

## Accepted Manuscript

Probabilistic Forecasting with Discrete Choice Models: Evaluating Predictions with Pseudo-Coefficients of Determination

Ming-Chien Sung, David C.J. McDonald, Johnnie E.V. Johnson

PII: S0377-2217(15)00828-0  
DOI: [10.1016/j.ejor.2015.08.068](https://doi.org/10.1016/j.ejor.2015.08.068)  
Reference: EOR 13223



To appear in: *European Journal of Operational Research*

Received date: 26 January 2015  
Revised date: 27 August 2015  
Accepted date: 28 August 2015

Please cite this article as: Ming-Chien Sung, David C.J. McDonald, Johnnie E.V. Johnson, Probabilistic Forecasting with Discrete Choice Models: Evaluating Predictions with Pseudo-Coefficients of Determination, *European Journal of Operational Research* (2015), doi: [10.1016/j.ejor.2015.08.068](https://doi.org/10.1016/j.ejor.2015.08.068)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Probabilistic Forecasting with Discrete Choice Models: Evaluating Predictions with Pseudo-Coefficients of Determination

Ming-Chien Sung\*, David C.J. McDonald, Johnnie E.V. Johnson

*Centre for Risk Research, Southampton Business School, University of Southampton,  
Southampton, SO17 1BJ, UK.*

---

## Abstract

Probabilistic forecasts from discrete choice models, which are widely used in marketing science and competitive event forecasting, are often best evaluated out-of-sample using pseudo-coefficients of determination, or pseudo- $R^2$ s. However, there is a danger of misjudging the accuracy of forecast probabilities of event outcomes, based on observed frequencies, because of issues related to pseudo- $R^2$ s. First, we show that McFadden's pseudo- $R^2$  varies predictably with the number of alternatives in the choice set. Then we evaluate the relative merits of two methods (bootstrap and asymptotic) for estimating the variance of pseudo- $R^2$ s so that their values can be appropriately compared across non-nested models. Finally, in the context of competitive event forecasting, where the accuracy of forecasts has direct economic consequence, we derive new  $R^2$  measures that can be used to assess the economic value of forecasts. Throughout, we illustrate using data drawn from UK and Ireland horse race betting markets.

*Keywords:* Forecasting, Decision analysis, Finance, Discrete choice models, Horseracing

---

\*Corresponding author. Tel.: +44 23 8059 8974. Fax: +44 23 8059 3844.

*Email addresses:* [m.sung@soton.ac.uk](mailto:m.sung@soton.ac.uk) (Ming-Chien Sung), [d.mcdonald@soton.ac.uk](mailto:d.mcdonald@soton.ac.uk) (David C.J. McDonald), [jej@soton.ac.uk](mailto:jej@soton.ac.uk) (Johnnie E.V. Johnson)

Download English Version:

<https://daneshyari.com/en/article/6896197>

Download Persian Version:

<https://daneshyari.com/article/6896197>

[Daneshyari.com](https://daneshyari.com)