Red Bull and Monster Energy in a Competitive Game: Modelling Market Behaviour through Game Theory

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This paper applies game theory to analyse the strategic interaction between Red Bull and Monster Energy, the two dominant firms in the global energy drink market. The main objective is to examine how their pricing, marketing, and expansion decisions can be modelled through key game-theoretic concepts. The central hypothesis posits that both companies tend to select aggressive investment strategies, leading to a stable equilibrium in which neither firm benefits from unilateral deviation. The study uses publicly available revenue and profit data to construct payoff matrices and simulate strategic outcomes under alternative competitive scenarios. A simplified two-strategy model, i.e., aggressive expansion versus conservative growth, is applied to evaluate firm behaviour and profit trajectories. The findings indicate that both companies achieve higher growth under mutually aggressive strategies, confirming the existence of a dominant-strategy equilibrium that aligns with a Nash equilibrium. The paper concludes that long-term competition between the two firms is characterised by high interdependence, strategic mirroring, and limited incentives for cooperative positioning.

1   Introduction

Game theory is a branch of mathematical economics that examines situations where players' decisions mutually affect outcomes. In a business setting, it offers a formal framework for modeling competition, negotiation, pricing, market entry, and product development. Using game theory, one can understand how rational managers choose their best strategies in conditions of mutual dependence and identify stable equilibria, such as Nash equilibria, among competitors (Church and Ware, 2000). The energy drink market is constantly growing and very competitive. Globally, companies like Red Bull and Monster Energy hold the top spots. Red Bull, an Austrian pioneer in the industry, built a strong brand with bold, often risky marketing strategies such as sponsorships in extreme sports, event organization, and lifestyle branding. Monster Energy, an American challenger, has gained ground through aggressive business expansion and strategic partnerships, like its distribution alliance with Coca-Cola. Both companies closely observe competitors' moves and carefully adjust their prices, marketing efforts, and distribution channels, making them ideal cases for analysis through game theory. In this environment, managers face high uncertainty and pressure to anticipate rivals' reactions, highlighting the importance of strategic decision-making in a highly competitive landscape (Sharma and Tomić, 2011).

In these situations, strategic decisions like marketing investments, pricing, or expanding into new markets become "games" where the outcome for one company depends on the actions of the other. The use of game theory formalizes these decisions through models where each player (Red Bull or Monster Energy) chooses a strategy while considering the possible moves of the competitor. This approach helps understand who can achieve the best results under certain strategy combinations and assists in identifying possible dominant strategies or equilibrium points. To evaluate these competitive strategies, a simplified game model will be used, with each company choosing one of two strategies: aggressive expansion (large investments in marketing, sponsorships, and distribution expansion) or a conservative approach (careful cost control and steady growth without significant expansion). Using publicly available financial data from previous periods on revenue and net income, payoff matrices will be created to measure the profit changes for each combination of strategies. This combination of theoretical modeling and empirical analysis allows for the assessment of key variables (e.g., market share,

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profitability) and the application of classical game theory concepts to a real business setting.

The aim of the paper is to examine the hypothesis that both companies, facing competitive pressures, tend to adopt aggressive strategies that result in a situation where neither can improve its outcome unilaterally – a Nash equilibrium. It is assumed that aggressive expansion is the dominant strategy for both, as initial analyses have indicated (for Red Bull and Monster, labeled as strategy "A"). In this scenario, the only Nash equilibrium is in both adopting aggressive strategies (A, A), which explains the ongoing "arms race" in the energy drink industry. Ultimately, the research will demonstrate how this dominance strategy model corresponds to the actual behavior of Red Bull and Monster and will discuss the limitations and implications of the findings.

2   Theoretical background

2.1   Game theory as a tool for decision-making

Game theory aims to help us understand situations in which decision-makers interact (Osborne, 2003). In other words, it is the analysis of strategies in interdependent situations, where participants (e.g., consumers, companies, governments) influence each other through the choices they make. When viewed strictly in a business context, game theory is used to analyse competition, negotiations, pricing, how and when to enter new markets, and product development. It allows us to understand observed behaviour, but also to predict future outcomes and prescribe optimal strategies in situations of conflict and cooperation (Holt and Roth, 2004). Rational behaviour is defined as choosing actions that maximize one's own utility under the constraints faced by the player. Although this is a simplification of reality, it has been shown to be a useful frame of reference that works surprisingly well in many cases (Tadelis, 2013).

