

VAR Shock

Referee Reviews And Live Sports: Ruination or Revolution?

More data is *always* better, right?

Right?

More information enables investors to make better-informed decisions.

Or, does more information overwhelm decision-making, creating analysis paralysis?

Attend a live sporting event, and you've undoubtedly encountered the problem.

Standing shoulder-to-shoulder with your fellow fans in a boisterous section of a packed stadium, the adrenaline is pumping, the noise is deafening, and the pints of beer are flowing.

Suddenly, the action stops on the pitch.¹

Confusion reigns in the stadium. Fans exchange quizzical glances and mutter with profanity-laced questions. The pause sometimes lasts for seconds or even minutes.

Then, the referee jogs off the pitch. Unless the official-in-charge requires immediate medical attention, it's likely the VAR, or video-assistant referee, is killing the on-field action. During the VAR pause, the referee is reviewing a slow-motion replay to see if he has made a "clear and obvious

error" when awarding a goal, penalty, or red card.

But by the time the decision is confirmed (or overturned), the crowd's excitement has already worn off. Worse, it leaves the fans puzzled—even angry—as their eyes saw something else.

«HOW MUCH TECHNOLOGY CAN BE IMPLEMENTED IN SPORTS GAMES WITHOUT COMPROMISING THE FUN IS A JUDGMENT CALL.»

The intent of using VAR is to enhance referee accuracy and promote fair play. However, how much technology can be implemented in sports games without compromising the fun is a judgment call. We can never get everything perfectly right, whether in sports or investing, and attempts at perfection can be futile, frustrating, and even dangerous.

HISTORY OF VAR

Arguably the greatest footballer of all time and certainly of his generation, Diego Maradona

committed one of the most blatant rule violations in sporting history, which led to a goal during the most prestigious and important sporting tournament on the planet.

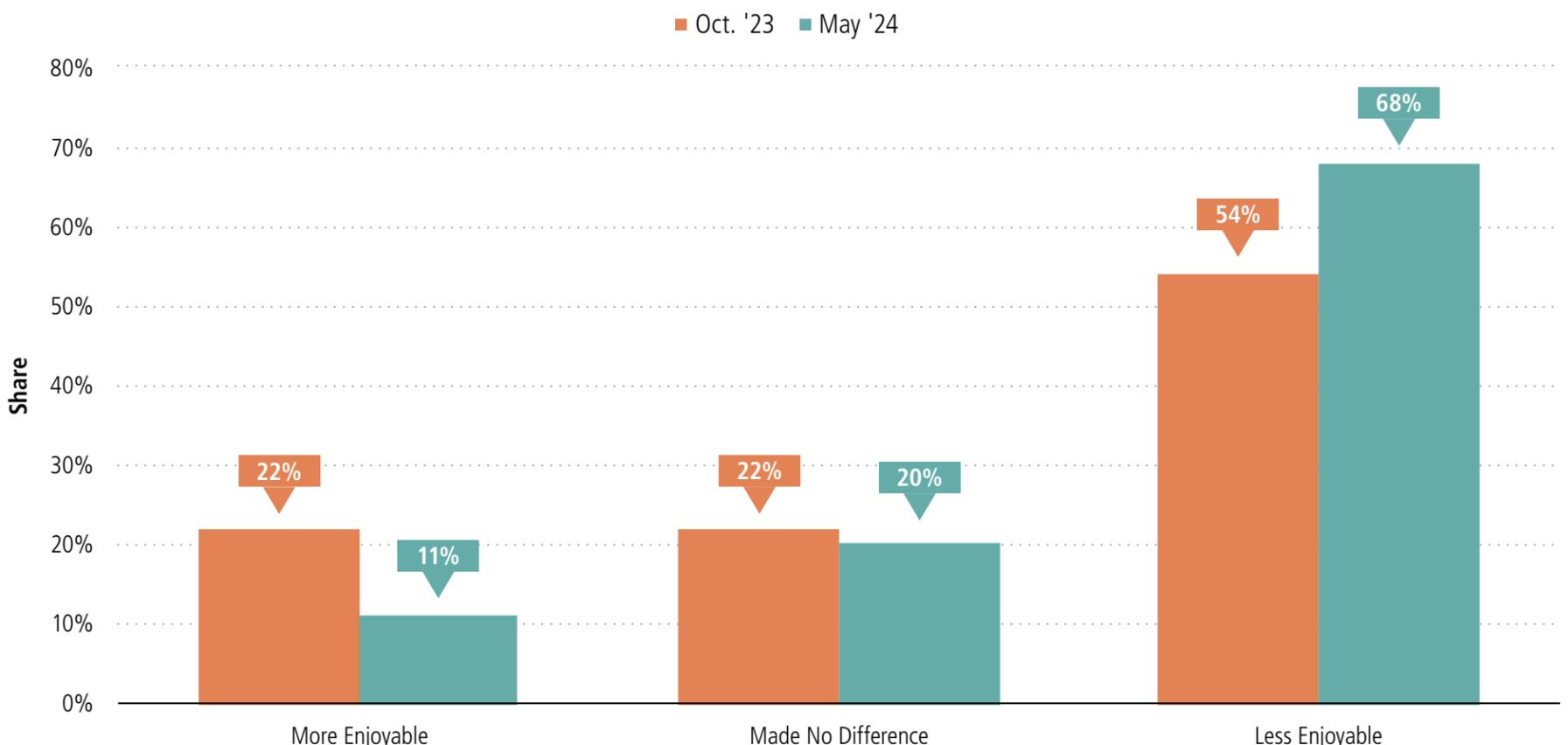
During the 1986 World Cup, in the so-called "Hand of God" goal, Maradona handled the ball in mid-air and scored en route to a 2-1 Argentine victory over England, securing a spot in the World Cup Semi-Final (*although* it does not necessarily mean England would have won *without* the Maradona goal).

