Contributing Your Notes:

The Potential of Voluntary Contribution Music Markets

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Introduction:

The music industry's operations have been under dynamic change for the last decade. Following the infamous Napster peer-to-peer (P2P) file sharing case, both artists and consumers alike made the transition from buying and selling in shops and malls to buying and selling through online music stores. For the past decade, the majority of online music sales have been done through set price music markets,[1] iTunes being the largest with a significant market share of 63%.[2] Although this type of market has been effective for suppliers and consumers to buy and sell music, in recent times another type of online music market that has emerged. This market has the potential to be more efficient than a set price one. Voluntary contribution markets[3] (VCMs) are not new to the music industry, but have gained attention in recent years. This came to prominence when famous rock band Radiohead released their album, *In Rainbows,* in a VCM. Long before *In Rainbows* was released physically, the band began selling it online in a VCM. Radiohead made more money from just the VCM than all sales of their previous albums.[4] After their success, many artists began to explore the potential of VCMs. This paper will model the profit potential of VCMs in comparison to a set price market such as iTunes.

The way music markets operate ought to be reexamined because current music markets have a potential inefficiency. As an information good, music is difficult to sell to

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[1] A goods market in which consumers pay a price set by the supplier
[2] Bostic Kevin , "Apple's iTunes rules digital music market with 63% share," *Apple Insider* (blog), 04 26, 2013, http://appleinsider.com/articles/13/04/16/apples-itunes-rules-digital-music-market-with-63-share.
[3] A goods market in which consumers pay what they want for the good
[4] , "Exclusive: Warner Chappell reveals Radiohead's 'In Rainbows' pot of gold," *Music Ally* (blog), 10 15, 2008, http://musically.com/2008/10/15/exclusive-warner-chappell-reveals-radioheads-in-rainbows-pot-of-gold/.

consumers. Before they consume music, people cannot fully know how much they value a song or album. In a set price market, the supplier will set a price for a song or album. If the consumer decides to buy that unit of music, they must pay that set amount, regardless of whether they value it at that price. This transaction results in a potential loss of both profit and utility. For example, a supplier may set the price of their album at $X. However, a consumer may value the album at lesser amount $Z, and thus a loss of utility occurred from having to pay more than they desired. Or, the consumer may value the album at greater amount $Y, and thus the supplier incurs a loss of profit from charging the lesser amount.

VCMs have the potential to solve this inefficiency. Rather than suppliers setting a set price for a song or an album, the consumers decide how much they wish to pay. This way, if a consumer values a song at price $X, they can pay exactly that amount. There are many different ways in which a VCM can operate that will affect the outcome of a market's potential. This will be discussed in the review of the literature.

Review of the Literature:

VCMs are not a new concept to the music industry. This type of market has been in existence since as early as 2003. A popular VCM at the time was *Magnatune*. Regner and Barria (2009) showed the potential of VCMs by modeling the success of *Magnatune*.[5] According to Regner and Barria, *Magnatune* shows the real world potential of voluntary contribution. While many studies have shown that consumers will pay voluntarily, most of these results come from laboratory settings. The example of *Magnatune* not only shows consumer's willingness to pay voluntarily, but it does so in a real life music market setting.

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[5] Regnar Tobias , and Barria Javier , "Do consumers pay voluntarily? The case of online music," *Journal of Economic Behavior & Organization* (2009): 395-406,

An important note that the authors stress is the success of a VCM seems to be heavily dependent on a number of certain criteria being met. Some of these criteria include the artists being relatively unknown or independent or consumers knowing specifically how much of the money they spend is being given to the artist. In particular, there are two criteria that are important to understand in order to show how VCMs can be successful.

Magnatune's prosperity was largely due to its use of behavioral heuristics within the VCM to maximize consumer's willingness to pay. Since the market is online, everything from the page design to the wording used is carefully planned using the anchoring heuristic [6] to sway consumers how much to pay for an album. For example, when describing how much an album costs, *Magnatune* would suggest a price. What data has shown, given an anchor in price, consumers on average will pay slightly more than the suggested amount. This phenomenon could be attributed to the altruistic "warm glow" feeling if they pay the anchored price, or guilt if they do not. The implication is that consumers, if presented information in a specific way, will pay an amount for music that will be profitable for artists and suppliers.

