

Abstract

Download digital product especially game for free harm game industry as no one will buy the original version for sale. As Steam enter the market and offer the solution to solve this problem. This paper wants to find out that Steam can reduce the illegal download rate or not. Someone may argue that just one download and the rest pay for it and everybody thinks this way. As the illegal download harm producer it also reduce innovation and R&D in game industry as afraid of copy and this industry will die soon as no one support the creator. In this paper will explain the consumer decision making to buy or download through model via using Salop's circle model and utility function to explain decision. Also collected data to support the model whether piracy rate is reduce or not from the existence of Steam. After analyze the data the question has been answer that Steam can reduce the piracy rate. However, it only reduce the piracy rate to lower level but not reduce it to zero as the irrational people because in the model assume that all people are rational. Steam also found the group of consumer that will buy the original produce if they have chance to try it at first place to reduce their cost. Author want to save this industry from illegal download and guide the way for investor to invest in this industry. Moreover, offer the way to avoid illegal download from Steam which Steam business model can be applied for prevent the negative effect from technology. Government can enter to help this industry also by imposed punishment from violate the copyright.

Introduction

As Internet become a main role of daily life it is very easy to find something you want from Internet even legal or illegal. Not only for gaming industry but also for music, films and program industry that also suffer from free download. Most of game producer company tries to use many scheme to block or prevent from playing in illegal version because this cause gaming industry lost a lot of profits.

Somebody may thinks that just one people download illegal one and the rest pay for original one the company will not default but what if everybody thinks this way? It is important that people need to concern more about intellectual property that how it effect the economy as a whole. If look down behind this problem, illegal downloading will reduce the incentive for game producer company to create new games and for investors to invest in this industry.

Steam was step in to revolute the way of playing game and selling games which give positive impact more on producers side. Steam is an Internet based game seller, right protection, multiplayer and social networking platform developed by valve corporation. Steam provides users with a very comfortable function such as self-update, community feature, cloud saving, matchmaking and support for users who have trouble using steam. Steam also selling Indies games for small company without steam these firms will not survive.

Hence, the piracy problem and its effect should be concerned and examined can Steam reduce the numbers of illegal download in the age of piracy.

Background of game industry

The computer game industry has grown more rapidly than music, television, cinema or any other entertainment industry that occur before game industry. In early 1984, a computer game market has established following of affordable home computer. Before that personal computer or home computer is very expensive which means ordinary people don't have a chance to use it but when the technology growing fast it effect the price of personal computer to cheaper as the mass production which reduce in cost in the other word, price reduce because of the Economies of Scales. In 2000, Computer games industry grow but not that fast from the effect of peer-to-peer (P2P) or Torrent which users can download every content from internet for free.

As year first introduced of Steam in 2004, at first Steam wasn't well known among gamers and the game that sell in Steam only from Valve but when the time pass by Stem prove that they successful in their role. In 2014, Steam users reach 100 million active users. Valve also announced today that there are now more than 3,700 total games on Steam. More than 1,300 games have been added so far in 2014.

As the decrease in sales due to the technology advance which make cost of piracy decrease from the faster internet and cheaper computer parts. For the game producer company need to rethink about enter this market due to the problem that music and cinema industry faced also. In the other hand, does Steam save game industry? That is the right question for the future of game industry.

Objectives of the study

- ☐ To examine the impact of Steam that can reduce the piracy rate or not
- ☐ To explain and analyze what is piracy problem and how it affects games producers and consumer purchasing of games
- ☐ To examine the factors influence in consuming the copyright games
- ☐ To provide strategy recommendation for game producers

Definition

Piracy refers to an unauthorized duplication of the authentic products without the consent of the owners of copyright. Pirated games include illegal only from peer to peer download.

Literature review

A growing of Internet age and technology become more fast and faster in every single day. The online piracy occurs not because of the consumer behavior but it from technology itself (Choi and Perez, 2006; Sudler, 2012; Peitz and Waelbroeck, 2006). Philippe, Hepburn, Teytelboym and Zenghelis (2002) research shows the rapid technological change makes the protection of rights difficult and costly. As the weak of government regulations has not imposed a framework which adequately solves it, then it would appear that pirates because free riding may curtail industry innovation.