Would a video review have solved the problem and imposed justice? So goes the argument in favor of VAR. It was so obvious!

With good intentions, VAR was finally adopted by the World Cup in 2018 and subsequently introduced to UEFA in 2019. During a match, the VAR sends alerts to the referee when an "obvious" mistake has been observed, and the referee has the option to verify their decision with the VAR (or not).

Indeed, studies have shown an improvement in accuracy since the implementation of VAR. For example, during the 2018 World Cup, the adoption of VAR improved the accuracy rate of referees from 95.6% to 99.34%.²

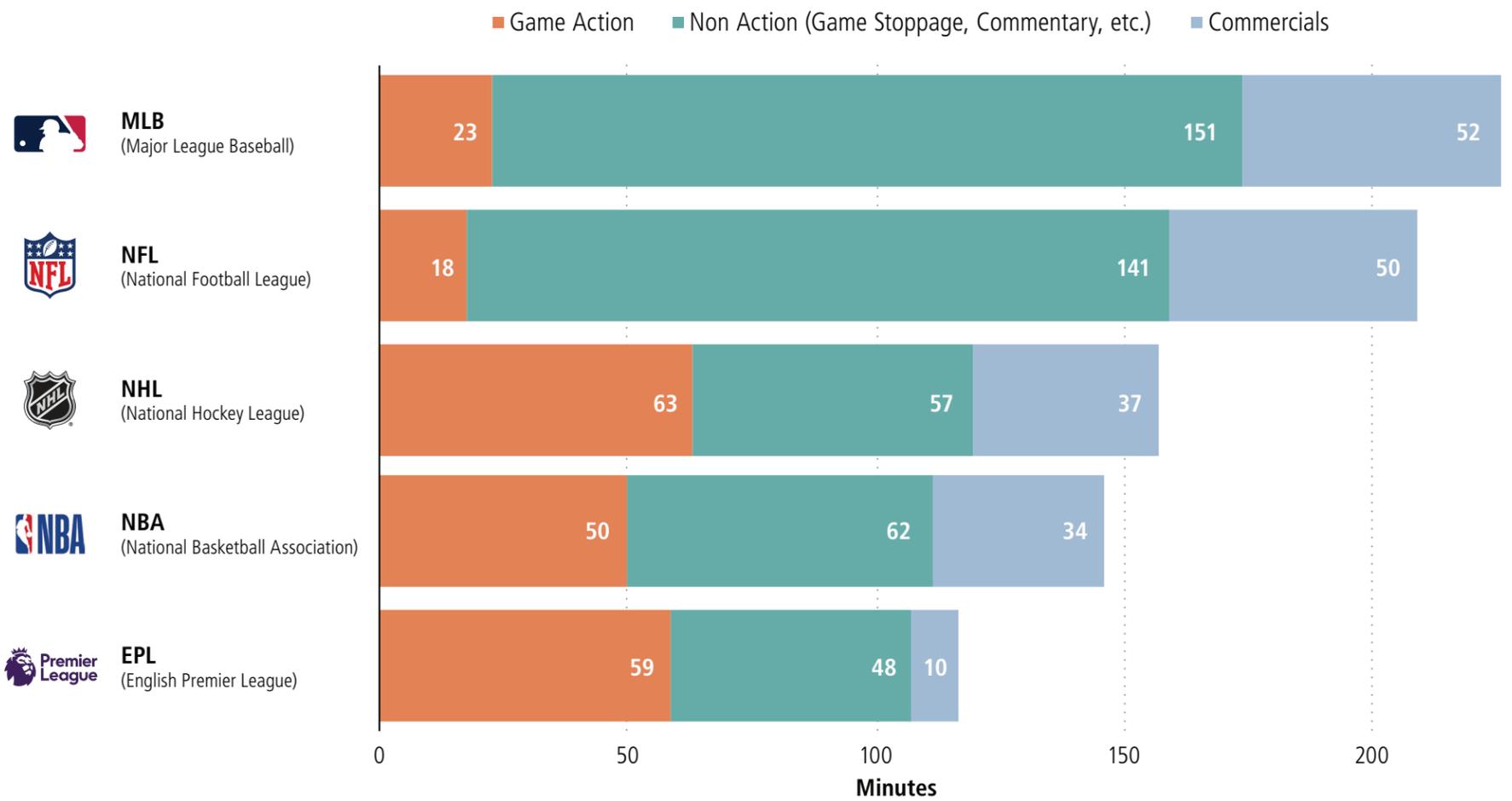
fig 1. NOT A FAN FAVORITE: SURVEY* ON ENJOYABILITY OF GAMES WITH VAR IMPLEMENTED