The second beneficial feature for a VCM is perfect sampling. While Regner and Barria's research supports the importance of perfect sampling, Gopal, Bhattacharjee, and Sanders were able to model the significance that sampling can have on a consumer's decision to purchase music. [7]

Sampling in music is the ability for a consumer to preview a song or album before

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[6] A tendency to make judgments by beginning with an initial estimate (an anchor) and then adjusting this estimate to reach a final decision

[7] Ram Gopal, Sudip Bhattacharjee,, and Lawrence Sanders, "Do Artists Benefit from Online Music Sharing?,"*Chicago Journals* (2006): 1503-1529.

deciding to purchase. This is an important concept for music because it is an information good[8]. A consumer will not know how much they are willing to pay until after it is first consumed. Music is also different from other goods in that every unit of music is different from each other. Thus a consumer's willingness to pay for one song will not be the same for another song. In addition, consumers cannot use their past history of purchasing music to perceive how much they will like another song. For example, if someone likes bananas, they know exactly how much utility consuming a banana gives them. Music however, is different. If a consumer likes music, it does not necessarily imply that one unit of music will grant the same amount of utility as another unit.

Offering perfect sampling of music will increase the likelihood of a consumer to purchase the sampled music. VCMs, such as *Magnatune,* have offered full sampling of their music since inception, which both Regner and Barria largely attribute for it's success. During this study of *Magnatune,* iTunes had imperfect sampling, usually only a 30 second to 1 minute clip of a song. iTunes thought that by offering the ability for consumers to hear a song before purchasing, it would actually be a deterrent from them deciding to buy it. However, both papers agree that this is not true. On the contrary, having the ability to perfectly sample music online for free is not seen as a substitute to buying music, as consumers still prefer to own their music.[9]

Methodology:

This section will seek to model when a music supplier would choose to sell through

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[8] A good for which its value is derived from the information it contains

[9] Dufft Nicole, "Digital Music Usage and DRM," *The Informed Dialogue about Consumer Acceptability of DRM Solutions in Europe* (2005), http://www.indicare.org/survey (accessed November 1, 2013).

a fixed price market (iTunes) versus a voluntary contribution market. This is modeled through a decision tree involving both suppliers and consumers of a music market. In this game, there are a number of constraints and assumptions that are made to ensure simplicity and accuracy of selling music online.

For this game, there exists only one supplier. This is because the game is examining the relationship between the supplier and the consumer, rather than two suppliers. The supplier is only allowed to use one of the markets, either iTunes or VCM, but not both.

The seller will only sell one unit of music. Rather than viewing music in albums or songs, a single unit is a more simplistic way to view music as a product.

Along with having only one supplier, there is also a fixed distribution of customers. In each variation of this market, there can be N types of consumers, C_n where n = 1 to N. For simplicity, every consumer of type C_n has utility $U_n=n$. Furthermore, every C_n has the same number of consumers.

In this paper, the game will be played three different times, starting with N = 1 and ending when N = 3. The reason for stopping at three consumers is because adding more consumers past N > 3 will yield similar results.

The game also models a fixed cost which suppliers incur regardless of which market is chosen. If suppliers cannot pay the fixed cost, then they will not sell their song. For instance, the fixed cost could be due to the price of recording the song, producing, etc. For example:

Fixed Cost (FC) = F, with N = 1 types of consumers, with consumer type being C_1

If the firm is to enter the market, it must make back its FC of F. Since there is only one consumer type who would pay up to U_1, the firm knows it would make back its FC only if $U_1 \geq F$ thus would enter the market. If $F > U_1$ then the firm will not enter the market.

It is also assumed that variable costs after fixed costs are zero. This assumption is actually not far off from an actual music market. The nature of selling online music makes variable cost very low if not zero, as once a song is recorded and uploaded online, there is no cost to the supplier for the song to be downloaded multiple times. For example, once a song is for sale on iTunes, it can be downloaded an infinite number of times by consumers at no additional cost to the supplier for every time it is downloaded.

