SUPPLEMENTAL APPENDIX for

"The Beautiful Dataset"

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This appendix reviews literature not included in the main text due to space considerations. It has two parts:

1. Part A is concerned with the subsections on "Other Topics" noted in the main text.

From *Section 2.3 Microeconomics*, it reviews:
       2.3.2 Utility: Decision-Making
         Other Topics: Goals and Round Numbers
       2.3.4 Market Design
         Other Topics: Rules, Fairness, and Incentives

From *Section 2.4 Labor Economics*, it reviews:
       2.4.8 Other Topics: Talent Discovery and Assortative Matching, Talent and Training,
         Bosses, Careers, Strikes

From *Section 2.8 Industrial Organization*, it reviews:
       2.8.4. Other Topics: Restrictions on Competition, Tickets

2. Part B is concerned with the "Other Fields" noted in Section 2.11, and structured as follows:

L. Finance
M. Crime and Corruption
       M1. Police
       M2. Incentives
       M3. Emotions
       M4. Violence as Identity Capital
       M5. Organizational Decision Making
N. Public Economics
O. Political Economy
       O1. Voting
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P. The Economics of Sports
Q. eSports
R. Neuroeconomics
S. History of Economic Thought
T. Culture and Cultural History

PART A

2.3 Microeconomics

2.3.2 Utility: Decision-Making

Other Topics: Goals and Round Numbers

Motivational processes are often involved in the "selection" of reference points for achievement-oriented activities. Research in psychology suggests that "goals" may serve as reference points, and research in economics is beginning to study goals more closely.[1] For example, goals may involve round numbers, which have been shown to be a relevant feature in the economics of pricing, marketing, consumer research, and social psychology. Thus goals, whether or not a round number, may serve as reference points, influencing decision utility through allocation of effort, and experienced utility when judging one's own performance.

When we think of goals and performance, a conjecture in the literature is that round numbers in performance scales may act as reference points: individuals may exert effort to perform just above such numbers rather than just below such numbers. Pope and Simonsohn (2011) find evidence consistent with this hypothesis. They report three studies, one of which concerns professional baseball players showing that these players do modify their behavior as the season is about to end, seeking to finish with a batting average just above rather than just below a .300 rate. Baseball managers also exhibit a bias that over-emphasizes round numbers. Phillips (2017) studies pitcher substitution decisions and finds that managers remove starting pitchers more often when the next pitch will result in a pitch count ending in zero. Unlike counts ending in nine, pitch counts ending in eight do not exhibit higher substitution rates. Thus, managers appear to use a rule-of-thumb that emphasizes left-most digits and ignore some future consequences of their actions. Interestingly, this bias disappears when the stakes are high. Relatedly, Allen et al. (2017) document a pattern of marathon finishing times consistent with a value function with a jump, classical loss aversion, and diminishing sensitivity around round numbers. They find significant bunching near round-number finishing times, such as 3:00 or 3:30. For example, in their dataset 50 percent more runners complete a marathon in 2:59:xx than in 3:00:xx.

Two recent studies also take advantage of marathon data to provide insights into how goals operate. Markle et al. (2018) recruit 2,652 participants registered for different marathons. Participants are randomly assigned to one of six conditions created by crossing three pre-marathon conditions (they are not asked about goals, and they are asked about goals two or six weeks before the marathon) with two post-marathon conditions (participants were asked about their satisfaction with their performance one day and four weeks after the marathon,

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[1] See, for example, Heath, Larrick, and Wu (1999), Williams and Gilovich (2012) in psychology, and Smithers (2015), Koch and Nafziger (2016), and Clark et al. (2020) in economics.

respectively). They find that goals serve as reference points, influencing decision utility through allocation of effort in training and on race day, as well as experienced utility (how marathoners judge their performances). Satisfaction exhibits loss aversion and diminishing sensitivity. In contrast to prospect theory, however, there is evidence of a discontinuity at the reference point. Further, *previous* marathon times also have an impact on satisfaction. This is consistent with personal bests and other experiences as references (Section 2.3.2), which suggests the presence of *multiple reference points* on satisfaction.

Using a clever strategy, Burdina, Hiller, and Metz (2017) study the impact of goal "attainability" on performance. They consider the goal of qualifying for the Boston Marathon, which requires different qualifying times in different age groups. For example, in order to qualify, a woman in the 40–44 age group must run a marathon under 3 hours and 45 minutes, while a woman in the 45–49 age group must run a marathon under 3 hours and 55 minutes. They then test if runners increase their effort and improve their *absolute* performance when they enter a new age group and have a more attainable goal. Interestingly, they do: runners who enter a new age group do perform better than runners whose qualifying time does not change. Attainability operates as an incentive that affects behavior. This is found in younger age groups, but not in older age groups. An advantage of the Boston qualifying time standards study is that the goal is not endogenously self-set, but exogenously determined by an outside agency.

Overall, these studies contribute greatly to our understanding of the comparative nature of feelings and perceptions, and extrinsic and intrinsic incentives.

2.3 Microeconomics

2.3.4 Market Design

Other Topics: Rules, Fairness and Incentives

Rules are a critical part of the design of marketplaces. Many rules are designed to be fair, and in fact fairness is often an explicit goal of the designer. Fairness, however, is an ethical criterion. And since there is no universally agreed system of ethics, there is no uncontested concept of fairness. As rules are also important in games and competitive sports, it should be no surprise that these settings are beginning to provide valuable evidence.

Consider a penalty shoot-out or a chess match (e.g., Apesteguia and Palacios-Huerta (2010), González-Díaz and Palacios-Huerta (2016)). In these settings, the leading-lagging asymmetry induced by the randomly determined order in which subjects sequentially perform a task generates psychological differences that have an impact on performance. As a result, the

order is fair ex ante but unfair ex post.[2] In penalty shoot-outs, the rules establish that subjects must follow a strict alternation of the chance to perform the task. Two teams, A and B, play against each other an even number of times and the order is: A B A B … Is there a way to improve the ex post fairness of this sequential order ABAB? In Palacios-Huerta (2012) I argued that if the order A-B in the first two rounds offers *any* kind of advantage to *either* team, then by reversing the order in the next two rounds (that is, A B B A in the first four rounds) we would tend to compensate for that advantage. And, of course, this reversing is innocuous if no advantage existed in the first place. There is no downside to reversing the order in the second pair of kicks, only upside. What next? Ideally, in the next four penalties we would again reverse the order of the first four in case an advantage for either team remains: A B B A-B A A B. What next? Ideally, in the next eight penalties we would reverse the order of the first eight penalties again: A B B A B A A B - B A A B A B B A. What next? You see the point. This process ad infinitum results in the sequence known in mathematics as the Thue-Morse or the Prouhet-Thue-Morse (PTM) sequence. The PTM sequence is interesting, but it is also complicated. Alternatively, if a designer is looking for simplicity, he might simply choose to repeat A B B A every four kicks, until a team wins (however winning is determined): A B B A - A B B A - … The tennis fan will note that this is exactly the serving order followed in tie-breaks in tennis.

In Palacios-Huerta (2014a), I implemented a series of penalty shoot-out experiments with professional soccer players. I found that the team kicking first won 60 percent of them when using the ABAB sequence, 54 percent when using ABBA, and 51 percent when using the PTM sequence. Thus, the results yielded a more balanced outcome in the expected direction, and served to quantify the intuition that moving towards the PTM order tends to produce a fairer outcome. Influenced by these findings, the International Football Association Board (IFAB), which sets the Laws of the Game in soccer worldwide, decided to start implementing ABBA shootouts in various youth European and World championships in 2017. The English and Dutch federations followed suit. How did the ABBA sequence work in these trials? Palacios-Huerta (2020) reports the complete dataset for all FIFA tournaments and in England. There were 36 penalty shoot-outs in total: Team A won 18 times, and team B 18 times. That is, in these trials ABBA worked in creating a more fair and balanced outcome, bringing the frequencies with which the A and B teams win closer to 50-50 than to 60-40. In fact, in this sample they are exactly 50-50: perfectly ex post fair.

Similarly, Cohen-Zada, Krumer, and Shapir (2018) find that serving first or second in tennis tie-breaks using the ABBA sequence does not have a significant impact on players' winning probabilities. ABBA appears to work just fine. In competitive rowing, Barrow (2010) shows that ABBA is the only arrangement of port- and starboard-rowing crew members that eliminates

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[2] See Ruffle and Volij (2016) for a test of the hypothesis that, in the absence of psychological effects, the probability that a given contestant wins a best-of-$2k+1$ series of asymmetric, zero-sum, binary-outcome games is, for a large class of assignment rules, independent of which contestant is assigned the advantageous role in each component game.

transverse forces (and hence sideways wiggle) on a four-membered coxless racing boat, while the PTM sequence ABBA-BAAB is one of only four rigs to avoid wiggle on an eight-membered boat.

One would think that after the successful ABBA trials in soccer, the world governing institution (FIFA) would adopt the rule. Surprisingly, however, FIFA has decided to stick with the unfair ABAB rule. The reason? It is hard to know not being present at the committee deliberations, but ignorance of the unfairness of this rule cannot be claimed anymore. This shows how idiosyncratic behavioral institutional factors determine adoptions even in ideal scenarios.[3] Market design has given economics the broader role of transforming markets, but it needs the collaboration of institutions.

While sports offer the first causal empirical evidence that gaining-losing or leading-lagging asymmetries matter, sport is not the first area where these issues have been studied. Brams and Taylor (1999) already invoked the PTM sequence but did not identify it as such. They suggested a method called *balanced alternation* or *taking turns taking turns taking turns …*, as a way to circumvent the "favoritism" inherent when one party chooses before the other. Similarly, Richman (2001) already addressed the same problem, but he too did not identify the PTM sequence as such.

In recent years, an important literature in economics has emerged on this general type of problems. For instance, Brams and Ismail (2018), Rudi, Olivares and Shetty (2020), Anbarci, Sun, and Ünver (2021), Csató (2021a), Lambers and Spieksma (2021), and Csató and Petróczy (2022) have extended these ideas in important ways, proposed different dynamic sequences, and carefully analyzed the implications.[4] Csató (2021b) offers a careful analysis of optimal tournament design, in particular how operations research can improve the fairness of sports rules.