In game theory, we can distinguish games according to different criteria, and the key focus is on the division of games into strategic games, extensive games, games of perfect investment, and games with incomplete information, as well as the difference between cooperative and non-cooperative games. According to Osborne and Rubinstein (1994), strategy games (or the normal form of the game) are models in

which each player simultaneously chooses their strategy without knowledge of the choices of other players, that is, where the plan of action is chosen once and for all. Extensive games represent sequential decisions where the order of moves is clearly defined, and players can make decisions at different times during the game. These games are divided into games with perfect information, where all previous moves are known to all players, and games with incomplete information, in which players are partially or completely uninformed about the moves of others.

Regarding cooperative and non-cooperative games, cooperative games analyse possible coalitions of players and their joint payoffs, while non-cooperative games model the individual strategies and decisions of each player separately, without formal negotiations or coalitions (Osborne & Rubinstein, 1994). Tadelis (2013) additionally classifies games according to completeness of information (complete or incomplete information) and time dimension (static and dynamic games). Static games are those in which players make decisions simultaneously and where available information is complete, while dynamic games model situations where decisions are made in several stages and information changes during the game. Also, games can be repeated or played once, depending on the duration of the interaction (Tadelis, 2013). It is important to understand that the choice of game type depends on the nature of the interaction, the availability of information, and the time frame of decisions, all of which influence the formation of optimal strategies and the analysis of equilibria within the game (Osborne & Rubinstein, 1994; Tadelis, 2013).

2.2   Key components of the game

1. Players

Players are the decision makers in the game (Myerson, 1991). They can be individuals, firms, states, or any entity that makes strategic decisions. An economically rational player, according to Tadelis (2013), can:

(i)   Evaluate outcomes and rank them according to their contribution to their own welfare,
(ii) Calculate paths to outcomes, recognizing which sequences of actions lead to which outcomes, and
(iii) Choose actions that maximize the preferred outcomes.

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2. Strategy

A strategy is a plan of action that determines what a player will do in each possible situation within a game (Tadelis, 2013).

(i) *Pure strategies*: deterministic actions without elements of randomness.
(ii) *Mixed strategies*: a probability distribution over a set of pure strategies where the player randomly chooses between multiple options according to certain probabilities (Fudenberg and Tirole, 1991).

3. Payoffs

Payoffs represent the rewards or punishments associated with each combination of strategies of all players (Tadelis, 2013). They reflect the utility or benefit that the player receives from a particular outcome.

3   Red Bull vs. Monster Energy – competitive dynamics

Monster Energy

Monster Beverage Corporation is an American energy drink company headquartered in California. Founded in 2002, it quickly gained global recognition thanks to the Monster Energy brand. The company is known for its heavy investment in sponsorships of extreme sports, music events, and the gaming scene, attracting a younger audience and creating a modern, dynamic image (Business Outreach, 2025).

Monster has seen significant revenue growth in recent years, driven by its expansion into global markets and strategic alliances, most notably its partnership with Coca-Cola. Despite its success, the company faces challenges such as market saturation and rising raw material costs, and is striving to maintain a balance between strong promotional activities and long-term profitability (Table 1).

Table 1: Monster Energy

Year	Income (in billions	Profit margin	Net profit (in billions)	Income growth	Profit growth
2022	5,995	18,89%	1,132	28,05%	-2,68%
2023	6,569	22,83%	1,499	9,56%	24,5%
2024	6,968	20,14%	1,403	6,08%	-6,45%

Source: authors, (Macrotrends, 2025; Bloomberg, 2025)