Another factor that must be accounted for is how the supplier would know what consumers are expected to pay, i.e. U_i is unknown. In the model, it is assumed that suppliers know how much consumers are expected to pay, and thus make their decision accordingly. Normally, consumers would not openly tell a supplier what their willingness to pay is, nor may they even know it. But, suppliers can still know this, or at least estimate it, from the previous experiences selling music. While each unit of music is in fact unique, and only that specific seller has the ability to sell it, it is still a substitute to other similar units of music. Suppliers are still able to accurately gauge how much consumers would be willing to pay based off of previous interactions with these substitutes. Also, suppliers can look at what populations of consumers have paid for other substitutes to better gauge what U_i may be. If the supplier looks at the history of what consumers have paid for substitutes of the

song, then they can accurately estimate what their song would make.

The first part of the game is:
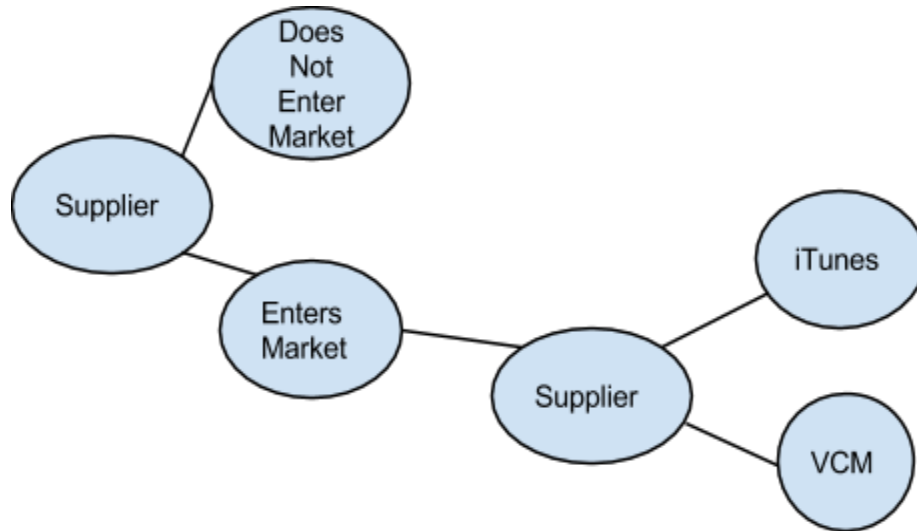
First, the supplier makes the decision whether or not to enter the market. This will be based off of whether or not fixed costs will be at least equal to expected profit. For variations of this game, it is assumed that fixed costs are lower or equal to profit of iTunes, and thus the supplier enters the market. Then, the supplier would decide whether to move to sell through iTunes or through the VCM. If the supplier chooses to go to iTunes, then the song will be sold at the market price, which in these variations will be one of U_1, U_2, or U_3. If the supplier goes to this node, the game is done and consumers will pay the set price if they value the song equal or less than to their willingness to pay. But, if the supplier chooses to go to the VCM, then the consumers then move to decide how much to pay. If the supplier chooses to go to the VCM, consumers will have the option to pay up to their willingness to pay. This will be affected by what the price would be in the iTunes market as well.

8

Game Variations:

In this section, the game will be played with various cases for N_n types of consumers.

