To What Extent does the Market for Game Consoles in Abu Dhabi Share the Characteristics of a Collusive Oligopoly?
Abstract

As a child I have always been interested in the battle between consoles for power and so as an economics student I chose to investigate the degree to which the market for gaming consoles represents that of a collusive oligopoly because gaming is a growing industry with lots of money being poured into it, and understanding how firms are using their resources is important insight into learning how businesses compete but also strive for mutual benefits. In order to investigate this I traveled to several malls across Abu Dhabi and recorded the prices of consoles from March to September while interviewing employees about each consoles successes and failures. The consoles I chose for investigation were Sony’s PlayStation 4, Microsoft's Xbox One, and Nintendo's Wii U, because they were the suspected leaders of the console market based off of past research. The models chosen for investigation were as similar as possible, and I also sent out a survey to my high school, the American Community School of Abu Dhabi, in order to get a better idea of what the population in Abu Dhabi thought of each console.

The overall results showed that the Playstation 4 hasn't changed its price at all, and this combined with results from the survey showed that Sony’s product had slightly more power in the market, but that it was still showing the characteristics of an oligopoly. Few firms with high barriers to entry were definitely characteristics of this market, however, collusion was difficult to evaluate because the data that I collected limited my analysis of how firms interacted with each other as it was more focused on finding data to investigate oligopolies rather than collusive behaviours.

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“To what extent does the market for game consoles in Abu Dhabi share the characteristics of a collusive oligopoly?”

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Section 1 - Introduction

Abu Dhabi, the capital of the United Arab Emirates, is home to some of the most wealthy people, statistically. Ranking 5th in GDP per capita, local residents of the UAE have no trouble purchasing luxury goods in large quantities due to their high income from the sales of oils in the last 50 years (UAE’s Per Capita).

One market that has seen growth in the nation has been that of console gaming. Based on the region sold, the three most popular console producers - Sony, Microsoft, and Nintendo, have each shown dominance in the market, however, never enough that the other two were having success, either (Stuart). In Abu Dhabi, console gaming is a popular leisure activity for both locals and expatriates, and all three have found loyal consumers for various reasons, for example the types of games that are supported on the console (Cleaver).

Due to the fact that there is a large consumer population in Abu Dhabi, console manufacturers will perhaps adjust their prices differently than elsewhere, and seeing whether or not they all choose to keep similar price levels will allow for the examination of how firms react with each other in a situation where demand is higher. Thus, the research question “To what extent does the market for game consoles in Abu Dhabi share the characteristics of a collusive oligopoly?” will allow for detailed economic analysis of the market structure as it will question whether or not these firms are interdependent, and will show how, when set in an area of high consumption rates and expenditure, if the decisions made by the individual firms and their products - the Playstation 4, Xbox One, and Wii U - correspond with those of a collusive oligopoly.
Section 2 - Methodology

The data that will be used to determine whether the console market is collusive and oligopolistic will be price. To prevent error there will be specific constraints on data collection that will determine what is considered valuable data and what is not.

Consoles are usually sold with a game in a ‘combo’. This helps attract buyers because the game is usually popular. The specific games that consoles are sold with may vary in price, and this may affect whether or not the console is sold. Moreover, the three consoles under investigation will all have slightly different specifications. These specifications include processing power, graphics, and storage space. It will be important to study the prices of a single console by Sony, for example, and not many with different specifications, because these are sold at different prices and will thus make the data more inaccurate (Consoles). Consoles with better specifications tend to require more of a firm's resources to produce, making them more expensive, since an extra processor chip will increase the cost by a fixed amount, for example. Moreover, it will be important to choose the console specifications that are most similar to each other (PS4 and Blockbuster Games). This means that the specific console chosen for investigation for each of the three producers should be as close to identical as possible (Bring a Wii U). When these variables are all controlled, seeing how price changes over a period of 7 months will aid in investigating collusion between the firms. The specifications chosen for the PS4 and XBox One were the 1 Terabyte versions, while the Wii U was specified as 32 Gigabytes.