In addition to fairness, rules also should be structured in a way that participants cannot benefit by *losing* instead of winning. This is another obvious goal, almost tautological. However, Dagaev and Sonin (2018) show that this is not always accomplished. Specifically, they show that tournament systems consisting of multiple round-robin and knockout tournaments with non-cumulative prizes are generically *incentive incompatible* (in the sense that contestants may benefit by losing instead of winning). They discuss potential remedies and applications.

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[3] Needless to say, even well-intended attempts to improve competitions can have unintended detrimental consequences. For example, UEFA introduced in 2011 the *Financial Fair Play Regulations* (FFPR) to improve the long-term viability of the European football industry. However, Peeters and Szymanski (2014) show that the FFPR will likely tilt the competitive balance in favor of the top teams, thus reducing the attraction of the sport. Caglio et al. (2023) confirm these predictions.

[4] See also Boczon and Wilson (2022), who analyze a randomization procedure used in the UEFA Champions League, and Dietzenbacher and Kondratev (2023) who introduce and axiomatically study the prize allocation problem in rank-order competitions.

This article has inspired a whole new line of research. It turns out, for example, that UEFA has often used incentive incompatible rules. Csató (2019, 2020a, 2020b, 2022) and Haugen and Krumer (2021) show that ignorance of Dagaev and Sonin's (2018) main theorem is responsible for many instances of misaligned incentive schemes.[5] Kendall and Lenten (2017) and Lenten and Kendall (2022) offer several examples of how sporting rules may lead to unintended consequences.

Sometimes the situation is actually worse. Sometimes the rewards for losing are not implicit but *explicit*. Taylor and Trogdon (2002) study the NBA's regularly scheduled season of games, and examine changes in the incentives provided by the introduction and restructuring of the lottery system to determine the draft order. The results confirm that teams are more likely to lose when incentives to lose are present. See Fornwagner (2019) for a related study with evidence from the NHL that documents *explicit* strategies implemented to lose.

2.4 Labor Economics

2.4.8 Other Topics: Talent Discovery and Assortative Matching, Talent and Training, Bosses, Careers, Strikes

Talent Discovery and Assortative Matching

The option value of employment relationships is a critical variable for efficient turnover decisions in labor markets. Socially efficient hiring means that firms should prefer riskier job candidates over safer ones when the upside risk is more valuable than (the negative of) the downside risk. A reason is that successful workers tend to have longer careers than unsuccessful ones. Terviö (2009), however, notes that when worker performance is observable by competing employers (for example in sports, music, and the creative industries) the finders may not always get to keep the stars whom they discover. Further, when differences in ability are associated with large differences in economic value, entry-level workers may not be able to repay firms for the full value of the chance "to be discovered." As a result, it is rational for employers to adopt a lenient threshold for retaining experienced workers. These forces allow "mediocrities" to survive in the labor market, which means that average worker ability in industries that feature these effects is inefficiently low. Peeters, Szymanski, and Terviö (2022) realize that it is possible to test these implications in the labor market for professional soccer managers in England because of its ideal characteristics. They find strong support for the hypothesis that many mediocre incumbents are, indeed, being retained in this labor market. See also Özdemir et al. (2022) for evidence from professional soccer players.

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[5] See also Csató (2020c, 2022) and Lasek et al. (2016) for strategies to manipulate a team's position in FIFA World Rankings.

Relatedly, positive assortative matching, whereby better workers tend to move to better firms, is a natural theoretical proposition not yet well-established in the empirical literature as several problems persist on the empirical side. Indeed, it is often extremely difficult to identify properly the types of workers and firms, and measures of individual productivity are usually not available. Filippin and Van Ours (2015), however, manage to investigate the existence, the direction, and the intensity of assortative matching by exploiting the unique features of a dataset based on a 24-hour relay marathon held in Belluno (Italy) in which runners perform in teams. Gandelman (2008) also uses sports data to address the fact that most of the literature focuses on occupational choice and not on whether mobility means moving to a *better* or *worse* firm. Clean information on a firm's "quality" is typically hard to obtain. But in sports it is often straightforward. The author confirms the existence of assortative matching using Uruguayan soccer data.

Talent and Training

Becker (1964) distinguishes general training from specialized training. General training is beneficial to other firms in addition to those that provide it, whereas specific training boosts a person's productivity in the firm that provides it and has limited value elsewhere. Hence, employees are expected to pay for general training, while firms are expected to pay for specific training. Interestingly, as Sanderson and Siegfried (2006) note, Rottenberg (1956, p. 256) foresaw this difference a few years earlier in what is considered the first sports economics paper. Following a discussion of how baseball teams offset certain training expenses by reducing player compensation, he wrote:

> *"If players were not indentured to teams but were free to accept the offers of the highest bidders, would the amount of investment in the training of players and the quality of play fall? In such a market, players will bear a larger proportion of the cost of training, and the wages they receive will have to compensate for this cost. If it pays … in a monopsonistic market, to invest in training and development, it will also pay to do so in a free market."*

Baseball training is specific in a monopsonistic market since no other team will hire the trained player without paying the team that trained him. However, training is general in a free market since other teams may hire the player, and thus players should pay a higher proportion of training expenses in this case. Rottenberg (1956) concludes that monopsony power derived from the reserve clause is the most plausible reason why players are likely paid less than their marginal revenue product. In his discussion, he acknowledges (p. 253, footnote 47) that Gary Becker suggested to him as an alternative explanation the necessity to recoup specific training costs. Under the reserve clause, teams can recoup the cost of investment in player skills either with lower salaries in the future or by selling the player's contract to another team for an amount sufficient to cover training costs. In other words, because of the reserve clause, training is specific since players cannot sell their enhanced skills to other teams. This exchange

between Rottenberg and Becker about the role of specific training as an alternative explanation for monopsony exploitation in 1956 was later reciprocated by Becker (1964) in his discussion of specific training.

Bosses

An aspect directly related to the literatures on leadership and teams discussed in the main text concerns the role of bosses. What is the impact of bosses on team performance? What drives managerial rotation? Bosses are typically not randomly allocated to teams, and so it is not trivial how to answer these questions. It is also difficult to assess changes in profitability (or in any other measure of performance) since changes in management are not usually observable from standard firm-level data sources. Van Ours and Van Tuijl (2016) study the causes and consequences of in-season changes in the head-coach in professional soccer teams. In this setting, the head-coach role is that of managers or bosses, and the researchers observe head-coach rotation events, team composition, match results (performance), and a rich set of variables. Further, they can compute the difference between the expected and the actual team performance (defined as "cumulative surprises") using bookmaker data. Evidence from the top Dutch professional league during 14 successive seasons shows that indeed cumulative surprise helps to predict coach dismissal. Do these dismissals improve team performance? This question is addressed using a difference-in-differences strategy where the treated group is the set of teams that sacked their coach, and the control group is formed by teams with the same cumulative surprise metric as the treated ones but that did not remove the manager. The results show that head-coach dismissals have no impact on team performance, suggesting that the effect of managers over firm performance may be negligible. Koning (2003) obtains a similar result using evidence from the same league, but focusing on sample selection issues (teams do not face the same opponents before and after a coach is fired). In a clever study, Flepp and Franck (2021) attempt to differentiate between dismissals following actual poor performance on the pitch (wise dismissals) and dismissals following seemingly poor performance due to bad luck (unwise dismissals). Wise dismissals increase subsequent performance compared to a control group of non-dismissals with similarly poor performance, whereas unwise dismissals do not improve subsequent performance compared to a control group with similar strings of bad luck.

Careers

A fundamental proposition in labor markets is that career prospects, in the sense of within-firm promotions or external opportunities, implicitly create incentives for effort. This proposition is difficult to test because we can hardly randomly assign career prospects to individuals. And yet, Miklos-Thal and Ulrich (2016) find a highly original way to do this using data from professional soccer. They observe that players of the same team often have different external career opportunities depending on their nationality. Specifically, the authors study whether

the prospect of being selected to a national team that will play in the European Cup has an impact on players' performances prior to this tournament. A key aspect is that nationals of countries that do not participate in the European Cup may be used as a control group. The results are quite interesting: European Cup career prospects have *positive* effects on the performances of players with *intermediate* chances of being selected to their national team, but *negative* effects on the performances of players whose selection is *very probable*.

As discussed earlier, Carrieri, Jones, and Principe (2020) use injuries as a natural experiment to estimate the impact of productivity shocks. Hoey (2021) notes that injuries may also be used as a source of random variation in opportunities to perform in order to study how *early career exposure* matters for future labor market outcomes. A critical advantage of sports settings relative to other settings is that measuring how often the employer observes the employee is straightforward. The author uses high-frequency worker-level data on in-game playing time from the NHL, and implements an instrumental variable strategy where co-worker (teammates) injuries act as a source of random variation in junior worker opportunities and playing time. Using these injuries as an instrument, the results show that total entry-level career playing time significantly increases both the likelihood of being rehired and the post entry-level salary.

Strikes

Conflict between owners and labor, or between management and workers, is an essential characteristic of the firm. Indeed, the primary bargaining power of organized labor is its ability to withdraw labor from the firm in the form of a strike. From the workers' perspective, a strike is intended to impose substantial costs upon the firm, and many studies have estimated the costs stemming from the loss of output to the firm during the duration of the conflict.

A neglected but important aspect is the extent to which the costs of the strike go beyond the firm and labor, and reach the consumer. Zipp (1996) uses the seven weeks of canceled games caused by the baseball strike of 1994 as a natural experiment to study the impact on retail trade and hotel room sales in the twenty-four US cities hosting baseball franchises and in four control cities. The absence of baseball had little, if any, economic impact on host cities in these variables.[6] Schmidt and Berri (2004) investigate a strike's impact on league attendance using time series and panel data for all teams in three North American professional team sports leagues for all professional teams: the MLB (1901-2000), the NFL (1935-1999), and the NHL (1960-2000). In principle, consumers may react with certain "disgust" to the management-labor conflict. Thus, it is unclear whether or not they will return after the conflict has been resolved, to what extent they will, and if they do how quickly aggregate league attendance may

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[6] Coates and Humphreys (2001) examine the impact of work stoppages in professional football and basketball during 1969-96. They also find no significant impact on real per capita income in several metropolitan areas.

recover. The results show that none of these disputes in over two hundred sport-years of data had a permanent impact upon attendance. In fact, in almost all instances attendance immediately rebounds in the year following the labor conflict. Thus, only short-run costs were imposed upon participants.

