The Market Structure of the Video Game Industry: A Platform Perspective

Sizhu Tan, Mingzhi Li

***Abstract*—The video game market has witnessed several significant structural changes. Our paper tries to explain the market structure dynamics of video game industry from the perspective of platform competition. We use a static game theory to find a stable solution. Then, we add expectations and expand the single-period to multi-period game and find another stable solution. Our analysis is confirmed comparing with the real-world situation.**

I. Introduction

VIDEO Game Console is a device for playing games on TV; in this paper, we particularly refer to the home-set of video game console.

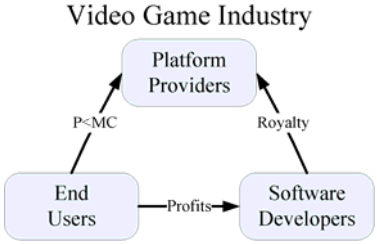
The video game industry has a great potential, which has been growing ever faster since 2005. In 2007, the total revenue of the global video game industry is expected to reach 35.8 billion dollar, with a growth rate of 11%, much higher than that of the global entertainment and media industry, which is expected to be 4.8%.

The video game industry has an interesting feature. Every 5-10 years, the hardware industry will start a whole new round of competition. Usually, only 3-5 big companies join the competition and finally only one wins. The winner will take more than half of the market share. But after a few years, the competition will start again an with a new winner stands out. This kind of situation has not been commonly observed in any other industries.

In this paper, first we introduce the history and current situation of the video game industry. Then we try to find out the economic rationale behind its market dynamics through a game theory type of analysis. In particular, we view competition in the video game industry from the perspective of platform.

II. The History and Current Situation of Video Game Industry

The video game industry can be divided into the hardware market (the video game console) and the software market (the games). The software industry is near perfectly competitive, with many companies competing in software market, such as SEGA, SquareEnix, Konami and so on. For simplicity we term the software companies which are independent from the hardware companies as The Third Party. The hardware market is a typical oligopoly, with three major companies: Nintendo, Sony and Microsoft.



Economists have realized that the sales of hardware are positively influenced by the quality of its software, and the sales of software are also affected by the sales of hardware. But not until 2004, have economists started to treat the video game industry from a two-sided market and platform perspective. The video game market is a typical two-sided market. From the graph above we can see, the hardware producer, as a platform supplier, offers the customers the game console at a cheap price. It earns profit mostly from the game producers. Although the customers can get the console at a low price, they have to pay a high price to the game software producers. The game producers get profit from the customers. But they also should pay a royalty to the hardware producer.

In 1945, with the invention of the computer, electronic game console was developed as well. The first war of hardware competition occurred in 1980's. The participants included Nintendo, SEGA and so on. Finally Nintendo's FC and SFC won out and took more than 80% of the market share. At the same time, a bunch of popular game brands emerged, including "Mario Brothers" and "Contra". The great success of FC and SFC helped Nintendo to become the monopoly of the hardware market. It began to put restriction on the third party game developers, such as asking for a high premium and restricting the topic of games. The conflict between Nintendo and the third party became more and more intense, and finally the relationship broke up. One of the most influential software companies, Squaresoft departed and developed its new work "Final Fantasy 7" on Playstation, which is the product of a new entrant Sony. This is the starting point toward the final success of Playstation.

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In March 2000, Sony launched Playstation2, which became the most popular game console at that time. It gained a sale of 110 million by 2006.

In 2002, Microsoft started to enter video game console industry with its new product XBOX. This game console sold well in Europe and America, but was unsuccessful in Japan.

The current war of video game consoles started in 2005, including XBOX360 ($399) of Microsoft which was launched in November 2005, Wii ($250) of Nintendo launched in December 2006 and PS3 ($599) launched in November 2006. XBOX360 and PS3 focus on the high definition of the picture, and Wii relies on a more creative way of game playing.

Currently, Wii's sale is much better than the other two. The customers welcome the new playing method. It becomes the most popular video game console ever. But most of the influential games are made by Nintendo itself (the first party). XBOX360 sells well in Europe and America, but is unsuccessful in Japan. It has a terrible defect in the designing of the hardware, which is believed to have affected the sales of XBOX360's sale badly. PS3 does not sell well because of its expensive price.

