FOUNDATION *for* ECONOMIC EDUCATION

EST. 1946

GAME THEORY

The Concert Dilemma

Taylor Swift and Beyonce are scheduled to perform concerts in the same city on the same night. Due to this scheduling conflict, many fans are forced to choose between attending Taylor's concert or Beyonce's concert, potentially splitting the audience and reducing profits for both artists.

Both artists have the option to reschedule their concert to a different night or keep their concert on the same night as scheduled. If both artists choose to reschedule, they share the audience evenly, and each earns $1 million. If one artist reschedules and the other does not, the artist who does not reschedule captures the majority of the audience, earning $1.5 million, while the other earns only $500,000 due to a smaller audience. If neither artist reschedules, they split the audience, and each earns $750,000.

Payoff Matrix

	Beyonce Reschedules	**Beyonce Does Not Reschedule**
Taylor Reschedules	$1,000,000, $1,000,000	$500,000, $1,500,000
Taylor Does Not Reschedule	$1,500,000, $500,000	$750,000, $750,000

1. What is the dominant strategy for each artist?
    a. Taylor:
    b. Beyonce:
2. Is there a Nash Equilibrium in this game? If so, what is it?

3. Discuss the tension between what would be mutually beneficial to both artists and how the rational pursuit of each artist to make the most money leads to a suboptimal collective outcome.

The Album Launch Dilemma

Taylor Swift and Eminem are both planning to release their highly anticipated albums. They have narrowed down their launch dates to the same day, unaware of each other's plans initially. The music industry and fans are buzzing with excitement, but there's a concern that releasing

both albums on the same day might split sales and media attention, potentially harming both artists' success.

Both Taylor and Eminem have the option to either stick to the planned release date or move their album launch to the following week. If both decide to cooperate by moving their release dates, they avoid direct competition, and each enjoys significant media attention and sales, earning 100 "success points" each. If one artist moves their release date while the other doesn't, the artist who sticks to the original date captures more attention and sales, earning 150 success points, while the other earns only 50, losing some hype and sales to the competing album. If both artists defect and release on the same day, they split the attention and sales, each earning 75 success points due to the diluted focus.

Payoff Matrix

	Eminem Moves Launch	**Eminem Does Not Move Launch**
Taylor Moves Launch	100, 100	50, 150
Taylor Does Not Move Launch	150, 50	75, 75

1. Identify the dominant strategy for Taylor and Eminem.
    a. Taylor:
    b. Eminem:
2. Determine if there is a Nash Equilibrium in this scenario. If so, what is it?

3. Discuss the tension between what would be mutually beneficial to both artists and how the rational pursuit of each artist to make the most money leads to a suboptimal collective outcome.

The Collaboration Dilemma

Taylor Swift and another prominent artist, "Artist D," are both considering whether to work on a collaborative single or to release their own solo singles. Both artists know that a collaboration could potentially lead to a hit song that would benefit both significantly. However, they also recognize the appeal and potential success of pursuing individual projects.

Here are the possible outcomes based on their decisions:

- *If both decide to collaborate, they produce a hit single together, and each earns 200 "fame points" due to the combined fan base and shared success.*
- *If one artist chooses to collaborate while the other decides to go solo, the solo artist gains 250 fame points due to capturing the spotlight alone, while the collaborating artist only*

gains 100 fame points, as their effort in the collaboration is overshadowed by the solo artist's success.

- *If both artists decide to go solo, they each earn 150 fame points, as they both have successful singles but miss out on the extra boost that a collaboration would have provided.*

Payoff Matrix

	Olivia Rodrigo Collaborates	**Olivia Rodrigo Goes Solo**
Taylor Collaborates	200, 200	100, 250
Taylor Goes Solo	250, 100	150, 150

1. What is the dominant strategy for Taylor Swift and Olivia Rodrigo, if any?
    a. Taylor:
    b. Olivia:
2. Identify the Nash Equilibrium of this game.