2.8　Industrial Organization

2.8.4　Other Topics: Restrictions on Competition, Tickets

Restrictions on Competition

Non-compete agreements forbid or make it costly for an employee to enter into or start a similar profession in competition with the current employer. Guimaraes, Pessoa, and Ponczek (2025) note that 18 percent of all US workers are currently bound by non-compete agreements, including 39 percent of those with a professional degree and 46 percent of those earning over 150,000 dollars a year. Non-compete clauses might be beneficial for strategic reasons (e.g., protecting trade secrets), but they might be costly in terms of adversely affecting wages and match efficiency. How substantial are these labor market effects? The authors build a model of labor markets under these frictions which they test using the exogenous removal of non-compete clauses for Brazilian footballers in 1998 known as the Pelé Act. The evidence shows that the Pelé Act raised players' lifetime incomes but also changed the wage profile in a heterogeneous way, reducing young players' salaries and increasing those of more experienced players. The bulk of income gains is due to distributional forces, and efficiency gains play only a minor role.

As pointed out earlier, the restrictive implications of the Reserve Clause were already discussed by Rottenberg (1956) and there has been extensive discussion of its antitrust implications (see, e.g., Fort and Quirk (1995), Flynn and Gilbert (2001), Rosen and Sanderson (2001)). This theme links naturally to a theoretical literature on the potential *procompetitive* consequences of specific arrangements that, at first glance, may appear to *restrict* competition but can actually boost it, including a body of research on the efficiency of joint ventures between rival companies that cooperate to produce a product. Empirical evidence that supports precisely this possibility is offered in Carlton, Frankel, and Landes (2004) who take advantage of the unique opportunity provided by the NHL rule governing franchise relocation during 1967 to 1984: The NHL enforced territorial exclusivity by allowing only a single team per metropolitan area (with the exception of New York City), and relocation to a different city had to be approved by all league members.

Tickets

Arts, music and sports share many characteristics. They all occupy an important place on the consumption and leisure sides of the human experience, and they also share comparable ticket

pricing problems on the production side. The pricing issues they face are in fact quite general, as they typically apply to any seller of perishable goods. Airlines and retailers of fashion and seasonal items, for example, also have to sell their inventories within a fixed time horizon. And much like in the music and sports event industries, their revenue management strategies involve changing prices as a function of inventory, time remaining, and consumer behavior.

Ticket pricing is about selling the right seat to the right individual at the right time. Modern data analytics and ticket distribution methods, together with the increasingly large gains traditionally captured by professional resellers in online secondary markets, have stimulated a wave of pricing innovations by event organizers, ticket distributors, and online marketplaces in the sport and entertainment industries. It should be no surprise then, that over the past twenty years, ticket pricing has gained increasing attention in the economics literature (see, e.g., Courty (2000, 2003, 2015, 2019), Rosen and Rosenfield (1997)). For example, the phenomenon of event-ticket *underpricing* – in which prices for an event are set at a level at which demand substantially exceeds supply – has long been found quite puzzling in economics. For underpricing reduces revenues and at the same time encourages socially wasteful rent-seeking by ticket speculators. This is just one example of what is in fact a wide range of ticket pricing issues. Prices often change due to a variety of factors, including the seat type, location, date of performance, time to performance, complementary goods offered by the venue, and whether or not many tickets are bundled into a season ticket package. From a theoretical perspective, small changes in the environment often call for very different ticketing strategies, and this has the potential to explain the different pricing strategies often observed in sport and entertainment events.

Unfortunately, in spite of substantial theoretical progress in this field, the empirical literature is lacking. Here again sports events provide an exceptional laboratory for empirics because they not only are a leading example of perishable goods, but also because they display a wealth of sources for price changes.

In the primary markets, event organizers have experimented with variable pricing (VP) and dynamic pricing (DP). Take a team that sells single-game tickets to its games for the first time. VP refers to setting, *before* the season begins, different prices for identical seats in different games. DP refers to teams having the opportunity to change the price of a ticket, for a given seat in a given game, at *any* time up to the start of the game depending on the weather, specific players participating in the game, importance of the game, winning streaks, and countless other possibilities. In the secondary market, where fans buy tickets from season ticket holders, ticket brokers, or other fans, there has also been a revolution. Traditionally, this market was referred to as "scalping" and took place outside the stadium and often outside the law. However, with the rise of the Internet and the creation of online marketplaces such as *StubHub*, reselling tickets has become easy and legitimate. And teams that initially resisted these markets have eventually endorsed them as an opportunity to share profits through

partnerships with resale platforms. Today, the term "sponsored secondary market" (SSM) covers any franchise-owned resale marketplace or partnership with independent resale marketplaces.

Well, how do theoretical predictions fare?

The use of DP has led to a growing theoretical literature predicting how prices should be set. The predictions are not straightforward, though, since they often depend on assumptions about market structure (e.g., monopoly or competition), how demand changes over time, and the ability of consumers to act strategically. It is not trivial how to test them. Sweeting (2012), however, notes that it is possible to test DP models using price and quantity data from secondary markets (*eBay* and *StubHub*) in sports, specifically for MLB tickets. These markets provide a unique natural setting for various reasons:

First, there is a clear dynamic pattern to prices in the data, with prices falling significantly as a game approaches, especially in the final month before a game. This is noteworthy because sellers in this market are small, may perhaps be relatively unsophisticated, and definitely do not use the type of DP systems developed by, for example, airlines.

Second, most sellers have a single ticket or set of tickets to sell for a particular game in a particular area of the stadium. This is extremely useful because it leads to a simple test of DP.

Third, a large amount of suitable data is available. Sweeting (2012) uses over 178,000 fixed-price listing observations on eBay and 66 million on StubHub to get statistically precise estimates, while flexibly controlling for differences in listing and game attributes.

Fourth, and more importantly, it is possible to estimate time-varying demand by using listing *and* transaction data. This is in fact an essential part of the empirical strategy. Previous work testing DP theories using airline or hotel data use listing data or transaction data, but *not both*.

The results show that the simplest DP models describe very accurately both the pricing problem faced by sellers and also how they behave. That is, they explain why they cut prices dramatically (by 40 percent or more) as an event approaches. The estimates also imply that DP is valuable, raising the average seller's expected payoff by around 16 percent.

Courty and Davey (2020) investigate whether VP, DP, and SSM have had an effect on revenue and firm value also taking advantage of a sports setting. Specifically, in the late 1990s and early 2000s, MLB teams began to move away from fixed ticket prices, first setting prices according to expected game demand, and subsequently dynamically changing prices in response to demand. Teams also began collaborating with secondary ticket marketplaces to sponsor resale. By exploiting a panel dataset covering seasons 1999-2017, the authors use fixed-effect models to estimate the impact of these pricing innovations on team revenue and team value. The results show that VP increases revenue and value by 4.2 percent and 9.5 percent, respectively. Adding DP or SSM on top of VP has no statistically significant incremental effect on revenue or

team value. While most of the literature has studied individual sports franchises and looked at a single pricing innovation, this is the first article to study the average effect of a new pricing innovation across adopting teams *within a league*.

Finally, pricing innovations have also reached even more challenging settings: college athletics. These settings are harder to study because there are many different factors that come into play besides revenue maximization and taking back some of the secondary market. Relative to professional teams, the difference is actually remarkable: "The marketing departments at a college team, I don't think they even know what their objective is, but it's some combination of keeping alumni happy, keeping donations coming in, filling the stadium and making money." (Jeff Ely, quoted in *Forbes* (October 21, 2014)).

Baliga and Ely (2013) propose a new system for these settings. It is called *Purple Pricing*: Prices start high and they fall in accordance with demand and the secondary market. Unlike DP, where prices can rise and fall and customers are stuck with the price they pay, prices here can only fall, and customers would be refunded to pay the lowest possible price. The concept is similar to a Dutch Auction used for over a hundred years in the Netherlands to sell flowers, but with one key twist: wherever the final price ends up, if someone buys a ticket at a higher price, they get a refund for the difference between the price they paid and the final price. This feature, which they call the *Purple Pledge*, is what allows both learning the demand curve (buyers' maximum willingness to pay) and setting the optimal price *at the same time*, making money despite giving refunds. Buyers, in the meantime, are comfortable buying early, getting the best seat they can, confident that they will not pay more than anyone else.

PART B

L. Finance

"We economists have written countless studies about the stock market. Yet, nothing in the toolbox of economists makes us good stock pickers." (N. Gregory Mankiw, *New York Times*, May 19, 2013). Non-economists may be shocked to read a remark like this one given the enormous industry of professional money managers that they surely know exists. The efficient markets hypothesis, however, which is a widely accepted theory of the stock market, proposes precisely that: the market processes information so thoroughly and quickly that any pertinent news would be fully incorporated into the stock's price before anyone has the opportunity to act on it.

The efficient markets hypothesis is most frequently linked to Eugene Fama since the 1970s, and to Louis Bachelier since his doctoral thesis *The Theory of Speculation* in 1900. If the hypothesis is "true" (with some abuse of language) and observed changes in stock prices are indeed unpredictable, there is not much we can do to get an advantage over other traders. But

it is not easy to know if the hypothesis is true. When new information is released, the price of an asset should immediately and discretely increase or decrease before remaining unchanged until more information is released. But what is a "news event"? And how can we be absolutely certain that no other information has emerged before or after this event? These are serious difficulties. But it gets even worse: We know at least since Sherlock Holmes' story *Silver Blaze* by Sir Arthur Conan Doyle that no news can be informative as well. How much information is contained in the *absence of news* and the passage of time?