Source: YouGov

*531 Regular Or Frequent Adult Viewers Of Premier League

fig 2. PASS ME THE NACHOS:
BROADCAST SCREEN TIME BY TYPE ACROSS FIVE MAJOR SPORTS LEAGUES



Sources: University of Texas at Austin-Sports Analytics Course, FiveThirtyEight

«IN SPORTS, ACCURACY IS NOT EVERYTHING.»

WHAT'S THE CONTROVERSY?

So what's the problem? The VAR controversy hinges on the fact that, in sports, accuracy is not everything.

At home, VAR "breaks" are filled by watching replays from various angles or listening to commentary, making the gap less interruptive.

But, *in person*, at a *live* sporting event, the interlude disrupts the game and the players' momentum, often with few updates for the fans on why decisions were made one way or the other, as all they see is the referee peering at a screen. Or worse, the "Jumbotron" video screens often show only *one* angle of the replay—the *most* favorable angle for the home team, which can incite pandemonium if the on-field review differs from what the fan consensus believes with their own eyes.

It's not just us. A large majority of regular attendees of English Premier League games find that VAR makes the games less enjoyable, and this perception has become even more pronounced over time (see Figure 1 on page 1).

«VAR MIGHT HAVE ENDED UP COMPLICATING THE GAME RATHER THAN SIMPLIFYING IT.»

REGULATORY RED TAPE

More than an inconvenience for fans, VAR might have ended up complicating the game rather than simplifying it.

The original handball rule before VAR read like this:

Handling the ball involves a deliberate act of a player making contact with the ball with the hand or arm.³

Twenty words. One sentence. Pretty straightforward. Right?

By the 2019/2020 season, a new handball law and a new VAR system were introduced into the Premier League at the same time, and the handball rule is now 11 times longer in terms of word count!⁴

Given the complexity of the new wording, it wouldn't be possible to enforce the new rule *without*

VAR, because an on-field referee simply wouldn't be able to analyze the situation in real-time.

Now, with video review, referees have begun identifying "incredibly marginal accidental handballs that occurred at the very start of a chain of events that led to a goal,"—say, when a player far upfield in the sequence accidentally touched the ball before several subsequent passes led to a goal. Goal overturned.

«WORSE, VAR IS CHANGING THE WAY THE GAME IS PLAYED.»

Worse, VAR is changing the way the game is played.

For example, players comically run with their hands behind their backs to prevent even the

