Macrothink Institute™

Business and Economic Research
ISSN 2162-4860
2012, Vol. 2, No. 2

The Futility of Utility

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Received: November 15, 2012 Accepted: November 29, 2012

doi:10.5296/ber.v2i2.2696 URL: http://dx.doi.org/10.5296/ber.v2i2.2696

Abstract

The Utility Theory, which forms the fundamental framework of a significant area of economic science devoted to the study of consumer behaviour, has always been met with objection and criticism from many economists and it continues to do so. The inability to quantify utility and the dubiousness of the comparative evaluation of different consumer combinations of goods continue to give rise to attempts to supplement, amend or improve the existing theory of supply and demand. Such attempts should be recognized as reasonable and necessary, as many people reading the extensive literature on the utility theory are certain that they are reading a psychology textbook. One of the possible alternatives of the utility theory is an attempt to view consumer behaviour in the same way as producer behaviour. In my opinion, dividing economic agents into consumers and producers is a grave error. This division is not only capable of raising a number of questions among students and specialists, but it could also give rise to such a psychological phenomenon as split personality. During working hours an entrepreneur attempts to obtain the maximum profit possible and in the evening in the shopping centre, he or she attempts to maximize utility. Furthermore, he or she will have to continuously solve a rather difficult task capable of putting many people in a dead-end situation: is the purchased item a normal consumer item or a means of production? What should be maximized: profit or utility? It is evident that the consumer behaviour theory continues to remain open to criticism and requires considerable amendments, which is the reason for this essay.

Keywords: Utility Theory, Profit, Consumers, Utility maximizing rule, Economic growth

1. Introduction

The concept of "utility" came about 300 years ago, when the fundamentals of the mathematical theory of probability began to be developed and, deservedly, it is linked to the name of the mathematician Bernoulli (1738). Later on, thanks to the efforts of the English philosopher Bentham, the economist Jevons and their numerous followers, "utility" became firmly and successfully settled in economic science. How is it at all possible that the representative of an outstanding family of Swiss mathematicians could require such a vague concept as "utility", which was rather difficult and challenging to quantify, in order to explain human behaviour? It is necessary to answer this question because, given the current level of economic knowledge, the answer will help us to not only point out the inaccuracies and mistakes of Bernoulli, but also indicate alternative methods of explaining human behaviour.

Bernoulli believes that the value of utility is measured not by the price of something, but rather the benefit that is gained from it. The price is determined by the item itself and is the same for all, but the benefit depends on individual circumstances. Everything is correct, up until this point nothing raises objections. It seems that it would be logical for the mathematician to use such a concept as profit as a benefit. But we should not draw hasty conclusions because at the beginning of the 18th century, a step such as this did not appear to be so obvious. At that time in Europe and in other parts of the world, exchange in kind was still dominant; the monetary economy was only just beginning to defend its right to existence (Braudel, 2011). In conditions where there was still no large-scale production, where the use of hired labour was scarce and irregular and steam engines had only just begun to arrive, it was, of course, premature to speak of the natural use of the mathematical concept of "profit". If one continues reading Bernoulli, it becomes clear that there existed another, more serious problem. An income for a poor person of one thousand ducats has greater significance than for a rich person, whilst the monetary value is the same for both. Benefit or utility obtained from a gain is inversely proportionate to an existing financial condition. One person has a wealth of 100,000 ducats and another has the same amount of half-ducats. If the first receives a gain of 5,000 ducats and the second receives the same amount of half-ducats, then it is entirely obvious that for the first person a whole ducat is the same as a half ducat is to the second person. This means that different people value different amounts of profit in the same way. But if you think about it, this does not at all negate the possibility of using profit rather than some kind of utility as the main motive of decision-making for a person. Both a poor person and a rich person value their gain in the abovementioned example in the same way for the reason that the profit rates in these cases are equal at 5%. In other words, the effectiveness of their monetary investments turned out to be the same. It is clear that in order to evaluate any economic activity of a person, the effectiveness of the decisions made and the profit rate are most important, not the absolute value of profit. It is unlikely that a poor person would be able to obtain the same profit as a rich person. The rich person has the opportunity to invest more funds into a financial or production operation and earn more, even if the profit rate is the same for him or her and the poor person. It is natural that a person evaluates their decisions by comparing their profit rate with the profit rate of others. And when choosing between different methods of using their money, the person makes a decision comparing the

profit rates gained from their investments. The person acts rationally because having determined the most effective method of investing money, he or she will have the opportunity to allocate additional funds. In this way he or she will generate the maximum possible profit. Finally, there was another reason for ignoring profit when examining consumer behaviour. Many people thought and continue to think that profits are, to a great extent, coincidental and for this reason both profit rates and absolute profit values differ widely for different producers and consumers. This means that the same goods item will be valued by different consumers in a completely different way. How, under such circumstances as a result of market trading, can consumers arrive at an agreement and set the market price for goods and services? It is an impossible task. Today, however, this task no longer seems so impossible. Many people believe that profit is not a random value. There are grounds to suppose that the average profit rate in any closed economic system is equal to the economic growth expressed as a percentage (Bilych, 2012). Consequently, the average profit rate of producers is equal to the average profit rate of consumers and both rates are equal to economic growth. Therefore, there is no surprise in the fact that people so readily agree on the price of a certain goods item. Furthermore, with this approach, it is easy to explain how a price is established for a goods item that may serve as a consumer product and as a means of production. And if we follow the traditional point of view and assume that manufacturers value means for the production of a marginal product and consumers value an item in terms of marginal utility, then why do they agree so easily with the common market price of a certain product, which may be used both by producers and consumers?

