

Playing to Win: How Game Theory Explains Success and Failure

David POLOJAN

Faculty of Business Administration in Foreign Languages, Bucharest, Romania

polojandavid25@stud.ase.ro

Mihnea GHEORGHIU

Faculty of Business Administration in Foreign Languages, Bucharest, Romania

gheorghiumihnea25@stud.ase.ro

Abstract

Game theory has moved from a highly formal branch of economics to one of the most useful lenses for reading strategic behavior in business. Its central insight is simple: firms, producer groups, and even regulators do not decide in isolation, because every meaningful move is shaped by the expected response of others. This paper examines how game theory helps explain both success and failure in global markets through two contrasting settings, the rivalry between The Coca-Cola Company and PepsiCo, Inc., and the coordination of output within the Organization of the Petroleum Exporting Countries. The analysis is built around Nash equilibrium, the Prisoner's Dilemma, repeated games, credible commitment, and coopetition. Using a focused literature review and a qualitative comparative case approach, the paper argues that success tends to appear when market actors read incentives accurately, think beyond the next move, and sustain credible forms of restraint or coordination. Failure appears more often when individually rational strategies push everyone toward escalation, opportunistic defection, or unstable agreements. At the same time, the paper does not treat game theory as a mechanical predictor of reality. In branded consumer markets, emotions, signaling, and incomplete information complicate the clean logic of classical models. In energy markets, geopolitical shocks can suddenly alter the payoffs of cooperation and defection. The paper therefore offers a business centered but critically balanced reading of game theory, showing why its classical models still help explain present day competition.

Keywords: game theory, strategic interaction, Nash equilibrium, global markets, oligopoly competition, managerial strategy

Introduction

In global markets, firms almost never act alone. A price cut, a promotional campaign, a capacity decision, a supply cut, or a new product launch rarely produces its effects in a vacuum. Each move invites responses, countermoves, expectations, and sometimes retaliation. What looks like a simple managerial choice is often a strategic decision made under pressure from competitors, consumers, suppliers, and regulators. This is exactly where game theory becomes useful. Its real strength is that it asks not only what a firm should do on its own, but what it should do once the likely reaction of others is taken seriously.

This is why game theory matters so much for business. Since the publication of *Theory of Games and Economic Behavior*, strategic interdependence has become central to the way economists and managers understand competition, bargaining, cooperation, deterrence, and market structure (von Neumann & Morgenstern, 1944). Nash later gave the field its most influential equilibrium concept, an outcome in which no player can improve its position by deviating alone, given the strategies already chosen by the others (Nash, 1950). Once that idea enters the picture, competition can no longer be treated as a mechanical adjustment of prices and quantities. It becomes a process of mutual anticipation.

That shift is even more relevant now than it was in the past. Contemporary firms operate in concentrated industries, spend heavily on branding and digital visibility, rely on global supply

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chains, and face consumers whose preferences move quickly. Under these conditions, isolated optimization is not enough. Firms need to think in reactions. Even in markets that look intensely competitive, actors may still discover limited forms of coordination, signaling, or strategic restraint. In markets where cooperation would clearly help everyone, incentives to defect may still make stability difficult. Game theory matters because it helps explain both sides of that tension.

This paper stays anchored in that business logic. Game theory can of course be used beyond economics, in politics, biology, and international relations, but the present study keeps a tight focus on global markets. The title's promise, success and failure, is understood here in strategic rather than moral terms. Success refers to the ability of firms or producer groups to secure outcomes that are favorable and sustainable under competitive pressure. Failure refers to the opposite: destructive rivalry, unstable agreements, or individually rational moves that end up eroding value for everyone involved.

The central research question is therefore the following: how do game theoretic models explain success and failure in strategic interactions among firms and organizations in global markets? Three hypotheses guide the analysis. First, in concentrated markets, strategic interdependence often encourages aggressive behavior even when mutual restraint would leave all players better off. Second, cooperation among competitors can raise long run payoffs, but it remains fragile when monitoring and enforcement are weak. Third, repeated interaction, reputation, and credible commitments make stable cooperation more likely, although never guaranteed.