Sudler's (2012) studied examining the effect of digital revolution, which has three major factors responsible for these trends. The primary problem of arrival of digital revolution is content in the Internet become easier to copy with little to no loss in quality. Another influential factor has been introduction of World Wide Web that leads to the low cost global distribution. A third catalyst has been the rapid increase of

high-speed networks. “Illegitimate distributors are increasingly turning streaming to deliver works because it faster, cheaper, and more convenient” (Chaudhry, Chaudhry, Stumpf and Sudler , 2012).

Sudler (2012) provide the positive effect from free downloading. It notes that piracy can increase fan base, product loyalty, and ultimately sales. Moreover, the evidence support that free downloading actually play a role in pushing the company to adopt there business models to cope with the internet technologies. Peitz and Waelbroeck (2005) result also aim in to the same direction by using Salop’s circle model to explain the asymmetric information problem as no one can observes the quality of the product before they purchased which this impact put a lot of cost to the consumers side. Free downloading can solves asymmetric information problem but like the double-edged sword. The positive side is that it will attract the customers group that will not buy that product before has sampling but this group will not buy if the free download is not available.

In this paper is try to explain the behavior of the consumers why they choose to commit a crime by downloading illegal version of games, Is the gaming industry suffer from this impact, What scheme they use to protect their property.

Methodology

Data collection:

In order to collect the data of illegal download, it must perform by using old statistics data since 1999. This research paper will use the comparison method to compare the numbers of downloaders (illegal version) before and after steam appear in this industry in order to see the impact of steam to reduce the numbers of illegal download or not. Moreover, this paper will focus only game that launches before the

age of steam and later on was sold on steam. The data will collect from peer to peer website which is very popular for illegal downloaders because it free of charge.

Data Analysis

Set up the model using Salop's circle model to determine the cost of consumers. After that will collect and compared the data this paper will analyze that behavior of consumers why the numbers of download increase or decrease. For the producers sides this paper will focus on how the firm adapt themselves from prevent the illegal version and how to del with it.

Limitations

In the age of steam there is around 2004 which most of all games are play only for single players which mean that in this paper will value the benefit of playing single player equal to multiplayer. The paper also focuses on games that sold before steam and later was put on steam store. Another point to mention is that the data will collect of peer to peer download not include the direct download on files sharing website because it is more than 10 years and all original files on the website was expired. For the fake CD version will not count also because it was sold in the black market and no data or statistic of how many produce or sold recorded. In the model also assume that every game provided by Steam can be try before purchase.

Contributions

The research is expected to yield the following results; Steam can reduce the numbers of illegal download and piracy rate of gaming industry but if the number increase it expected to be increase in decreasing rate. As the expected results from this

paper the benefit from this research is to show that game producers not need to concern about piracy as Steam still available which create confident from investors to invest and keep this industry growing. Moreover, as illegal download reduce it will create incentive of firms to create new games or the new innovation in gaming industry. Even in the worst cases if Steam can't reduce piracy rate this research still useful in term of warn, prevent and rethink of firms before get in to this industry and let them know why piracy is the most major problem in this industry and should they avoid this industry or not.

