

Comments on the Commerce Commission's
What Drives Television Demand for NPC Rugby Matches?

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Introduction

1. I have been asked by the NZRU to comment on the econometrics of the paper prepared by the Commerce Commission entitled *What Drives Television Demand for NPC Rugby Matches?* In particular, whether the results can be used to infer that uncertainty of outcome has no effect on the number of television viewers.
2. My academic qualifications are in mathematical economics and econometrics. For the last 20 years I have been an economic consultant specialising in economic modelling. Recent research in this area includes the econometric analysis of labour market intervention programmes, the estimation of company credit risk models, and the development of econometric forecasting models for such diverse areas as casino revenue, revenue from the fire services levy and the demand for cement.
3. The Commerce Commission's (The Commission) attempt to identify the effect of match uncertainty on the number of television viewers contains some innovative measures of uncertainty. Nevertheless in my opinion and for the reasons that I will explain below the work that has been undertaken is not a reliable basis from which to reach the Commission's conclusions about the relationship between uncertainty of outcome and television audience size.

Model Estimation

4. As the model is based on a panel dataset, albeit with some missing observations, it is not clear whether this property has been exploited in the estimation. For example:
 - Whether there is an allowance for autocorrelation and if so whether it is fixed across all cross-sections. Not allowing for autocorrelation could bias the coefficients and hence lead to incorrect interpretation of the impact of the explanatory variables.
 - Whether heteroskedasticity is taken into account. Not doing so could weaken the measured significance of the explanatory variables.
5. While the size of the dataset is reasonable, each combination of teams occurs no more than four times. Thus there may not be enough variation in some of the variables to generate robust estimates of their effects. This links to the next point.
6. There are too many insignificant variables in the specifications presented. While it is certainly useful to see the results with all the variables incorporated, one would expect final models to have a more parsimonious specification which reflected careful application of a general-to-specific methodology.

Multicollinearity

7. The insignificance of many of the variables probably stems from the correlation between them. For example, games are not allocated randomly over times and days. Allocation is designed to increase the size of television audiences. In particular, games between the better teams are usually evening games. This means that the day/time dummies actually capture an element of both game quality and game uncertainty.
8. Variables such as STAND, CBALW, MWPS and AWWPS¹ also probably capture elements of both game quality and game uncertainty.
9. When SUPER (number of Super 12 players in the match) is incorporated into the equation specification the significance of POP (populations of the two competing provinces) falls considerably, suggesting some correlation between SUPER and POP, notably that the bigger regions also have the most Super 12 players. This suggests that POP is picking up a match quality effect and probably undermining SUPER.
10. Note that the low initial significance of POP is probably because television audiences are drawn from across the country and not just (or mainly) from the two competing provinces in any given game.
11. Household income (INC) is very significant, but one wonders about the extent to which it might be capturing a match uncertainty effect. Over the last five years (including 2005, which the Commission excludes) the four semi-finalists have been drawn from six provinces (Auckland, Canterbury, North Harbour, Otago, Waikato and Wellington) on all but one occasion. These regions are probably also those with the highest average incomes, and most games between their teams have very uncertain outcomes.

Measurement Error

12. Concepts such as quality and uncertainty of outcome are inherently subjective. Indeed quality and uncertainty contain considerable overlap. Thus any measurable proxy for them is likely to be subject to measurement error. This leads to under-estimates of the effects of those variables. That the SUPER variable is statistically significant against a background of measurement error and multicollinearity engenders confidence that quality/uncertainty is an important determinant of the number of television viewers.

Other points

13. Two further non-econometric points are also germane. Firstly, the number of television viewers is only one aspect of the public benefit of a better and more even competition. The other is the enjoyment (or utility) derived by television viewers. Even if a better and more even competition generated no increase in viewers, existing viewers still obtain greater enjoyment.
14. Secondly, the variation in the number of television viewers under the NPC may be much lower than the variation in viewer numbers that would occur under the proposed Air New Zealand Cup, without some method of generating a more even competition. The implication is that outcome uncertainty could well have been quite high for most NPC matches (and therefore difficult to measure), but the entry of teams such as Manawatu would generate far less match uncertainty in the absence of measures that encourage a greater spread of the top players.