To answer these questions, the paper combines a focused literature review with a qualitative comparative analysis of two emblematic cases. The first is the long rivalry between The Coca-Cola Company and PepsiCo, Inc., which illustrates repeated competition in a branded consumer market. The second is the coordination of output within the Organization of the Petroleum Exporting Countries, which illustrates repeated cooperation among actors that still face strong incentives to defect. Taken together, the cases bring into view the two poles of strategic interaction that matter most in business analysis, rivalry and coordination.

The paper makes a modest but clear contribution. It does not try to invent a new theorem or build an elaborate quantitative model. Instead, it aims to do something more useful for a short research paper: connect classical game theoretic ideas with current market evidence in a way that remains analytically serious but still readable. The result is a business centered account of game theory that keeps its conceptual precision, remains aware of real world complications, and shows why the framework is still highly relevant in 2025 and early 2026.

Literature review

Development of game theory in economic research

Game theory entered economics as a formal answer to a simple but important problem: many economic outcomes depend on interaction, not isolated choice. Von Neumann and Morgenstern made that insight mathematically precise by treating decision makers as players whose payoffs depended on the combined strategies of all participants (von Neumann & Morgenstern, 1944). Their work opened a path beyond the simpler image of anonymous competition. Instead of assuming that firms merely react to impersonal market forces, the new framework made room for rivalry, bargaining, coalition formation, and tactical anticipation.

Nash's contribution was to generalize this logic and provide an equilibrium concept that could be used in non cooperative settings. A Nash equilibrium exists when each player's strategy is the best response to the strategies chosen by the others, so that no one has an incentive to deviate

alone (Nash, 1950). This idea became foundational because it translated strategic interdependence into a stable analytical outcome. In business terms, it helps explain why firms may settle into patterns of behavior that are stable without being efficient, desirable, or even attractive in the long run.

Later research made the framework more realistic by bringing in reputation, repeated interaction, imperfect information, and credible commitment. Kreps and Wilson (1982) showed that reputation can shape behavior in settings where future expectations matter. This was especially important for applied business analysis, because real markets rarely look like one shot games with perfect information. Firms signal, bluff, punish, accommodate, and learn. Strategic behavior unfolds over time, and the future often changes the meaning of the present.

Core concepts and their business relevance

At the heart of game theory lies strategic interdependence. A market actor is strategically interdependent when its outcome depends not only on its own decision, but also on the decisions of others. This sounds obvious, but it changes everything. A firm cannot decide whether a price cut, advertising campaign, or production increase is rational without asking how competitors are likely to respond. In many business settings, the best move is not the strongest move in the abstract, but the move that still makes sense after rivals answer it.

This logic appears in several standard distinctions used in the literature. Some games are cooperative and others non cooperative. Some are zero sum while others are non zero sum. Some are simultaneous, others sequential. Some are one shot, others repeated. For business analysis, the difference between one shot and repeated games is often the most revealing. In a one shot setting, short term opportunism is hard to resist. In repeated settings, the shadow of the future changes the incentives. Cooperation may become rational precisely because present defection can be punished later.

The Prisoner's Dilemma remains the clearest model of this tension. Each player has an incentive to defect regardless of what the other does, which makes defection a dominant strategy. Yet when both defect, both end up worse off than under mutual cooperation. That logic matters in business because it captures a recurring pattern. What is rational for each firm taken separately may be bad for the industry as a whole. Price wars, excessive promotional escalation, and unstable cartels all reflect this structure. The model remains useful because it shows why collective restraint is difficult to sustain even when all players understand its value.

Repeated games make the story more interesting. When actors expect to meet again, contingent strategies such as reciprocal cooperation or delayed punishment can support better outcomes. This matters enormously for managers. Firms that face one another over time can discipline one another not only through formal agreements, but also through reputation, signaling, and established response patterns. At the same time, the literature also shows why cooperation is easier to sustain when the horizon is open ended than when the final round is clearly visible. Once the endpoint becomes obvious, incentives to defect become stronger again.

