



An Investigation of Quick Thinking: Whether Consumers Are Willing to Pay More in Perfect Competition

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Abstract. Some firms have earned an abnormal profit in the long run of perfect competition. However, massive papers have only examined the limitations of the perfect competition models from producer side because they have not considered the perspectives from the behavioral economics. The aim of this paper is to explain the abnormal profit in the relation of limitation of quick thinking and consumer willingness to pay Research design by the consumer side. The data were obtained from the owner design lab survey and field experiment to evaluate the heuristics of consumers. Our analysis showed a strong correlation between consumer choice and heuristic, especially under a low price product which requires more quick thinking. The main outcome of this paper is that Left-digit effect, Representation, Availability bias, anchoring bias are main heuristics during the quick thinking. However, the results depend on the quality and price of the products. In this case, the premise of the study is that the products being discovered has similar quality and price.

Keywords: quick decision · willingness to pay · perfect competition

1 Introduction

For decades, perfect competition has been considered an ideal market structure. Baumol and Blinder defined *perfect competition* as a market without barriers to entry (freedom of entry and exit), which means numerous producers have low market shares and homogeneous products [1]. The definition introduces one of the most popular basic assumptions in perfect competition literature: the idea that perfect competitors are price takers. Hence, firms should make zero economic profit in the long run to maximize profit. However, a challenging problem in this domain is that some firms have earned an abnormal profit

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in the long run of perfect competition. In the current research, massive papers have examined the limitations of the perfect competition models. Also, they focus on the producers' perspective, which investigates the lack of the entrepreneurs' power in the model [2]. However, consumer behavior has rarely been studied directly in that research. The monopoly characteristics will also be shown when the consumers are willing to pay a higher price. In addition, the paper will investigate the heuristics of quick thinking because the Nasserites always consider a good alternative to a perfect competition market. Thus, consumers may spend a small amount of time on it because it takes a relatively small proportion of their income.

Based on that, this proposal aims to figure out whether the consumer is willing to pay more. It will provide a different perspective and further analyze the heuristics of quick thinking. Additionally, if there are consumers pay more, we aim to investigate to find the most-influence groups. It may provide further analysis of to what extent the heuristics will affect consumer willingness to pay. This may provide a deeper understanding of consumer behavior. From Sects. 1–4, we develop four experiments to examine how heuristics affect consumer willingness to pay. In Sect. 5.2, there will be a further explanation of consumer behavior and the influence between different groups. Section 6 concludes.

2 Section I

This lab experiment examines whether the representation will exist and how it affects consumer willingness to pay. The proposal will also find the most influential group and analyze the reasons deeper.

2.1 Methodology

The experiment will be set online, which may increase the number of samples. If the subject is neither a university student nor a teacher, nor the subject does not have familiar software, it will be considered irrelevant data. The irrelevant data will be excluded in steps 1 and step 2. After step 2, subjects will be asked four questions about switching the software. The two software are needed to sell the Nasserites and perfect substitutes, such as the app of Family Mart and Rawson. If the subjects select that they are unwilling to change with a discount, it may prove that there is a representation due to the subjects being irrational and suffering from confirmation bias. The result of whether representation will exist will be shown in step 3.

Furthermore, the data will be developed into two treatment groups: workers and university students. The paper assumes that the workers have relatively higher disposable income but have little time. On the contrary, the students have lots of time but little disposable income. Thus, in contrast to the control group, it may show which group most suffer from the bias, and we may get assumptions from the results (see Tables 1 and 2).

Table 1. The grouping questionnaire [Owner-draw]

STEP 1 selects different groups of people (exclude other groups)	University students	Workers
STEP 2 affirm they are familiar with one software (exclude “NO”)	YES or NO	YES or NO
STEP 3 test 1. will they switch apps (1-dollar discount)	YES or NO	YES or NO
STEP 3 test 2. If “no” in step 3, what is the minimum amount will force you to switch(dollars)	Do not switch 5 10 More	Do not switch 5 10 More

Table 2. The ungrouping questionnaire [Owner-draw]

STEP 1 selects random groups between the university and workers	University students or workers	University students or workers
STEP 2 affirm they are familiar with one software (exclude “NO”)	YES or NO	YES or NO
STEP 3 test 1. will they switch apps (no discount)	YES or NO	YES or NO
STEP 3 test 2. what is the minimum amount will force you to switch(dollars)	Do not switch 5 10 more	Do not switch 5 10 more

2.2 Results

After selecting thousands of questionnaires, the result may look like Table 3.