The data will be collected between March and October of 2016. At least once a month, retailers will be visited where prices will be recorded and compiled. 4 different retailers were chose for visit and price analysis. The reason for having 4 stores and locations is to help diminish the individual pricing decisions made by stores, and to look primarily at the base prices set by the producers; since each store can make decisions on pricing the spread of data will be averaged out. Having the average price across all stores in the region will allow for analysis of the consoles price set by the firms, and not by the individual retailers.

The second portion of data collection will be used to determine general trends and popularity of each console in order to better determine whether this marker is oligopolistic. This will be done through a survey to the American Community School of Abu Dhabi’s high school student body, as well as through interviews with retail store representatives.
Section 3 - Economic Theory in the Context of the Research Question

A collusive oligopoly is the market form that most closely resembles that of the console market when looking at it without much detail. Additionally, no other market type (perfect competition, monopolistic competition, monopoly) has anywhere near the same amount of similarities.

The key characteristics of a collusive oligopoly are as follows. Similar to a normal oligopoly, collusive oligopolies may sell similar or differentiated products. This can be seen through consoles, they have different specifications and games, but serve the same basic purpose, which is to play video games. Oligopolies are also interdependent, meaning that their profit is affected by the pricing decisions of their rivals. This means that there can be some forms of price leadership taking place, which is when one firm who seems to be leading the market sets a price for the rest of the firms (Hall).

Another characteristic is of oligopolies is that there are few firms who control the majority of the market, and many who have a very small share. This is evident in the console market, where the last 10 consoles that have had significant share in the market have all come from either Nintendo (4 products 40% of Market), Sony (4 products, 40% of Market), or Microsoft (2 products, 20% of Market) (Gaming Console Market). This data is based off the previous best selling consoles, however, when visiting stores in Abu Dhabi, it is rare to see a product in the console section that isn’t from the top 3 mentioned firms.

When the prices of oligopolistic firm’s products stay constant, non-price determinants become a factor in how successful the firm does over a period of time. Advertising is the most common method of influencing a consumer's tastes and preferences, and this is a resource for console developers, too. However, the primary method for consoles to gain popularity is through the releases of highly anticipated games for that console. This attracts new consumers because they want to play this game, which is a complementary good. Complementary goods are defined as products whose supply and demand influence one another, and in this the 2 products are consoles and games (Maley). When the supply of games increases due to a new game being released, the demand for game consoles increases, as shown in Figure 1, where when supply for games shifts to the right from $S_1$ to $S_2$, the demand for consoles will shift to the right as well, from $D_1$ to $D_2$; creating new equilibrium $E_2$ at which there is a higher price for consoles when there are more games on the market.
The final basic characteristic of an oligopoly is that, like monopolies, they have high barriers to entry (Maley). The best example of this in the console industry is through game licenses, which bind video game producers to programming games specifically for a select few consoles. Licenses can have two different outcomes in the consoles industry. The first is that the three companies are all able to get a license from the game developers, which means that the game is available for all three consoles and considered ‘cross-platform’, an example of a developer that has licenses with all three consoles is the Lego Company, some examples of cross-platform games they have produced are Lego Marvel Superheros and more recently, Lego Star Wars The Force Awakens. Cross-platform games are beneficial to all consumers because they do not have to worry about which console they own. The second outcome is that games are licensed to only one or two out of the three console producers. This leads to games being referred to as ‘exclusives’. These are beneficial to owners of the console that the exclusive is supported by, but problematic to owners of consoles that don’t support console. Exclusive allow for firms to individualize themselves and thus attract consumers because only they have the complementary game on demand. Exclusive games are significant in determining the demand for a specific console because when a firm has full control over a certain product they gain more control over price, and thus could gain an advantage in the oligopoly.