There were, most likely, also other reasons for the strange victory of the utility theory and, later on, the marginal utility theory. Of course, this victory was aided by the lack of any easily defined alternative. However, the victory was never complete, or uninterrupted, small and large fires broke out here and there along the way and there were conspiracies and rebellions. The first sign of the collapse of the old concept of utility came about at the end of the 19th century and was linked with the name Fisher (1892). Fisher demonstrated that, firstly, the entire theory of market equilibrium depends on assumptions on areas of indifference and nothing more. Secondly, if there are three or more goods, the areas of indifference may not be complete and therefore it is impossible to derive any utility function from the knowledge of these areas. Shortly afterwards Pareto (1909) continued with the destruction of the old concept. According to Hicks and Allen (1934), of all the scientific contributions made by Pareto, perhaps the most significant was his proof of the immeasurability of utility. However, this was not the final nail in the coffin for the utility theory because Pareto generously cast a lifeline by replacing the concept of utility with the concept of a scale of preference. Despite this, it was no longer possible to restore the former glory and order of the utility theory. Although Alchian (1953) confidently talked of the rebirth of measuring utility, he himself stated that interpersonal comparisons of utility are questionable. When we compare the situations of two people, a rich person and a poor person for instance, we make our personal assessment of the two possible conditions in relation to ourselves (Kirzner, 1986). Samuelson (1956) comes to a logical conclusion with the statement that social indifference curves are not possible – they do not exist. This is the fundamental theorem of impossibility.

Despite all this, the fairly worn utility theory continues to occupy a place of honour in economic textbooks and magazines. Some authors continue to firmly believe that utility is a measurable value (Brandt, 1979; Smart, 1973) and others that it is an immeasurable value (Goodin, 1993, Rothbard, 1997). We can understand those who believe it to be a measurable value. What is the value of a theory that is virtually impossible to verify? What can it give us? Using a theory such as this will give you any result you require. If you are not happy with the result obtained then slightly alter the starting conditions or substitute some of the preferences for others. However, utility is not measurable and this is now becoming clear to almost everyone. When studying the numerous statistics on a country or region we see a myriad of figures. We are able to compare GDP at different times, profits of corporations before and after taxation, we can learn a great deal about savings, investments, consumption, incomes per capita and much more. But there are no columns and no rows in statistical reports with the word "utility" and this is most likely a death sentence.

In the latter half of the 20th century there began to appear more and more studies that, to a greater or lesser extent, touched upon the issue of justifying the division of economic agents into consumers and manufacturers. Simon (1971) doubts that a firm's objective is always maximum profit and a consumer's objective – maximum utility. He states that some firm managers attempt to maximize utility and some consumers attempt to maximize profit. For example, a consumer gathers information until the time when the marginal costs for gathering additional information are equal to the marginal profit that may be obtained as a result of having this additional portion of information. Both in this case and in many other cases, the behaviour of manufacturers and consumers is in no way different – they both seek to maximize profit. Machlup (1971) justifiably asks a very simple question, which has remained unanswered: what does a firm maximize if it is always managed by a person who is undoubtedly a consumer? Finally, Becker (2003) always regards households as "small factories" that combine capital resources, raw materials and labour and produce useful consumer goods. The word "profit" is always present in all of his studies on human economic behaviour, without fail. A person receives further education until their marginal costs equal the profit that will be gained as a result of higher earnings. A criminal will continue to commit crime until his or her marginal costs equal the criminal income or profit that will be gained.

It is clear that claims to the utility theory have never gone away and what is more, they continue to grow. The smoke from the fires has not dissipated and the fire is beginning to engulf new areas. In this situation, one should consider the most reasonable solution to be the attempt to save anything of value that remains and build new foundations for a future home. It is unlikely that I will be able to complete this task. However, I will attempt to lay a few bricks in the foundations.

2. Consumers and Producers

How rational is it to divide economic agents into consumers and producers? Is there any noticeable divide between the process of consumption and production? I believe and will try to prove that the answer to the first question should be – it is not rational and to the second

