



## Penalty Kicks and the Wisdom of Inaction

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A penalty kick in soccer is one of the most exciting and impactful shots in all of sports. Goalie vs. striker, one on one, winner take all. Taken from the penalty spot 12 yards away from the goal line, the penalty kick is a shot that can make an entire stadium of rowdy fans hold their breath all at once, and given that a typical professional-level soccer game total score averages only 2.5 goals, the penalty kick can frequently decide the outcome of a soccer match.

In game theory, the penalty kick is classified as a “non-cooperative zero-sum game,” meaning that neither participant can compel the other player to make a particular choice, and all gains by the goalkeeper (in the form of saved or missed penalty kicks) occur to the direct detriment of the striker, and vice versa. One player wins and the other player loses. There are no ties.

The success or failure of penalty kicks are not mere coin flips, as the odds of success skews radically in the favor of the striker and against the goalie. With the penalty spot so close to the goal, the goalie has only hundredths of a second to locate the ball as it is kicked to stop the shot.

With so little time to react, goalies attempt to guess in which direction a striker will kick the ball, and then typically commit to dive in one direction or the other to increase their chances of making a save. However, goalies are usually not successful in their attempt to make a save.

Ignacio Palacios-Huerta, a behavioral scientist at the London School of Economics, is the recognized expert in data collection and analysis in the science of penalty kicks. He manages a database of over 11,000 penalty kick outcomes, and he has found that penalty kicks are successful for the ball striker 82 percent of the time. Shots that strikers make to their dominant side (a right-handed player is typically a stronger striker to the left side of the goal) convert to goals 82.7 percent of the time, and shots to the striker's non-dominant side convert to goals 81.1 percent of the time. These outcomes are so similar that there is little difference in success outcomes between a striker shooting to their dominant side or their weaker side.

Although Pacacios-Huerta's data analyzes shot success both when a player shoots to the left side of the goal and the right side of the goal, the more interesting data arises from when a player strikes the shot to the middle of the goal. Reviewing 440 penalty shots in his database from World Cup and European Championship tournaments from 1976 to 2016, he found that goalkeepers remained in the center of the goal (not diving right or left) only 3 percent of the time. Also, over this period strikers kicked their shots to the middle of the goal only 9 percent of the time. The success rate at scoring a goal from a penalty kick to the upper center of the goal, at 97 percent, is materially higher than shooting at either the right side or the left side of the goal. So, the question must be asked: Why don't more strikers kick their shots to the center of the goal, when success is almost always ensured?

The answer lies deep in the behavioral biases of the players. Both the goalie and the striker must not only gauge the chance of success from a particular choice, but also must weigh the consequences of failure of each of the choices. From the striker's standpoint, if they aim for either side of the goal and the shot is saved, much of the credit will go to the goalkeeper for making a "great save." But if the striker aims the ball at the center of the goal and the goalie remains motionless and stops the shot, the striker will look foolish to their teammates, coaches and rowdy fans. Strikers, therefore, have a bias toward action, any action, except the perceived inaction of shooting straight ahead. If strikers are going to fail, they at least want to fail in an acceptable way.

From goalies' perspective, if they dive left or right, at least they are making a strong attempt to stop a shot that had a high chance of getting by them anyway, so they will feel less fault and culpability for the resulting goal. However, if goalies simply stand in place and the ball finds the back of the net on the right or left side, they may be seen as "not even trying" and may appear and feel foolish in the minds of those who would judge them. The goalies have a bias toward action and want to give at least the appearance of effort, and any action is seen as better than the inaction of standing in place. The behavioral desire to "fail for the right reasons" overwhelms each player's own self-interest to maximize the odds of their own success.

We have seen examples of this desire to fail for the right reasons all through business history as well. Throughout the 20th century, a common expression was, “You will never get fired for choosing IBM,” meaning that business executives with a choice of firms for providing computer services would minimize their own responsibility for failure of a project if they chose the industry standard. Although IBM may not have had the superior product or service, IBM was seen as the only safe bet. When a project manager was tasked with choosing the best piece of software or consultancy they could for a certain project, they frequently chose IBM, to shield them from repercussions if anything had gone wrong, as IBM had the strongest perceived reputation for not allowing projects to fail. The executives concluded that if they were going to fail, they would at least do it in the most acceptable manner.

This desire to “fail for the right reasons” is often seen in investor behavior and wealth management as well. Looking at S&P 500 index returns since World War II, the index shows a positive performance in 54 percent of all individual trading days. So, on a short-term basis, an investor’s success closely resembles a coin flip. However, the longer the timeframe, the higher the odds are of success. Over a calendar quarter, investors have a 69 percent chance of gaining a positive return. Over a year, they have an 82 percent chance of achieving a positive return. Over five years, 88 percent. Over 10 years, 95 percent. And over any 20-year period, S&P 500 investors have a 100 percent chance of gaining a positive return.

With such a high chance of equity market success and positive returns over longer periods of time, why do investors feel the need to worry about daily economic and market headlines, attempting to time the market by holding large cash balances or trade in and out of asset classes based on gut feel? The answer is the same behavioral bias toward action that is seen in soccer players attempting to be successful in penalty kicks. When faced with stress, humans tend to prefer action over inaction. Investors, like soccer players, feel the need to take perceived control of a situation, rather than standing by passively ceding control to market forces. While both soccer players and stock market investors know that it is in their best interest to play the highest odds possible, humans still favor action over inaction. Even after millions of years of human evolution, people still have a very hard time remaining motionless in a time of stress, whether on a soccer field or in a stock market correction.

As humans, we want to feel that we are in control over our own destiny and will feel more foolish if we take no action and harm befalls us than if we make concrete decisions to take action and the same misfortune comes to pass. Although penalty kick goals are winner take all and there are no do-overs, with stock market investing there is always another day, quarter or year to overcome the temporary misfortune of a negative return. Long-term success can be achieved if investors do not succumb to making emotional short-term decisions that damage the long-term chance of success of their investment goals. In both soccer and investing, inaction with the odds on your side has proven to be the best route to success. With a high chance of investor success over a long period of time, the best action in times of market volatility or correction is usually no action at all.

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