Moving on, a feature that can be a singular but important difference in types of oligopolies is collusion. Collusion in oligopolies is defined as the cooperation of rival companies for mutual benefit (Maley). In the case of the console market this would mean that Sony, Microsoft, and Nintendo, working together in order to increase the overall revenue of all firms. There are two types of collusion, the first is known as formal collusion, which occurs when there is a formal agreement, likely a cartel, where firms agree how they will control the market. (Maley) In the console market, the three firms have not shown sufficient evidence of formal agreements for this to be the likely form of collusion to take place. The more likely option is known as informal collusion, where firms make an agreement on price control, but it is not binding; this allows for cheating to take place occasionally.
Cheating in this situation would be when console firms fund exclusive games, because this gives them an advantage over their competition that cannot be perfectly matched. In this case exclusives could show a lack of collusion because there wouldn’t be uniform increases in demand or price for all consoles in the market.

Figure 2 shows the possible situations that could occur once a game, either exclusive or cross-platform, is released into the market that would then provide insight as to whether collusion is occurring or not. If a cross-platform game were to be released, seeing that the average prices of all consoles increased from MC2 to MC1 would show that there is likely collusion between firms to maintain mutual benefits. Likewise, seeing that once the demand for this game fell, if all consoles fell back down from MC1 to MC2 then the same could be assumed (Welker).

Price and Quantity of Consoles Affected by Cheating

![Kinked Demand Curve](image_url)

Figure 2 - Kinked Demand Curve
In order to determine whether or not the market for gaming consoles is a collusive oligopoly, the prices of specific consoles and video games were recorded over a time period of 8 months. This allows for long term trends to be seen when displayed graphically, allowing one to determine whether or not collusive behaviour, such as cheating, was displayed in the prices. Moreover, a survey was sent out to all high school students at the American Community School of Abu Dhabi, there were a total of 210 responses. The survey was sent with the intentions of better understanding how evenly distributed the popularity of consoles were among the sample. Additionally, it investigated reasons for purchase, in order to better understand what determines a consumer's choice.

**Prices of Consoles Over Time**

Over the last 8 months of 2016, dating from March until October; 3 different retailers across 5 different shopping malls were visited. The prices of Playstation 4, Xbox One, and Wii U models were all recorded in a table. For both the Playstation and Xbox, the models with 1 Terabyte of storage space were chosen to be examined because they were the most similar in terms of prices based off of specifications, and because they were the best model being offered (Consoles). For the Wii, there was no 1 Terabyte model being sold, the best being the model of 32 Gigabytes of storage space, so this was chosen for data collection (Bring a Wii U).

The reason that the best console offered was chosen for data collection is because it would better represent the local community. As stated earlier, the UAE has one of the highest per capita GDP’s in the world. This means that they have lots of purchasing power and that that the locals will likely always purchase the best version of any product being sold. By choosing to examine the best offered models and no other, the data analysis will show conclusions about the local population and not simply show general trends in sales and market power.

Additionally, while the general price levels of the Playstation 4, Xbox One, and Wii U may not be identical, it should not impact the overall conclusions made from this portion of the data collection. This is because even though the data collected was price, the purpose of collecting this was to see general trends in pricing decisions by firms over time, which is what this data allows for.
### Table 1 - Prices of Individual Consoles Over Time

<table>
<thead>
<tr>
<th>Date Price was Taken</th>
<th>Price of Console in Arab Emirate Dirham (AED)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Playstation 4</td>
</tr>
<tr>
<td>March 10, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>April 23, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>May 13, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>June 14, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>June 25, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>July 29, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>August 4, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>August 14, 2016</td>
<td>1600</td>
</tr>
<tr>
<td>September 3, 2016</td>
<td>1600</td>
</tr>
<tr>
<td><strong>Average Price</strong></td>
<td><strong>1600</strong></td>
</tr>
</tbody>
</table>

There are clear trends that can be seen through the prices set each firm over time, especially with the price of the Playstation 4. While this table provides information, plotting the data as a line graph can accurately model changes in price over time, allowing for all three of the data sets to be seen together.

