

Are squad rotation policies optimal deployment strategies? The relationship between team selection and team performance

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**Economics
Session 14**

**Friday, May 30, 2008
2:00 PM - 2:25 PM**

**Presentation (25-minute)
Abstract 82**

Berman et al. (2002) adopt a resource-based view of competitive advantage. They argue that a key strategic resource is tacit knowledge acquired through a learning-by-doing process within the firm and hence unique and difficult to imitate by rivals. Berman et al. tested the significance of tacit knowledge using data from the NBA. They modelled the season win-loss records of NBA teams over 14 seasons controlling for differences in team quality. They used shared experience (i.e. each player's total number of team appearances weighted by their total court time in the current season) as a proxy for the team's stock of tacit knowledge. Berman et al. found that shared experience was a highly significant positive influence of team performance.

Gerrard and Lockett (2007) have criticised the Berman et al. study on both theoretical and empirical grounds. Gerrard and Lockett argue that shared experience will include both tacit and codified knowledge. Gerrard and Lockett prefer to conceptualise shared experience as a measure of team-specific human capital comprising both codified/formal and tacit/informal components. Furthermore, Gerrard and Lockett argue that shared experience is likely to be closely related to the dynamics of team performance. Successful teams tend to be kept together and, as a consequence, increase their shared experience. Unsuccessful teams are broken up and hence have lower shared experience. Berman et al. interpret this as an estimation problem to be resolved by including an AR(1) error process. Gerrard and Lockett argue that it is a dynamic specification problem that can only be resolved by re-specifying the model to allow for the impact of past team performance on current team performance (i.e. momentum effects). Gerrard and Lockett estimate a dynamic human capital model using season-average data for English Premiership soccer for 10 seasons including shared experience, past team performance and their interaction. They find that shared experience has no significant influence independent of past team performance.

The current study is motivated by the belief that the use of season-average data compounds the difficulties of separating out the impact of shared experience and momentum effects in team performance. Using match-level data that charts changes in team selection from match to match may allow a better understanding of the impact of shared experience on team performance. In addition, it provides an opportunity to model the team selection process to identify any systematic reasons for changes in the deployment of players and, by implication, changes in the amount of shared experience between matches.

Theoretical Model and Hypotheses

Team Performance Model

Team Performance = f(Match Location, Team Quality, Shared Experience, Previous Performance, Opposition Quality, Team Selection Changes)

Team Selection Model

Team Selection Changes = f(Match Location, Previous Performance, Tournament Schedule)

We test five target hypotheses:

H1: Shared experience is positively related to current team performance.

H2: Team selection changes are negatively related to current team performance.

H3: Team selection changes are more frequent when teams are playing at home.

H4: Team selection changes are negatively related to previous team performance.

H5: Team selection changes are more frequent when the tournament schedule is more intensive.

Data and Methodology: We use English Premiership soccer as the research site in which to test our hypotheses. Soccer is a highly complex team invasion sport in which we would expect significant positive returns to increasing the stock of team-specific human capital. In addition English Premiership soccer is highly competitive with maximised effort and innovation incentives since it is part of a merit hierarchy with qualification to European tournaments and retention of Premiership status in the following season both being dependent on league performance in the current season. In our initial exploratory study we use match-level data for one team (Arsenal) over five seasons, 2001/02 - 2005/06. The FA Premier League contains 20 teams who play a round-robin league tournament with each team playing every other team home and away every season implying a 38-game schedule per season. The initial database contains data on 190 games by Arsenal but the inclusion of team selection variables reduces the final sample to 185 games since the first game in each of the five seasons has to be eliminated. The variables included in the study are defined as follows:

Result: game result measured in league points gained (win = 3; tie = 1; loss = 0); Select: the number of changes in the starting

2008 North American Society for Sport Management Conference (NASSM 2008)

line-up from the previous league game; Home: binary variable for home-field advantage (home game = 1; away game = 0); TeamPQI: stock of playing talent in starting line-up measured by the PQI index; Inter: total international caps of starting line-up; TotExp: total number of career league appearances of starting line-up; TeamExp: total number of team league appearances of starting line-up; OppQual: quality of opposing team measured by total league points gained in current season; PrevRes: game result in previous league measured as league points gained; PrevGS: goals scored in previous league game; PrevGC: goals conceded in previous league game; Euro: binary variable with value of unity if previous game played is in European tournament; TeamPQIch: % change in TeamPQI of starting line-up from previous league game; TeamExpCh: change in TeamExp of starting line-up from previous league game

The initial team performance and team selection models are estimated by OLS regression. The team performance model is re-estimated using limited dependent variable (LDV) and instrumental variable (IV) estimation methods to allow for the limited range of values of the Result variable and the endogeneity of the Select variable, respectively.

Results and Discussion: The principal results of the empirical tests of the hypotheses are as follows:

H1: There is no evidence of the stock of shared experience having a significant impact on team performance although match-to-match changes in shared experience have a positive effect.

H2: There is no evidence that team changes adversely affect team performance. Team changes that increase shared experience have a positive but insignificant impact on team performance.

H3: There is no evidence that team selection is significantly affected by match location although there is likely to be fewer changes for home games.

H4: Changes in team selection increase significantly with the number of goals conceded in the previous game.

H5: There is a positive but insignificant effect on team selection changes if teams have played a midweek European game.

We now intend to proceed to test the hypotheses on an extended database including eight Premiership teams over five seasons (= 1,520 team-game observations). We also plan to try to control for enforced changes due to suspensions and injuries.

References

Berman, S.L., Down, J. and Hill, C.W.L. (2002), 'Tacit knowledge as a source of competitive advantage in the National Basketball Association', *Academy of Management Journal*, 45, 13-31.

Gerrard, B. and Lockett, A. (2007), 'Does practice make perfect or permanent? Team-specific human capital and performance', unpublished mimeo.