outcome in which at least one player is better off and no player is worse off.[8] But because the rules of the game require noncooperation, the firms end up in an equilibrium that is, from their perspective, suboptimal.

This example shows the value of game theory. By understanding the rules under which players (firms, employers, employees, managers, stock owners, etc.) operate, we can understand why we observe what might be otherwise inexplicable in the marketplace. We may even be able to predict outcomes. In a later section, we look at how managers can use their understanding to strategize, taking advantage of the rules of the game or working around them to achieve better results for their firm or even a more efficient result overall. In the remainder of this section, we examine four additional examples of games and how they can inform us about market interactions. Two of these examples involve pricing, one involves location, and the fourth involves decisions about output.

Beach Kiosk Game

Let us look at other potential equilibriums to better understand stable and unstable equilibriums. The **beach kiosk scenario** is a *two-person, noncooperative, zero-sum game.* There are two potential equilibriums in which the players are equally well off, but only one of them is stable. Suppose two vendors have been granted licenses to provide soft drinks, snacks, and sunscreen to a county beach area that runs north and south for about 200 yards. Every day they roll their kiosks down to the beach and must decide where to set them up. The beachgoers tend to avoid large concentrations and are generally spread out evenly along the beach. They have no preferences for one vendor over the other and will use whichever beach kiosk is nearest. One possibility is for the two vendors to split the market so one locates 50 yards from the north end and the other locates 50 yards from the south end.

The previous situation would not be a stable equilibrium because if the first vendor sets up at 50 yards from the north end, the second vendor can make herself better off by moving closer to the first, perhaps 25 yards farther north (midway between the first vendor and the south end). She can then serve a wider portion of the beach, that is, take away some of the other vendor's customers. Likewise, once the second vendor locates at 75 yards from the south end, the first vendor can make himself better off by moving closer to the first vendor, perhaps 12.5 yards farther south (midway between the north end and the second vendor). Can you see where this is going and define the Nash equilibrium?

The only stable equilibrium is when both vendors locate next to each other at the midpoint, 100 yards from both the South and from the North ends. Only in this situation will neither vendor have an incentive to move given the location of the other vendor. They will split the market just as when they were located 50 yards from the ends. In this case, neither of the two equilibriums is more *efficient* from the vendors' point of view. However, from the beachgoers' point of view, either would be preferable. Have you ever observed this phenomenon? Consider the location of gas stations or the political rhetoric of the two main American parties in a presidential election year. Is there evidence that they tend to position themselves close together? What additional examples can you provide?

[8]Note that this definition of efficiency is not consistent with a welfare maximization concept of efficiency. It is efficient only from the point of view of the players. Others not involved in setting the strategy may be made worse off. For example, consumers facing higher prices would be worse off than if no cooperation were possible and both firms chose the lower price. For this discussion, we choose not to consider whether the outcome of a game is economically efficient.