These reasons make testing for market efficiency hard. In today's markets, information is constantly being released. Thus, finding a time window during which news cleanly occur, when no more news can possibly arrive while trading still continues, and where the absence of news and the passage of time are known to contain no information whatsoever, seems impossible.[7]

It turns out that sports betting markets, which have been characterized as "simple financial markets" (Sauer, 1998), are also very useful. Contrary to stocks and other financial securities, these markets feature clearly specified "ending times" such as the end of game, and well-defined final outcomes such as victories and losses. Sports news also frequently break surprisingly neatly. Croxson and Reade (2013) observe that soccer offers a distinctive environment where none of the typically insurmountable empirical challenges exist. The main news in soccer is when a goal is scored. If betting markets are efficient, prices should react to goals scored instantly and fully. Obviously, when a goal is scored during the game, efficient pricing would still mean that we should see prices drifting continuously because of the passing of playing time (which may also contain news). The authors, however, cleverly note that this should not be the case for goals scored *just before the half-time break*, also called "cusp goals." Indeed, this break provides a golden opportunity because the "playing clock" stops but the "betting clock" does not. In an efficient market, prices should *not* drift during the newsless interval during the two halves of a soccer game. The authors utilize a data set comprising second-by-second snapshots of *Betfair*'s live order book for 1,206 professional soccer matches from a wide range of competitions. The results show that it is not possible to reject the null hypothesis of statistical and economic market efficiency at standard confidence levels: Market prices impound news so rapidly and completely that it is not possible to profit during the half-time interval.

Moskowitz (2021) also takes advantage of a massive dataset on sports betting contracts. Specifically, since the cross-section of returns cannot be driven by aggregate risks and terminal values are exogenous to betting activity, it is possible to test behavioral asset pricing theories

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[7] Koudijs (2016) takes advantage of the fact that markets were very different two centuries ago to identify such type of situation. English securities were traded in Amsterdam, with news coming from London by mail boats. Bad weather sometimes delayed these boats, disrupting the news flow. When no news arrived, it's likely (but not certain) that the Amsterdam market had no new information. Koudijs found that even without news, securities prices still fluctuated significantly.

in a way that is not confounded by rational risk-based theories. He finds momentum premia mostly consistent with models of overreaction. However, trading costs wipe out any profits to trading on these patterns, preventing arbitrage opportunities. Moskowitz and Vasudevan (2022) further study how to take advantage of sports betting markets for distinguishing the roles of preferences and beliefs in asset prices.

These recent analyses show the usefulness of sports betting markets to shed light on broader phenomena in capital markets, and more importantly how they can provide new insights in spite of a voluminous literature on financial asset pricing. As the "simple financial markets" they are, sports betting markets have been useful from other perspectives as well. Moreover, as they are not only simpler but also somewhat *different*, the differences open up the possibility of obtaining *new insights*. It is actually hard to separate what economics can do for betting markets from what these markets can do and have done for economics and finance. An entire survey could be devoted just to this theme.

In general, in these markets bookmakers set prices either in the form of a point spread (common in sports where scoring is frequent) or betting odds (common in lower-scoring sports). In markets with odds betting, bettors wager on match outcomes. In markets with point spread betting, bettors wager on the expected margin of victory. Two early contributions by Bassett (1981) and Woodland and Woodland (1991) study the factors that could explain the different structures observed in betting markets. With this in mind, I briefly summarize various findings in the remainder of this section, split by the specific sport in which the betting market is analyzed, and conclude with illegal betting markets.

NBA. Research on the hot hand discussed in Section 2.3.3 relates to market efficiency in this market. In addition, Brown and Sauer (1993) offer evidence that traders may be able to grasp fundamentals that the econometrician is unable to observe.

NFL. Zuber, Gandar, and Bowers (1985) is the first paper that studies the efficient market hypothesis in the NFL betting market with data from a single season. Sauer et al. (1988) revisit this market extending both the dataset and the econometric methodology. Gandar et al. (1988), which replicates and extends both articles, is unable to reject statistical efficiency but can reject economic efficiency. Golec and Tamarin (1991) study two sources of economic inefficiency (home-team bias and underdog bias) not only in the NFL but also in college football wagers. Dana and Knetter (1994) study the role of unobserved team ability, finding substantial weekly variation throughout the season. Gray and Gray (1997) attempt to reconcile the different findings in the literature using non-linear regressions. Avery and Chevalier (1999) aim to identify the role of investor sentiment, where sentimental impulses may come from uninformative "experts," hot-hand bias, or a preference for more prestigious teams. Finally, Feddersen, Humphreys, and Soebbing (2017) take advantage of social media data (Facebook "likes") to capture investor sentiment. Betting data from sports leagues in Europe (top five soccer leagues) and North America (NFL and NBA) show that bookmakers increase prices for

bets on teams with relatively more "likes" (price-insensitive investors with sentiment bias), although price changes do not affect informational efficiency in these markets.

MLB. Woodland and Woodland (1994) is the first paper that studies the efficient market hypothesis in the MLB betting market. Somewhat surprisingly, they find a *reversal* of the favorite-longshot bias typically found in racetrack betting: Bettors overbet favorite teams in this market. The deviations from efficiency are small though, and insufficient to generate profits net of commissions. Gandar et al. (2002) revisit this market and include the study of home bias: Home team underdogs are indeed underbet, but away team underdogs are not. Also, the reverse longshot bias is non-linear.

Soccer. Pope and Peel (2000) focus on betting *shops* in the UK soccer market finding evidence of systematic price differences across houses. Yet, these statistical inefficiencies do not translate into economic inefficiencies. Cain, Law, and Peel (2000) study the favorite-longshot bias in this market where bookmakers offer various types of fixed odd bets to clients. They find evidence of a favorite-longshot bias and the presence of profitable arbitrage opportunities as well.

Horse Racing. In addition to the research discussed in Section 2.3.3, Snyder (1978) is among the first to test for market efficiency at the racetrack. Experts exhibit a *greater* favorite-longshot bias than non-experts. The statistical inefficiencies, however, are small and not enough to generate arbitrage opportunities. Hurley and McDonough (1995) study the role of information and transaction costs. Schnytzer and Shilony (1995) take advantage of unique features in the Australian horse betting market to test for aggregate effects of insider trading since on-course and off-course gamblers have access to different information. Asch, Burton, and Malkiel (1982) and Asch and Quandt (1987) are also concerned with information asymmetries and insider trading, the latter using evidence from "exotic" or "compound" bets. Suhonene et al. (2018) introduce two new aspects to the literature in this market (bet timing and bet size) whose relevance they explore using evidence from the Finnish monopolistic online platform. Late bets and big bets appear to be more profitable. An important early paper by Camerer (1998) finds that these markets are not easily manipulated by dominant bettors.

Other Sports. Hockey is, like horse racing, an odds betting market, and so it represents a good opportunity for a robustness test of the favorite-longshot bias. Interestingly, Woodland and Woodland (2001) also find a *reverse* favorite-longshot bias in this sport, as well as evidence suggesting an economic inefficient market that is not converging towards efficiency during the season. Brailsford et al. (1995) test for market efficiency in two unusual settings that feature quite a few idiosyncratic characteristics: The Australian Rugby League (ARL) "FootyTAB" and the Australian Football League (AFL) "Footywin." Prediction models suggest that it may be possible to generate profitable strategies in both markets. Koning and Boot (2020) compare different ways to estimate implied win probabilities from observed betting quotes in professional tennis. They show that Shin's (1993) model which endogenously corrects for a

favorite-longshot bias provides the best prediction of the actual outcome. The standard method of scaling the yields implies win probabilities that suffer from a favorite-longshot bias.

Illegal Betting Markets. The research reviewed thus far concerns legal betting markets. Interestingly, estimates suggest that illegal wagering may be orders of magnitude larger. Clearly, the unlawful nature of these arrangements also makes them hard to study. Strumpf (2003), however, manages to obtain a number of interesting insights using the accounting records during 1995-2000 of six illegal bookmarkers in New York. These records, which became available after their arrest, provide a unique picture of the business of illegal sports gambling that relates to the literature on the economics of crime (Section M). It may be summarized in five insights. First, illegal bookmarkers run their operations like standard firms, with an "executive" who oversees specialized workers. Second, the lack of contractual enforcement is replaced by *trust* between bookies and gamblers. Third, it is a highly localized activity, which confers bookmarkers limited market power within their territory. This characteristic also prevents bigger bookies from hoarding large market shares. Fourth, illegal bookmarkers make profits from charging commissions and engage in betting *themselves*. This is consistent with risk-loving preferences. Moreover, it may generate such a large variations in revenues that forces them to hold a large cash cushion. Finally, illegal betting odds closely follow their legal counterparts, and they mainly deviate from them in order to leverage the sentimental bias of local gamblers for their home teams.

M. Crime and Corruption

M1. Police

Social scientists have always given great importance to crime for understanding human nature and societies. However, it was not until the 1960s that crime was first formalized as an economic activity performed by rational agents. Gary Becker's (1968) seminal model of the economics of crime and punishment represents the centerpiece around which most work has developed since. Indeed, while there are environmental theories of crime (see Klick and MacDonald (2021)), theoretical models are typically centered on a simplified version of Becker's model. This model makes a strong prediction: when the probability of detection increases, crime should fall. As intuitive as it may seem, however, it is not easy to document how, for example, increased police presence affects criminal activity in a causal manner. High crime locations typically see increased police presence, which leads to simultaneity and endogeneity issues. It is hardly surprising to see that the literature has obtained different results depending on whether and how these issues are addressed. Criminals are often free to relocate and change their behavior in other ways as a reaction to greater police force, and the

police's effectiveness may also change. Further, it is often challenging to distinguish between crime rates that decrease due to greater incarceration or due to enhanced police patrols.

In important recent work, Lasso de la Vega, Volij, and Weinschelbaum (2023) have extended the partial equilibrium approach in the literature to a *general equilibrium* framework. They find that the predictions are actually not so straightforward: In a standard Walrasian economy more police may induce not less but *more* crime in equilibrium. Similarly, Vasquez (2022) shows that in a game theoretical model in which potential victims choose their level of protection, an increase in punishment may *raise* crime, and a "criminal Laffer curve" emerges. These important general equilibrium and game theoretical effects may be quite relevant from the perspective of the future empirical literature in this area.