![Diagram One: Trends in Prices Over Time](image)
Analyzing the Trends of Console Price Over Time

The clear trend is Sony’s Playstation 4 never changed price across 8 months and retailers. It is clear from this information that Sony is happy with their relative position to both Nintendo and Microsoft, since they are selling more units than either of their competitors. “Playstation is the most popular here.” noted a Virgin Megastore employee. Across all retailers it was observed that their were slightly more units of PlayStation available at all times, with more versions of the console being sold, too. By keeping their price at 1600, which on average is higher than the other two consoles, Sony that they intend on keeping market power because if they are selling more, at a higher price, their profit will be greater (Goldberg). In the short run, firms usually choose to maintain a certain price level when they are already making profit; and based off of the success of the PS4 in Abu Dhabi according to sales and statistics that will be later discussed, it seems that Sony is in a comfortable spot (Short Run Firm). Another possibility for this reason of price decision is that there are non-price determinants involved in consumers product selection process, one of the biggest ones would be exclusive games, which Sony has an advantage in with over 70 different PS4 exclusives compared to Xbox’s 28 and Wii’s very specific child centric genre (PS4 Games vs XBox Games). However, even if Sony sees themselves as successful it doesn’t mean the other firms lose market power if this were an oligopoly.

Both the Wii U and Xbox One experienced significant changes in price. The Xbox was the console with the most fluctuation in its price, at times having it as high as 1,650 dirhams and other times as low as 1,350 during the data collection process. XBox’s fluctuating prices show some correspondence to the times at which both exclusive and cross-platform games were released in the past 8 months. The large increase in price during the month of June directly corresponded with two games hyped up in the media: Mirror's Edge Catalyst, an XBox exclusive, and Lego Star Wars The Force Awakens, a cross-platform game (Elliot). It is likely that Microsoft decided to hike up the price of their console during the month of June because Mirror's Edge Catalyst is only available on the XBox, forcing consumers who want to play this game to buy the console. Additionally, it would show why both the PS4 and Wii U either kept or lowered the prices during this month, in order to stay competitive when demand for their product was lower.

The majority of Wii U games are exclusive to the Nintendo console, thus when big games are released the other two firms would in theory react by lowering their price. However, from observation and discussion with employees at both Virgin Megastore and Carrefour the Wii has not been doing very well because it’s games are ‘childish’ and ‘there are not enough of them’ said one employee. The Wii also experienced some increase in price in July, and this was during the time where 2 games: Lego Star Wars The Force Awakens and Mario and Sonic at the Rio Olympics were released (Elliot). On average the Wii had the lowest price of 1405 dirhams, and this could likely be due to its choice of games.

The results of a survey shown in Figures 4 and 5 taken at the American Community School showed that most people preferred the PS4 to any other console, with more than 35% of the people choosing Sony’s console. This also goes in line with how Sony chose to maintain their 1600 dirham price, because they already have a larger consumer group than Microsoft and Nintendo and can rely on them to sustain their
business. The data also revealed that most people choose their console based off of their own tastes as well as the games available, and this goes against the Wii U because it fails to appeal to either of those for the majority of consumers, which is why Nintendo must set a lower base price to remain a significant member of the market.

![Figure 4 - Distribution of Console Ownership Among Sample Population at ACS](image)

Even though the PlayStation 4 seems to have a larger influence in the console market than the Wii U and Xbox One due to its superior games and appealingness to consumers according to the survey and interviews, as well as its constant, high pricing, both the Xbox and Wii have adjusted their prices over the last 8 months to compete with Sony. In the summer months of June and July, where more people have time to purchase and play video games on consoles, game releases corresponded with increases in the prices the Wii and Xbox. It is still difficult to determine whether or not this price adjustment is due to interfirm communication or general trends, however, each console has its power in the market to influence consumers towards one product or another.

![Figure 5 - Reasons for Purchasing Specific Consoles](image)
Section 5 - The Limitations of the Research

The purpose of this essay was to investigate how closely the characteristics of the game console market resembled that of a collusive oligopoly. The methodology of using prices as a measure of collusion had its limitations. The most prominent being that while producers may set a base price for the product that they provide to retailers, it is then entirely possible for retailers to increase or decrease the price within a certain range if they so chose. This would have altered the diagrams and graphs for the consoles over time and possibly lead to false conclusions. A base price was not obtainable specifically for the city of Abu Dhabi and thus stores were chosen for data collection, and this is where the issue arose, however, many different stores were visited in an attempt to find an average price for better data analysis.

