



## Game Theory and Oligopoly: Crash Course Economics #26

Crash Course: Economics

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Jacob: Welcome to CrashCourse Economics. I'm Jacob Clifford.

Adriene: And I'm Adriene Hill, and today, we're talking about competition and game theory.

Jacob: Games? Like board games or video games? I can beat my seven year old at Call of Duty.

Adriene: No, not quite like that. In this kind of game, if you lose, you're bankrupt.

(Intro)

Jacob: So when we talk about markets, there are basically four different types, or market structures. They vary based on things like number of producers, control over prices, and barriers to entry, or how hard it is for new businesses to jump in the market. Most agricultural products, like strawberries, are in a type of market called perfect competition. There are thousands of farmers, all growing identical strawberries, and it's pretty easy to get in the market, you just plant strawberries. Individual businesses don't have control over prices. One farmer can't convince you to pay \$10 if you can buy it from other farmers for only \$4.

A monopoly is on the side of the spectrum. There's one large company that produces a product with very few substitutes, and because high barriers prevent competition, a monopoly has a lot of control over price.

There are two types of markets in between these extremes. Monopolistic competition is a market with many producers and relatively low barriers. Their products are very similar, but not identical. This could be something like furniture stores or fast food. McDonald's and Burger King do have noticeably different products. One might be able to charge a slightly higher price if, for whatever reason, consumers prefer that type of burger, but if either tried to increase their prices a lot, then everyone would just go to their competitor, and if McDonald's and Burger King both tried to raise their prices at the same time, some other company will enter the market since the barriers are relatively low. Taco Bell will start selling hamburgers.

The last type are oligopolies, and that's what we're gonna focus on today. Oligopolies are markets that have high barriers to entry and are controlled by a few large companies. Oligopolies are all over the place. In fact, their products are likely in front of you right now. The laptop computer market is dominated by companies like HP, Dell, and Apple, and the majority of mobile phones are produced by Apple, Samsung, and LG. You also see this type of thing in the market for cars, air travel, movies, candy, and game consoles.

Adriene: Like monopolistic competition, oligopolies often sell product that are similar but not identical and this gives them control over their prices. But how much? You might love your iPhone, but if Apple raised the price of a phone to \$3,000 you might switch to Android. But the price of an iPhone is pretty close to the price of a high-end Android.

So how do they compete? The answer is non-price competition and, as you might guess, it's competing without changing the price. This happens in a lot of industries. Companies focus on things like style, quality, location, or service. The goal is to distinguish their product from their competitors. Like, the jeans that one company sells might be virtually identical to everyone else's in terms of quality, but if they can convince consumers that having a designer label on their butt is cool, buyers might pay much much more. The same logic holds true if a better customer service or has more convenient locations.

The most recognizable form of non-price competition is advertising. Companies spend billions of dollars each year introducing new products or services and differentiating themselves from their competitors. And despite all that spending, most of the time, advertising just kind of fades into the background. Can you remember the ad that ran before this video? No? Me neither. Don Draper might tell you, "Half the money spent on advertising is wasted; the trouble is you don't know which half." It's clear that not every advertisement sticks, but advertising can work to help a brand stand out.

Jacob: So, those ads that run before YouTube videos? Some are for products sold in monopolistically competitive markets, but the majority are probably from oligopolies. I mean, think of car companies, they advertise a lot. Generally, monopolies don't bother advertising because they have no competition, and firms in perfectly competitive markets don't run ads because their products are identical.

Advertising just increases their costs and drives up the prices, which means customers go to their competitors. So, oligopolies sound like they operate pretty much like monopolistic competition but the big difference between the two is that oligopolies are made up of a few large companies. This means that each company makes a decision with the actions of their competitors in mind. They use game theory, the study of strategic decision making. Let's go to the Thought Bubble.

Adriene: Let's start with a classic of game theory, something called the "prisoner's dilemma." Suppose Stan and I are arrested for scrawling in wet cement outside the YouTube studios. We're being interviewed separately. If we both confess, we'll both have to pay a \$10,000 fine. If neither of us confesses we'll get it scot-free. And if I take a deal and confess, but Stan doesn't I'll walk away and Stan will owe \$20,000. And vice versa. So what do we do? Because we can't discuss it, we both confess, and both end up owing \$10,000. This is game theory: even if people or companies rationally follow their own self-interest, the best outcomes hard to reach when they can't or don't cooperate.