question – no. Of course, the final stage of any production process is consumption and consumption is always the initial stage of production. Consumption and production are inseparable; one would not exist without the other. Every person is a producer. It does not matter at all whether that person works independently or within a firm carrying out the orders of a manager. In the latter case the person will receive their share of the product in the form of a salary. The person agrees to become a hired worker if remuneration for their labour is higher than in the case of independent activity. In other words, when working in a firm, the person generates more products and their productivity is higher. Having completed the production process, the person consumes the product made or exchanges it for other goods. It is not rational to see the firm as a kind of isolated mechanism or a black box that is exclusively engaged in the production process. The firm not only produces, but also consumes, resources for example. Becker (2003) believes that the distinguishing feature of a firm is the lack of freedom of the hired worker; firms have control over the worker and his or her time. And what does this change? The worker agrees to this not at gunpoint, but because it is beneficial to him or her also. A firm is a voluntary association of free producers who agree to fulfill the commands of a manager. The aim of this association is to increase the consumption of each worker. Bohm-Bawerk (1959) insists that the distinguishing feature of a firm is the presence of capital and a long process (roundabout, *Produktionsumwege* (Ger.)) of production. However, in his very own words, capital is nothing more than an intermediate product, the value of which is included in the value of the end product. Capital is an intermediate product, which has to be processed or used in some way to obtain the end product. Why might a firm be interested in lengthening the production process? In real life firms try to shorten the time needed to manufacture a product and they remove all unnecessary operations from the production process. Firms seek to reduce costs and increase profit. Rational consumers pursue the same objective. Every consumer in their everyday lives uses a great deal of capital goods in order to obtain a certain product or consume it. A spoon, a fork, a spade, a lawnmower, a car and everything else we have at home or gathering dust in a dark corner of the garage – these things are all our capital. We can go to the shop and buy a fish and then cook it and eat it. Or we can use the “roundabout” path: put a fishing rod and a fishing boat in the car, take a friend or neighbour with us and set off on a 300 km journey to the lake to catch a fish. A day later we come back home tired and satisfied, cook the fish and eat it.

Very often it is useful to look back to the past. A journey in time can give a lot of results. The difficulty of modern economic life does not allow us to see the obvious, even simple things end up shrouded in a film of an infinite number of exchanges using an infinite number of financial instruments. But if we go back to the times of the simple goods exchange, then many things that are hidden are revealed. For example, we can easily discover that in any relatively closed economy, the profit of all producers is equal to the profit of all consumers and they are both equal to economic growth (Bilych, 2012). In fact, in an economy such as this, the profit of a producer may only be materialized in the form of an additionally issued product and the profit of a consumer is the additionally consumed product. Naturally they are both equal. The additionally issued product represents economic growth. Therefore, adding together the profits and losses of all consumers or producers, we obtain the value of economic

growth. In the Middle Ages a peasant and members of his family worked a land plot in the summer and in the winter they worked on crafts. This was all done to one aim: to consume more or, in other words, to earn a greater profit. The family included expenses for clothing, food, a shovel and a plough as part of the production costs. If, at the end of the year, the family earned more than at the beginning, this meant that it had profit. Consequently, next year the family would consume more clothing, food, shovels and ploughs. A person could spin and weave, be involved in textile, hardware or forging production, manufacture coarse linen, furniture, harnesses, lime bark ropes or wicker baskets. But the person always was and always would be a producer and a consumer. What changed after the arrival of money, inflation, spacecraft and computers? Nothing. People only started producing and consuming more.

Many people would argue that a person seeks to not only maximize their profit, he or she knows how to love, to do things on a whim, to go the theatre and to listen to music. But neither do firms only receive profit, they also organize parties, care for their employees, build and maintain museums and get involved in charity events. As rightly noted by Machlup (1971), firms are managed by people, therefore they have all the same characteristics as a normal person. Others would again argue that every day a person eats food, gets dressed, goes to the shops and does sport in order to simply live a normal life. But for its normal activities a firm also requires water, electricity, petrol and metal on a daily basis. And if the next day new material arrives capable of earning profit for the manufacturer, then he or she will substitute metal, for example, with plastic. A person behaves in the same way substituting margarine for butter.

3. How Are Market Prices Set?

In equilibrium, the production function for each consumer will be as follows:

$$wl = \sum_i p_i q_i, \tag{1}$$

where w – the cost of labour, l – the amount of labour, p_i - the price of the i^{th} goods item, q_i - the amount of the i^{th} goods item. The left side of the equation represents the salary of the consumer over a certain period of time or, more generally, the income from all types of activity. As follows from equation (1) in stationary conditions, when prices and salaries are stable, for the market of two goods items:

$$\mathrm{d}(wl) = p_1 \mathrm{d}q_1 + p_2 \mathrm{d}q_2 = 0, \qquad \frac{p_1}{p_2} = -\frac{\mathrm{d}q_2}{\mathrm{d}q_1}.$$

The latter equation is the well-known rule of goods replacement. The minus sign, which many people forget to include, signifies that the consumption of one of the goods is decreasing. Equation (1) represents the production function of both the consumer and the producer. But for producers, the left side of the equation is the product of the price of the issued goods and their amount and the right side is the sum of the values of all production means. The total salary of consumers equals the value of all issued goods, therefore all goods will be sold and purchased.

In my opinion, economists should completely forget about such a concept as over-production. If a goods item is not sold, then it drops out of the market exchange process. This may be linked to the inefficiency of the producer or the producer's aspirations to increase the price of the goods item in the future. All that is important for us is that the producer has made a loss and reduced the economic growth in the economy under review. (Bilych, 2012).