A simple model in which steam may reduce the piracy

Model setup

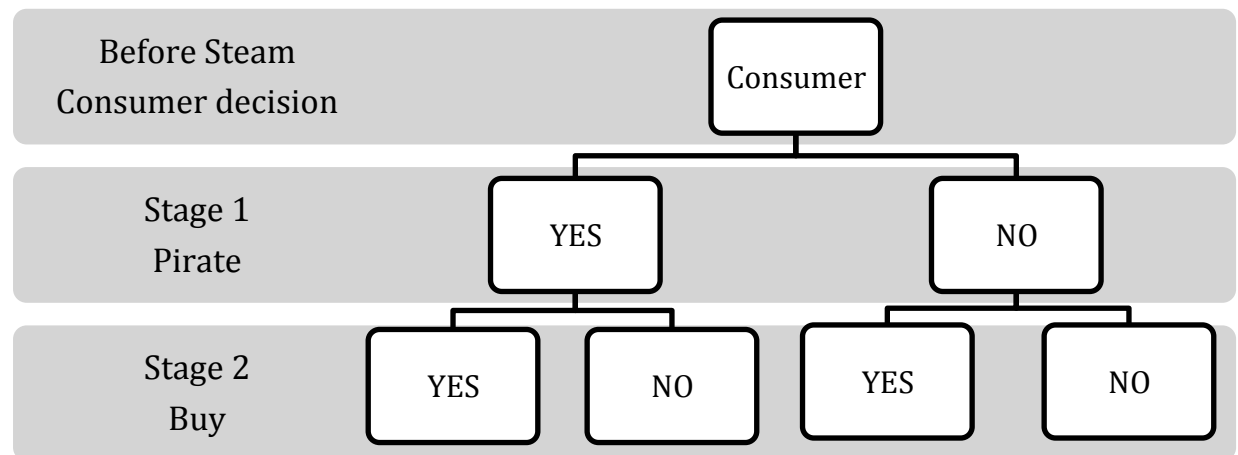
Game is an experience good, which means period before purchase or download you have no information about it as you need to play to observe the true value of it.

The main theory that considers explaining the behavior of downloader and buyer is Salop's circle model to formalize the product differentiation. The Salop's circle model is a variant of Hotelling's model. This two-location model is similar but each model introduced two main different, which is on Salop's circle model firms are located in a circle instead of a line and consumer allowed to choose second or other product.

In this circular model, consider the problem of multi-product monopolist that offers N products. All products are located at equal distance on a circle. Product A is located at L_A on the circle. The distance between two products is $\frac{1}{N}$. Game Producer Company can maximize profit by charging the same price P because all products have equal distance. In this model setup consider the final price of output of the product such as CDs at any marginal cost of production.

Consumer will have choices to choose which the variety of the product is as M. Consumer usually buys one product. Assume that product located at L. Consumer who chooses this product will gain surplus of $r - T |M - L|$ from Peitz and Waelbroeck (2005) in this paper will add more cost and benefit to compare between the time before and after Steam, where r is surplus of a product which located on the circle, T is transportation cost. T will measure the degree of substitution for one another. When T is large its mean that the product is very differentiate. In the case of piracy problem, consumer that decide the original product he will get more benefit which is B. This model also added benefit from buying original version over the copy one such as additional service when consumer faced a problem with their games (technical support), patch to fix bug of game and feel-good that they help support their game producer which the value from purchasing original version will be more than the pirate version. In the case of pirate version, downloader need to bear more cost and need to accept their problem that may occur on their computer such as virus or malwares, lack of technical support and game glitch (In some games you can't finished the game with pirate version). In the time that Internet connection still slow to download pirate game use more than 8 hours for one game. What if you wait for 8 hours and you can't play it? These are the problem for downloaders that they need accept.

Utility equation setup



At stage 1; As the symmetric information period. No one knows the true value or the cost that they have to bear if they decide to buy game. Let say in the theory point of view, consumer will not know the location of the game on Salop's circle model which consumer incurs an opportunity Consumer will have 2 stage of decision process

- Stage 1: Pirate or not, denoted by $p = 1$ for pirate and $p = 0$ for not pirate
- Stage 2: Buy or not buy, denoted by $b = 1$ for buy and $b = 0$ for not buy

Consumer has to consider their variable

- Denoted a consumer action as (p,b)
- Utility = U
- Price = P
- Location = L
- Variety = M

- Pirate cost ¹ = K; where $B > K$

Cost for the information which are the taste and type of game. Without pirating consumer will not have any information about it. Consumer will buy only at random. After consumer download they will learn the exact location, which is, the closest to them to maximize their own utility.