Game theory helps explain why you get drug stores and coffee shops next to each other. Let's say that Craig and Phil both start selling tchotchkes on the Coney Island Boardwalk. At first they start on opposite sides of the strip, sharing customers equally. Phil realizes that if he gets closer to Craig, he'll retain all of his old customers, and snag some of Craig's. But Craig's no dummy, he moves his cart closer to Phil's. This continues until they both wind up right in the middle of the boardwalk, sharing customers equally and unable to improve their position. This also plays out with pricing. If Craig lowers his price on Crash Course nesting dolls, Phil will likely compete by dropping his prices as well. In the end they're going to continue to share customers equally, and earn less money. If Craig understands game theory, he knows there's no reason to change his price. Instead, he focuses on providing knick-knacks that differentiate his kiosk from Phil's. This can help explain why the prices in oligopolies tend to get stuck and why companies focus so much on non-price competition. Thanks Thought Bubble.

So, what if Craig and Phil don't compete at all? What if instead, they agree to charge the same high price, conspiring to form what economists call a cartel?

Adriene: Again they split the customers 50/50, but they make even more profit, benefiting at the expense of customers. This is called collusion, and it's illegal in the U.S. There are strict antitrust laws designed to prevent it. But that doesn't mean companies don't figure out other ways to raise prices.

Price leadership is when one company changes its prices, and its



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competitors have to decide if they're going to follow suit. Since they're not actively colluding, it's technically legal. But it can be hard to tell the difference. Look at airline baggage fees. When some airlines started charging fees for checked bags, other airlines quickly joined them. And when one big airline changes their baggage fee, the others tend to move to the same price point. Are they colluding, or is this a case of price leadership? Well, the Justice Department's looking into it. Other countries' laws differ, and cartels do exist.

(Outro)

The best example is OPEC, The Organization of Petroleum Exporting Countries. It's an international cartel made up of oil-producing countries that manipulate oil supplies to control prices. They control 80% of the world's known oil reserves and nearly half of the world's crude oil production.

Jacob: Economists like to explain oligopolies and game theory by creating something called a payoff matrix. Let's say Stan and Brandon have competing companies. Each can set prices high or low. The numbers in the boxes represent the amount of the profit each company will earn in different situations. The profit on the left in each cell is for Stan and the numbers on the right are for Brandon. So if Stan has a low price and Brandon has a high price, Stan earns \$300 and Brandon earns \$50. Now, payoff scenarios for companies are never this transparent, but the matrix says a lot about oligopolies.

The optimal outcome is for each business to charge high prices so they both get \$200. Stan knows this, but he also recognizes that there could be even more profit by charging a lower price. Brandon comes to the same conclusion, so they both price low and they end up in the worst combined outcome with each only making \$80 profit. Even if they collude and agree to price high, they both have an incentive to cheat on that agreement.

Jacob: So collusion and cartels are often unstable. They can only last if the agreement is monitored and strictly enforced. A lot of times, it's possible to predict the final outcome based on the information in the payoff matrix. The best outcome for Stan, when Brandon makes a move, is called Stan's best response. So if Brandon prices high, Stan's best response is to price low and if Brandon prices low, Stan's best response is, again, to price low. That is called having a dominant strategy. It always gives the best available outcome, no matter what the other guy does. For Brandon, pricing low is his dominant strategy too. Regardless of what Stan does, pricing low always results in a better outcome.

Adriene: Game theory helps companies make decisions, but, potential payoffs are never easy to predict and there are many situations where there's no clear dominant strategy. Sometimes, the best response changes depending on what competitors do. Those that don't keep up or are slow to adapt are pushed aside. It's called game theory, but the former industry leaders like Pan American Airways, Atari, and Research In Motion, that made Blackberry phones, the end of the game was not that fun. In any game, there are winners and losers, unless it's some lame co-op thing. But at its best, healthy competition promotes innovation which, in the end, makes us all better off.

Jacob: And ideally we get cheaper air fares, constantly improving cell phones, and amazing video game consoles. Thanks for watching, we'll see you next week.

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