Table 3. Prediction of results [Owner-draw]

Relevant data	University students	workers
STEP 3 1-dollar discount	YES 60% NO 40%	YES 30% NO 70%
STEP 4 minimum amounts force you to switch(dollars)	Do not switch-2% 5-68% 10- 20% More 10%	Do not switch-5% 5-40% 10-35% More-20%

Due to the assumption that the students are time-rich-money-poor, and the workers are time-poor-money-rich, we make some predictions of the results. We assume that students are more likely to witch the apps because students have more time. In addition, they are relatively demands elastic because the discount takes a larger proportion of their disposable income. Because of that, students tend to have fewer “NO” and more “yes” than the workers in step 3. Also, because workers have more money, the discount may take a little proportion of the disposable income. The confirmation biases may outweigh the discount. They are willing to pay more for the familiar apps and tend not to switch them.

2.3 Limitations

This lab survey has some limitations, which lead to a wrong estimate of the result. In reality, the survey may differ in reality. The subjects may have wrong estimates of themselves. In addition, the subjects may have overestimated themselves. They argue that they may not suffer from the bias but may not switch in reality. Also, there is a longer time for thinking than in reality. Subjects may behave more rationally rather than usual. Doing a questionnaire may not be quick thinking. Also, the survey will be placed on the internet, meaning people may answer it causally. Therefore, it is hard to choose the real answers from the massive amount of information. However, a survey is the most available way to test the representation. It has a little cost and is easy to operate.

3 Section II

Objectives: This field experiment is for the purpose of understanding how cognitive bias, specifically anchoring bias, affect people.

Definition: Anchoring bias is when people tend to make irrational decisions by relying too heavily on information that was recieved early on in the decision making process [3].

3.1 Methodology and Results

Part I method.

this paper will conduct this experiment in two group of supermarkets which this paper simply labeled as Group I and Group II. In Group I, this paper will fix the price of a certain commodity at a high level which this paper record as Price H originally after a period for people that consume in Group I accept this price, then this paper will lower the price to a relatively low price which this paper record as Price L. In group II, this paper directly made the price of the same commodity at Price L, making it to be this paper’s control group.

Based on the aforementioned conditions, this paper submit three experiments and given assumed result.

3.2 Results

Experiment i

This paper will set different combination of Price H and Price L to see if people's behavior varies and will set the prices as in the chart, the data are assumed to appear what the following Table 4 shows'1.

As different commodities would have different reasonable prices, so this paper only suggests a set of pricing mechanism base on Price L, it might not be the most precise theory but it does provide a set of idea. The consumption quantities will be recorded at both stages of the two groups as in the next chart.

All the figures here such as 80% and 120% are speculation, they could be severely inaccurate, but they show this paper's expected results that due to the higher price at

Table 4. Defining the three tables [Owner-draw]

combination	Price H	Price L
Table 5	125% L	L
Table 6	125% L	75% L
Table 7	150% L	L

Table 5. Assumption case 1 [Owner-draw]

Groups Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	80%Q	120%Q
Group II	Q	Q

Table 6. Assumption case 2 [Owner-draw]

Groups Stages	stage I (125% L in G1 and 75%L in G2)	Stage II (75%L in both G1 and G2)
Group I	80%Q	140%Q
Group II	110%Q	110%Q

Table 7. Assumption case 3 [Owner-draw]

Groups Stages	stage I (150% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	50%Q	150%Q
Group II	Q	Q

stage I Group I consumption will be less than that of Group II, but after the lowering of the consumption in Group I will rise to a level high than Group II due to the consumers received different information. Also, in Table 6, as the controlled price is lower, the consumption of Group II should be higher.

As well, this paper expects that Table 5’s figures are the most inapparent because Table 5 has a lower H, a higher L and therefore a narrow gap between them comparing to Table 6 and Table 7. Becasue of that, the impact of the information about price changing and anchoring effect from those information are not that prominence.

In Table 6 and Table 7, even though the price changing is both 50%L, this paper expects that people would behave more obviously toward a higher original price. Thus, the quantity gap in Table 6 is 80%L but in Table 7 the figure is 100%L.