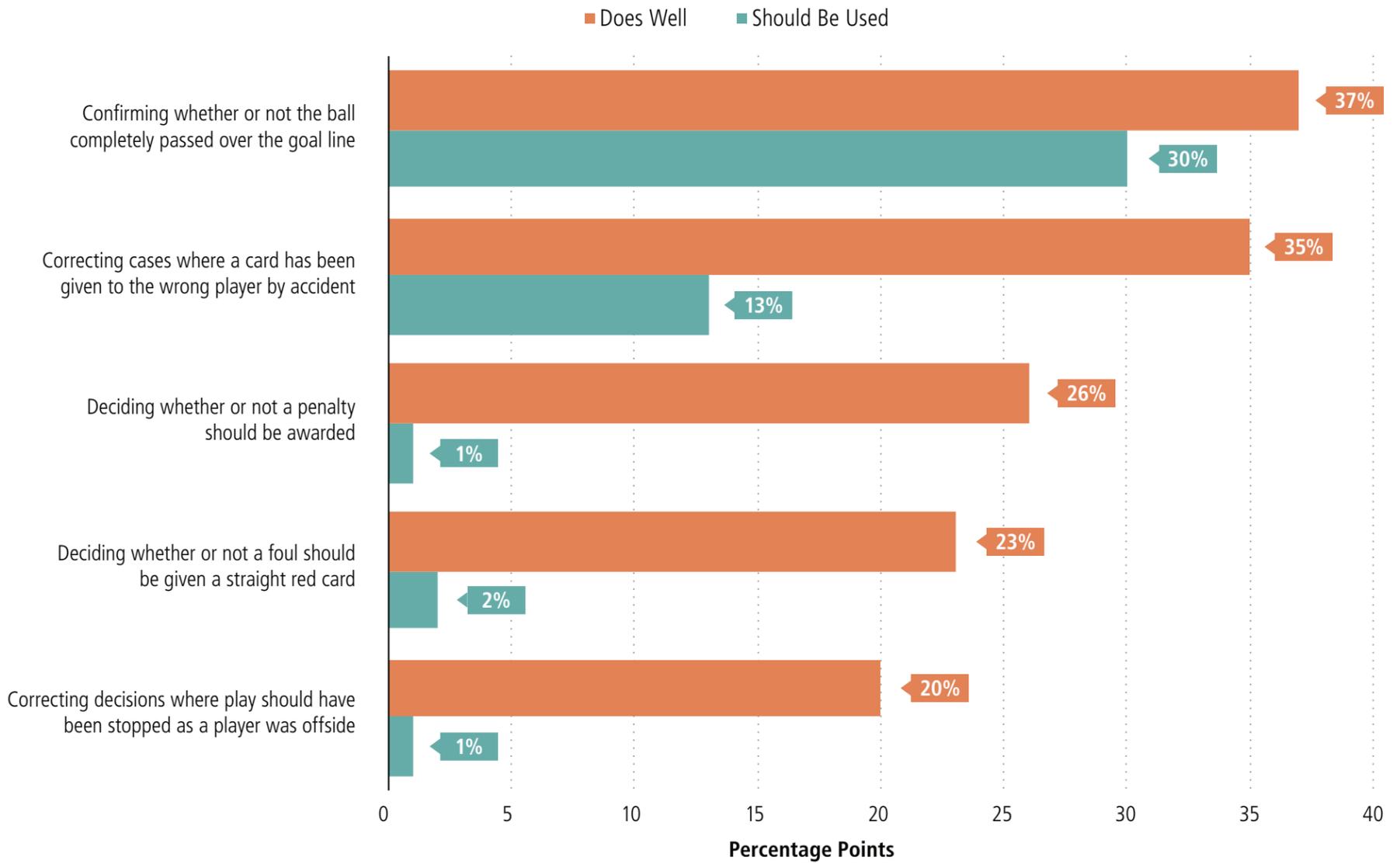
DID YOU KNOW?

MARKETING SCHEME

Cynical readers may have long ago spotted another VAR angle: controversial VAR decisions generate a huge amount of interest, especially on social media. Headlines with "the most controversial VAR decision" and "the most sterile game" attract many clicks and tweets. What's more, the implementation of VAR in top leagues might have fueled new opportunities in football betting, where gamblers often bet on match outcomes and specific events in a game. VAR adds more betting options and creates additional uncertainty of outcomes due to VAR reviews. Furthermore, more bettors prefer leagues with VAR, as the referee has less influence on the final result.⁵ Perhaps counterintuitively, then, in an entertainment-driven era, do leagues actively benefit from VAR controversy to fuel clicks and attract eyeballs?

fig 3. WISDOM OF THE CROWD:

RATIO OF RESPONDENTS* WHO THINK VAR SHOULD BE USED (OR DOES WELL) TO RATIO OF THOSE WHO THINK VAR SHOULDN'T BE USED (OR DOESN'T DO WELL)



Source: YouGov

*Respondents are 531 regular or frequent adult viewers of Premier League

possibility of incidental contact with the ball when in the penalty box. Why so careful? Well, handling the ball in the penalty box results in an automatic penalty kick—and the conversion rate of a penalty kick, or the rate at which penalty kicks are converted into a goal, is 82%.⁶ In other words, since so few goals get scored in a football game, a penalty kick can easily alter the outcome of the game.