Case when pirate is not available

The market when pirate is not available. Consumer has choice to choose action to buy or not buy only so they can't pirate in this case. The response of consumer will be (0,1) and (0,0)

- If the consumer decides not to buy the utility will be

$$U(0,0) = 0$$

- If the consumer decides to buy at any location the utility will be

$$U(0,1) = r + B - T |M - L| - P$$

- When consumer decides to buy he still doesn't know the location of the game on a circle. Consumer does not have any information before purchasing a game.

Therefore, Consumer will buy game when $U(0,1) \geq U(0,0)$ and If the consumer decides not to buy but pirate the utility will be

$$U(1,0) = r - T |M - L| - K$$

- If the consumer decides to buy and pirate the utility will be

$$U(1,1) = r + B - T |M - L| - P - K$$

when $U(0,1) = U(0,0)$ consumer will feel indifferent between buy and not buy.

¹ Pirate cost is the cost when consumer decide to download pirate version and need to bear the cost of malwares, lack of technical support and glitch of game (defect)

Case when pirate is available

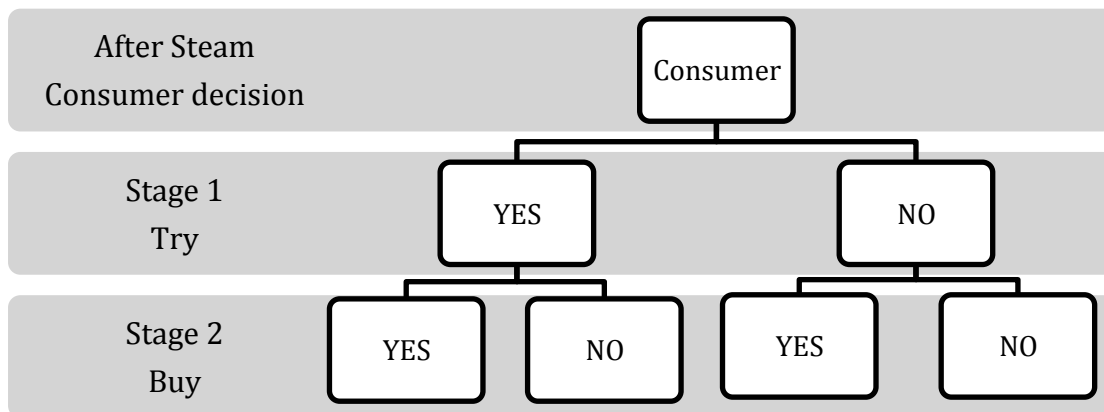
To explain the decision process of consumer as occurrence of many P2P or torrent sites. Consumer has choice to choose the action to pirate or not pirate. Under assumption that every consumer have rational thought. To reduce cost before purchase they will be pirate only. The response will be (1,0) and (1,1). Therefore, consumer will buy the original if $U(1,1) \geq U(1,0)$ and $P \geq B$. For the case when $B = P$ and $U(1,1) = U(1,0)$ consumer feels indifferent between buy and not buy. Before consumer consume pirate game they don't know the exact location of the game but after they pirate they know the location and know taste and game type that is suitable for them or game the response to their need. The cost will be higher for the one who decide to pirate because the pirate version will have Pirate cost (consider as defect). For the one who pirate and buy, consumer will know the information about game and gain benefit of buying original version but they already risk their computer after they decide to pirate.

Hence, these two markets consider when Steam doesn't exist. As Steam have free weekend or freemium² that provide to every Steam users to try that game for free with a limited time. With this strategy Steam can reduce the symmetric information, which in this paper consider as pirate (stage1).

Effect after Steam exists

In the case of Steam, consumer can observe the information by himself or herself.

² Freemium is a price strategy that provided with free of charge but charge premium with access to full version or unlimited time usage



Assume that in *Try stage = Pirate stage* because Steam provide information of the product and consumer can download and play for some period of time this will decrease the cost of finding location of the product on circle. Both stage result in less cost for finding out but case of pirate incurs pirate cost.