In conditions of economic growth, as follows from equation (1), the profit of a producer may be represented as:

$$\mathrm{d}(wl) = \sum_i \mathrm{d}(p_i q_i), \tag{2}$$

The profit is equal to the increase in the consumer's income, thanks to which additional goods and services are acquired. It is evident that in stationary conditions, the total profit of all consumers equals zero. Someone may have a profit and someone a loss, but the general consumption will remain unchanged. Therefore, as a rule, profit only occurs in conditions of economic growth. When there is an increase in the production and consumption of only one goods item, the price of which may be considered stable, then

$$p_i = \frac{\mathrm{d}(wl)}{\mathrm{d}q_i}. \tag{3}$$

The price or the marginal utility of any goods item is equal to the profit obtained from the consumption of the last unit of the goods item. This raises a question – how is it so that a consumer easily agrees with the existing market price for a certain goods item? It is evident that all consumers must evaluate a goods item differently because they receive different profit that depends on the individual, their environment and other circumstances. For example, purchasing a car may bring an owner different profit, it depends on the family status, the distance to the shopping centre, school or office, whether there is public transport and parking areas, the cost of a taxi and much more. However we know the answer to this question from both the theory of producer behaviour and the theory of utility. If the profit from acquiring a goods item is greater than its market price, the consumer continues to additionally consume the item or changes it for another more expensive item that has additional consumer properties. In the end, the consumer price becomes equal to the market price because the profit gained from additional consumption decreases and the market price increases due to additional demand. If the profit from the acquisition of a car exceeds its market price, a family will purchase another car or purchase a more expensive model with more space. Of course, consumers and producers are not ideal machines for calculating profit, they often make mistakes. Consumers make decisions based on their own personal experience and the experience of others; they listen to the opinions of acquaintances, friends, neighbours and any other information. This leaves room for errors that may be repeated in the future. There is nothing wrong with this, as Walras would say, there is a continual process of *tâtonnement* ("groping") on the markets. A rational consumer will not spend more on acquiring an item than the profit they would gain from using it. Nobody can stop an irrational consumer from being irrational, and there is nothing wrong with this, despite the concerns that modern economists have for this problem. Irrationality does

not stop an economist from being in a so-called state of equilibrium. If a producer used up production resources, paid the workers for their labour and was not able to sell their goods, the market would react to this with an increase in prices. If a consumer wants to purchase an item that cannot bring him or her adequate profit, the extra demand for the item will cause it to rise in price. Obviously inflation can easily eliminate any consequences as a result of irrational behaviour. Inflation may perhaps represent a kind of payment for irrationality. This may in fact be confirmed by the high levels of inflation we see in countries with underdeveloped market institutes and high administrative barriers where the circumstances force the consumers and the producers to act irrationally. I would like to highlight another very important conclusion. In a stationary economy, it is virtually impossible for a consumer to determine the price of a goods item. As can be seen in equation (1), there is one equation and many unknown values (prices). How much is a plant or factory worth when their profits are zero, what is the price of a land plot if, in whichever way it is used, we are only able to reimburse our expenses? As follows from equation (3), only under conditions of economic growth can we easily determine the price or the marginal utility of a goods item. In order to do so we have to evaluate the profit from the acquisition of an additional amount of the goods, provided that the consumption of these goods is consistent.

Let us look at a simple example which will help us to understand how all producers and consumers come to an agreement, how a single market price for a goods item is formed and how it turns out that all goods are produced in the required quantities and are purchased. Let us suppose that there are three buyers active on the market and a few goods producers producing two different products. In fact, we can look at this example with many buyers, producers and goods. But this will only complicate the process and will not change the main outcomes. Let us suppose that the production capacities of the economy allow us to produce 7 units of one product and 11 units of the other ($q_1 = 7,\ q_2 = 11$). Based on their costs and interests, producers set the following prices for the goods: $p_1 = \$10,\ p_2 = \$5$ (hereinafter we shall sometimes omit the $ sign). What steps will consumers take in response to this? They will try to consume such quantities of the first and the second product so that the average profit gained from the consumption of one unit of the product is as close as possible to the producer's price. The first buyer, analysing their capabilities and gains and also taking into account the recommended prices for the products, will come to the conclusion that purchasing one unit of the first product will help him or her to obtain a profit of 10 currency units and purchasing 4 items of the second product will give him or her 20 units of profit. Consequently their own evaluation of the cost of the goods will match the evaluation of the producers: $p_1 = 10,\ p_2 = 5$.

If the consumer's own price was higher than the producer's price, the consumer would continue to acquire additional goods. Since the profit of the last unit of the product, as with the average profit, would steadily decline it would stop at the time when the prices became equal. If the consumer's price was lower than the producer's price, the consumer would reduce

consumption. Of course, we had to make considerable allowances, allowing the consumer to get the same price as the producers, despite the non-absolute divisibility of the product. In real life this is very difficult to achieve. However, we have to remember that in real life a buyer has the opportunity to slightly increase or reduce the consumption of virtually any product. He or she does this by increasing or reducing the consumption of various alternatives that are more divisible than the main product. For example, after purchasing a car, a person sometimes uses taxis and public transport, after graduating from university a young specialist continues training at the workplace and uses other methods of acquiring additional knowledge. Furthermore, the modern economy offers the buyer a wide range of similar products at different prices and with different consumer properties. Therefore, it is much easier for consumers to achieve an acceptable result than many people think. I do not know how convincing this all sounds, but nothing bad will happen even if some consumers do not achieve the necessary result. They will continue to search for an acceptable result and will probably find it. On the other hand, as we will see later, we have made the task more difficult because in our example the profits from the acquisition of the first unit of the same product by different consumers vary considerably, which does not happen all too often. Let us continue. The first buyer purchases 1 unit of the first product and 4 units of the second product. Consequently the profit and expenses of the first consumer will be as follows:

$$\mathrm{d}(w_1 l_1) = 1 \times 10 + 4 \times 5 = 30.$$

The second buyer, having analysed the possible acquisitions, comes to the conclusion that purchasing 3 units of the first product will give him or her a profit of 30 and purchasing 2 units of the second product will give him or her 10 currency units. The evaluation of the value of the products: $p_1 = 10,\ p_2 = 5$. The expenses of the second buyer are:

$$\mathrm{d}(w_2 l_2) = 3 \times 10 + 2 \times 5 = 40.$$

Let us suppose that the third consumer has a profit from the acquisition of 2 units of the first product of 20 and from the acquisition of 6 units of the second product a profit of 30. When purchasing such a quantity of a product the consumer's evaluation of the value of the products is the same as the evaluation of other buyers. However, a third buyer had a wonderful night out yesterday and slept in very late today. Therefore, this buyer will get only 5 units of the second product. The economic capabilities of producers are limited to 11 units of the second product. Consequently the additional expenses will be:

$$\mathrm{d}(w_3 l_3) = 2 \times 10 + 5 \times 5 = 45.$$

What conclusions should be drawn from this? Some participants of the market exchange are not satisfied with the results obtained. The producers of the second product, after having quickly sold 11 units of their product, are plagued by doubt and strongly suspect that the price for their product was underestimated. The producers of the second product were only able to

sell 6 units out of 7. The third consumer did not obtain the expected profit. The growth of consumption and production of goods in our small country was 115 currency units. In the future, competition between producers of the first product should lead to a reduction in price or a decrease in the volume of production. Both this and the other alternative can be analysed. However, so as not to frustrate the reader we will suppose that the existing technologies do not allow the cost of the first product to be reduced. Therefore producers refrain from producing 1 unit of the product. The resources are freed up go to other firms that will attempt to manufacture a certain product at reasonable prices. The producers of the second product, following their suspicions, slightly raise the price of the product or increase production. Let us suppose that new technological capabilities arrive and producers are able to produce 12 units of the product at a price of $5. It is not difficult to establish that during the process of market trading the following result will be obtained:

$$d(w_1 l_1) = 1 \times 10 + 4 \times 5 = 30,$$

$$d(w_2 l_2) = 3 \times 10 + 2 \times 5 = 40,$$

$$d(w_3 l_3) = 2 \times 10 + 6 \times 5 = 50.$$

All consumers have received the maximum possible profit. The growth in GDP has increased to 120. If, after a certain period of time, the technology of production for, let us suppose, the first product becomes more complete and producers are able to offer a greater amount of goods at a lower price, consumers will increase consumption of the first product. They will increase it to such an extent so that their profit or marginal utility is equal to the market price of the product. The result could be something like this:

$$d(w_1 l_1) = 2 \times 7 + 4 \times 5 = 34,$$

$$d(w_2 l_2) = 6 \times 7 + 2 \times 5 = 52,$$

$$d(w_3 l_3) = 4 \times 7 + 6 \times 5 = 58.$$

The increase in GDP and the increase in consumption have become even greater than in the previous example and have risen to $144. Let us try to create a schematic diagram of the results obtained (fig. 1).

