arrangements?

Observation 7: The *quantitative* evidence in the report, that more people watch a higher quality game, is not yet convincing due to the myriad problems with the methodology and actual estimation. But the *qualitative* outcomes in the "Couch Potato" paper and in this study, suggest to me that it is likely that higher quality games draw more viewers and raise viewer satisfaction. And other attempts to quantify this, such as those suggested by Michael Copeland, may be useful to that end. But the estimates of quality impacts in this study are not convincing enough to be put to that purpose.

Comment Details

The Commission seeks comments or questions from interested parties on the methodology it has used in this study to evaluate which are the key drivers of television demand for NPC matches.

1. In my opinion, the most important limitation of the study is its data. The data really represent four observations of the same teams playing against each other. Extreme caution concerning any findings from such data is warranted for two reasons. First, degrees of freedom are low if properly adjusted to account for the

fact that there are four observations on the same set of teams. Such low degrees of freedom mean that standard statistical tests of individual coefficient significance won't have much power. Second, one would suspect that there probably isn't much variation in the data in the first place; outcomes are similar game by game and the end result is similar across teams in each of the years. Again, lack of variation can lead to weak significance outcomes.

2. In any panel, there is a time series element to consider. If the RATING data are not stationary, then cross-section models can generate spurious regression results. But with only four years to examine, standard tests of the time series behavior of the data can't be performed.
3. Finally, an underlying selection issue is ignored. Viewers must decide whether to pay their additional monthly fee to gain access to live matches on SKY sports channels or don't pay and see the matches delayed over-the-air on TV3. Missing this selection process clouds the precision of all coefficient estimates since, for example, income may be one of the main determinants of this choice. But there simply aren't enough data to take care of this selection issue. And even if there were sufficient data, actually accounting for the demand for over-the-air TV will be a difficult job since over-the-air broadcasts are "public" goods. And the estimation of the demand for public goods is much more difficult than for goods where prices are actually charged.
4. *Observation 1: I expect that these limited data will stymie any empirical analysis of the demand for NPC rugby matches because of low true degrees of freedom, lack of variation, the chance that unaccounted time elements are important, and an unaccounted underlying selection process. All standard tests of statistical significance will be reduced in power and regression results can even be entirely misleading.*
5. But there is a second methodological issue concerning the specification of the UOH in the study. There actually are three components to the UOH in the literature—match uncertainty, season uncertainty (or uncertainty over the eventual champion in a given season), and consecutive season uncertainty (dynasty issues). The report narrowly defines the UOH relative to only match uncertainty. This leads to many interpretation problems.
6. Let's begin with *match uncertainty*. While specifying some variables to capture match uncertainty (STDDIST, DHMWP, DHMWPS, and DHMWPG), the report misses that other variables in the specification also are capturing match uncertainty. The clearest example is the dummy variable set identified as TIM. Here, day of the week (SAT, SUN) and time of day (PM4, PM7) are employed as control variables. But surely viewers know that better balanced matches will be aired on "prime days" in "prime time." It would come as a great surprise to me if SKY doesn't know this as well, airing these expected closer contests during prime

time and charging more for ad slots. So, I would have interpreted these dummy variables as capturing match uncertainty.

7. The same may be said of other variables intended as quality measures, namely, the “historical volatility” variables HMWPS and AWWPS. The variables measure how difficult it is for past performance to measure future performances. But the more difficult this becomes, and the higher are either of these measures, the more uncertainty of outcome in a given match. So these seem to me to be measures of match uncertainty
8. In addition, I find it curious that pre-game betting odds are dismissed as a measure of match uncertainty on the basis of only the two papers cited that suggest odds markets are inefficient. This is not a settled issue in the literature by any means.
9. PLAY and RELEG, rather than capturing how fans identify with unions, are clear measures of *season uncertainty*. The PLAY variable is an “in contention or not” variable; can the two teams catch up to the fourth-place team. This is clearly a balance measure; if play is more balanced, the chances of catching up improve. The same goes for RELEG; if play is more balanced, the chances the two teams will be relegated decline. Given specifications in past literature, it also is the case that CBALW measures season uncertainty; the more balanced is play, the closer to unity will be the ratio of actual to “idealized” standard deviations in winning both during the season and at its end.
10. Finally, STAND (previous standing in past seasons versus current pre-match standing) is used as a quality variable. But I would interpret this as a *consecutive season uncertainty* variable. Increasing or decreasing relative standings over time is all about outcome uncertainty. The author suggests that a low value in (4) indicates a high-quality match. The alternative interpretation is that a low value of STAND suggests an increase in uncertainty in the standings over time, a measure of consecutive season uncertainty.
11. The foregoing indicates “over-specification” of match uncertainty and season uncertainty. In particular, two of the match uncertainty variables are constructed in nearly perfect negative relation to one another (PLAY and RELEG). This is a sure prescription for multicollinearity and its usual result that there will be few significant coefficient estimates. However, in my opinion, even if this were amended, the data limitations in paragraphs 1 through 4 will still leave the coefficient estimates in shambles.
12. *Observation 2: The methodology employed in the report narrowly defines the UOH and misinterprets many of the variables used in the analysis. Arguably, variables used to capture play during the week and during the day, and quality of matches, actually measure match uncertainty. Further, variables used to measure fan identification and match quality actually measure season uncertainty. And*

the same observation holds for a variable intended to measure match quality that actually measures consecutive season uncertainty.