Game 1: N = 1,
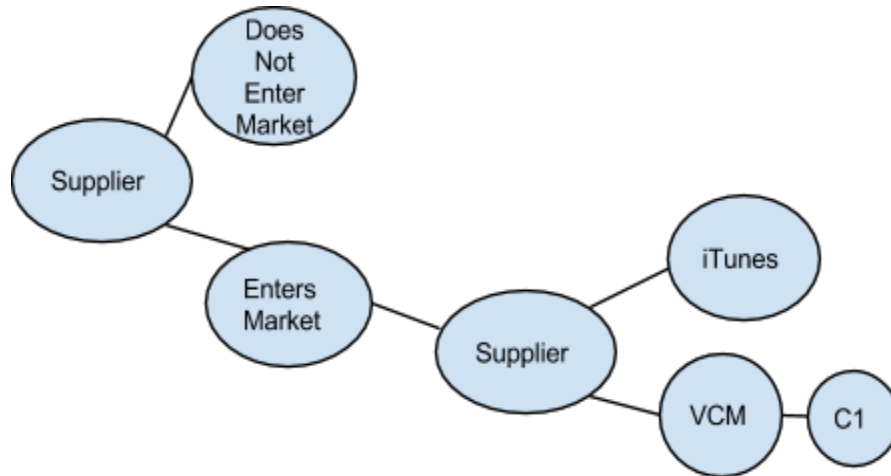
In this game, there exists the one type of consumer (C_1) who would be willing to pay up to U_1. Assume fixed costs are equal to 1. The iTunes price with C_1 will be U_1, so the supplier thus enters the market. When this variation of the game is played with only one type of consumer, regardless of the type of consumer, the supplier is impartial between iTunes and the VCM. If the supplier chooses iTunes, then the iTunes price would be 1, and thus C_1 would pay U_1 to buy the song. However, if the supplier decided to sell through the VCM, C_1 would still pay its willingness to pay of U_1. This is because if C_1 did not pay U_1, then the supplier would simply go to iTunes in which case C_1 would pay U_1. This indifference between the two types of markets shows very little in the variation of potential between the two markets. Therefore, adding another type of consumer will potentially give

9

more relevant results.

Game 2: N = 2 : C_1, C_2
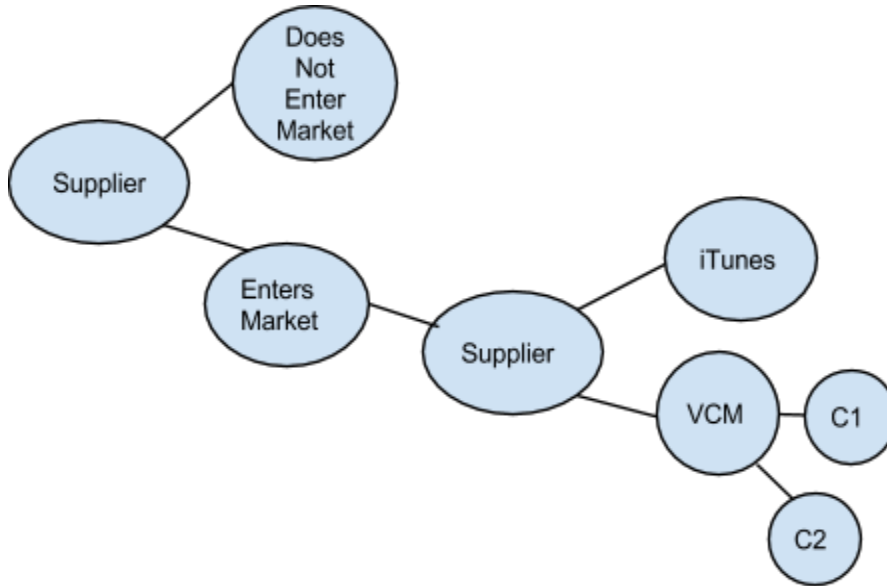
In this variation, there are now two consumers, C_1 with up to U_1 willingness to pay, and C_2 with up to U_2 willingness to pay. In this game, the most profit iTunes could make is 2. If the price was set to 2, then C_1 would not buy the song because they would only be willing to pay up to 1. But, C_2 would pay 2 and thus total profit would be 2. However, C_1, and C_2 can all still be made better off. If iTunes sets the price to 1, then C_1 would pay 1, C_2 would pay 1. C_2 would then have 1 unit of consumer surplus, since they would be willing to pay 2 but only paid 1. However, iTunes would be impartial between the two choices, because in boths scenarios they make a profit of 2.

If the supplier decided to use the VCM, the max profit they could make is also 2. Intuitively, in a VCM C_1 and C_2 would want to pay 0 since they have that option. Then they

would both have the song, and would each have consumer surplus equal to their willingness to pay, since they did not pay anything. However, this would never happen because then the supplier has no incentive to use a VCM if expected profit was 0. Therefore, C_1 and C_2 must pay enough to equal iTunes profit, otherwise the supplier will only use iTunes.