Consumer will have 2 stage of decision process

- Stage 1: Try or not try, denoted by $t = 1$ for try and $t = 0$ for not try
- Stage 2: Buy or not buy, denoted by $b = 1$ for buy and $b = 0$ for not buy

Consumer has to consider their variable

- Denoted a consumer action as (t,b)
- Utility = U
- Price = P
- Location = L
- Variety = M
- Steam benefit ³ = S

In stage 1: Everyone have chance to try to play game for free after they try they

³ Steam benefit is benefit from try and buy via Steam to avoid pirate cost that may occur after pirate game and provide 24hours technical support for buyer.

will know exact location of the product. In this case consumer don't need to bear opportunity cost to find out that each game is suitable to their preference and taste or not. Consumer will know the location without pirating game, which cost that consumer try from Steam, will less than cost from pirate.

Behind the assumption that everybody are rational which case that people choose not to try and buy game will not occur (0,1) but for the rest, the consumer response will be (0,0), (1,0) and (1,1)

- If the consumer decides not to try and not to buy the utility will be

$$U(0,0) = 0$$

- If the consumer decides to try but not buy the utility will be

$$U(1,0) = r + \frac{B}{2} - T |M - L|$$

As consumer can observe only limited time which the benefit from play game under try period will be half from actual benefit $= \frac{B}{2}$

- If the consumer decides to try and buy the utility will be

$$U(1,1) = r + S + B - T |M - L| - P$$

Therefore, consumer will buy the product if $U(1,1) \geq U(0,0)$ and $U(1,1) \geq U(1,0)$ but In the case of $U(1,1) = U(0,0)$ and $U(1,1) = U(1,0)$ consumer will feel indifferent between buy and not buy after try period.

In the model above can analyze the behavior of consumer no matter which response from their choices and show that after Steam exists consumer gave much more benefit than the period before Steam. Steam also help to reduce asymmetric information problem or the cost that put on thee consumer side which these make consumer decide to pirate as the cost for buy without know any information about game that they will buy. So, Steam help to solve asymmetric information which cost in consumer side will be less if compared with the period before Steam.

Pirate will be less as Steam solves the asymmetric that may occur during purchase. Hence, model show that Steam can reduce pirate but in fact piracy can't be eliminate or decrease to zero. No matter how well Steam is there is always room for pirate. In the model assume that benefit for TRY is higher than PIRATE. Even benefit for try is higher there still irrational thinker that still choose to pirate because they want to play game without limited time and without purchase but they will risk their computer from chance of having virus and glitch. Hence, this model setup behind the assumption that everyone was rational but reality there are irrational also. In all cases if utility at before period will less than utility at after period people will turn to buy from Steam at any cases.

Statistic data

For the statistic data research to find the figure of total sales before and after Steam exists. The data concern only games that sell before Steam and later on these games were put on Steam store again.

Total sales before Steam exists

	UNITS	PROPORTION OF SAMPLE	PERCENTAGE
Half-life	9300000	0.603896104	60.38961039
Half-life: Opposing force	1100000	0.071428571	7.142857143
Half-life: Blue shift	800000	0.051948052	5.194805195
Counter strike	4200000	0.272727273	27.27272727
Total game sold	15400000	1	100

Before Steam exist
Sources: gamasutra.com

This data collect from independent valve developer released lifetime sales figure over Valve ten-year history. In face Valve always kept their information privately which all of the following statistic data were describes Valve estimate of worldwide lifetime retail sales.

Total owned after Steam exists

	UNITS	PROPORTION OF SAMPLE	PERCENTAGE
Half-life	53375	0.242098627	24.20986266
Half-life: Opposing force	46201	0.209558757	20.95587568
Half-life: Blue shift	46275	0.209894406	20.98944064
Counter strike	74617	0.33844821	33.84482102
Total game sold	220468	1	100

After Steam exists (220,468 samples)

Source: steamdb.info

This set of statistic data was collect from 220,468 samples. This sample get access to the Steam users to collect how many people owned these games as these games were sold before Steam exists. As the data above estimate from Valve worldwide lifetime sales but this data collect for some sample that is the reason why this second statistic data have less number of units.