3. How do the concepts of risk and reward play out in this scenario?

The Merchandise Launch Dilemma

Taylor Swift and another popular band, "Band E," both plan to launch new merchandise lines. They have two options: launch their merchandise before a major holiday season to maximize sales (Defect) or delay the launch until after the holiday season to avoid direct competition (Cooperate). Launching before the holiday season could significantly increase sales due to higher consumer spending, but if both launch simultaneously, they risk splitting the market and diluting their potential sales.

Here are the potential outcomes based on their decisions:

- *If both decide to launch before the holiday season (Defect), they split the holiday market, each earning $800,000 in sales.*
- *If one decides to launch before the holiday while the other waits (one Defects, one Cooperates), the one who launches first captures the heightened holiday spending, earning $1.2 million, while the other, launching later, earns less due to decreased consumer spending, making $400,000.*
- *If both decide to delay their launches (Cooperate), they avoid direct competition, each securing $1 million in sales during a less competitive time.*

Payoff Matrix

	Morgan Wallen Launches Pre-Holiday	**Morgan Wallen Launches Post-Holiday**
Taylor Launches Pre-Holiday	$800,000, $800,000	$1,200,000, $400,000
Taylor Launches Post-Holiday	$400,000, $1,200,000	$1,000,000, $1,000,000

1. What is the dominant strategy for Taylor Swift and Morgan Wallen, if any?
    a. Taylor:
    b. Morgan:
2. Find the Nash Equilibrium of this game.

3. Assume Taylor pays Morgan Wallen $600,000 to delay his launch until post-holiday.
    a. Redraw the payoff matrix to analyze this new situation.
    b. What is the Nash equilibrium for the new matrix?

    c. Would it make sense for Taylor to do this? Explain

New Payoff Matrix

	Morgan Wallen Launches Pre-Holiday	**Morgan Wallen Launches Post-Holiday**
Taylor Launches Pre-Holiday		
Taylor Launches Post-Holiday		

ANSWER KEY

The Concert Dilemma

Taylor Swift and Beyonce are scheduled to perform concerts in the same city on the same night. Due to this scheduling conflict, many fans are forced to choose between attending Taylor's concert or Beyonce's concert, potentially splitting the audience and reducing profits for both artists.

Both artists have the option to reschedule their concert to a different night or keep their concert on the same night as scheduled. If both artists choose to reschedule, they share the audience evenly, and each earns $1 million. If one artist reschedules and the other does not, the artist who does not reschedule captures the majority of the audience, earning $1.5 million, while the other earns only $500,000 due to a smaller audience. If neither artist reschedules, they split the audience, and each earns $750,000.

Payoff Matrix

	Beyonce Reschedules	**Beyonce Does Not Reschedule**
Taylor Reschedules	$1,000,000, $1,000,000	$500,000, $1,500,000
Taylor Does Not Reschedule	$1,500,000, $500,000	$750,000, $750,000

1. What is the dominant strategy for each artist?
    a. Taylor: Does Not Reschedule
    b. Beyonce: Does Not Reschedule
2. Is there a Nash Equilibrium in this game? If so, what is it?

A Nash Equilibrium occurs when no player can benefit by changing strategies while the other player's strategies remain unchanged. In the Concert Dilemma, the Nash Equilibrium is when both Taylor and Beyonce choose to Defect (do not reschedule). At this point, neither artist can improve their payoff by unilaterally changing their decision, making $750K each. This outcome is achieved even though cooperating would lead to a better collective outcome ($1M each).

3. Discuss the tension between what would be mutually beneficial to both artists and how the rational pursuit of each artist to make the most money leads to a suboptimal collective outcome.