Another key concept is credible commitment. A threat or promise matters only if others believe it. In entry games, for instance, an incumbent may threaten retaliation against a new entrant, but if carrying out the threat would be too costly, the threat lacks credibility. In repeated competition, by contrast, firms may create credibility through reputation, public communication, pricing norms, or organizational choices. The point is simple but powerful: beliefs about future behavior can shape present choices just as strongly as current payoffs do.

Game theory in marketing and managerial strategy

Although game theory was formalized inside economics, its value for managers depends on whether it can survive contact with real markets. That question has generated a long debate in marketing. Dominici (2011) captures the issue well. Marketing decisions are made in dynamic, interactive, and interdependent environments, which makes game theory look attractive. At the same time, real consumer markets rarely satisfy the strongest assumptions of classical models. Complete information, perfect information, stable payoffs, and strict rationality are simply not normal conditions in branded markets.

This criticism matters and should not be ignored. In consumer goods markets, firms do not compete only on price and quantity. They compete on shelf space, image, taste, packaging, health positioning, digital attention, and emotional associations. Consumers themselves are not purely rational calculators. Dominici's point is therefore not that game theory is useless, but that it has to be used carefully in environments shaped by incomplete information, behavioral noise, and symbolic value (Dominici, 2011).

Even so, the framework remains valuable because strategic interdependence is still real. Firms still react to one another. Advertising, pricing, product launches, reputation, and signaling still alter rival incentives. This is why more recent strategy research often uses game theory less as a machine for exact prediction and more as a disciplined way to identify incentive structures. Brandenburger and Nalebuff (1995) made this especially clear when they argued that firms should not see rivals only as enemies to defeat, but also as actors with whom value can be co created under the right conditions. Their idea of coopetition remains highly relevant in globalized markets, where firms may compete in one arena while depending on one another in another.

Recent work on advertising supports the same intuition. Yenipazarli (2024) shows that comparative advertising can be effective under some conditions but damaging under others. This matters because it moves past the simplistic idea that a more aggressive campaign is always the stronger move. The value of the move depends on market structure, asymmetry, and the way the rival is likely to respond. That lesson is deeply game theoretic. A strategic action cannot be judged properly unless the reaction function of the opponent enters the picture.

This literature points to the gap addressed by the present paper. On one side, the classical tradition gives us clear concepts such as Nash equilibrium, the Prisoner's Dilemma, repeated games, and credible commitment. On the other side, recent business research shows that actual markets are more dynamic, more behavioral, and more institutionally messy than the classical model assumes. What is often missing in short applied papers is a balanced bridge between those two bodies of work. Either the argument stays too abstract, or it becomes so technical that the strategic intuition disappears. This paper tries to close that gap by keeping the analysis business centered, using recognizable global cases, and treating game theory as both powerful and limited.

Methodology

The paper uses a qualitative, literature informed comparative case study design. The aim is not to estimate parameters econometrically, but to examine how core game theoretic concepts illuminate the strategic logic of two real world market settings. This fits the research question well, because the paper asks how game theoretic models explain success and failure in strategic interaction, not how strongly one numerical variable predicts another in a statistical sense.

The two cases were selected through theoretical sampling. The first case, The Coca-Cola Company versus PepsiCo, Inc., represents repeated rivalry in a branded oligopolistic consumer

market. It is useful because it combines long term competition with heavy investment in advertising, positioning, and distribution. The second case, OPEC coordination, represents repeated cooperation among competing producers in a global commodity market. It is useful because it places cooperation, defection, monitoring, and leadership at the center of the strategic problem. Together, the two cases create a clear contrast while remaining comparable through the lens of game theory.