But even in the absence of these effects, the basic theoretical implications are already difficult to test empirically. This has led different authors to take advantage of the virtues of sports where, in addition, frequent rule changes in athletic competitions provide a very useful source of exogenous variation to identify the effects of a changing "police force" (officiating crew) on "crime" (penalty) rates. Moreover, in these settings "criminals" (players) do not relocate.

The first novel contribution is by McCormick and Tollison (1984) who note that they could study the addition of a third referee to Atlantic Coast Conference (ACC) basketball games in 1978 to test the basic implication of Becker's model. An added referee increases the probability that a foul is detected. Hence, if players' behavior doesn't change, the number of fouls called should rise. But players may adapt their behavior to the larger probability of detection, making the number of actual fouls decline as a result. The authors find that the number of foul calls per game fell by more than 30 percent with the addition of the third referee, a result that lends support to the key implication of the model.

To address a number of empirical subtleties, other researchers have implemented the same idea in other sports settings as well. Heckelman and Yates (2003) examine a referee experiment in the NHL in which games during the 1999-2000 season had either one or two referees. Increasing the number of referees leads to a slight increase in the number of penalties called, but does not significantly deter players from committing infractions. Similarly, Kitchens, Makofske, and Le Wang (2019) exploit an experiment in college football. In 2013, the Big XII added an eighth referee *to conference games only*, while maintaining the use of seven officials in non-conference games. By comparing play-by-play data from the 2012 to 2013 seasons, it is possible to observe athletes competing in conference and non-conference games. Overall, they find that the increased police presence causes an increase in the observed crime rate. This increase is largest in the teams' first treated games, suggesting a substantial *detection effect*. However, the penalty rate decreases sharply in the teams' subsequent treated games, suggesting a large *general* deterrent effect, which appears to be partly due to players learning to avoid detection over time.

Finally, Kitchens (2014) studies a related experiment to identify changes in the *spatial* distribution of crime. The NFL *repositioned* one of its officials between the 2009–10 and 2010–11 seasons in an effort to reduce injuries among officials. Specifically, the NFL repositioned one official from the middle of the defense (the portion of the field with the most activity) to behind the offense in order to protect him from injury. Thus, by repositioning this official, some players experienced a decrease in their "localized police force," while others experienced an increase. The results show that after the NFL repositioned the official, there was a 20 percent spike in the amount of offensive holding penalties assessed, and a *decrease* in penalties assessed to defensive linemen. The overall number of penalties called remained roughly the same. On the temporal and spatial distribution of crime, Rees and Schnepel (2009) document sharp increases in assaults and vandalism on game days in Division I-A college football games. Both upset wins and losses led to more assaults and vandalism than non-upsets. Relatedly, using information on soccer matches in London, Marie (2016) studies how sporting events affect criminal behavior via three potential channels: fan concentration, self-incapacitation, and police displacement.

M2. Incentives

Incentives drive behavior, including deviations from honest behavior. We have seen in Garicano, Palacios-Huerta, and Prendergast (2001, 2005) how non-monetary incentives (social pressure) may be a determinant of corruption, even among professionals whose job is to be honest. In the last decade and a half, a new field of "forensic economics" (Zitzewitz, 2012) has begun to emerge with the goal of uncovering evidence of corruption using a clever idea: In many settings, incentives are asymmetric and non-linear, and this may encourage *mutually beneficial* illegal effort. The empirical evidence in this new field comes mainly from sports.

Wolfers (2006), for example, highlights how the structure of gambling on college basketball yields payoffs to gamblers and players that are both asymmetric and nonlinear, thereby encouraging mutually beneficial effort manipulation through "point shaving." The key incentive is that betting pay-offs are discontinuous at the spread point, a specific point that should be irrelevant to the players. Players should care about winning the game and gamblers about whether a team beats (or covers) the spread. Data on 44,120 NCAA Division I basketball games suggest that point shaving may be quite widespread. The estimates show that around 6 percent of strong favorites may have been willing to manipulate their performance, and that around 1 percent of all games (or nearly 500 games) may involve gambling-related corruption.

Related to the tournaments literature overviewed earlier, Moul and Nye (2009) suggest an interesting modification to the standard framework: The addition of draws to the possible outcomes of a contest. This is interesting not only from a theoretical perspective, but also because it generates incentives for corruption. Most of the literature has studied settings where the result is either a win or a loss, or where the scores are monotonic in effort (for example, golf). Adding the possibility of a draw means that the choice of strategy may have an

impact not on the *expected* value of a competition but on the *distribution* of outcomes (more draws with fewer wins and losses vs. a higher chance of both wins and losses). As a result, these settings exhibit *strategic incentives* for corruption, in particular for illegal collusion. Moul and Nye (2009) study several post-war chess competitions and ask whether players from the former Soviet Union engaged in cartel behavior by purposefully drawing against one another: Did they respond to the incentives to induce non-Soviet opponents to exert *more* effort and fellow compatriots to exert *less* effort in order to increase the likelihood that some Soviet player would win? The evidence they find is at odds with Soviet rivalry but consistent with Soviet draw-collusion advantageous to the cartel. For example, the observed Soviet sweep in the five FIDE Candidates tournaments (the premier international competitions) was an event with a 60 percent probability under the assumption of Soviet collusion but only a 25 percent probability event under the assumption of no cooperation.

Elaad, Krumer, and Kantor (2018) also study the role of asymmetric incentives as a determinant of corruption. The important novelty in this study is to link these incentives to *social norms* at the country level. They study data from "critical" soccer matches (defined as those in which Team A is under immediate risk of being demoted to a lower tier, whereas its opponent Team B is unaffected by the outcome) in 75 different nations. They find that the more corrupt the country is the greater the probability that Team A beats Team B relative to that of a match between the same two teams when the outcome is not critical for either team. Team A also tends to *reciprocate* the following year by being more likely to lose to Team B (relative to a similar team). These effects are greater the greater the corruption index of the country.

M3. Emotions

I have discussed previously how emotions act as determinants of violence *within* the family. Here I review how emotions translate into criminal activity *outside* the family, and how they contribute to determining the appropriate punishment for criminal activities. In subsection M4, I will focus more closely on how violence may contribute to forming preferences.

Again, it is not easy to find variation in emotions that allow researchers to establish causal relationships. In particular, it is difficult to link arguably simple and natural emotions, such as frustration and euphoria, to illicit activity. Munyo and Rossi (2013) analyze precisely this issue using sports events. By comparing betting market predictions on soccer match outcomes with actual results, the authors are able to classify sports event outcomes into three categories: "frustration," "euphoria," and "no surprise." This classification is then combined with records of property crime in Montevideo (Uruguay) for the 2002-10 period. The accurate reporting time of both the sports events and the crimes in their dataset allows the study of the persistence of emotional reactions, and to distinguish between robbery (that involves violence) and theft (that does not involve violence). They compare criminal behavior after unexpected versus expected losses, and after unexpected versus expected wins. The results show that

euphoria tames robbery, while frustration increases it, an effect that lasts for about one hour only. Interestingly, theft activity is unaffected by emotional shocks.

Eren and Mocan (2018) contribute to the literature by studying how emotional shocks translate into criminal sentences. They study the records of all judicial decisions in the state of Louisiana during 1996-2012. Crucially, the data includes the university attended by the ruling judge, which proxies for his football team preferences. They consider the performance of the Louisiana State University (LSU) college football team and use the pre-game betting market point spread to measure the predicted outcome of each match. Perhaps surprisingly, unexpected losses *increase* sentence length for young defendants. This effect is *stronger* on the judges that earned a degree by LSU. Losses in important matches have an even greater impact on judicial decisions. Importantly, the results also feature a racial bias, in that LSU football performances have no effect on the sentences on white defendants. The results also show that upset wins have no impact on judicial decisions.

M4. Violence as Identity Capital

Understanding the influence of social environments on individual behavior is at the center of the literature on endogenous preference formation. We have discussed earlier examples such as the role of social pressure in shaping preferences and attitudes. This section discusses a related but different aspect, namely whether the exposure to violence is related to violent behavior possibly as a form of "identity capital." This question is in fact at the heart of the essence of human nature. War, enslavement, infanticide, pogroms, cruel punishments, violent disputes, and genocide are only a few examples of ordinary features of the human experience for most of history in most parts of the world. Even though violence has been diminishing for millennia and we may be living in the most peaceful time in our species' existence (Pinker, 2011), we still appear to be living in a never-ending cycle of news featuring violence.

Clearly, these are difficult issues from an empirical perspective. And yet Miguel, Saiegh, and Satyanath (2011) note that they could exploit the fact that many international players in the European professional soccer leagues have had very different exposures to civil and military conflict in their home countries. A key advantage is that violent behavior is readily observable and that subjects operate in a common institutional backdrop. Specifically, the authors consider exposure to civil war and, in order to capture violent conduct, whether subjects commit violent fouls that warrant a disciplinary sanction in the form of a caution (indicated by a yellow card) or a dismissal from the match (a red card). The results are quite interesting: There is a strong relationship between the extent of civil conflict in a player's home country and his propensity to behave violently on the soccer field. This relationship is robust to controlling for a plethora of aspects at the player, team, region, and country levels, and to controlling for civil wars *before* a player's birth. Importantly, there is no meaningful correlation between exposure to civil war and performance measures *not* closely related to violent conduct such as scoring goals. Although these results are not causal, the causal relationship

can be studied using the same idea but in a non-sports setting, which helps as a measure of external validity. Couttenier et al. (2019) study the case of asylum seekers in Switzerland and find that, consistent with the previous study, exposure to violence (civil conflict/mass killing) during childhood at the home country translates into violent attitudes in the host country.

Relatedly, Restrepo (2015) studies if differences in violence across regions reflect the historical ability of the state to centralize authority and monopolize violence. The clever idea is to compare Canadian Prairies settlements that in the late 1880s were located near Mountie-created forts with those that were not. Settlements far from these forts had unusually high adult male death rates early in the 19th century, relative to communities located closer to the forts. One century later, those areas also have significantly greater rates of homicides and violent crimes per capita. This may be the result of a violent "culture of honor" that emerged as an adaptation to the lack of a central authority during the settlement and persisted over time. Consistent with this interpretation, data from the careers of ice hockey players who played in the NHL at some point show that those who were born in areas historically outside the reach of the Mounties are punished for their violent behavior more often than those who were not. These results suggest that the influence of a violent culture on individual behavior may persist over long periods of time.