III. 3. An economic analysis of platform games

Now we analyze the market situation of the video game industry from the perspective of a platform game. We assume:

A. The hardware producer, who is also the platform supplier, can also produce the software (games).

B. All the producers in the third party are similar. That means, they will take the same action if they are in the same situation. The quantity of the third party is far more than that of the first party.

C. The customers will choose the platform which has the most games (including both the third party and the first party) on it.

D. For simplicity, we assume that the game is static.

In the game, the hardware producer has two options: Friendly and Repel. "Friendly" means the hardware producer will avoid the competition with the third party. It will not produce the games of the first party or control the sales of the first party. "Repel" means the hardware producer will do its best to expand the first party and compete with the third party to get a higher profit.

The third party also has two options: Cooperate and Reject. "Cooperate" means they will rely firmly on the hardware producer, and accept any of the hardware producer's action. "Reject" means the third party will oppose the action of the hardware producer and select the product of the hardware producer's rival as their platform.

		The software producer	
		Cooperate	Reject
The Hardware Producer	Friendly	(3,4)	(0,3)
	Repel	(4,1)	(1,2)

The payoff matrix is given as above. Now let's explain the meaning of the payoff matrix.

When the hardware producer chooses "Friendly" and the third party chooses "Cooperate", the third party will put all their games on this platform. Now the platform of the hardware producer has the most games. So it will become the best choice of the customers. In this situation, the hardware producer becomes the monopoly provider of the hardware industry. The payoffs of both sides are (3, 4). The sum of the payoff is the biggest. Since the hardware producer treats the third party friendly, it will control the first party, or asks for a low premium from the third party. Then the third party will get a bigger payoff than the hardware producer.

When the hardware producer chooses "Repel" and the third party chooses "Cooperate", the platform still has the most games. So the customers will choose its game console. The hardware producer becomes the monopoly provider of the hardware industry. But since the first party supported by the hardware producer competes with the third party, the hardware producer has the incentive to repel the third party in order to gain a higher profit, such as asks for a expensive premium and offers greater technology support to the first party. Now the payoff of the hardware producer is higher, reaches 4, as it can get premium from the third party and the profit from the first party. On the other side, the third party only gets 1.

When the hardware producer chooses "Repel" and the third party chooses "Reject", the third party will select the product of the hardware producer's rival as their platform. Now the game console of the hardware producer no longer has the most games, so customers will not choose it. The hardware producer loses most of its payoff. Its profit merely comes from the first party. Now the third party will take advantage on the new platform. Although they should pay a transfer cost, they are still better off.

When the hardware producer chooses "Friendly" and the third party chooses "Reject", now the third party still choose the rival's game console as their platform. There're still a few games on the hardware producer's platform. It won't be welcomed by customers. The hardware producer gets a low payoff. In order to show its friendship towards the third party, the hardware producer will offer better condition to attract them, such as offering high level technology support, asking for lower premium and even share the successful brands of the first party. This policy will improve the third party's condition and raise their payoff.

From the payoff matrix we could easily know, no matter the third party chooses to cooperate or to reject, the hardware producer will repel them, as the payoff of repelling is always higher than the payoff of being friendly. So, "Repel" is a dominant strategy of the hardware producer. But while the hardware producer chooses "Repel", the third party will definitely choose "Reject" according to their benefit. So the stable solution is "the hardware producer intend to repel, the third party intend to reject." The payoff of both sides is (1, 2). It's not a good situation, but will definitely happen in the single-period game.

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If we put the game into several periods, does the conclusion change?

Let's assume that the hardware producer and the third party are rational. They can make reasonable expectation for the future. Then, the hardware producer can expect that if he repels the third party, they will reject the platform and put their games in the rival's game console. Afterwards, the hardware producer itself will lose its benefit. At this time, although it costs a lot in the current period to take the "friendly" strategy, it will bring a lot of expected benefit in the future. If the expected benefit can cover the current cost, it's clever to treat the third party friendly. When (3-1)n>1-0 -> n>1/2, the hardware producer will choose the "friendly" strategy. Now the third party choose to cooperate, the payoff is (3, 4), which is the best situation.

IV. 4. Real-world Application

Now let's combine the theory and the reality to see how the theory works out in real-world.