Experiment ii

In this experiment, this paper changes the way of lowering the price, ceteris paribus and uses Table 5’s price hypothesis here. This paper considers differennt ways to lower the price: directly cut the price, discounts, coupons and memberships. Displayed in Table 8 to Table 11. In this paper’s setting, directly cut the price means the price tag will say this paper lowers the price from 125%L to 75%L and discounts would say this paper have a 20% discount. Coupons are presented to consumers when they were checking out during the Stage I. It is possible that some consumers might ignore coupons, and indeed revealing a lower price in future might affect the current consumption quantity, but this paper expects it not to be that devastating. The special price for membership are informed to consumers when they are checking out during Stage II. The cashier would simply ask them to fill in a form of some basic information, phone numbers (Table 10), zip codes and so on (Table 9).

Again, all figures are conjectures. This paper expects that people are more inclined to discount than direct cut in price and coupons and memberships are complicated in operations thus they might have implications but very subtle.

Experiment iii

In the last experiment, this paper changes the commodity, ceteris paribus. This paper uses

Table 8. Direct cut in price [Owner-draw]

Groups Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	80%Q	120%Q
Group II	Q	Q

Table 9. Price with discounts [Owner-draw]

Groups Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	80%Q	140%Q
Group II	Q	Q

Table 10. Utilizing Coupons [Owner-draw]

Groups Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	80%Q	110%Q
Group II	Q	Q

Table 11. Being in memberships [Owner-draw]

Groups Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Group I	80%Q	105%Q
Group II	Q	Q

Table 12. Group 1[Owner-draw]

Commodities Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Necessities	90%Q	110%Q
Luxuries	50%Q	125%Q

Table 13. Group 2[Owner-draw]

Commodities Stages	stage I (125% L in G1 and L in G2)	Stage II (L in both G1 and G2)
Necessities	Q	Q
Luxuries	Q	Q

Table 5's price hypothesis here and separate commodities into necessities and luxuries, or it can be simply viewed as needs and wants.

This paper expects that people would still purchase necessities as much as they need, though there will be reductions, and they would buy slightly more due to the favorable price cut. When it come to what do people want, it is very different. This paper anticipates that the consumption when the price is high will prominently decrease, and it will rise much higher than necessities when facing a price cut (see Tables 12 and 13).

3.3 Limitations and Revisions

Firstly, this paper has to pick experimental locations at distinct areas to prevent information exchange brought by consumers' circulations. Undisputedly, doing field experiment in supermarkets and in different areas is difficult to control and to record data. It is also

difficult to repeat experiments since it is quite arduous to find supermarkets that are willing to cooperate.

If this paper changed the locations to groceries, open markets, or shops, this paper might face the problem of small footfall. Also, it is still hard to find enough collaborators to fulfil this whole experiment. This paper might solve part of these problems by setting up future experiment of online shopping. It is easy to collect data, easier to find collaborators and to control the whole process.

Anyway, it is still uncertain that if the consumers in stage 1 and stage 2 are the same population, also, this paper doesn't know if consumers already their own expectations on the prices of commodities have, it requires a large amount of data to cover enough analyzable data. Overall, this paper believes the works this paper did are worth considering and the experiments this paper described are useful, and this paper are looking forward for any helpful supplementary in future.

4 Section III

Objective: This field experiment is for the purpose of understanding availability bias and how it affects consumers to pay higher prices.

Explain what does availability bias entail? To examine this bias, a idea was proposed. The idea's first premise is that recent years have seen an excess of media coverage of stories about successful people's educational backgrounds. And the reasons behind this are worth pondering. It is correct to report that most businessmen lack formal education. If these report and spread such information like this? Moreover, how do individuals view this problem?

4.1 Methodology and Results

This experiment will use an online questionnaire survey to ask questions it 1000 people.

Step 1: The question of online questionnaire survey is whether successful people are considered to have received higher education.

Step 2: Survey the educational background of these respondents. Because the participate in online surveys, their educational level, age, and other uncontrollable factors are likely to affect the results of the survey. In the experiment, subjective consciousness suggests that individuals with higher levels of education are less likely to believe that successful individuals have not received higher education. This is because more of the people they know who are successful in entrepreneurship are highly educated. However, the less educated the respondents are, the more prevalent the perception is, because they do not know the background of the successful entrepreneurs and subconsciously believe that their education level should be the same as their own. This prediction is that 90% of people should think that successful entrepreneurs are not highly educated.

Experimental designer envisage that the percentage of these successful entrepreneurs are highly educated is much higher. This is because there are many difficulties that successful entrepreneurs encounter in the process of starting a business, and these require a certain degree to solve.

4.2 Reason

Why is the proportion of highly educated successful people greater, but there are still many people believe that the majority of successful entrepreneurs are low education?