Look at the percentage change between two periods. Percentage increase from Half-life: Opposing force, Half-life: Blue shift and Counter-Strike by 13.81% 15.79% and 6.57% respectively. The data shown that 3 out of 4 games sales increase after Steam exists. However, for the Half-life total sales decrease by 36.17%

GAME	PERCENTAGE CHANGE
Half-life	-36.17974773
Half-life: Opposing force	13.81301854
Half-life: Blue shift	15.79463545
Counter strike	6.572093744

From the percentage change its hard to conclude that increase in sales imply the reduce number of piracy. From the statistic data Author like to use statistic method that is dependent T-test to find the significant for the data above.

Dependent T-Test

Author decide to use T-test not Z-test because the sample N is less than 30 and dependent t-test because game is not depreciate it will stay forever and consumer who buy game will not buy the same game again which sales will be increase in decrease rate in the long-run.

Setup the hypothesis

$H_{\text{null}}: = 0$; Denoted $\beta = 0$ when Steam has no impact to pirate games

$H_A: \neq 0$; Denoted $\beta \neq 0$ when Steam has impact to not pirate games

Significant level 95%

$t = -12.706 \text{ and } 12.706$

After compute statistic data via using T-test method the result show that in every case of each game always accept the reject region. Accepting reject region mean this case will accept H_{null} hypothesis even the expected result will be reject

H_{null} . This result can conclude in the way that it is occur Type1 error from too little sample data that use to compute in T-test. Type1 error stated the result that it should reject H_{null} instead of accepts. It may occur from unequal set data and too little sample data. Therefore, statistic test cannot prove in this case and have no significant for this set of data.

T-TEST	HALF-LIFE	HALF-LIFE:OF	HALF-LIFE:BS	COUNTER STRIKE
N	2	2	2	2
Mean	42.29973652	14.04936641	13.09212292	30.55877414
Std	25.58294496	9.767279078	11.16849383	4.647172053
Std error	18.08987387	6.90650927	7.897317725	3.286046872
Tails	2	2	2	2
Degree of freedom	1	1	1	1
Significant level	0.05	0.05	0.05	0.05
T-stat	2.338310197	2.034221032	1.657793618	9.29955516
P value	0.257271358	0.290868981	0.345542872	0.06819497
T-critical value	12.70620474	12.70620474	12.70620474	12.70620474
Significant	No	No	No	No

Conclusion

Does the impact of Steam can reduce the piracy rate in gaming industry? This paper analysis shows the answer “yes”. However, even Steam can decrease piracy rate but Steam can’t reduce it to zero. No matter how well Steam is there is always room for pirate. The model result show the benefit from buying after Steam exists increase and also reduces the cost of pirate and opportunity cost from asymmetric information. Steam provided freemium for users to informed consumer before their purchase to observe characteristic of the game that match their taste and preference or not. Another point is even Steam doesn’t exist at first it give a surprise result to Author because when pirate game occur it create some group of customer that will buy after they know information of games which they can observe it worth to pay for or not.

Result in this paper can applied in other field, to other digital product such as music and software and to the business point of view as well. Steam business model is very clever to cope with the problem of piracy. Steam also give a breath to the independent game producer or fringe firms which afraid of piracy effect that can survive on Steam platform and have more distribution channel to sold their games. The piracy occurs because of asymmetric problem and Steam came in to solve this problem. For contribution to the society, this paper can use for investment decision as Steam protect producer and less cost for consumers. Result in more innovative to hardware, software and more R&D and increase in technology. Government can step in to help producers also as they can set the higher punishment from using technology in the bad way that create negative effect to the industry.

The statistic data on this paper is not as good as Author expect because Valve is a private company. The information is kept to be secret. Valve didn’t provide any

information to public. In the future if Valve becomes public company this paper can be used again to test with new data that Valve released so the result will be more accurate. Data contains in this paper is very hard to find and consumer a lot of time to collect and result is bad. Author was send email to ask Valve for access to their sale data but they reject my request. Therefore, no wonder that bad data crate Type1 error.

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