Summary

15. Overall, in my view the Commission's conclusions from this modelling analysis cannot be relied on with any confidence. The results suffer from two main and significant weaknesses;

¹ Respectively; a weighted average of competing teams previous season and current season standings, variation in win probability versus ideal variation, standard deviation of home team's historical winning probability, and variation of away team's historical winning probability.

they are beset by multicollinearity and the main variables of interest (relating to match uncertainty) are measured with error – in spite of being innovative in their design. Both of these problems have the same effect; they lead the researcher to be too hasty in inferring that variables are not significant. Consequently it cannot be safely inferred from the Commission's analysis that match uncertainty has no effect on the number of television viewers.



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Curriculum Vitae Adolf H. Stroombergen

Qualifications

BA (Maths & Econ), BA [Hons] (Econ), PhD (Econ)

Fields of competence

Economic modelling, industry studies, public and social economics, energy, econometrics, efficiency, risk analysis and benchmarking, capital budgeting, resource rentals

Positions held

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| 1997 to date | Chief Economist and Director, Infometrics Consulting. |
| 1986 to 1997 | Senior Economist and Director, Business & Economic Research Ltd. |
| 1979 to 1986 | Research Fellow and Tutor, VUW. |

Membership of Professional Societies

Member, New Zealand Association of Economists

Publications and peer reviewed reports

(consultancy reports are generally confidential to the client)

Sculley, G.W. & A.H. Stroombergen (2000), "The Equity-Efficiency Trade-off in New Zealand: A Preliminary Analysis," in G.W. Sculley & P.J. Caragata (eds), (2000), *Taxation and the Limits of Growth*, Kluwer Academic Publishers, Dordrecht, Netherlands, pp173-191.

Norton P., K. Sanderson, T. Booth and A Stroombergen (2000), *A Literature Review of the Effect of School Resourcing on Education Outcomes*, report to Ministry of Education, February 2000.

Stroombergen A.H. and G. Stuart, "A General Equilibrium Model for Regional Economic Development," in *Papers and Proceedings of the EcoMod Conference*, Istanbul, 2003.

Tait A.B, J.A. Renwick and A.H. Stroombergen (2005), "The economic implications of climate-induced variations in milk production", *New Zealand Journal of Agricultural Research*, 48, 213-225.

Selection of projects and assignments

Energy and environment

- Industry consultation on recycling revenue from carbon charges and general equilibrium analysis of carbon charge scenarios. NZ delegate to workshop in Norway.
 - Analysis of New Zealand's exports of environmental goods and services.
 - Projection of the demand for electricity and other energy resources.
 - Review of the Ministry of Economic Development's energy model (with Covec Ltd).
 - Analysis of the economy-wide impacts of LNG imports (with Covec Ltd).
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Economic structure

- Consultant to the Faroese Government on economic growth and restructuring.
- Assessment of alternative paths for import tariff reduction after expiry of the 2005 tariff freeze (with Business & Economic Research Ltd. and Decision Research).
- Assessment of the economic effects of proposed changes to the powers of local government.

Labour market

- Econometric investigation of the relationship between labour force status and access to transport (with Firecone Ltd).
- Review of fiscal savings model for the *Jobs Jolt* employment package.

Education

- Economic impacts of foreign fee-paying students.
- Development of a dynamic microsimulation model to track borrowing and repayment under the tertiary student loan scheme.
- Review of methods for measuring human capital.

Fiscal policy

- Analysis of negative tax rates, taxation on imputed rental of owner-occupied dwellings, and other tax policy.
- Analysis of retirement savings policy based on a dynamic microsimulation model of wealth accumulation.

Infrastructure

- General equilibrium analysis of investment in New Zealand's roading network.
- Consultation with business on the constraints to growth caused by inadequate physical infrastructure (water, energy, telecommunications and transport)
- Review of methods for determining airport landing charges.

Miscellaneous

- Development of a financial compensation model in relation to low market rents for leasehold Maori land.
- General equilibrium analysis of biotechnology.
- Valuation of a fishing and fish processing company.
- Performance and efficiency analysis of over 100 franchised branches using data envelope analysis and econometric methods.
- Econometric estimation of corporate credit risk models.
- Development of an organisational resource allocation model (with Future Impact Ltd).