In the VCM, C_2 would not pay more than 1. This is because the iTunes price is 1, and C_2 would not pay more in the VCM than it would in the iTunes market. Just like in the iTunes market, C_2 would pay 1 and have 1 unit of consumer surplus. Although C_1 would want to pay 0 so it too could have 1 unit of consumer surplus, it would actually also pay 1. If it does not pay at least 1, then the VCM profit would be less than 2, and thus the supplier would choose iTunes.

In this game, when the supplier goes through iTunes, no one can be made better off without making someone worse off, and thus there is Nash equilibrium. However, when the supplier goes through a VCM, everyone is just as well off as they were in the iTunes market, and thus there is also Nash equilibrium. With this game, neither the iTunes market or VCM is better or worse for suppliers, if iTunes charges 1. However, if iTunes charges 2, then Nash equilibrium is in the VCM.

This variation of the model demonstrates that VCMs are just as profitable for suppliers, and can make consumers just as well off as selling through iTunes. This shows a basic look at how and when VCMs are a viable option for suppliers. However, to ensure that this result is consistent if N>2, the next model will add one more consumer to the game.

Game 3: N = 3 : C_1, C_2, C_3
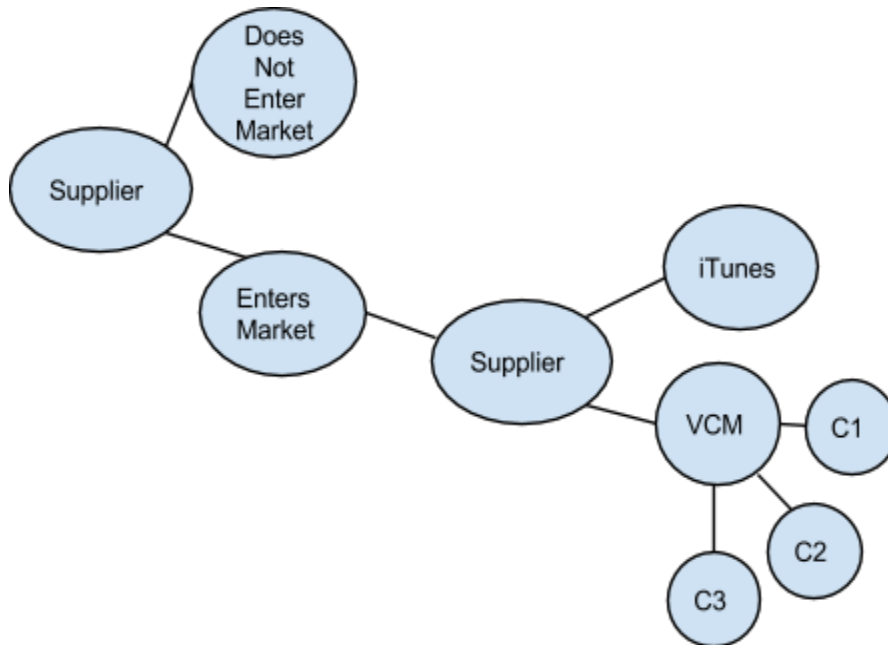
Now, there are three consumers, C_1, C_2, and C_3. With three consumers, the highest

potential profit the supplier could make from iTunes is 4. If the firm set the price at 1, all

three consumers would buy, and the supplier would have a profit of 3 with 1 unit of

consumer surplus for C_2 and 2 units for C_3. In this situation, the supplier can still be made

better off. If the supplier charges 3, then only C_3 will purchase, and the firm will make 3

again, with 0 consumer surplus. But if the supplier charges 2, then both C_2 and C_3 will buy

and the firm will make 4 with C_3 getting 1 unit of consumer surplus. Thus, if the supplier

goes through iTunes, it will make a profit of 4.

The following table shows all the possible profit combinations the supplier could

make if they went through a VCM:

C_1	C_2	C_3	Profit:
0	0	0	0
0	0	1	1
0	1	0	1
1	0	0	1
1	0	1	2
1	1	0	2
0	1	1	2
1	1	1	3
1	0	2	3
1	1	2	4
0	1	2	3
0	2	2	4
0	2	1	3
1	2	2	5
1	2	3	6
1	1	3	5
0	1	3	4
0	2	3	5
0	1	3	4
1	0	3	4
1	2	0	3
0	0	3	3
0	0	2	2
0	2	0	2

The supplier will only go to the VCM if it can expect to make a profit of at least 4.