Business and Economic Research
ISSN 2162-4860
2012, Vol. 2, No. 2

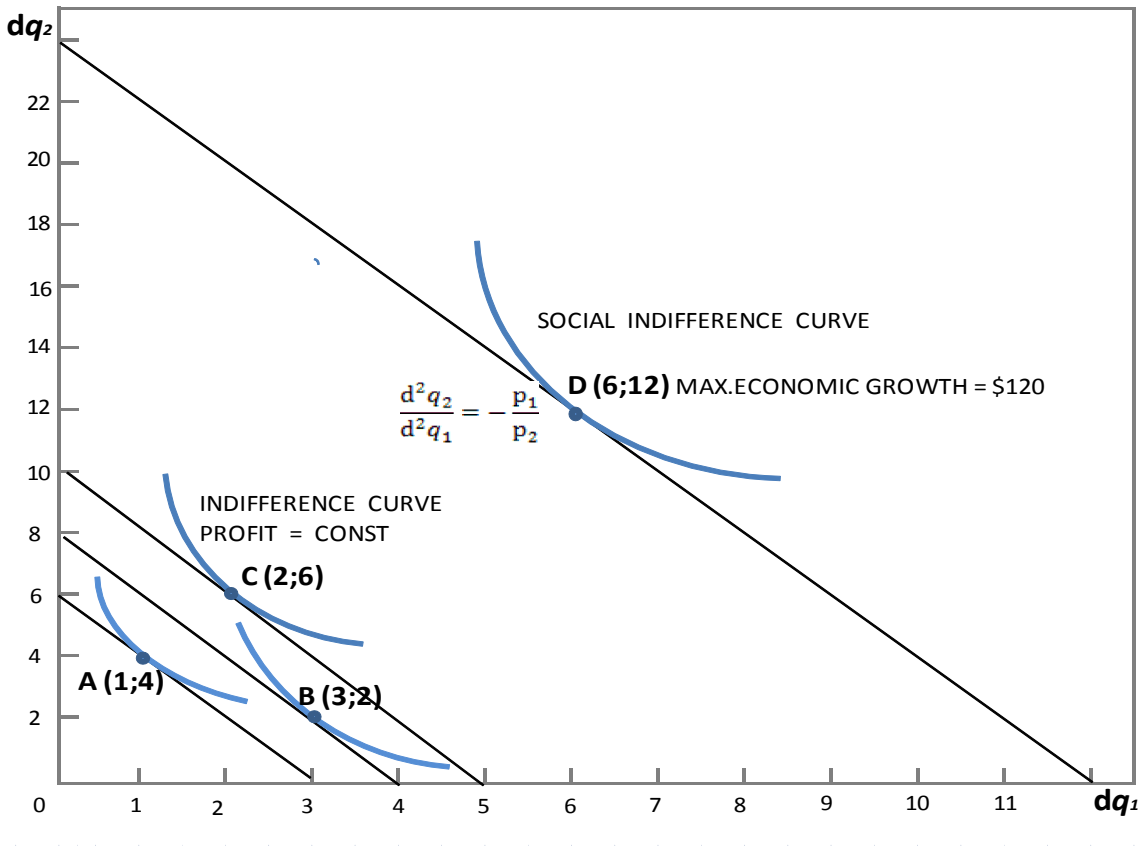

Figure 1. Indifference curves or fixed income curves for consumers.

The diagram looks very familiar and is reminiscent of the countless diagrams in economic textbooks on the utility theory (the diagram shows an example where the growth in GDP was \$120, $p_1 = \$10$, $p_2 = \$5$). The lower left corner shows the indifference curves or the fixed income curves for buyers. The budget lines, the gradient of which depends on the prices established for the goods, touch the curves at points A, B and C. At these points consumers and producers have maximum profit. At all other points of the curve the expenses of the consumers will be more than at points A, B and C. The only difference between this diagram and the diagrams in textbooks is the social indifference curve, which Samuelson (1956) and others doubted existed (for example: Goodin, 1993). It is displayed in the upper right corner of the diagram. The social indifference curve is, of course, a curve of constant growth in GDP. GDP is the only real measure of social welfare. At point D, all consumers and producers have maximum profit and the economy is approaching the limit of its production capacities (in our case the production of the first item reaches 6 units and the second – 12 units).

4. Rule for Maximizing The Utility of Consumption

Let us now discuss the so-called utility maximizing rule. As follows from equation (2), in conditions of economic growth the consumption and profit of a consumer will be at their maximum level if

$$d^2(wl) = \sum_i d^2(p_i q_i) = 0. \quad (4)$$

For two products when the prices are stable

$$p_1 d^2 q_1 + p_2 d^2 q_2 = 0,$$

$$\frac{p_2 d^2 q_2}{p_1 d^2 q_1} = -1, \tag{5}$$

$$\frac{d^2 q_2}{d^2 q_1} = -\frac{p_1}{p_2}. \tag{6}$$

In equation (5) the top half of the fraction represents the marginal profit (marginal utility) gained from the consumption of the second product and the bottom half the marginal profit (marginal utility) gained from the consumption of the first product. This is the well-known utility maximizing rule. In the utility theory it is as follows – "The consumer will receive maximum satisfaction or utility acquiring goods at market prices when the last dollar spent on acquiring a product brings the same marginal utility as every last dollar spent on acquiring other products." Equation (6) is a condition which, when fulfilled, will result in the budget line touching the fixed income curve (indifference curve). On the one hand the gradient of the line determines the price ratio of the two products. On the other hand the gradient of the curve at the point of tangency is defined by the relation

$$\frac{d(dq_2)}{d(dq_1)} = \frac{d^2 q_2}{d^2 q_1}.$$

The minus sign in equations (5) and (6) means that the tangent line always has a negative gradient. The utility curve cannot have any peculiarities in terms of flexion or discontinuity. Otherwise there would always be an area of the curve in which the tangent line will have a positive gradient and the price ratio of the products will become indefinite (the tangent line will intersect the axes in negative regions). In our case the utility maximizing rule for consumption may formulated as follows: "The consumer receives maximum profit if the last dollar spent on acquiring a product gives a profit value equal to the loss value from the reduction in consumption of the other product by one dollar". This is obvious because in order to gain additional profit, the consumption of one product must be increased by one dollar and the consumption of the other product must be reduced by the same amount, if the additional profit from the increase in consumption of the first product is higher than the loss from the reduction in consumption of the second product.

An ordinary consumer can achieve maximum profit by observing and analysing three different indicators: total profit, average profit and marginal profit. The consumer naturally chooses one of these indicators, but may simultaneously evaluate two or three indicators. As his or her experience and intuition suggests, this is exactly what the consumer does.

