Oakland, Analytics and Sporting Efficiency: Revisiting the Moneyball Story after 15 Years

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Introduction
2018 sees the 15th anniversary of the publication of Moneyball: The Art of Winning an Unfair Game (Lewis, 2003) and so provides an appropriate opportunity to assess the significance of the book and subsequent Hollywood movie. Moneyball has been a real game-changer in the adoption of data analytics by professional sports teams not just in the MLB but in the other Major Leagues and in other team sports across the world particularly in player recruitment. The purpose of this presentation is to review the Moneyball story but also to provide new evidence on the extent of Oakland’s efficiency gains over the longer term.

Literature Review
Focusing mainly on seasons 2001 and 2002, Moneyball tells the story of how the Oakland Athletics in the MLB under the stewardship of their GM, Billy Beane, used data analytics as a David strategy to compete effectively with resource-richer rivals. In particular Beane took advantage of the gain opportunity in the valuation of hitters by using on-base percentage (OBP), the most predictive hitting metric but largely ignored by other MLB teams. Hakes and Sauer (2006) framed Moneyball from the perspective of the efficient market hypothesis and showed that OBP had no significant impact on hitter salaries in the period 2000 – 2003 but, after the publication of Moneyball, in Fall 2003, OBP became a significant determinant of hitter salaries. Gerrard (2007) analysed the first nine seasons under Beane, 1998 – 2006, and, after adjusting for salary inflation, estimated that Oakland were operating with an efficiency gain of 59.3% compared to the MLB average.

Davenport, one of the leading management gurus in the area of business analytics, considers Oakland along with two other Major League teams, Boston Red Sox and New England Patriots, as exemplars of what he calls “analytical competitors” in the area of personnel/talent/HR analytics (Davenport, 2006; Davenport and Harris, 2007). Analytical competitors represent the final stage of Davenport’s five-stage taxonomy of organisations in terms of their use of data analytics. Analytical competitors are organisations in which analytics has become the principal driver of performance, with analytical competitors committed to a continual search for analytics-led innovations to maintain their competitive advantage.

Data and Methods
In order to update the analysis of Oakland’s sporting efficiency under Beane, payroll costs and regular-season win-loss records have been compiled for all MLB teams for seasons 1998 – 2017. Payroll costs have been defined as total opening-day annual team salary and sourced from the USA Today statistical archive. Win-loss records have been sourced from the official MLB website and team win percentages calculated. The initial analysis of sporting efficiency uses the season-to-season rankings of payroll costs and team win percentages which not only ensures direct comparability of payroll costs and team performance but also allows comparability over time by controlling for player salary inflation. Sporting efficiency is defined as the difference between the win rank and the wage rank. Future work will involve the calculation of inflation-adjustment payroll costs in order to estimate win-cost ratios.

Results and Discussion
Based on the ranking method, Oakland under Beane’s stewardship emerge as the most efficient MLB team in sporting terms over the last 20 years. Between 1998 and 2017, Oakland have had 12 winning seasons despite having payroll costs below the median in every season, and in the lowest quartile for 15 out of 20 seasons. In only 2007 did Oakland have a wage rank (17th) higher than their win percentage (19th). Over the 20-year period Oakland have had an average wage rank of 25.2 but an average win rank of 12.6, yielding a rank gap of +12.6, the highest of all 30 MLB teams. The next best performer has been the Miami Marlins with a very similar average wage rank as Oakland (25.1) but a much poorer on-field performance with an average win rank of 19.3, implying a rank gap of +5.8. While Oakland have been a winning team over the period (win% = 52.4%), Miami have been a losing team (win% =
These results show that the exceptional efficiency gains Oakland achieved from their use of data analytics in the early years of Beane’s stewardship have been maintained in the long term. Moneyball focused on seasons 2001 and 2002 when Oakland achieved rank gaps of +27 and +26, respectively. (Remember the maximum possible rank gap in the MLB is +29.) But these two seasons have been by no means unique with Oakland achieving similar rank gaps in 2012 (+25) and 2013 (+24.5). Oakland have achieved a rank gap of +10 or greater in 11 of the last 20 seasons.

As Hakes and Sauer (2006) argue, competitive pressures should remove any market efficiencies quickly as other traders observe the profitable gains of those exploiting available information more effectively. And indeed Hakes and Sauer provide evidence that the OBP anomaly in the valuation of hitters disappeared after the publication of Moneyball. The long-term efficiency gains of Oakland are the anomaly to be explained. Two possible explanations will be explored. One possibility is that Oakland may still be reaping the benefits of first-mover advantage in the use of on-field analytics although this seems unlikely given the level of investment in analytics by other MLB teams, the explosive growth in analytics in recent years, and the natural knowledge diffusion process particularly as Oakland personnel have moved into senior roles in other teams. Alternatively, Oakland’s long-term efficiency gains may be due to a change in organisational culture initiated by the use of data analytics but involving a more thorough-going adoption of evidence-based management practices (Briner et al., 2009; Pfeffer and Sutton, 2006). This ultimately may be the most transferable lesson of Moneyball for other professional sports teams as well as businesses and organisations more generally (Gerrard, 2016).