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Pitcher's Name	Daniel Murray	Purpose	General Research Project: Mathematics (A10)		
(A) Working Title	Measuring efficiency in the National Rugby League				
(B) Basic Research Question	How well do teams in the National Rugby League play up to their potential?				
	 Anthony Bedford, James Baglin, 2008, Evaluating the performance of an ice hockey team using interactive phases of play, IMA Journal of Management Mathematics, no. 2, pg 159-166 Carlos Pestana Barros, Pedro Garcia-del-Barrio, 2008, Efficiency measurement of the English football Premier League with a random frontier model, Econom Modelling, no. 25, pp 994-1002 				
(C) Key paper(s)	Afriat, S.N., 1972. Efficiency estimation of production frontiers. International Economic Review 13, 568-598 Richard A. Hofler, James E. Payne, 1997, Measuring efficiency in the National Basketball Association, Economics Letters, no. 55, pp 293- 299				
	García, J., Ibáñez, S.J., Gómez, M.A., Sampaio, J, 2014, Basketball Game-related statistics discriminating ACB league teams according to game location, game outcome and final score difference, International Journal of Performance Analysis in Sport, no. 2, pp 443-452				
(D) Motivation	Sports fans frequently debate about which team is the best, usually by quoting won-lost records. Conversely, many coaches talk less about won-lost records and more about their teams "playing up to their potential"				
/ ruzzie	Puzzle: Can stochastic production frontier models measure efficiency w Sports League?				
THREE	Three core aspec	ts of any em	pirical research project i.e. the "IDioTs" guide		
	"Core" idea: The r the stochastic from Economic Studies study was develop It is natural to add means. In the cas efficiency may not a team's wins. The attainable (potent and other circums potential a team a	novel idea is ntier method b). The stocha oed, and cont dress efficier e of a sport, i t have clear n e 'frontier' an tial) wins tha stances. Fina approaches.	efficiency will be measured by the application of ology developed by Aigener et al. (1977, Journal of astic frontier model which will be employed in this cinues to be largely used, in a production context. acy in that case and easy to understand what it however, terms like production, frontier and meanings. For this discussion, 'production' means and 'frontier production' refer to the maximum t a team can achieve, given its players, coaching lly, 'efficiency' describes how closely to its		
(E) Idea	Central hypothesi potential when: • The ratios of tac impact on team w measure the quali • The ratios assoc to have a positive	s(es): Teams ckles and mis rins when >0 ity of a team ciated with ef impact on te	will become more efficient at reaching their sed tackles is hypothesised to have a positive . These two variables s defensive ability. fective plays and ineffective plays is hypothesised cam wins when >0.		

	 These two variables measure the quality of a team's ability to execute strategic decisions. The ratios of Completions and Errors is hypothesised to assist increases in wins when >0. These two variables measure the ability of a team to effectively keep possession of the ball. 		
(F) Data	 (1) Country/setting: Australia, National Rugby League Unit of analysis: Individual teams Sampling: Weekly Type: Game related (2) Expected sample size: 16 teams on 5 years (2009-2013) (3) Data Source: NRL.com. No hand-collecting required. Timeframe: No major time delays; Research assistance needed?: No; Funding/grant?: No; (4) Standard data - Nothing novel, high quality data from NRL.com (5) Will there be any problem with missing data/observations? Nothing major, just standard issues (6) Will your test variables exhibit adequate("meaningful" variation to give good power?: Yes. Large and "meaningful" variation will be inherent in the results of NRL games. 		
(G) Tools	Basic empirical framework: Stochastic frontier model Econometric software needed/appropriate for job? Python Knowledge of implementation of appropriate or best statistical/econometric tests?: Yes Compatibility of data with planned empirical framework?: Yes, already used and admitted in the existing literature		
TWO	Two key questions		
(H) What's New?	Idea is novel - The idea of "Measuring efficiency" to reach a competitive advantage in game results is novel. While the (positive) effect of measuring efficiency on the National Basketball Association, Major League Baseball and UK Premier League has been studied in prior research, the more specific effect of 'measuring efficiency' has never been applied to the National Rugby League. The main novelty therefore lies into a focus on measuring efficiency, accounting for -1- determining the NRL's ability to measure potential predictions -2- analysing a team's ability to improve and evaluate current inefficiencies.		
(I) So What?	Considering the measurement of efficiency in a team's ability to maximise potential is of particular interest for NRL clubs and relevant associations on one side, and socially responsible investors on the other. Indeed, both need to understand the underlying mechanisms that prompt teams to increase winning potential. As each season is becoming more unpredictable, understanding how improvements in efficiency ratios can influence a team's victory capability will play a crucial role in the success of a club.		
ONE	One bottom line		
(J) Contribution?	Primary source of the contribution: The idea that teams focus more on increasing efficiency to reach their team's potential under competitive pressure is our main contribution. We test this idea by considering efficiency is dependent on a number of factors intuitive to success, while other studies focus on a number of variables unrelated to direct success.		
	Is collaboration needed/desirable? -Idea: No -Data: No -Tools: No Target Journal: Journal of Mathematical Social Sciences, Journal of Mathematic		

Modelling, Journal of Economic Theory, Journal of Economic Behav	Modelling, Journal of Economic Theory, Journal of Economic Behaviour and			
Organisation? To be discussed.	Organisation? To be discussed.			
(K) Other "Risk" assessment:	"Risk" assessment:			
- "No result" risk: Low- the source of contribution rather comes fro	om the angle of			
approach, any results can be interesting, although it will be easier	approach, any results can be interesting, although it will be easier to 'sell' the			
paper if we get significant coefficients:	paper if we get significant coefficients:			
-"competitor" risk (ie being beaten by a competitor): LOW - No cur	rrent papers			
are being written at the moment in relation to measuring efficience	y against and			
Australian sports league				
-risk of "obsolescence": LOW - efficiency issues are attracting a gro	owing interest,			
and investors are becoming more and more competitive, the subject	ct is likely to			
remain topical for a while.				

This pitch has been created at <u>http://PitchMyResearch.com</u> using a template modified from Faff, Robert W., Pitching Research (2014,2015). Available at SSRN: <u>http://ssrn.com/abstract=2462059</u>