Red Bull

Red Bull, founded in 1987 in Austria by Dietrich Mateschitz, revolutionized the energy drink industry by focusing on selling a lifestyle instead of just a product, with sales of 12.67 billion cans in 2024 (see Table 2 for deeper insight) in 178 countries (Red Bull, 2025). The company became a global leader with a 43% market share through aggressive expansion, starting in Europe in the 1990s and entering the US market in 1997, where it quickly dominated California with more than 5 million cans (Shastri, 2024). Instead of classic advertising, Red Bull invests in sponsorships of extreme sports such as Formula 1, Red Bull Air Race, and Cliff Diving, and organizes events such as Red Bull Dolomitenmann since 1988, thus building an emotional connection with the young audience from 16 to 34 years old (Perkov, 2023). Vertical integration through Red Bull Media House enables control over content, from movies and magazines to digital platforms, creating organic growth and an adventure image (Blankboard Studio, 2025; Cascade Strategy, 2024).

Table 2: Red Bull

Year	Income (in billions)	Profit margin	Net profit (in billions)	Income growth	Profit growth
2022	9,684	13,7%	1,33	7,02%	5,4%
2023	10,554	12,9%	1,36	9,0%	2,5%
2024	11,227	13,9%	1,55	6,4%	12,5%

Source: authors, (Red Bull, 2025; Statista, 2025)

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4   Methodology

4.1   Mathematical game-theoretic model of strategic interaction between Red Bull and Monster Energy

Game modelling

In this competitive setting, the players are Red Bull and Monster Energy, the two dominant global firms in the energy drink market. Analytically, each player is modelled as a rational profit-maximizing agent whose objective is to increase long-run market share, brand strength, and net profitability. Practically, this reflects real-world actions: both companies operate in a highly saturated international market where aggressive marketing, expansion, and brand differentiation determine performance. Red Bull acts as the market pioneer with strong brand identity and vertically integrated media operations, while Monster Energy leverages strategic partnerships (e.g., Coca-Cola) and rapid international expansion. Both firms actively observe competitor behaviour, making them ideal subjects for strategic modelling using game theory. Let us define the framework of the game.

1. Players

The strategic interaction in the energy drink market is modelled as a two-player normal-form game: $N = \{R, M\}$, where R denotes Red Bull and M denotes Monster Energy.

2. Strategy sets

Both firms choose between two strategic options: $s\_R = s\_M = \{A, K\}$, where A presents 'Aggressive expansion' (high investments in marketing, sponsorships, and market penetration) and K presents 'Conservative strategy' (cost optimization and stable growth without strong expansion). Practically, Red Bull's aggressive strategy appears in its investments in Formula 1, extreme sports, digital media, and global events; tactics that enhance brand value but require significant capital. Monster Energy mirrors this through extreme sports sponsorships and heavy marketing expenditures. Conversely, conservative strategies represent periods where firms

prioritize profit margins over expansion, often during market uncertainty or rising production costs.

3. Timing of moves

The game is modelled as a simultaneous-move, one-shot game in normal form. Each firm chooses its strategy without observing the competitor's choice. Practically, this mirrors how real firms operate: pricing decisions, annual marketing budgets, and expansion plans are made independently, often based on expectations rather than direct observation. Neither firm discloses strategic plans in advance, and decisions are shaped by industry signals, historical behaviour, and predictive analytics rather than explicit coordination.

4. Payoff structure

Let $u_R(s_R, s_M)$ and $u_M(s_R, s_M)$ denote the payoff functions. Payoffs are derived from empirical growth rates of net profits for 2022-2024. Based on the data, the payoff matrix in Table 3 (Monster Energy first, Red Bull second) is:

Table 3: Payoff matrix

	R: A	R: K
M: A	(14, 8)	(16, 5)
M: K	(8, 10)	(9, 7)

Source: authors' calculations (2025).

These values represent the percentage growth of net profits under each strategic combination. The payoff functions can be expressed as:

$u_R(A, A) = 8$, $u_R(A, K) = 5$, $u_R(K, A) = 10$, $u_R(K, K) = 7$

$u_M(A, A) = 14$, $u_M(A, K) = 16$, $u_M(K, A) = 8$, $u_M(K, K) = 9$

Practically, these payoffs represent real financial consequences: aggressive expansion yields high growth but also greater volatility, whereas conservative strategies produce stable but lower returns. The payoff structure also captures competitive spill over effects; one firm's expansion can reduce the other's market share, altering profitability outcomes.