In the examples given above the buyers made conclusions based on average profit, but, with the same success, they could have made conclusions based on marginal or total profit. I will give an example in order to explain how this happens in real life. Let us suppose that a young man has been studying at a university or any other educational institution for four years. The tuition fees are $47,500 per year. Should he continue studying or not? In order to answer this question he may use three different methods. The first method is based on the calculation of the average profit. Let us suppose that he wishes to work actively for 40 years after completing his studies. He anticipates that after four years of studying his income will be $35,000 per year. Before studying his salary could have been $30,000 per year. Therefore, over the 40 years he will receive a profit of:

$$(35.000 - 30.000) \times 40 = 200.000(\$).$$

Each year of study enables him to receive an additional profit of:

$$200.000 \div 4 = 50.000\ (\$).$$

As this figure is greater than the annual tuition fees, he decides to continue studying. One year later he does his calculations again. Having contacted potential employers he determines that his salary may now be $36,000 per year. Given that he has 39 years of active work left, the calculations will be as follows:

$$(36.000 - 30.000) \times 39 = 234.000(\$).$$

$$234.000 \div 5 = 47.000\ (\$).$$

Each year of study brings an average of $47,000, which is less than the cost of study. Therefore he stops studying. The student's friend, who has always been good at mathematics since school, is more anxious about figures. His method of evaluation is to calculate the marginal profit. After three years of studying he calculated that his income at the time could be $33,800 per year. After four years of study he works out that the last year of study will bring him a profit of:

$$(35.000 - 33.800) \times 40 = 48.000(\$).$$

This is more than the cost of the final year of study ($47,500). Perhaps he may continue to study, but he will be well aware that his studies are coming to an end. The fifth year of studies will give him

$$(36.000 - 35.000) \times 39 = 39.000(\$),$$

which is considerably less than the cost of the final year of studies. His calculations are more accurate and therefore he will most likely terminate his studies in the first half of the academic

year. A third student is a little absent-minded and very interested in poetry. In order to come to a decision he calculates his total profit and total expenses. After four years they are:

$$(35.000 - 30.000) \times 40 = 200.000(\$),$$

$$47.500 \times 4 = 190.000(\$).$$

$10,000 is not a bad incentive to continue studying. After five years of study the total profit and total expenses will be:

$$(36.000 - 30.000) \times 39 = 234.000(\$),$$

$$47.500 \times 5 = 237.500(\$).$$

The profit has become less than the expenses and the time has come to say goodbye to his student friends. Fortunately he did not turn out to be so absent-minded. He took into consideration that every year of study takes away one year of production activity. If he did not take this into consideration the profit would be:

$$(36.000 - 30.000) \times 40 = 240.000(\$),$$

and the number of students at the university would increase by one. This is more or less how people make decisions. Of course, they do not always ring around potential employers, they do not always operate with accurate figures and quite often they do not calculate anything at all. People rely on their personal experience and the experience of others and sometimes they simply use their intuition. Nothing bad happens as a result of this, houses continue to be built, technologies continue to be improved and the standard of living rises. The economy stays within a state of equilibrium. A mechanism such as inflation is able to easily compensate for any irrational behaviour from consumers or producers. If it turns out that too many young people are unnecessarily continuing studying, then, first of all, this will increase the cost of studying. Secondly, this decision will lower the potentially possible level of production of goods and services, therefore their prices may increase. In other words, in an economy such as this there will be a slight increase in inflation. If young people finish their studies early too often, this is likely to bring about a reduction in the cost of studying and a certain short-term increase in goods production. The level of inflation will decrease slightly. Students will take into consideration the experience of the older generation and many will arrive at the conclusion that they should finish university at the beginning of the fifth year. In reality different people require different lengths of study. This depends on the level of previous education, diligence, the number of additional lessons and much more. Therefore, most people choose the same period of study, but as time goes on each of them receives a certain amount of additional knowledge.

Let us briefly talk of producers. A certain firm owns the rights to develop and extract oil at a certain oil field. $47,500,000 are required each year in order to expand extraction and drill additional wells. After four years of operation of the oil field the additional wells generated a profit of $48,000,000 in the final year. The additional profit is greater than the additional costs and therefore additional wells continue to be drilled. After the fifth year of extraction the field reserves deplete and the additional profit is $39,000,000. The drilling of additional wells is ceased immediately. How does this last example with the oil company differ from the previous example examining the behaviour of university students? The behaviour of consumers and producers follows the same objective – to maximize their profit.

I will now briefly cover the main conclusions.

5. Conclusion

Any individual involved in the process of market exchange simultaneously acts as both a consumer and a producer. If the individual was not a producer, he or she would not have a product to exchange for other products in the barter economy and the individual would not have money to purchase goods under modern economic conditions. A firm is a voluntary association of individual producers who agree to fulfill the commands of managers in order to maximize their consumption. The numbers of goods produced and their prices depend on all market participants. They vote with their money, which enables them to maximize profit. The market exchange of a product for money, of money for a product, or of a product for another product can only take place if both parties will be able to gain profit from the process, not an immeasurable value of utility. If there is no external interference in the economic process, the set of goods and their prices are optimal for the existing level of knowledge and technology. Concepts such as over-production and shortages of goods and services cannot exist in a free market. If a portion of the goods of a certain producer are unsold and a certain individual keeps their savings in a personal garage, then cases such as these should be more of interest to psychiatrists than economists. These cases may only interest economists due to the fact that a certain amount of goods and money are excluded from the exchange process. Therefore, in the first case there will be a slight increase in inflation and in the second case – a reduction in inflation. Say's Law is always satisfied and should read more or less as follows: the supply creates a demand at a price agreed with buyers and the demand creates a supply at a price agreed with producers. It is time for governments and government officials to stop worrying about consumers whilst inhibiting producers and helping producers to the detriment of consumers. It is like an elephant in a china shop. In turning its head towards broken crockery, the elephant risks demolishing the items on the other side. Having smashed the items on the other side with its bulky body, it turns its head again and finishes off everything that is left. It must be remembered that a consumer and a producer are different sides of the same person. In the daytime at work this person may thank the government for the help given to producers and in the evening curse the government and producers on a visit to the shopping centre.

