The structural components of sports competitions and the characteristics of sport practices can vary significantly. These differences may be translated into different optimal employment arrangements for professional coaches. While there has been some academic inquiry into sport coaching practice, there has been no apparent research into the industrial organization of sport coaches. This paper presents a formal model of the coaching practice that generates employment arrangement predictions based on known model parameters. This study develops an economic model of the industrial organization of sport coaching.

There have been widespread academic and practical investigations of sport coaching in terms of pedagogy (e.g. Light & Dixon, 2007), practical application (e.g. Douge, & Hastie 1993), and human resources (e.g. Ryan & Sagas 2009), but little economics work has focused on the industrial organization of sport coaching (Larson & Maxcy, 2011). There are limited discussions of human capital (Singell, 1991), examination of compensation (Humphreys, 2000; Kahn, 2006), and investigations into coaches' contributions to production (Clement & McCormick, 1989), but the topic of overall coaching industry structure has been relatively untouched. This may be due to the fact that coaches are, in a majority of sports, simply viewed as employees or labor inputs in the production of their sports products (competitions). Yet, coaches of team-sport athletes who operate independently and outside the employ of traditional professional teams do not fit into this standard mold. The relevance (or lack thereof) of each of these coaching research areas speaks to the need for a generalized theory of coaching practice in sports. What does a coach add to the sports product? How are the gains to coaching integrated into team management's objective function? How can differences in the nature or sports settings affect the structure of a sport's coaching industry? We propose a general theory of coaching practice could assist in the answer of these questions, and then specifically apply the model to professional cycling.

There are a small number of research works focusing on coaching in terms of industry structure, and these primarily focus on executive coaching. Many of these papers highlight the ambiguity of coaches' roles and tasks (Hall, Otazo, & Holenbeck, 1999); and what performance outcomes are present (Schlosser et al., 2006). Some suggest a substantial overlap into psycho-therapeutic methods (Levinson, 1996), and others highlight the risk of coaches' unwitting influences on executives (Berglas, 2002). In nearly all of these cases, coaching is examined in terms of leadership and executive performance. The difficulties of observing employee performance and internal operations in a traditional organization and determining where coaching is or isn't taking place for non-leaders, can make the analysis very difficult. However, we suggest that these issues may be largely side stepped by studying training and coaching within sports settings. While some sports structures may be more analogous than others to any one industry, there could potentially be uses for sports findings that cross-over to extensively similar industrial conditions. The basic premise of coaching service is that the activities of a coach generate at least some marginal improvements in the performance of an employee. In the case of coaching in sports, employee (athlete) performance is clearly observable, tasks and production are clearly defined, and coaches are explicitly named and/or defined by the client. We will simplify the discussion by assuming expected performance improvements map to monotonically increasing payoffs (revenue) earned by the athlete. As such, a coach and client, (the team or an individual athlete) will engage in bilateral bargaining to determine the coach's compensation.

We develop a formal calculus that shows efficiency gains result in either centralized hiring (by the team) or decentralized hiring (by the individual athlete) of coaches, depending on several key factors. Sports can vary in (1) the specific skills that are practiced, (2) the level of physiological conditioning required, (3) the level of integrated action (plays), (4) the physical characteristics of the competitive facility (field of play), and (5) the dispersion of athlete residences (whether there is actually a "home" area). In most cases the team-sport hiring of coaches is centralized and likewise hiring is decentralized for pure individual sports. While these results may seem obvious, the interesting cases are those sports that are to a degree hybrids of individual and team competition. Those where, in some manner, team performance is an aggregate of individual performance, for example gymnastics, swimming, and
cycling. In these cases the formal model predicts different outcomes based on the variables listed above. Using professional cycling as an example we are able show that it is efficient for individual cyclist to hire their own coaches, even though individual coaches may have goals for their client that conflict with the team's objectives. Using survey data from the industry we find that our prediction about decentralized hiring of coaches generally hold, there are however conflicts of interest.