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Game development

Dominant equilibrium

Dominant strategy equilibrium exists if both firms satisfy: $u\_i(A, s\_j) > u\_i(K, s\_j)$ for all $s\_j \in \{A, K\}$. Thus, A is a strictly dominant strategy for both firms. For example, best-response analysis yields:

For Monster Energy:

  − If R plays A: 14 > 8 → A is better.
  − If R plays K: 16 > 9 → A is better.

Hence, A is Monster's dominant strategy.

For Red Bull:

  − If M plays A: 8 > 5 → A is better.
  − If M plays K: 10 > 7 → A is better.

Hence, A is Red Bull's dominant strategy. Therefore, (A, A) is a dominant-strategy equilibrium.

Analytically, both firms exhibit a strictly dominant strategy of aggressive expansion (A). This occurs because the observed historical growth patterns show that aggressive investment consistently outperforms conservative behaviour in both symmetric and asymmetric scenarios. Practically, this aligns with the competitive nature of the energy drink industry. Firms that reduce marketing intensity risk losing brand visibility and shelf presence. As a result, both Red Bull and Monster face a competitive pressure to sustain high levels of promotional activity, even when costly, because retreating allows the rival to strengthen its position at their expense.

Nash equilibrium

A profile (s_R^*, s_M^*) is a Nash equilibrium if neither player benefits from unilateral deviation. Since both players have a dominant strategy A, (A, A) is the unique Nash equilibrium. For example, at (A, A):

- – Monster: deviating to K yields 8 < 14.
- – Red Bull: deviating to K yields 5 < 8.

Analytically, the profile (A, A) is the unique Nash equilibrium. In this state, both firms pursue aggressive expansion, and neither benefits from shifting to conservative behaviour, given the other's choice. Practically, this explains the persistent marketing arms race in the energy drink sector. Both companies maintain heavy, long-term sponsorship contracts, athlete endorsements, and global event portfolios. Neither can scale back spending without risking a visible competitive disadvantage. Thus, the equilibrium reflects real-world strategic lock-in driven by mutual expectations and industry dynamics.

Assessment of Prisoner's dilemma structure

A classical Prisoner's dilemma requires: (1) A dominant strategy that leads to (D, D), (2) while (C, C) is Pareto-superior. In this case, (A, A) gives higher payoffs for both firms than (K, K). Therefore, the model does not represent a standard Prisoner's dilemma. However, the strategic tension, i.e., fear of losing market share if the rival invests aggressively, resembles an arms-race dynamic (Plous, 1993). Even if aggressive strategies are optimal in the short run, the long-term sustainability of extreme marketing expenditures can be questionable. Firms may recognize that a mutually conservative market posture would reduce industry-wide costs, but competitive pressures prevent them from adopting such behaviour. Thus, the structure resembles a "high-pressure equilibrium" rather than a cooperative optimum.

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4.2 Extended model: Incorporating costs of aggressive expansion

To capture high marketing and sponsorship costs (e.g., F1, extreme sports), we introduce cost parameters: $c_R \geq 0$ for Red Bull and $c_M \geq 0$ for Monster. Net payoffs become: $u_R^c = g_R - c_R \cdot 1\{R = A\}$ and $u_M^c = g_M - c_M \cdot 1\{M = A\}$. Using reduced payoffs (as in the extended Table 4):

Table 4: Reduced payoffs

	R: A	R: K
M: A	(10, 4)	(11, 1)
M: K	(4, 6)	(5, 3)

Source: authors' calculations (2025).

Best-response analysis still suggests A is dominant for both firms, but only under moderate costs. If c_R or c_M exceed critical thresholds (e.g., for Red Bull: $8 - c_R \geq 5 \rightarrow c_R \leq 3$), the strategic ranking changes. Implications follow that with low costs, the equilibrium remains (A, A), but with high costs, the equilibrium shifts toward (K, K), reflecting a sustainability-oriented market outcome.