Another limitation to the research was that the survey sent out to the American Community School of Abu Dhabi’s high school did not reach out to a large enough sample size to make any strong conclusions. The majority of the students at the school are the children of expatriates and thus not influenced by the local oil money which made the UAE one of the richest per capita nations in the world. This means that the question referring to whether or not one owned specific consoles would be skewed likely to show that there was less purchasing going on because of the disparity in income between local Emiratis and the rest of the residents of the city. Had the sample size been larger, more locals would have taken part in the survey and helped make the results more relevant and accurate, and the expected outcome would be that there would be more people buying products and less who didn’t own a console, like the survey which had 40% of responses state they did not.

An error in the methodology that led to limitations in the data collection and analysis of this research question was that it was assumed that cross-platform games were the primary form of video games for the three consoles, whereas in reality, it was the exclusive games that individualised the console and determined which system a consumer would buy. By making this assumption early on, prices for exclusive games were not recorded and therefore only their release dates were known. If the prices of new exclusive games were recorded one could have assessed how each firm chooses to price new games that are high on demand, and if each console games were set at similar prices, then perhaps conclusions could’ve been drawn as to how collusive this market really is.
Section 6 - Conclusion

Analysing the prices of consoles over the past 8 months as well as sending out a poll to the American Community School of Abu Dhabi’s high school yielded results as to how closely the market for video game consoles matches that of a collusive oligopoly.

Sony was shown to have a larger amount of the market share based off of the sample population that answered the poll, and this majority is not a characteristic of an oligopoly. In an oligopoly the top competing firms should theoretically have a balanced amount of power and influence in the market; it was shown in through the data, however, that Sony felt no need to change the prices of their consoles over this long period of time because according to retail employees they were consistently out selling their opponents in the market. People answered in the poll questions that they preferred the PlayStation 4 based off of their own tastes and preferences most of the time, and this showed that Sony has done a better job of establishing their brand and standing out compared to the other two firms.

The fact that both Microsoft and Nintendo, with their produced consoles, the XBox One and Wii U respectively, chose to change their prices multiple times every month showed that they perhaps were not confident in their market power and needed something to convince consumers to purchase their product. Additional data from the poll correlated with the results from the price analysis, with the Wii and Xbox having similar amounts of consumers but both significantly behind the PlayStation 4. Even though this lack of market equality doesn’t model the characteristics of an oligopoly, these three firms are still the only ones in the market with any significant power.

Moving on, collusion was difficult to analyse based on the conditions set forth, however, there was some extent of analysis that was possible. Sony did not change their price over the entire duration of the data collection process, however, both Microsoft and Nintendo had multiple price adjustments, and the timings of these changes show a small level of possible collusion. While it may be coincidence, during the months of May, June, and August, there were points when the prices of the Xbox One and Wii U had changed to become the exactly or almost equal, and lower than the price of the PlayStation 4. Firms may have chosen these times as peak points and thus adjusted accordingly to be able to better compete with Sony.

Overall, limitations to the data may result in inaccurate statements, but all 3 consoles showed ability to manipulate the market either through their own pricing or the price of their games, and no other firm other than Sony, Microsoft, and Nintendo has any game license. With high barriers to entry and a top three in big firms, the console industry can be classified as a fairly oligopolistic market based on the data, however, it was very difficult to detect any forms of collusion and thus with little confidence can one call this market a truly collusive oligopoly.
Section 7 - Bibliography


Appendix 1
Primary Source: Multiple Choice Survey
Participants: American Community School of Abu Dhabi High School Student Body

Questions
1. Do you or your any of your siblings own any of the following gaming consoles (Check all that apply)?
Possible Answers
   a. Playstation 4
   b. Xbox One
   c. Wii U
   d. None
2. Why did you purchase the one(s) that you did?
   a. Better graphics/performance
   b. Individual preference
   c. Price (Cheaper/Sales)
   d. Games that are available for the console
   e. I don’t own a console
   f. Other: (Typed Response)