Depetris-Chauvin, Durante, and Campante (2020) study the impact of shared collective experiences in building a national identity, and also on violence, using evidence from national soccer team games in sub-Saharan Africa. They find that victories by the national soccer team reinforce national identity in detriment of ethnic identification. The empirical analysis relies on 37,000 survey respondents across 25 Sub-Saharan countries. By comparing the answers of similar respondents around the date of a match, it is possible to implement a pseudo differences-in-differences exercise. The results show that high-stakes matches and matches between countries that feature long-standing rivalries are more effective at promoting national identity. Interestingly, no significant effects are found for dependent variables like trust towards the ruling party or perceived economic outlook. A country-level analysis also shows that victories are able to decrease ethnic violence. The empirical exercise relies on the qualification stage of the Africa Cup of Nations by comparing countries that barely qualified for the next round after the group stage with countries that barely did not, finding a significant reduction of interethnic violence among the former. Moreover, unexpected victories are especially useful in reducing unrest. The effect is greater the more ethnically diverse is the roster of the team, which is consistent with the hypothesis that this contributes better to the idea of "coming together as one."[8]

While Depetris-Chauvin et al. (2020) study the divide between ethnicities, Mousa (2020) addresses a similar question but focusing on religious differences. Using a randomized field

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[8] Fernández (2021) studies the same idea but for a club team (FC Barcelona in Catalonia) and its role in galvanizing the pro-independence movement in the region.

experiment in Iraq, where the takeover of Mosul by ISIS in 2014 displaced 100,000 Christians, the goal is to test the "contact hypothesis:" Does the contact between individuals of different religions tame prejudices? The setting is a two-month-long amateur soccer tournament in which displaced Christians are randomly assigned either to an all-Christian team or to a squad that includes Muslim players. By exogenously varying the amount of contact between religions, the results show that Christians exposed to Muslim peers became more tolerant towards them on a variety of dimensions. This change in attitudes is stronger in more successful teams. Even slight exposure to a different religion yields positive effects, as all the players who took part in the tournaments became more tolerant even when they played for an all-Christian team. Nevertheless, the increase in tolerance appears to be limited to on-field behavior as it does not translate into off-field preferences. Treated Christians, for instance, are not more willing to attend restaurants owned by Muslims any more than their untreated peers.

At the intersection between the contact hypothesis and the literature on discrimination is the analysis in Alrababa'h et al. (2021) who focus on the "parasocial contact hypothesis" using the effect of Muslim elite soccer star Mohamed Salah on islamophobic behaviors. After Salah joined Liverpool FC (LFC), hate crimes in the Liverpool area dropped by 16 percent compared with a synthetic control, and anti-Muslim tweets from LFC fans dropped by 50 percent relative to fans of other top-flight clubs. This is perhaps more than simply exposure or contact: It could be that changes in *own identity* spark behavioral changes in prejudice.

As stressed in Pinker (2011), understanding our intrinsic motives—the "inner demons" that incline us toward violence vs the "better angels" that steer us away—is at the heart of our understanding of human nature. When, how and what type of changing circumstances may allow our better angels to prevail? How does it exactly work? What is the mechanism?

Violence and fear are often closely linked. Becker and Rubinstein (2013) offer the first rational approach to the economics and psychology of fear by considering not just its impact but also that people have *incentives to control fear*. A conceptual breakthrough is that a person's willingness to "invest" in controlling fear depends on the costs and benefits associated with acquiring this self-control, and that these incentives differ across individuals in predictable ways. The model generates a number of testable implications. In Palacios-Huerta (2014b), I test these implications in a sports setting by comparing the behavior of soccer fans before and after games that were subject to acts of hooliganism, vandalism or criminal damage. I find that: (1) frequent consumers of soccer matches respond *less* to those acts of violence than occasional consumers; (2) married individuals respond more than singles; (3) fans with greater education respond *less* than those with lower education, and (4) while there is a large impact of these acts in regular media coverage days, there is almost no impact when the acts of violence take place after the newspaper printing presses close for the day. These findings are consistent with the implications of the Becker-Rubinstein model.

M5. Organizational Decision Making

A central problem in organizations is the design of decision-making processes that use the input of potentially biased agents. Consider a professional services firm's promotion committee, where senior partners gather to decide which associates to promote. The partners who know each associate best may also be biased in their favor, which is a dilemma for the committee's chair. What to do? He might exclude partners he believes are strongly biased. Or he might let them participate while accounting for their likely bias when interpreting their opinions. He might try to discourage biased reporting by tying their future credibility to their record of objectivity and accuracy. Or he might demand that they provide explicit evidence rather than merely opinions. These measures, individually or jointly, could mitigate and perhaps sometimes even solve the promotion committee's dilemma. Yet, their implementation is often problematic for various reasons.

Zitzewitz (2006) studies these important issues using sports as a frame of reference, specifically using evidence from judging in winter sports: ski jumping and figure skating. In these sports, judges favor athletes from their own nations in the scores they assign relative to those from other nations, and they appear to change their biases depending on the stakes, the level of scrutiny, and the room for subjectivity in the performances they evaluate. Interestingly, while judges for figure skating appear to engage in vote bartering and to practice bloc judging, judges for ski jumping adjust for the nationalistic prejudices of other panelists. The author offers several recommendations for group decision-making in businesses based on the evidence. An important one concerns transparency. Transparency is typically assumed to decrease favoritism and corruption by allowing greater monitoring by outsiders. However, it may also encourage collusion by insiders. Zitzewitz (2014) examines the International Skating Union's (ISU) decision to make certain changes to its judging system, including hiding which judge gave which mark, in reaction to the vote-trading scandals at the 1998 and 2002 Olympics. Although the measure was made to prevent judge collusion, it also made it difficult for outside observers to scrutinize the judges' actions. It turns out that the "compatriot-judge effect," which combines corruption (vote trading) and favoritism (nationalistic bias from own-country judges) *increased* significantly as a result of the ISU reforms.

As favoritism is easier to document in sports data, it is also possible to link it to other characteristics. For instance, Krumer, Otto, and Pawlowski (2002) find that in World Cup, World Championship, and Olympic Games ski jumping competitions, judges assign significantly higher scores to their compatriots. Interestingly, the magnitude of this nationalistic bias is significantly higher in more corrupt countries. Relatedly, Sandberg (2017) notes that dressage is the only international sport involving subjective performance evaluations in which men and women compete as equals. This provides a unique opportunity to study multiple in-group biases within the same natural setting, including gender bias. Judges are found to exhibit biases in favor of athletes of their own nationality, and of the same nationality as the other judges in the

competition. Interestingly, although not a very strong result, gender bias and nationalistic bias appear to be *substitutes*. Within this literature, "debiasing" is also possible as Fernando and George (2024) show by studying how peer effects affect in-group bias using a number of natural experiments in cricket.

N. Public Economics

An important, classic issue in public economics is that of free access to resources in the absence of clearly defined ownership rights. Research has frequently focused on the issue of how much government intervention is required to ensure sustainable exploitation when ownership rights are not, or cannot, be established or monitored. According to Demsetz (1974), ownership rights will be developed endogenously by actual users when the advantages of creating and upholding them outweigh the costs, whether or not the government is involved.

There are many examples in the literature that support this hypothesis. Researchers such as Nazer (2004), Kaffine (2009), and Mixon (2014), make the case that surfing is an excellent empirical setting for a number of reasons that are typically impossible to find in other settings: Surf is best experienced when only one surfer is on a wave; the amount of rideable waves available is often limited (particularly in recent years when the popularity of surfing worldwide has increased, making breaking waves crowded); ownership rights are nonexistent in surfing, and there is little-to-no state involvement. These features essentially turn surf breaks into a shared resource issue that is governed almost *entirely* by *social norms*, as these studies confirm.

Building on this literature, Rode (2022) studies 750 surfing venues scattered across 10 different countries and 29 regions on the Atlantic coast of Europe. This heterogeneity in venues, regions, and countries is useful for studying the importance of regional social norms in much greater detail than previously. The results show that regional social trust decreases the probability of violent conflict and exclusion, and that the tightness-looseness of cultural norms interacts with resource quality to a substantial degree. Also, the importance of social trust in preventing exclusionary localism increases with greater resource scarcity. This is broadly consistent with Kaffine's (2009) evidence from surf breaks along the southern California coast that a 10 percent increase in quality is associated with a 7–17 percent increase in the strength of ownership rights, and also with the evidence in Mixon (2014) who extends the analysis to all of California's surf breaks and explores additional aspects of surf break quality. He finds even larger increases in the probability of observing "bad vibrations" and fierce localism with greater surf quality.

O. Political Economy

O1. Voting

The rational voter disregards irrelevant factors that may affect his mood but are unrelated to electoral matters. Behavioral political economy challenges the depiction of voters as rational agents as it argues that emotions may sometimes critically determine the act of casting a ballot.

Disentangling behavioral motives is not trivial. Healy, Malhotra, and Mo (2010) test the impact of college football games on election results, and find that voters lean significantly towards incumbent candidates when the local team wins. This effect is stronger in counties with particularly loyal fan bases. The authors also report a survey during the 2009 NCAA men's college basketball tournament ("March Madness"), where half of the subjects were provided with information on their team's performance at the NCAA while the other half remained as a control group. They were then asked about US President Barack Obama's job performance. Individuals treated with positive information about their team were more favorable to the president. Similarly, using Brazilian soccer data, Corbi (2018) finds that negative emotional shocks depress the vote for the incumbent at both local and state-level elections. A novel feature of this research is the use of Facebook data to identify the location of each team's supporters. The results show that unexpected match losses turn undecided voters against the incumbents. However, these emotion-driven swings are *less likely* to occur when the election is tight. This suggests that individuals behave more rationally in high-stakes votes. Evidence from online search increases in the midst of close elections reinforces this hypothesis.