The empirical basis of the analysis consists of public documents and selected scholarly sources. For the beverage case, current evidence comes primarily from the 2025 annual reports of The Coca-Cola Company and PepsiCo, Inc., both filed in 2026, together with recent scholarship on advertising rivalry and strategic interaction. For the OPEC case, the analysis relies on OPEC's 2025 Annual Statistical Bulletin, its March 2026 Monthly Oil Market Report, and a recent Reuters report on the 2026 U.S. Iran war and its effect on oil markets. These sources were chosen because they keep the discussion current without making the paper dependent on excessive factual detail.

The analytical procedure has two steps. First, each case is interpreted descriptively in order to identify the key actors, the relevant strategic variables, the likely payoffs, and the surrounding institutional context. Second, each case is translated into a stylized game theoretic structure using a normalized payoff matrix. These matrices are not presented as econometric estimates. Their purpose is explanatory. They make the strategic ranking of outcomes visible, which is exactly what this kind of paper needs.

That distinction matters. One of the standard criticisms of applied game theory is that it can look more precise than the underlying evidence really allows. To avoid that trap, the paper uses disciplined stylization. The payoff values are illustrative, but their ordering is grounded in the literature and in the basic case evidence. The argument is not that a certain move generates a precise dollar figure. The argument is that some strategic combinations are more attractive than others and that this ranking can be modeled coherently through game theoretic reasoning.

The main analytical categories used throughout the paper are Nash equilibrium, dominant strategy logic, the Prisoner's Dilemma, repeated interaction, credible commitment, and cooperation. Microsoft Excel was used to organize the descriptive case evidence and construct the normalized payoff tables. In that sense, the study adopts a focused analytical perspective built around two representative cases. This choice makes it possible to examine strategic interaction clearly and coherently while keeping the discussion aligned with the managerial purpose of the paper.

Results and discussions

The Coca-Cola Company versus PepsiCo, Inc.: repeated rivalry in a branded market

The rivalry between The Coca-Cola Company and PepsiCo, Inc. remains one of the clearest examples of repeated competition in consumer markets. It is not a pure duopoly in the strict technical sense, because both companies also compete against other beverage firms. Even so, their long running head to head rivalry still makes them analytically useful. PepsiCo's 2025 annual report shows consolidated net revenue of \$93.9 billion in 2025 and notes that beverages represented 42 percent of total consolidated net revenue. The Coca-Cola Company's 2025 annual report reports total net operating revenues of \$47.9 billion and 33.8 billion unit cases sold by the Coca-Cola system in 2025 (PepsiCo, Inc., 2026; The Coca-Cola Company, 2026). These figures do not prove a specific game on their own, but they confirm the scale, durability, and strategic significance of the rivalry.

In this environment, the two firms face a recurring problem. Moderate promotional behavior may preserve margins, but if one brand suddenly intensifies advertising or adopts a more aggressive comparative posture, the other risks losing visibility, shelf influence, and consumer attention. This creates the logic of a repeated Prisoner's Dilemma. Mutual moderation may be collectively better, but unilateral aggression can be privately tempting. Table 1 models this logic in stylized terms.

Table 1. Stylized payoff matrix for promotional rivalry

	Pepsi aggressive	Pepsi moderate
Coca-Cola aggressive	80, 80	120, 60
Coca-Cola moderate	60, 120	100, 100

(Source: authors' own research, 2026)

The matrix is normalized and illustrative, not empirical. Its role is to show ranking rather than measurement. If both firms remain moderate, each preserves better overall profitability. If one escalates while the other remains moderate, the aggressive player may gain attention, share, or bargaining leverage. Yet if both escalate, the result is weaker for both than mutual restraint because spending rises and the incremental gain from visibility declines. The Nash logic is direct. Once each firm expects the other might escalate, escalation becomes the safer best response. The equilibrium is stable, but it is not collectively optimal.

This reading fits both older and newer literature. Dominici (2011) notes that advertising competition often follows game theoretic logic because unilateral increases in spending can create an advantage, whereas joint escalation may reduce profitability. Yenipazarli (2024) pushes the point further by showing that comparative advertising in non zero sum competition can help firms attain certain objectives, but can also hurt the attacking firm or even the broader category if badly executed. That matters here because it reminds us that advertising rivalry is not simply a contest of boldness. It is strategic because its value depends on how the rival answers.