If you agree with the ideas presented in this article, you will not have to change textbooks on economic theory. It will be sufficient to simply substitute the word "utility" for "profit". The graphs, formulae, objectives and all conclusions will remain the same. If you try to read a

textbook like this, it will most likely turn out that many of the problems discussed today seem clearer and the solutions will become more apparent. For example, the topic of observing copyrights on the Internet, which is the subject of many heated debates, causes endless disputes. Many people tend to resolve the issue through additional regulation and accepting a whole set of new laws. Some have already decided, using the utility of theory of course, that observing copyrights is better for everybody rather than failing to observe them. But this is not as clear as it would appear at first glance. Both the owner of a certain text or idea and the users will seek to gain profit from the text or idea. Primarily protecting his or her rights, the owner will evaluate their own profits if the text or idea is used by them alone and if the text or idea is used by other people as well as himself or herself. If it turns out that the profit in the second case is the same as in the first or greater, which does sometimes occur, the author will decide against any protection of their rights. However, if the profit in the first case is greater, the author may spend the entire difference between the profit in the first and second cases on protecting their rights. The next events depend on the profit received by other users. If their profits are greater than the owner's profits, they may possibly gain free access to the text or idea through measures that are legitimate, or not entirely so. This is wonderful because a higher level of profit means a higher level of production, consumption and economic growth. The free market is able to distribute consumers' rights in the optimum manner possible. The Coase Theorem is true both for the producers' market and the consumers' market. When Coase (1960) wrote his famous article, one would hope that he used the words "gain" and "benefit" as synonyms for the word "profit". Therefore, governments should eliminate any obstacles for the free exchange of rights and they should not get involved in, for example, the protection of copyrights on the Internet, especially because people who use other people's ideas are in a worse position than the author. They incur additional transaction costs due to the need to carry out joint concerted actions. Strangely enough, this means that all users of a text or an idea, except the author himself or herself, are in need of help. If the market, for whatever reason, is not able to manage the task of distributing property rights, then the best solution for the government will be that which brings the highest profit to consumers and producers.

For many years the utility theory has served us faithfully explaining consumer behaviour. It has also enabled countless researchers to further their studies. Its great merit is that it has at least been able to protect the foundations of the classical economic school from attacks from certain followers of the Keynes Theory, for whom any unexplained occurrences can be easily explained by the irrational behaviour of people. But the time of the utility theory has come to an end. As one famous character once said: "The Moor has done his duty, the Moor can go".

References

Bernoulli D. (1738). *Specimen Theoriae Novae De Mensura Sortis*. Commentarii Academiae Scientiarium Imperialis Petropditanae. *T. V. Petropoli. P.* 175-192. Gem.

Bilych G. (2012). Profit and Economic Growth. *Business and Economic Research.* 2(2). http://dx.doi.org/10.5296/ber.v2i2.2285

Bohm-Bawerk E. W. (1959). *Capital and Interest*. The History and Critique of Interest Theories. G.D. Hunke and H.F. Sewholz, tr., Libertarian Press.

Braudel F. (2011). *Civilisation Materielle, Economie et capitalisme, XV-XVIII Siecle*. Tome 1. Les Structures du Quotidien: le Possible et L`impossible. Armand Colin. Rus.

Brandt R. (1979). A Theory of the Good and the Right. *Oxford*. P. 201.

Coase R. (1960). The Problem of Social Cost. *Journal of Law and Economics, 1*(3), 1-44. http://dx.doi.org/10.1086/466560

Fisher I. (1892). Mathematical Investigations in the Theory of Value and Price. *Transaction of the Connecticut Academy.* Vol. IX. July.

Hicks J. R., Allen G. D. (1934). A Reconsideration of the Theory of Value. *Economica. New Series. 1*, 52-76. http://dx.doi.org/10.2307/2548574

Goodin R .E. (1993). Utility and the Good. In P. Singer (Ed.). *A Companion to Ethics.* Cambridge. P. 245.

Kirzner I. (1986). Another Look at the Subjectivism of Costs. In I. Kirzner (Ed.). *Subjectivism, Intelligibility and Economic Understanding.* New York: New York University Press.

Machlup F. (1971). *Theory of the Firm: Marginalist, Behavioral, Managerial*. Microeconomics: Selected Readings. (Ed. By E. Mansfield). New York.

Pareto V. (1909). *Manuel D'economic Politique*. Paris.

Rothbard M. N. (1997). Toward a Reconstruction of Utility and Welfare Economics. In *The Logic of Action One. Method, Money, and the Austrian School*. London: Edward Elgar. P. 211-255.

Samuelson P. A. (1956). Social Indifference Curve. *Quarterly Journal of Economics. Vol. LXX*. February. No 1. P. 1-22. http://dx.doi.org/10.2307/1884510

Simon H. A. (1971). *Theories of Decision – Making in Economics and Behavioral Science*. Microeconomics: Selected Readings. (Ed. By E. Mansfield). New York.

Smart J. J. (1973). An Outline of a System of Utilitarian Ethics. Smart J.J., Williams B.O. Utilitarianism: For and Against. Cambridge. P. 27-28.