There are two possible reasons for this result. The first is the availability bias, because there are many books already in the media that often hype the story of how successful entrepreneurs struggled with low education and thus succeeded. So when asked if successful entrepreneurs have high education, your brain can easily think of what these media reported. And the ease with which the examples are presented in your mind determines your perception. If the matter can come to your mind easily, you will think the matter has a higher probability. Conversely, if you can't recall it easily, then you will think the probability of the event is called small. And this is the availability bias. The second reason may be the information bias, because people in daily life can't intuitively understand whether these successful people have high education or not, but only through the media and some marketing numbers or online profiles to understand these successful people's education. Therefore, they cannot judge whether the information is true or not, which leads to the deviation between the information they know and the real information.

Our scenario has successfully verified the existence of availability bias. The availability bias also affects consumer behavior to a large extent. Because availability biases are also present in everyday life, they make consumers more willing to buy the same goods but pay a higher price, because part of them believe that you get what you pay for. So they believe that the higher price corresponds to a better product quality.

4.3 Limitation

This lab survey has some limitation, which lead to a wrong estimate of the results. Because the ideas we put forward are also subjective and not objective, without the help of real and powerful data to support this idea, so the results of the experiment are definitely inaccurate. Secondly, the use of online questionnaires alone is very simple. We should use a variety of different experimental methods in order to make this experiment more accurate.

5 Section IV

5.1 Aims and Definition of Key Term

We designed another field experiment discovering focusing on left-digit bias.

Objectives: To understand that left-digit bias leads consumer to purchase more amount of money when they could have save money and understand how left-digit bias effects consumer demand.

This experiment is to test whether price left-digit bias contributes when consumer makes quick decisions to purchase goods with elastic demand, base on the fact that we are discussing why people are willing to pay high price in perfect competition even though consumers should be the ones setting the prices and make the best use of money as standard economy says. We are finding out the reasons for this phenomenon which disobey standard economic, so we designed experiments to see if the possible factors we think take form of it. Hence, this is is another experiment to see whether this factor (left-digit bias) explains why people are willing to pay higher prices.

5.2 Defining the Term Left-Digit Effect

The Left-Digit Effect is a term used in numerical cognition and behavioral pricing to suggest that numeric magnitude judgments are anchored on the left most digits of multi-digit numbers. Left-digit bias occurs when firm changes a whole number price to “99” ending along with the left most digit, giving consumer the wrong impression that the price is not as high. For example, the firm alter the price from \$5 to \$4.99, there’s only one cent difference but the first digit people see has a difference by \$1 making people think that the product is not as cheap. Here we have two small field experiment to prove that left-digit effect exists and makes people to pay higher price. We will be using histograms to analyze the data collected because patterns and comparison will be more clearly shown. We are doing field experiment on same 1000 consumers and collect the percentage of them purchasing one of the good we set.

Experiment 1, method, result

We will compare the sales same quality & same sized tissue with different price. We’ve chosen tissue to be the product experimented is because it is a very daily good, people uses it everyday and there’s a range of brands that produces it, it is a good with many substitutes and elastic demand. Consumers are able to find the cheapest substitutes for tissue, basically meaning that consumers can spend the least money. Therefore, experiment left-digit effect on tissue will expand any patterns that will exist, so the factor is being discovered entirely. Furthermore, tissue is a good in the perfect competition, hence, it is closely related to why consumers are willing to pay higher price in when they can choose, so that the results gain will be more accurate. We will compare the same tissue sold at price with ignorable price difference. Moreover, we analyze the percentage purchasing A compared to B of 1000 consumer. The aim of this experiment is to find out whether left-digit bias exist (see Table 14).

In this scenario we assume A cost \$19.98 and B cost \$19.99, according to this we will predict that most consumer will purchase tissue A, because consumers should be totally rational and always make the best choice as standard economy says. However, we will discover from behavioral economic side, hence, the prediction is not certain. In our opinion from behavioral economic perspective, we think that the percentage buying A compared to B will be same or effected by the occasion consumer are purchasing in (which one they see first). But we limited the purchasing occasion to the same super-markets, we will choose two supermarket in urban area, that we are not including wealth issue because living circumstance of consumers are equal. Overall, we believe that the percentage purchasing A will be largely less than prediction, whether A or B takes more percentage is uncertain. As shown in Table 15 the percentage of consumer who bought A are much more lower and share around equal probability of purchasing B.