The repeated nature of the Coca-Cola Pepsi relationship complicates the one shot equilibrium. These firms do not meet once and disappear. They face one another continuously across retail negotiations, shelf battles, campaign cycles, and category innovation. Repetition creates room for signaling, accommodation, and tacit restraint. It does not eliminate conflict, but it makes moderation at least conceivable. For that reason, the rivalry is better understood as a repeated non zero sum game than as a pure war of annihilation. The companies compete intensely, yet both also depend on the long run health of the broader beverage category and on the durability of their brands.

OPEC: coordination, defection, and strategic shocks in the oil market

If the cola rivalry illustrates repeated competition, OPEC illustrates repeated coordination under temptation to defect. Its members benefit collectively when production discipline supports prices, yet each producer also faces a recurring incentive to exceed restraint and capture extra revenue in the short run. That tension has made OPEC one of the clearest real world illustrations of game theory in global commodity markets.

The strategic problem remains current. OPEC's Annual Statistical Bulletin 2025 and its March 2026 Monthly Oil Market Report both show that supply management remains central to how the organization presents market balance and stability (Organization of the Petroleum Exporting Countries, 2025, 2026). The underlying logic is familiar. Restraint can raise collective returns, but it works only if enough members believe others will also restrain themselves.

Table 2. Stylized payoff matrix for quota coordination in an oil cartel

	Producer B cooperates	Producer B defects
Producer A cooperates	110, 110	70, 130
Producer A defects	130, 70	85, 85

(Source: authors' own research, 2026)

Again, the matrix expresses ordered incentives rather than observed monetary values. Mutual cooperation yields the highest combined payoff because production restraint supports prices and collective revenue. If one producer defects while the other cooperates, the defector enjoys the best individual outcome by selling more into a supported market. If both defect, the collective arrangement weakens and the price supporting effect erodes, leaving both worse off than under disciplined cooperation. In one shot logic, the temptation to defect is obvious. In repeated interaction, however, the calculation changes.

OPEC's structure makes repetition central. Members meet regularly, monitor one another, and understand that today's opportunism can damage tomorrow's bargaining position. This is exactly where reputation and credible commitment matter. The cartel does not function because its members are naturally cooperative. It functions when enough of them believe that restraint will be reciprocated and that defection will eventually be noticed and answered. In this sense, OPEC is a stronger case for cooperative equilibrium than the Coca Cola Pepsi rivalry because explicit coordination is built into the institutional design.

At the same time, the arrangement is never fully secure. Members differ in production costs, fiscal needs, reserves, and political time horizons. These differences make the payoff structure asymmetric. Leadership therefore matters. In practice, larger players, especially Saudi Arabia, often absorb a disproportionate share of restraint because their broader strategic position gives them both the capacity and the incentive to stabilize the arrangement. In game theoretic terms, this looks like a leadership solution to collusion: one actor carries more of the burden in order to preserve a cooperative equilibrium that still benefits the group.

The strategic value of this case becomes even clearer once recent geopolitics are brought in. The U.S. attack on Iran that began on 28 February 2026 and the wider conflict that followed did not replace the OPEC game. It changed its payoffs. Reuters reported in late March that the war disrupted Middle Eastern energy routes, put the Strait of Hormuz under direct pressure, and kept oil prices elevated across scenarios, with close to one fifth of global oil and gas transit exposed to renewed risk (Reuters, 2026). For OPEC and OPEC+, that kind of shock raises the premium on coordinated signaling and supply discipline, while also increasing the temptation for individual producers to exploit tighter conditions. In other words, the geopolitical shock did not invalidate the model. It made the strategic logic more visible.