BEYOND FOOTBALL

Action in football (soccer for our American readers) is fairly continuous. Taking a break—even for 60 seconds—disrupts the flow of play, making the implementation of VAR difficult.

However, the technology itself is not useless. There are sports where video reviews can be integrated much more effectively.

For example, cameras have been used extensively in track and field races for a long time. As early as 1912, the Stockholm Olympics utilized a camera system for the men’s 1500-meter race.⁷

Other sports, like basketball or American football, have frequent breaks in the action, making video review more palatable—even desirable. Why? VAR gives the announcers something to talk about, filling time between advertisements, and provides the audience with something to discuss on social media. In the

average NFL game broadcast, only 18 minutes are devoted to actual playing time (see Figure 2 on page 2).⁸

Nonetheless, leagues were initially resistant to delegating authority to an official not on the field of play (i.e., sitting in a booth above the field). As a result, the VAR rollout was slow. The United States Football League (USFL) began using Instant Replay in 1985, and the NHL followed suit in 1991. The NBA didn’t follow until 2002, and the MLB joined the club in 2008 (see *Did*

You Know? Marketing Scheme on Page 2).⁹

Tennis might have been one of the first ball sports to adopt VAR. But even in tennis, where it seems most straightforward, the devil is in the details. Research shows that the “Hawk-Eye” software used to monitor whether a tennis ball is in or out has a margin of error (see *Did You Know? History of Hawk-Eye*). Players have encountered cases where the physical ball mark on the field shows that the ball is “out,” but the “Hawk-Eye” system counted it as “in.”¹⁰

DID YOU KNOW?

HISTORY OF HAWK-EYE

Developed by Paul Hawkins, the Hawk-Eye system was designed to provide additional insight into the broadcast of cricket and add visually engaging elements that the audience can enjoy. Further, unlike the VAR in football, the Hawk-Eye system doesn’t just record a video of the ball and replay it in slow motion. Hawk-Eye develops models that forecast the path of the ball based on the angle and position from which the player hits it. Interestingly, during the 2004 U.S. Open, the chair umpire (referee in tennis) ruled several balls hit by Serena Williams as “out,” while the Hawk-Eye model displayed on the audience’s screen showed the balls as “in,” creating a huge controversy.¹¹ As a result, in the following U.S. Open, Hawk-Eye was integrated with the umpire’s decision-making. Fast forward to today, Hawk-Eye has completely replaced human line judges in prominent tennis tournaments, but it still generates controversy among tennis fans.

«BUT WHAT DOES “GETTING IT RIGHT” MEAN? BEYOND THE HANDBALL RULE IN FOOTBALL, INTEGRATING VAR MAKES “GETTING IT RIGHT” HARDER, NOT EASIER.»

THE WAY FORWARD: DISPERSED KNOWLEDGE?

Sure, critics might say, “We can all agree, let’s just get it right.” That makes sports better, right?

But what does “getting it right” mean? Beyond the handball rule in football, integrating VAR makes “getting it right” harder, not easier.

We can spend several minutes in every match trying to “just get it right,” but the trade-off is that it has become painful to watch sports, ruining the entertainment.

One solution is to limit in-game VAR to very few key decisions, thereby reducing disruptions. Football fans have a consensus on the types of referee decisions they believe VAR is effective in addressing (see *Figure 3 on page 3*).

Or, we can rely on the “wisdom of the crowds.” Allow the audience in the stadium or at home to vote, or use a panel of experts (former players, referees, coaches, and managers), since, with most infractions, “you know it when you see it.” Fooling the referee, diving in football, flopping in basketball, players trying to kick the ball off the defender’s hands to draw a penalty—once fans see it on screen, they will realize it’s wrong.

Alternatively, modern techniques, such as AI algorithms, may be significantly more effective if trained on thousands of past correct and incorrect referee decisions or calls.

«JUST LIVE WITH IMPERFECTION—AS WE DO WITH WEATHER FORECASTS, AND FAMILY VACATIONS.»

Best of all, perhaps we just live with imperfection—as we do with weather forecasts and family vacations.

In sports, the unexpected (and imperfection) is thrilling. In markets, we need to be comfortable with the unpredictable and not fool ourselves into thinking that with just a bit more data, or just the right metric, we’ll cover all our bases (and risks).

Because we won’t. 

ENDNOTES

1. To our American readers: “pitch” refers to the field on which the football game is played.
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1 Bartholomew Lane
London EC2N 2AX
United Kingdom
+44 020 7621 3000

MILAN

Corso Matteotti, 1 20121
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