Table 14. The first assumption of situation [Owner-draw]

Paper A	Paper B	The % of consumer who buys Paper A
\$19.98	\$19.99	70%

Table 15. Assumption of the situation according to left-digit bias [Owner-draw]

Paper A	Paper B	The % of consumer who buys PaperA
\$19.98	\$19.99	56%

Reasons for the Result

The possible explanation for this is due to representation when doing quick decision; if B is located closer to the supermarket entry, then B is predicted to take more percentage, people are lazy to deal with new information later coming (A), so they keep with the same tissue. Furthermore, when consumer compare A and B, they will the left digits the same, making them think that the price is equal. Therefore, left-digit bias effects consumers to purchase higher price, people didn't notice the tiny one-cent difference on the rightest number.

5.3 Experiment 2, Method and Results

We will compare the sales of tissues with different quality and larger price difference. We still experiment on tissue because of the same reason and to make sure that the materials are same, to maximize the accuracy of the experiment. Same as the last experiment, we will analyze the percentage of 1000 consumer purchasing tissue A. The aim of this part is to further analyze the effect of left-digit effect and explain the main question (see Tables 16 and 17).

We designed two scenarios. Firstly, A will set price with 9 ending, and B set price as a whole number. In the second scenario, A set price as a whole number, B set price with 9 ending. Basically, in scenario one A uses left-digit bias, but not in scenario two. For both scenarios, the premise is that the price difference between A & B is equal. The prediction will be that the percentage of consumer purchasing A is be equal in both scenarios. However, in behavioral economic, it is not certain. It is possible that more percentage purchase A in the scenario1 and opposite in scenario2. People became more price sensitive by how the price are set.

Table 16. Senario 1[Owner-draw].

Good quality Laundry detergent (A)	Poor quality Laundry detergent (B)	The % of consumer who buys A
\$3.99	\$2.00	44%

Table 17. Senario 2[Owner-draw].

Good quality Laundry detergent (A)	Poor quality Laundry detergent (B)	The % of consumer who buys A
\$4.00	\$1.99	22%

5.4 Reasons for Expected Result

The reason that we think it will have this outcome is because of the left-digit effect. When comparing two multi-digit numbers, the human mind starts comparing the digits even before it—Stiving and Winer [4, 5]. Therefore, image effects & level effects, basically heuristic thinking is displayed, consumer are given wrong impression that the one with 99 ending is cheaper. Also, 9-ending prices increased consumers likelihood of making a purchase decision [6]. Madigan looks at charm prices (ending in .99 or .95) and the impact they have on consumers across the spectrum, throughout their study, the researchers found that when presented with these different prices, consumers bought more items with the nine-ending digits. Buyers in the used car market pay disproportionately higher prices for cars whose mileage falls just below 10,000-mile thresholds [7, 8], stock traders are more likely to buy stocks priced one penny below whole-dollar amounts [9], and students are more likely to retake the SATs when their scores fall below multiples of 100 [10]. Overall, this is experiment 4, by doing this experiment we are able to explain weird phenomenon and firms and the government will be able to use left-digit bias to make effect of their decision and to get what they want to see and guide more people to purchase and response to the firms. The limitation of this experiment is that we didn't consider occasion when products are in discount and different occasions (stimulus-based judgements or memory-based judgements and considering the level of wealth), we didn't consider that in some occasions left-digit bias will be weaken or for different individuals left-digit bias doesn't works for them. Only 1000 consumer might not be able to include all different people with different mindset. However, different to before, we used field experiment other than scanner panel, another type of experiment is possible to make the results more comprehensive.

6 Conclusion

In conclusion, this paper has discovered four main reasons that could explain why consumers are willing to pay higher prices. It defies the usual assumption that people will make absolutely rational choices. Also it provides the evidence from several experiment that people tends to make irrational decisions on purchasing the product with lowest cost and explained by the four main behavioral economic biases, especially in making quick decisions. This paper complement the reason of abnormal proficiency in perfect competition by analyzing behavior of consumers, which may further explained the limitations of perfect competition model. However, this paper also have some limitations, since it mainly draws on the evidence from the experiments, and there's difficulty to find a perfect competition in real life. Therefore, the results might be a slight deviation from the actual. In order to solve this problem, the paper has screened the goods that are closest to perfect competition but still not perfect. In future studies, it hope to find the most suitable substitutes for experiment, hence, to improve the accuracy and depth of the study, as well as new discoveries that could bring the understanding of economic field to a higher level. Furthermore, we would also like to include factors affecting consumer behavior being discussed from other aspect, such as the environmental factor influencing people's way of purchasing and the probability of reaching which product first.

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