13. The final important problem with the study concerns the specification of the rest of the determinants of the demand for viewing (cost of viewing and the closeness of substitutes). And this is a variation on the earlier comment about the limitations of the data. The demand function for TV viewing, first and foremost, must reflect the willingness to pay to watch games on TV. The report does hold the availability of substitutes constant. But income is used to measure willingness to pay. It is essential to 1) hold time costs and out of pocket expense constant in order to allow the income variable to capture the “income effect” and 2) hold income constant in order to allow the time cost and out of pocket expense variables to capture the “substitution effect.” After holding price effects constant, income effects capture whether TV viewing is a “normal” good (demand increases with income) or an “inferior” good (demand decreases with income). Without time costs and out of pocket expense held constant, the variable measuring income cannot detect the “income effect.” And I cannot conceive how income is a price (cost of viewing) variable.
14. On the issue of measuring cost of viewing, I see a pretty thorny road ahead for this analysis. First, estimates of time costs must be obtained; a match lasts, say, two hours and individual viewers have time costs on those hours. Second, the out of pocket price is a “bundled” price charged by SKY. Untangling the price paid for each of the games that a viewer might watch will be a daunting task. Third, both of these measures will vary between those paying for the SKY version and the TV3 version. Both types of viewers have time costs, but these costs may be quite distinct between the two types of viewers. And TV3 viewers do not pay any fee. This seems to me a daunting task, indeed.
15. *Observation 3: Income cannot measure price effects and obtaining and specifying cost of viewing data will prove an especially difficult and time consuming task.*
16. And there are other issues. Measuring variables relative to the geographical location of the two teams in the match (e.g., POP, INC) simply omits all of the rest of the viewing audience for no reason, stated or apparent. Especially since rugby is the national pastime and an important difference between TV viewing and gate attendance is in terms of national access. This approach makes these variables measured with error relative to the true underlying viewing population further clouding coefficient estimates.
17. The study is about the “old” Division One, not the “new” Premier Division. Explanation of past viewing behavior is insightful, generally, but forecasts for the new Premier Division would be more insightful.

18. *Observation 4: The econometric issues involved in the current specification are many. But given Observation 1, it is reasonable to expect that even if some of the specification issues were overcome, the data would not be up to the task. In such a case, I expect that, while the goodness of fit will be acceptable under this methodology, there will be very few coefficients in the model that will be statistically significant. Finally, by focusing on a previous league structure, the results will only lend indirect insight into a brand new structure of competition.*

The commission seeks comments or questions from interested parties on the key results of this study and, in particular, on its finding that the uncertainty of outcome is not a significant determinant of television demand for NPC matches.

19. Due to data limitations, misinterpretation of UOH variables, and mis-specification of price and income, my expectation is that the results would exhibit strong enough goodness of fit, but very little precision will appear in the coefficient estimates. And that is precisely the outcome—income, Sunday matches, prime time matches, the number of games in a given day, and participation by Super12 players are significant and of expected sign. None of the *nineteen* other variables show statistical significance. Given all of the issues detailed above, I attribute this to lack of true degrees of freedom, lack of variation in the data, multicollinearity due to over-specification, and failure to capture the selection problem of pay versus free viewing.

20. Interestingly, however, under the alternative expanded view of the UOH, two of the five significant variables reasonably *support the importance of match uncertainty to viewers*. Since viewers know that matches expected to be more balanced will be aired on “prime days” in “prime time,” then the Sunday and prime time variables actually support the UOH. And given that these variables are capturing match uncertainty, it is not surprising that including other measures of match uncertainty adds nothing to the explanation of TV viewing.

21. *Observation 5: The conclusion that uncertainty of outcome is not a significant determinant of TV demand for NPC matches isn't actually supported by the analysis. Econometric issues, rather than true insignificance, explain why 19 of 26 variables have no statistical significance. And two of the five variables that are statistically significant actually support the idea that match uncertainty matters to viewers.*

22. *Observation 6: But suppose that it really is true; only quality matters, not the UOH. I hope the Commission recognizes that large parts of my original statement rested on the assertion that the NZRU actions under consideration will enhance quality. And the study shows that quality matters to viewers. Further, my original statement suggests that the NZRU actions should increase the quality of NZRU players for Super15 and AllBlacks. If viewers of matches also respond to quality, still further benefits will be forthcoming.*

The Commission seeks comments from interested parties on its finding that the quality of contest appears to be a significant driver of television demand for NPC matches. If it is a significant driver, how should this effect be quantified when assessing the public benefits likely to flow from implementing the proposed arrangements?

23. While quality does matter in the study (in my interpretation of the UOH given above, quality is captured only by the SUPER variable), I urge a word of caution for all of the same reasons already mentioned. Data limitations and the host of econometric issues are not cause for much confidence in the outcomes. But gathering even more data and further empirical work may inform this insight better in the future (and given the amount of work, and the daunting tasks, this would be quite some time in the future).

24. *Observation 7: The quantitative evidence in the report, that more people watch a higher quality game, is not yet convincing due to the myriad problems with the methodology and actual estimation. But the qualitative outcomes in the "Couch Potato" paper and in this study, suggest to me that it is likely that higher quality games draw more viewers and raise viewer satisfaction. And other attempts to quantify this, such as those suggested by Michael Copeland, may be useful to that end. But the estimates of quality impacts in this study are not convincing enough to be put to that purpose.*