O2. Accountability and Mass Media

Politicians and governments are held accountable to the extent that the public is aware of their actions. In principle, mass media could ensure accountability by informing the public. However, a number of factors, such as the existence of other significant events that might obstruct news coverage of political actions, may affect how well mass media can inform the public. This also creates incentives in that in order to limit unfavorable attention policymakers may *purposefully* time their unpopular measures to coincide with specific moments when the public and the media are preoccupied with other events. Durante and Zhuravskaya (2018) note that the day Italy qualified for the final of the FIFA World Cup (July 13, 1994), the government of Silvio Berlusconi passed an emergency decree that allowed hundreds of corrupt politicians to avoid jail sentences. The day of the opening ceremony of the Beijing Summer Olympics (August 8, 2008), Russia invaded Georgia. The day of the FIFA World Cup semifinal between Brazil and Germany (July 8, 2014), Israel launched operation "Protective Edge" in Gaza. Motivated by these and other examples, the authors study whether politicians may choose the timing of their actions strategically in order to minimize their US news coverage in the context of Israeli-Palestinian conflict. Besides providing strong motivation, sports are also useful to address two

critical aspects. First, the timing of sports events that take place at predetermined times, dominate US news, and are completely unrelated to international affairs, can be used both as a gauge of *news pressure* and as a measure of the ex ante expectation of whether US media are likely to cover important events in this conflict. Second, news pressure could be endogenous to the conflict (because, for example, important US news and Israeli military actions may be jointly determined by unobserved factors (e.g., a war in the Middle East)), and may include unpredictable events to which attacks could not possibly be timed. To address these issues, the authors draw up a list of events from forward-looking US political and sports calendars and create a dummy variable for predictable events that are unrelated to foreign policy but are significantly related to news pressure. It turns out that the results support the hypothesis that attacks that bear risk of civilian casualties and are not too costly to postpone are timed strategically.

P. The Economics of Sports

This survey has been emphasized as *not* concerned with the economics of sports. But of course it is useful from the perspective of this industry. The economic approach to human behavior can provide a unified framework for understanding *all* human behavior, and as such it has been successfully applied to basically all aspects of human activity in the last 50 years (Becker (1976)). How could it not be successfully applied to sports? Why would the different aspects of supply and demand, and even the many *peculiar* aspects on the consumption and production sides, not be effectively studied with this approach? Further, sports is not a minor industry. If the standard for judging an industry is the attention given to it by mass media, then sports rank among the top two or three industries in the world, in both modern societies and developing countries alike. Could economists have missed this industry? Although sports is one of the last industries to have been "treated" by the economic approach, surely economists did not miss it.

The economics of sport may be defined as "the study of the use of scarce resources by producers and consumers of sport" (Vamplew, 2022a). It is broadly considered that the economics of sports started with Rottenberg (1956). Neale (1964) is viewed as the second paper fully devoted to the economic analysis of sports. Interestingly, the relatively unknown article by Craig (1953) had already introduced many relevant concepts that later laid the foundations for research on sports economics. There are even earlier law publications on the economics of sports (see Scelles, Peng, and Valenti (2021)).

Around the 1990s a number of books such as Scully (1989, 1995), Quirk and Fort (1992), and Noll and Zimbalist (1997) began to show the power of the economic approach to sports and to the sports industry. Articles such as Rosen and Sanderson (2001) on the economic analysis of labor markets in sports and Szymanski (2003) on the economic design of sporting contests also comprise a broad body of literature. Viewed from this perspective, "league competition" is a

distinct form of competition compared to competition in other industries. Leagues vary in structure, with North American sports favoring "closed" franchise systems and soccer and other sports all over the world using "open" leagues where teams advance or are relegated based on merit within a hierarchical pyramid. Scholars like Noll (2002), Buzzacchi et al. (2010), and Szymanski and Valletti (2010) have studied the implications of these systems both theoretically and empirically. The last 20 years or so have seen a number of books and handbooks that bring together a plethora of insightful research findings for this industry, such as Fort (2002), Andreff and Szymanski (2006), Fizel (2006), Szymanski (2009), Dobson and Goddard (2007), Kahane and Shmanske (2012a, 2012b), Downward et al. (2019), Koning and Kesenne (2021), and Vamplew (2022a). Perhaps because economics has taken a long time to carefully study this industry, as Oyer (2022) shows, the economic insights for both scientific and general audiences alike seem never-ending.

Q. eSports

In 1970, Ralph H. Baer created the first video game console, called the "Brown Box." It wasn't until the late 1970s and early 1980s that arcade games (coin-operated machines) became popular. These games are seen as the predecessors of modern eSports. eSports gained momentum in the 1990s, shifting from human vs. machine to human vs. human competitions due to advancements in personal computers and LAN technology. This laid the foundation for the rapid growth of eSports in recent years.

Despite their popularity, academic research has been slow to catch up. eSports are worth studying due to their unique characteristics and potential new opportunities. They involve structured, competitive gaming and represent a growing economic sector linked to leisure and competition. Unlike traditional sports, eSports require fine motor skills (small muscle movements) rather than gross motor skills (large muscle movements). They also differ in being played in a computerized environment, having lower participation costs, and being governed by private organizations instead of public institutions. Additionally, there are perceived risks associated with eSports, such as addiction and social isolation (which are interesting in their own right), and as they blend real and virtual experiences, they offer a new dimension beyond traditional sports.

The explosive growth in market value and number of participants worldwide is remarkable. Newzoo (2023) global report estimates that nearly 3.2 billion people are playing games in 2022 (up from 2.6 in 2019), spending a combined total of $196.8 billion (up from 135 in 2019). Global gaming is today bigger than the global music and film industries *combined*.

For economists, eSports also provide valuable real-world data on individual and institutional behavior, similar to laboratory experiments. The expanding scope of eSports makes them an important new academic subject, especially as gaming occupies more leisure time for

generations like Gen Alpha, Gen Z, and Millennials. These virtual worlds are becoming social hubs, with about 75% of players using them to connect with others. Even non-gamers are showing interest in these virtual environments, reflecting a growing fascination with the *metaverse*. As such, advances in technology, new social formats and monetization methods are bringing an activity once considered fringe deeply into the mainstream of contemporary societies. Gaming is not only on its way to becoming the world's new favorite pastime, but may also be soon recognized as a sport. The 2017 Olympic Summit noted that "competitive eSports could be considered as a sporting activity [as] the players involved prepare and train with an intensity which may be comparable to athletes in traditional sports," and that a "requirement for recognition by the International Olympic Committee must be the existence of an organisation guaranteeing compliance with the rules and regulations of the Olympic Movement."[9]

Overall, the increasing availability of detailed data, of new and different data, their institutional peculiarities, the communication in a computerized environment resembling the work environment in modern companies, and other characteristics suggest that eSports may offer valuable research opportunities for *discovery* of new phenomena, the component of science stressed in Simon (1999) noted in the Introduction.[10]

R. Neuroeconomics

A number of current global research efforts in public and private sectors aim to create an "activity map" of the human brain, detailing its complex functions with unprecedented precision. The main goals are to deepen our understanding of brain activity, enhance clinical outcomes, and explore fundamental questions about consciousness, perception, memory, and thought generation. Economists and other social scientists are interested in these efforts because the brain is the center of human cognition and behavior. In fact, over the past two decades they have begun to provide important contributions in what has become an entire new field of scientific enterprise: Neuroeconomics.[11] It is not unreasonable to think that predictions about human behavior may improve by allowing behavior in the models we develop to depend not only on the choice options individuals have but also on neuro-

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[9] See https://olympics.com/ioc/news/communique-of-the-olympic-summit.

[10] Researchers are beginning to study various aspects. For example, García and Murillo (2018) characterize the profile of eSports participants, finding support for the hypothesis that practicing eSports and traditional sports are complements. See also Chikish, Carreras, and García (2019). Coates and Parshakov (2016) find that rewards schemes in eSport tournaments are consistent with the predictions in Lazear and Rosen (1981). Parshakov, Coates, and Zavertiaeva (2018) study the effects of culture, language, and skill diversity on teams' performance in eSports tournaments. Cultural diversity contributes to team performance, whereas language and experience diversities have an adverse effect.

[11] See, for example, different contributions by Colin Camerer, Ernst Fehr, Paul Glimcher, George Loewenstein, Drazen Prelec, Faruk Gul, and Wolfang Pesendorfer.

physiological information. From this perspective, neural and physiological evidence has option value for improving economic analysis.

With this in mind, Palacios-Huerta et al. (2014) use fMRI techniques to peer inside the brain when subjects play a penalty kick game (see Section 2.2.1 in the main text). This asymmetric zero-sum game is a good one to study because Minimax is a cornerstone of game theory, and we already know that professionals' play is already consistent with Minimax in the absence of neuro-physiological information in the field. But how about regular, student subjects? Interestingly, the results show that these subjects play close to Minimax even though they are inconveniently lying inside a 3T Siemens Trio fMRI scanning system when playing. Neural activity in left inferior prefrontal cortex is related to the ability to equate payoffs, and activity in the right inferior prefrontal region is related to the ability to generate random choice sequences. In other words, two inferior prefrontal nodes appear to jointly contribute to the ability to optimally play this asymmetric zero-sum penalty kick game.

In the future, we may perhaps manage to have professionals inside fMRIs playing the games we are interested in, as the brain does change with the acquisition of expertise (Hill and Schneider, 2006). With the data they generate, we might then be able to improve the prediction of certain game-theoretical and other models. Or we could perhaps be able to obtain physiological and neural information directly from professionals without "interfering" in such a drastic way as taking them inside an fMRI. Indeed, Lu and Zhong (2023) note that recent technological advances enable researchers to use wearable, non-invasive devices to measure real-time heartbeats as stress biomarkers. The heart is not the brain, but it is potentially a very informative organ too (the brain controls the heart through the sympathetic and parasympathetic branches of the autonomic nervous system). This technology was used for the first time in a competitive setting, under high stakes and involving experts: The archery competition in the 2020 Tokyo Olympics. In this competition, real-time heart rates were measured and broadcasted on TV prior to each shoot. The authors find that higher heart rates—which indicate increases in stress—are associated with lower scores. These results provide the first direct evidence in support of a negative relationship between stress measured by a biomarker in real time in a high-stakes competitive setting. While the link is correlational rather than causal, the findings are not due to differences between archers or differences in the characteristics of matches.