Therefore, all combinations that have a profit of less than 4 can be removed. Also, we know that the price in the iTunes market will be 2. C_3 would therefore not ever pay more than 2 in the VCM, since it could make itself better off in the iTunes market. Combinations in which C_3 pays 3 can also be crossed out. Here is the table revised with the remaining 4 combinations:

	C_1	C_2	C_3	Profit:
1)	1	1	2	4
2)	0	2	2	4
3)	1	2	2	5
4)	1	2	1	4

With combination 1, C_1 will pay its willingness to pay for the song because if the

supplier went through iTunes C_1 would not have the song at all. C_2 would pay 1 since it is making itself better off than iTunes by giving itself a unit of consumer surplus. C_3 pays 2, making it indifferent between the VCM and iTunes since both give it 1 unit of consumer surplus.

Next, combination 2 is the same as iTunes, except C_1 is still able purchase the song for 0, thus getting 1 unit of consumer surplus. Meanwhile, C_2 and C_3 are indifferent between iTunes and VCM.

Combination 3 gives consumers the least amount of consumer surplus, since C_1 and C_2 are both paying their full willingness to pay, and C_3 still pays 2. Here, the supplier actually makes more than iTunes profit while still not making the consumers worse off.

Finally in combination 4, C_3 pays only 1, while C_1 and C_2 pay 1 and 2 respectively. Here, C_3 gets an additional unit of consumer surplus than they would normally in the iTunes market, while still having C_1 and C_2 impartial between the two markets.

In this game, there is no Nash equilibrium in the iTunes market. All parties can be made better off by going through the VCM. In iTunes, C_1 will never be able to purchase the song, and therefore prefers the VCM. Meanwhile, C_2 and C_3 and the supplier are just as happy or happier in the VCM as they would be in the iTunes market.

Conclusion:

The results obtained from this analysis showed that VCMs can be just as profitable as a set price market like iTunes. They could even potentially be more profitable. One of the main benefits VCMs have over set price markets that is not included in the model shown, is that they encompass a much larger distribution of consumers. If more consumers

are listening to a certain supplier's music, then the supplier becomes more popular. If the supplier has the option of becoming more popular by accessing more consumers while making the same profit, then when VCM profit is equal to iTunes profit. One can be concluded that suppliers would be better off to use VCMs.

While this model shows a fairly simple layout of how VCMs can perform compared to iTunes, further steps can be taken to further measure this potential. Regner and Barria's paper discussed how certain criteria must be met in order for VCMs to be successful. While the model used in this paper holds these things constant by adding further variables, the model's results can be made more salient. For example, giving consumers a 'recommended price' to pay has been shown to anchor how future consumers will pay. As a result VCMs often will share a recommended price with consumers. Renger and Barria show how this dramatically affects the amount consumers will pay. If a recommended price is high, consumer's average payment will be higher, and vice versa if the recommended price is lower. The model used in this paper could potentially be adjusted to try to account for this anchoring effect.

Along with analyzing the criteria that was deemed necessary for a successful VCM, there are other assumptions that were either included or excluded from this paper. In this model, the background of the supplier was not specified. If the supplier is an independent artist versus a successful superstar, the results of the VCM vs iTunes could be different. The concept of superstardom is a strong variable that was excluded for the sake of simplicity. However, this may change the way consumers approach how much they would be willing to pay.

Another potential benefit of VCMs is their ability to counter music piracy. In a world where exclusively VCMs are used, there would essentially be no piracy. Piracy is illegal because it is downloading music for free. But, if paying a price of 0 for music is a legal option through VCMs, then the concept of piracy is no longer relevant. This may be an oversimplification, as there may still be legal implications tied to music sales that would have to be addressed in order for such a reduction in piracy to occur. However, VCMs should still be studied as a potential way to reduce piracy.

While this paper's model does show that there are often situations in which VCMs are profitable, the takeaway message is that VCMs should not be used exclusively. To be more successful, music suppliers ought to consider the methods in which they sell their products. In addition to only using a traditional set price market, music suppliers can create a win-win solution by using a VCM. A win for a more profitable venture, and a win for the consumer.

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