Comparative discussion

Placed side by side, the two cases clarify the paper's main argument. Both involve strategic interdependence, repeated interaction, and the possibility of outcomes that are stable but collectively suboptimal. Yet the institutional settings are different enough to produce different equilibrium tendencies. In the Coca Cola Pepsi case, antitrust constraints and branded rivalry keep the firms inside a space of repeated competitive adjustment. Tacit restraint may appear, but explicit coordination is not the governing logic. In the OPEC case, explicit coordination is part of the institutional structure, even though the temptation to defect remains constant.

The comparison also shows why game theory should be treated as a framework rather than a single formula. The same core concepts, Nash equilibrium, dominant strategy logic, repeated games, credible commitment, and the Prisoner's Dilemma, travel across both cases, but they do not generate identical outcomes. They help explain why the structure of incentives matters more than the surface story. A market can look chaotic and still display stable strategic logic. Another can look coordinated and still be internally fragile.

The cases also confirm the need for balance. Marketing rivalry is shaped by branding, consumer psychology, and symbolic value, which complicate strict rational choice assumptions. Oil coordination is shaped by politics, fiscal pressure, and external shocks, which complicate the clean logic of stable collusion. This is why game theory works best here not as a machine for exact prediction, but as a framework that clarifies the architecture of strategic interaction. Used that way, it remains highly useful.

Conclusion

This paper set out to answer a focused question: how do game theoretic models explain success and failure in strategic interactions among firms and organizations in global markets? The answer that emerges is clear. Game theory is most useful when it reveals how outcomes are structured by strategic interdependence rather than by isolated decision making. Firms and producer groups succeed when they anticipate reactions accurately, recognize the difference between short term temptation and long term value, and sustain arrangements that make favorable equilibria more durable. They fail when rivalry escalates automatically, when cooperation lacks credible support, or when individually rational moves destroy collective value.

The literature review showed why the framework still matters. Classical contributions from von Neumann, Morgenstern, and Nash continue to define the conceptual core of the field, while later work on reputation, coopetition, comparative advertising, and real market limitations has made the framework more realistic for business analysis. At the same time, critical voices remain necessary. The assumptions of complete information and strict rationality are too strong to be accepted without qualification, especially in consumer markets. A serious use of game theory therefore requires both confidence in its analytical power and caution in the way it is applied.

The two cases support that balanced conclusion. The Coca Cola Pepsi rivalry showed how repeated competition in a branded market can create Prisoner's Dilemma type incentives, where aggressive promotional moves are individually rational but collectively expensive. The OPEC case showed how repeated interaction, monitoring, leadership, and shifting geopolitical conditions can sustain cooperation more effectively, although never perfectly, among actors facing a constant temptation to defect. Together, the cases make one point very clear: success and failure are not random. They are often the predictable consequences of how incentives are organized over time.

From a managerial perspective, the paper suggests three practical lessons. First, market actors should think in reactions, not only in actions. Second, stable cooperation requires more than goodwill. It requires mechanisms that make cooperation credible. Third, escalation is not automatically a sign of strength. In many repeated games, the apparently harder move can destroy value, while a more measured strategy can preserve it. These lessons matter not only for consumer goods firms and commodity producers, but for managers operating in any environment where strategic responses shape outcomes.

The paper adopts a deliberately focused analytical perspective built around two representative cases and stylized payoff structures. That choice makes it possible to examine strategic interaction with conceptual clarity and managerial relevance, which suits the scope of the study well. The discussion also remains intentionally centered on the classical and most widely applicable uses of game theory, keeping the argument accessible and coherent rather than dispersing it across more technical branches. From this foundation, future research could move toward platform markets, digital advertising ecosystems, or cross border technology competition, where strategic interaction is increasingly shaped by data, algorithmic visibility, and regulatory intervention.

Even with that narrow focus, the central claim stands. Game theory remains one of the sharpest tools available for explaining why global market actors sometimes create value together and sometimes trap one another in costly equilibria. Its greatest practical benefit is not that it predicts everything. It is that it forces the analyst to ask the right question: not simply what one actor wants to do, but what becomes rational once everyone else is expected to respond.

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