

Bayesian Inference in Binomial Logistic Regression: A Case Study of the 2002 Taipei Mayoral Election*

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ABSTRACT

Bayesian statistics assumes that there are specific parameteric distributions for the unknown parameters. It fits the probability model of interest by incorporating prior information regarding the unknown parameters and the likelihood function of the observed data. Moreover, Bayesian statistics as well as non-Bayesian methods produce good asymptotic results. Using WinBUGS and R language, a binomial logistic regression model of voting choice in the 2002 Taipei mayoral election is developed. Adding the prior information from the first panel to the estimation of the second panel, the Bayesian model yields sharper estimates concerning the election outcome. Additionally, the replication of data provides a model check and the baseline of the new observations. The methodological contribution of this paper is the ability to fit a binary logistic regression model with the observed data using the Bayesian inference.

Key Words: Bayesian statistics, prior information, predictive posterior simulation, binomial logistic regression, voting choice

貝式估計在二元勝算模型的應用： 以 2002 年台北市長選舉為例

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摘 要

貝式統計假設未知的參數有特殊的參數分布，在估計模型時包含未知參數的事先資訊以及最大概似函數。而且，貝式統計以及傳統的統計方法的估計皆是無偏估計。本研究使用 WinBUGS 及 R 語言對 2002 年台北市長的選舉資料估計一個二元勝算的投票模型，得出事後分布以產生參數估計及可信區間。在加入第一次調查所得出的事前資訊到第二次調查的模型之後，發現貝式模型提供一個更準確的依變項預測值的估計。本研究在方法上的貢獻是提供一個應用貝式統計在二元勝算迴歸模型的例子，並且嘗試納入事前資訊以增強選舉的預測。

關鍵詞：貝式定理，事前資訊，預測事後模擬，二元勝算迴歸，投票選擇