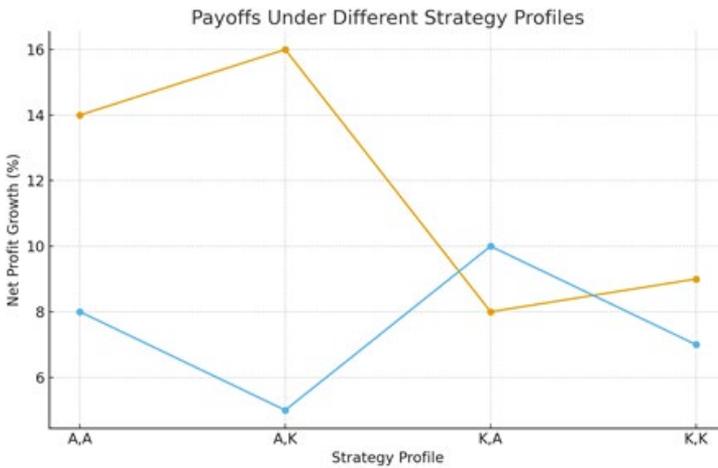The following figure illustrates payoff dynamics across strategy profiles (Figure 1):

Figure 1: Payoff dynamics across strategy profiles
Source: authors' calculations (2025).

When expansion costs are introduced, the payoffs adjust downward for aggressive strategies. Analytically, this shifts the payoff matrix and may alter best responses if costs exceed critical thresholds. If the marginal cost of aggressive investment surpasses marginal gain, conservative strategies may become optimal, leading to new equilibria potentially including (K, K). Practically, rising production costs, inflation, regulatory constraints, and diminishing returns on sponsorships can force firms to reconsider expansion intensity. For example, increasing costs in logistics, sugar taxation, sponsorship inflation, or media production can reduce the profitability of aggressive campaigns. In such cases, both firms may gradually converge toward cost-efficient strategies, especially in saturated markets or economic downturns.

5   Conclusion

The analysis of the strategic competition between Red Bull and Monster Energy shows that the competition in the global market of energy drinks can be explained very effectively with the classical tools of game theory. Empirical data on revenues, profitability, and growth dynamics of both companies clearly indicate that aggressive market expansion - characterized by intensive investments in marketing, sponsorships, distribution channels, and branding - represents a strategy that systematically brings more benefits than a conservative approach. Accordingly, the modelled outcome in the form of a dominant strategy confirms the existence of a Nash equilibrium in which both firms choose an aggressive approach because neither has an incentive to unilaterally deviate from it (Osborne, 2003; Tadelis, 2013). Although such an outcome ensures high growth rates and strengthens the global visibility of the brand, it simultaneously generates a strong market race in which both parties must continuously increase investments in order to maintain their position. This dynamic resembles an "arms-race" situation, as recognized in earlier research on competitive dilemmas (Plous, 1993), because reducing the intensity of one party's investments almost automatically creates space for the other to strengthen.

However, the extended model presented in the paper, which includes the cost structure of aggressive strategies, reveals an important nuance: if the costs of aggressive expansion exceed a certain threshold, the relative benefits of such a strategy begin to decline. In this case, there may be a shift in the equilibrium towards more conservative, cost-sustainable behaviour, which reduces competitive pressure and allows for the creation of a more stable market environment in the long run. In

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such a scenario, although cooperation in the formal sense is not possible due to the non-cooperative nature of the market, both companies could find themselves in a kind of "quasi-cooperative" state in which neither has reason for extreme, costly competition, and the emphasis shifts to profitability and sustainability. This conclusion is consistent with the additional empirical assertion that both firms have strong incentives for aggressive strategies, but that after the inclusion of cost factors, the competitive balance can shift towards more conservative behaviour, thus opening up possibilities for long-term stability similar to cooperative outcomes. This confirms that the strategic decisions of Red Bull and Monster Energy are not only the result of short-term market pressures, but also structural factors such as costs, market saturation, and profitability limits.

Overall, the research indicates that the long-term behaviour of leading energy drink manufacturers is shaped by a complex combination of mutual dependence, constant adaptation to competition, and rational risk management. In this context, game theory is confirmed as an extremely useful analytical framework that enables the understanding of not only current strategic decisions, but also potential changes in future market dynamics.

Acknowledgment

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