Volleyball data analysis

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Abstract

Analysis of 2016 Olympic Men's Volleyball data.

1 Introduction

This is about the statistical analysis of volleyball data. Currently, models are being developed for traditional 6 vs 6 indoor volleyball games using men's indoor volleyball data recorded from the 2016 Olympics.

2 Methods

$$Y_i = \begin{cases} 1 & \text{if team wins point } i, \\ 0 & \text{if team loses point } i. \end{cases} \tag{1}$$

We develop a probit regression model for estimating $\rho_i = \mathsf{P}(Y_i = 1)$, the probability of winning point i, for $i \in \mathcal{S}$, where $\mathcal{S}$ is the state space; the set of all possible *states* of the game, or game *scores*, i.e., 0-0, 1-0, 2-0, 2-1, 3-1, etc.

$$\Phi^{-1}(\widehat{\rho}_i) = \alpha_0 + \boldsymbol{\beta}\mathbf{X} + Z_i, \tag{2}$$

where α_0 is an intercept term, $\mathbf{X}$ is an $n \times p$ matrix of predictors with corresponding coefficient vector $\boldsymbol{\beta}$, and Z_i is a conditional "game-flow" random effect that depends on $i \,|\, i-1, i-2, \dots$. This random effect is modeled as a discrete-time dynamical system of game flow.

2.1 Random effect

Consider a stationary and ergodic process.