Mutual Benefit: If both artists cooperated by rescheduling their concerts, they would each earn $1M, which is a better outcome collectively ($2M total) compared to when both defect ($1.5M total). This represents the mutual benefit of cooperation.
Individual Rationality: Despite the mutual benefits of cooperation, individual rationality drives both artists to defect, as doing so maximizes their individual payoff regardless of the other's action. This leads to a suboptimal collective outcome, highlighting the dilemma where individual rational pursuits lead to worse outcomes for all parties involved.
The rational choice for individuals leads to a Nash Equilibrium that is not Pareto optimal, meaning there is another outcome that would make at least one player better off without making the other worse off. Cooperation would lead to a better collective outcome, but the incentive to maximize individual gain leads both to choose options that are worse for them collectively.
Economic Lesson: These dilemmas teach us that in economic activities, competition and the pursuit of individual rationality can lead to outcomes that are not socially optimal. They highlight the importance of

communication, trust, and mechanisms (like contracts or regulations) that can encourage cooperation for mutual benefit, showcasing the complexity of decision-making in economic contexts.

The Album Launch Dilemma

Taylor Swift and Eminem are both planning to release their highly anticipated albums. They have narrowed down their launch dates to the same day, unaware of each other's plans initially. The music industry and fans are buzzing with excitement, but there's a concern that releasing both albums on the same day might split sales and media attention, potentially harming both artists' success.

Both Taylor and Eminem have the option to either stick to the planned release date or move their album launch to the following week. If both decide to cooperate by moving their release dates, they avoid direct competition, and each enjoys significant media attention and sales, earning 100 "success points" each. If one artist moves their release date while the other doesn't, the artist who sticks to the original date captures more attention and sales, earning 150 success points, while the other earns only 50, losing some hype and sales to the competing album. If both artists defect and release on the same day, they split the attention and sales, each earning 75 success points due to the diluted focus.

Payoff Matrix

	Eminem Moves Launch	**Eminem Does Not Move Launch**
Taylor Moves Launch	100, 100	50, 150
Taylor Does Not Move Launch	150, 50	75, 75

1. Identify the dominant strategy for Taylor and Eminem.
    a. Taylor: Does Not Move Launch
    b. Eminem: Does Not Move Launch
2. Determine if there is a Nash Equilibrium in this scenario. If so, what is it?
   A Nash Equilibrium occurs when each player's strategy is optimal, given the other player's strategy, and no player has an incentive to deviate from their strategy. In the Album Launch Dilemma, the Nash Equilibrium is when both Taylor and Eminem choose to Defect (release their albums on the original date). At this point, neither artist can increase their payoff by unilaterally changing their decision (both earning 75 success points), even though cooperation would lead to a better collective outcome (100 success points each).

3. Discuss the tension between what would be mutually beneficial to both artists and how the rational pursuit of each artist to make the most money leads to a suboptimal collective outcome.
   Mutual Benefit: If both artists cooperated by moving their album launches, they would each earn 100 success points, maximizing their collective success without directly competing for attention and sales.
   Individual Gains: Despite the potential for mutual benefit, the incentive structure leads both artists to pursue individual gains by sticking to the original launch date, resulting in a lower payoff for both (75 success points each). This outcome is suboptimal compared to the cooperative outcome but is rational given the game's structure.

The Collaboration Dilemma

Taylor Swift and another prominent artist, "Artist D," are both considering whether to work on a collaborative single or to release their own solo singles. Both artists know that a collaboration could potentially lead to a hit song that would benefit both significantly. However, they also recognize the appeal and potential success of pursuing individual projects.