In 1980's, Nintendo, who is the platform supplier, launched the game console FC (Family Computer) and SFC (Super Family Computer). It got support from a large number of third party game software providers and gradually developed. At that time, the third party cooperated with Nintendo. This made FC and SFC the most popular game console. Nintendo gradually became the monopoly of the hardware market.

At that time, Nintendo and the third party chose (Friendly, Cooperate) strategies. Both of them got a high payoff.

From the analysis in the last section, we know that this kind of situation was not stable. Nintendo intended to gain a higher share of profits. So on one hand, it tried to develop its own games; on the other hand, it restricted the third party developers with heavy pressure, such as asking for very high premium and checked the games with a high standard. In that period, Nintendo, as a monopoly, got extremely high profit both from the hardware market and from the software market, while the third party earned a very thin profit margins.

As we mentioned in the beginning of this paper, a new round of competition occurred every 5-10 years in the video game industry. It was just like a new game. In 1997, a new war of hardware began. Except Nintendo, Sony also entered the hardware market with its new product "Playstation". In this competition, Nintendo still took the "Repel" strategy. But the third party decided to reject this platform. Squaresoft, one of the most famous game producers, switched its new fabulous work "Final Fantasy VII" to Sony' s Playstation. In a short time, large number of game companies followed Squaresoft and abandoned Nintendo's new game console N64. Playstation got full support from the third party providers, and naturally it became the most popular game console.

Now the game reached a stable solution (Repel, Reject). Although the third party paid a transfer cost, they benefited from the switching after all. But Nintendo lost the status of monopoly. It only got profit from the first party and a low profit from hardware.

After the three periods, Nintendo had a rational expectation for the future. It realized that (Friendly, Cooperate) was a better situation. Nintendo began to repair the relation with the third party, such as offering full support in technology, cutting down the cost of developing a game and even lending some of its successful brands (like Mario Brother) to the third party. These actions lowered its current benefit, but gradually won the trust of the third party. Most of the third party who used to compete with Nintendo, started to develop games on its platform again.

In the current competition of the hardware market, the participants include Wii from Nintendo, PS3 from Sony and XBOX360 from Microsoft. According to the latest data, Wii from Nintendo has sold for more than a million. PS3 from Sony and XBOX360 from Microsoft have almost the same market shares.

V. Conclusion

Our paper tries to explain the market structure dynamics of video game industry from the perspective of platform competition. First, we use a static game theory to find a stable solution. Then we add expectations and expand the single-period to multi-period game and find another stable solution.

Comparing with the real-world situation, we confirm our analysis with the game theory. The video game industry is a special industry. A new round of competition occurs every 5-10 years and only one hardware producer wins the game and becomes the monopoly. The winners are different in every competition. In such a market condition, we can observe the predictions of the abovementioned games.

The theoretical analysis used in our paper is quite simple. The market structure changes in real world are more complicated, with many factors getting involved, such as technology improvement, expansion of customer base, and the effect of advertisement and so on. There are still many interesting questions left for future research. As for the newest development of the video game industry, Nintendo is still in the leading position of the hardware market, with bunches of the most popular games on Wii also developed by Nintendo. This is easier to understand since as the first party, Nintendo can make best use of its hardware. If we assume that the customers are not only concerned with quantity of the games, but also quality of the games, the characteristics and solutions of the games ill be different.

References

[1] Armstrong, M, 2006, *Competition in Two-Sided Markets*,[J], RAND Journal of Economics, Vol. 37(3), pp.668-691.

[2] Arthur, W. B., 1989, *Competing Technologies, Increasing Returns, and Lock-in by Historical Events*, [J] Economic Journal, Vol. 99(394), pp.116-131.

[3] Economides, N. and Katsamakas, E., 2006, *Two-Sided Competition of Proprietary vs. Open Source Technology Platforms and the Implications for the Software Industry*,[J] Management Science, Vol. 52(7), pp. 1057-1071.

[4] Evans, S. D., Hagiu A and Schmalensee R, 2004, *A Survey of The Economic Role of Software Platforms in Computer-Based Industries*, CESifo Working Paper.

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[5] Hagiu, A., 2007, *Microsoft Xbox: Changing the Game?* Harvard Business School case.
[6] Rochet, J. C. and Tirole, J., 2003, *Platform Competition in Two-Sided Markets*,[J] Journal of the European Economics Association, Vol.1(4), pp.990-1209.

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