It is conceivable that non-contact, non-invasive, camera-based methods to obtain heart rate and other physiological data could become increasingly accessible for researchers in the near future in all types of settings. In this regard, these results can be viewed as a proof of concept by showing that camera-based heart rates capture stress, and that stress helps predict the performance of expert subjects in a highly competitive environment.

S. History of Economic Thought

In 1617 Antoine de Montchrestien published his *Traicté de l'économie politique*, which is recognized in the history of economic thought as the first use of the words "political economy" (economics, in modern terms). It is true that from the perspective of this survey not much developed over the following three centuries. But it is also true that not much developed that was even related to the empirical revolution in economics which did not start until the 1990s. As noted earlier, Ragnar Frisch, the first Nobel laureate in economics, lamented in his Nobel address (Frisch, 1970) that neither classical nor neo-classical economists attempted to verify their theories. This was partly due to poor statistical data and partly because their theories were not designed to be verified statistically. In a sense, Adam Smith deserves some responsibility too. Sir William Petty (1623-1687), one of the founders of "systematic statistics," which in those days was called "political arithmetic," attached great importance to quantitative measurement: "he was a pioneer, but he didn't impress Adam Smith either. Adam Smith said that he had pretty little faith in political arithmetic" (Robbins, 1998, p. 58).

Of course, even if Smith had had some faith, a connection to sports could hardly be established since sports, including physical education, were just beginning to be developed within the context of the associative activities in the 18th and 19th centuries in Britain. Perhaps a more important reason is that the predominant view during these early centuries was actually not even neutral but *hostile to empiricism*, even up to the first few decades of the 20th century. This is summarized in an exchange between John M. Keynes and Roy Harrod in the summer of 1938, where Keynes argues that a central task for economists is weeding through models and choosing the applicable one, and that empirical tests offer only limited help. Harrod strongly objected to Keynes' arguments.[12] The result is that during the first three centuries very few shared the dream of Stanley Jevons (1835-1882) that "one day when we would be able to quantify at least some of the laws and regularities of economics" (Frisch, 1970).

Even in game theory. Although strategic interactions would seem to find a natural ground in sports, game theory has not shown a great deal of interest about the real *real* world until the last couple of decades. Not long ago, the Game Theory Society, which began operations on January 1, 1999, stated in an opening remark in 2006: "Much real-world strategic interaction

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[12] The exchange takes place in four letters dated 4 July, 6 July, 10 July, and 3 Aug, reproduced in volume XIV of his *Collected Writings* (Cambridge University Press, 1973). Roy Harrod was seeking comments to a draft he was preparing for this Presidential address to the British Economic Association on the topic "Scope and Method of Economics" (published in the September 1938 issue of the *Economic Journal*). Keynes argues: "Economics is a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world. … Economics is essentially a moral science and not a natural science. That is to say, it employs introspection and judgments of value." (July 4 letter). Harrod objected: "I am not sure that I agree altogether with your hostility to the idea of economics as a natural science; tho' no doubt it has its own special modes of procedure." (July 6 letter).

cannot be fully understood with current tools. To make further progress, the field needs to gain more *experience* in applications to the *real world*" (italics mine).

The pioneers did not show much interest either, although they were clearly motivated by sports. Ernest Zermelo's (1912) first formal theorem in the theory of games concerned chess as a leading case, and Emile Borel (1921) and John Von Neumann (1928) both used poker as examples. Von Neumann often warned that mathematics loses much of its creative drive when removed from empirical sources, but he did not seem particularly interested in the empirical verification of game theory theorems with sports data, or with any data.[13]

This began to change with some impetus after World War II, when Friedman (1953), Stigler (1955, 1962) and others began to lay the ground both for price theory and for what became to be known as "economic imperialism." Based on the role of prices, markets, and incentives, price theory is a Chicago tradition that treats economics as an empirical subject, one which guides measurement and attempts to explain and predict how people behave. As for the genre of "economic imperialism," the first two works recognized as such only appeared in the 1950s: Gary Becker's *The Economics of Discrimination* and Anthony Downs' *An Economic Theory of Democracy*. During the 1960s and 1970s an "economic approach" began to analyze a host of new topics, fields, and areas, all of which are covered in this survey and are now taken for granted. By the 1980s, the forces of imperialism had already made forays into sociology, human capital and education, organizations and institutions, political science, law, history, behavioural economics, and others. And yet, as noted earlier, the situation in the 1980s was such that hardly anyone was taking data analysis seriously.

Herbert Simon (1999) offers probably the best connection from the perspective and purpose of this survey, as noted in the quotations in the Introduction section. Consistent with his views, chess provided an ideal setting for his pioneering research on bounded rationality, cognition, problem-solving, decision-making, learning, expertise, computer science, artificial intelligence, and other critical areas.

T. Culture and Cultural History

The premise that *culture* --defined as a set encompassing the behavior, norms, and institutions of human societies-- matters for decision-making and motivation seems uncontroversial.

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[13] I note in Palacios-Huerta (2014a, p. 11) that his daughter Marina Whitman von Neumann indicated to me that: "The truth is that, to the best of my knowledge, my father had absolutely no interest in soccer or any other team sport, even as a spectator or news-follower. Ironically, he wasn't much on games in general (though he loved children's toys, which he could often persuade to yield up some principle of mathematics or physics); but his game-playing didn't go much beyond an occasional game of Chinese checkers at my request. I don't believe he even played poker."

Culture influences, and is influenced by, not only consumption patterns and individual values but also codes, habits, and tastes. This includes preferences for competition and for how to compete. And competition is a cornerstone concept in economics.

One study on individual decision-making (on players and consumers) and another on group decision-making processes in high-stakes settings use sport data to provide novel evidence of cultural forces:

(1). Chuang et al. (2022) study cultural differences in the ways in which American and Japanese players compete and fans consume the competition process. In the professional baseball leagues, playing outcomes reflecting high-risk-high-payoff strategies are more prevalent in the US, whereas outcomes reflecting low-risk-low-payoff strategies are more prevalent in Japan. With regard to fans, Americans also prefer high-risk-high-payoff strategies, whereas Japanese prefer low risk-low-payoff strategies. The results suggest that psychological differences in "motivational orientation" appear to underlie these cultural differences in strategic decision-making concerning risk. Indeed, preferences are not always static, and differences in risk attitudes and culture clearly matter for emotions and preferences (see Palacios-Huerta and Santos (2004), Bernheim et al. (2021), and Meier (2022)).

(2). Anicich et al. (2015) are interested in how cultural values related to hierarchies may improve or undermine group performance. Specifically, they seek to study how "hierarchical cultural values" affect the outcomes of teams in high-stakes environments through group processes. This is an important aspect also relevant from the perspective of globalization, teams, and the market for teammates (see Section 2.4). In the literature that they review, the cultural value of hierarchy is often defined as a "cultural emphasis on the legitimacy of an unequal distribution of power roles and resources" or as "the extent to which members of society accept the fact that power in institutions and organizations is distributed unequally." Thus a hierarchy may increase group coordination and reduce conflict, but at the same time may also impair group performance by preventing low-ranking team members from voicing their viewpoints. The authors note that it is possible to study empirically these aspects in a clean high-stakes decision-making situation: Himalayan mountain climbing. Their hypothesis is that expeditions that involve climbers from a more hierarchical culture should show improved team coordination but also impaired information sharing and safety. They study data from 5,104 expeditions with 30,625 Himalayan mountain climbers from 56 countries. Controlling for a number of factors and characteristics, they find that expeditions from more "hierarchical countries" have more climbers reach the summit, but also have more climbers die along the way than expeditions from more "egalitarian countries." Importantly, these effects occur only for group expeditions and not for solo expeditions.

Finally, in terms of cultural history, it is worth beginning with Johan Huizinga (1938) who in his classic *Homo Ludens* remarks:

> "Play is older than culture, for culture, however inadequately defined, always presupposes human society, and animals have not waited for man to teach them their playing"

Ludens, which is cognate with the word *ludus*, is the present active participle of the Latin verb *ludere.* The term *ludus* has no exact English equivalent, as it relates to play, practice, school, and sport all at once. Huizinga (1938, pp. 46 and 173, 1955 English edition) eloquently argues that *ludus* is primary to and a necessary condition for the generation of culture:

> "culture arises in the form of play, that it is played from the very beginning ... Social life is endued with supra-biological forms, in the shape of play, which enhances its value ... We have to conclude, therefore, that civilization is, in its earliest phases, played. It does not come *from* play like a baby detached itself from the womb: it arises *in* and *as* play, and never leaves it"

Unfortunately, there seems to be no data on *ludus* before civilization started. So we have to content ourselves with the idea that if the data existed they would probably show that *ludus* has played a significant role in cultural history. What we do have, however, is evidence on the role of "organized sports" in the human experience. In one fascinating piece, Szymanski (2008) locates the development of modern sports ("sport" and "physical education" representing political ideologies) within the context of the wider development of associative activities in the 18th and 19th centuries. This revolution took place in Britain in the Victorian period and was later matched by similar experiences in the United States, France, Germany, and elsewhere. See also Szymanski (2010) and Griffin (2005).

The economic history of sport has been a neglected area of research, and yet commercial activities have been closely connected with the development of modern sport since at least the 18th century, and probably much earlier (see Vamplew (2022b) on sports commercialization in Ancient Greece and Rome). Among the few lights that illuminate the way are, just recently, the captivating six volumes edited by Vamplew, McClelland, and Dyreson (2021). They show, from gladiatorial combat to knightly tournaments and from hunting to games and gambling, that sport has been central to human culture. These volumes present the first extensive history from classical antiquity through the medieval age and the Renaissance to the age of Enlightenment, the age of industry and the modern age. Vamplew (2017) also argues for a more quantitative, economic and theoretical approach to sports history, specifically noting the *peculiar* economics of sports since in no other industry do rival businesses have to cooperate to produce a sellable output. See Vamplew (2021) for a fascinating global history of sports.

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