Here are the possible outcomes based on their decisions:

- *If both decide to collaborate, they produce a hit single together, and each earns 200 "fame points" due to the combined fan base and shared success.*
- *If one artist chooses to collaborate while the other decides to go solo, the solo artist gains 250 fame points due to capturing the spotlight alone, while the collaborating artist only gains 100 fame points, as their effort in the collaboration is overshadowed by the solo artist's success.*
- *If both artists decide to go solo, they each earn 150 fame points, as they both have successful singles but miss out on the extra boost that a collaboration would have provided.*

Payoff Matrix

	Olivia Rodrigo Collaborates	**Olivia Rodrigo Goes Solo**
Taylor Collaborates	200, 200	100, 250
Taylor Goes Solo	250, 100	150, 150

1. What is the dominant strategy for Taylor Swift and Olivia Rodrigo, if any?
    a. Taylor: Goes Solo
    b. Olivia: Goes Solo
2. Identify the Nash Equilibrium of this game.
   The Nash Equilibrium occurs when both Taylor and Olivia Rodrigo decide to go solo. At this point, neither artist can benefit by changing their strategy given the decision of the other, with both earning 150 fame points. This outcome is stable because moving away from it would reduce their individual fame points.
3. How do the concepts of risk and reward play out in this scenario?
   Risk: Choosing to collaborate carries the risk of being overshadowed if the other artist decides to go solo, leading to a significantly lower payoff (100 fame points).
   Reward: The reward for collaborating is high if both artists choose to do so (200 fame points each), offering a potential payoff higher than going solo without competition. However, the solo strategy provides a safer, albeit potentially lower, steady reward without depending on the other's decision. This scenario highlights the balance artists must consider between the safe option (going solo) and the riskier, potentially more rewarding option (collaborating).

The Merchandise Launch Dilemma

Taylor Swift and another popular band, "Band E," both plan to launch new merchandise lines. They have two options: launch their merchandise before a major holiday season to maximize sales (Defect) or delay the launch until after the holiday season to avoid direct competition (Cooperate). Launching before the holiday season could significantly increase sales due to higher consumer spending, but if both launch simultaneously, they risk splitting the market and diluting their potential sales.

Here are the potential outcomes based on their decisions:

- *If both decide to launch before the holiday season (Defect), they split the holiday market, each earning $800,000 in sales.*
- *If one decides to launch before the holiday while the other waits (one Defects, one Cooperates), the one who launches first captures the heightened holiday spending, earning $1.2 million, while the other, launching later, earns less due to decreased consumer spending, making $400,000.*
- *If both decide to delay their launches (Cooperate), they avoid direct competition, each securing $1 million in sales during a less competitive time.*

Payoff Matrix

	Morgan Wallen Launches Pre-Holiday	**Morgan Wallen Launches Post-Holiday**
Taylor Launches Pre-Holiday	$800,000, $800,000	$1,200,000, $400,000
Taylor Launches Post-Holiday	$400,000, $1,200,000	$1,000,000, $1,000,000

1. What is the dominant strategy for Taylor Swift and Morgan Wallen, if any?
    a. Taylor: Launch Pre-Holiday
    b. Morgan: Launch Pre-Holiday
2. Find the Nash Equilibrium of this game.
   The Nash Equilibrium for this game is where both Taylor Swift and Morgan Wallen choose to launch their merchandise before the holiday season, each earning $800,000. This outcome is stable because neither party can increase their payoff by unilaterally changing their decision, given the strategy chosen by the other.
3. Assume Taylor pays Morgan Wallen $600,000 to delay his launch until post-holiday.
    a. Redraw the payoff matrix to analyze this new situation.
    b. What is the Nash equilibrium for the new matrix?

   The Nash Equilibrium for this new situation is where Taylor Swift will launch her merchandise pre-holiday and Morgan Wallen will launch his merchandise post-holiday.
    c. Would it make sense for Taylor to do this? Explain.

   It would not make sense for Taylor to do this. While her profit will increase from $800,000 to $1,200,000, it is only an increase of $400,000. Spending $600,000 to make $400,000 would not be a good economic decision for Taylor.

New Payoff Matrix

	Morgan Wallen Launches Pre-Holiday	**Morgan Wallen Launches Post-Holiday**
Taylor Launches Pre-Holiday	$800,000, $800,000	$1,200,000, $1,000,000
Taylor Launches Post-Holiday	$400,000, $1,200,000	$1,000,000, $1,600,000