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"To be a volunteer – application of the utility function."

Abstract

The objective of this work is to show that choosing to be a volunteer depends on individual choice based on utility.

The objective of each person is to be happy. There are many ways of achieving that objective. One of them is to make the right choices. In economics there are always choices to be made.
The choice problem is one of the most fundamental in economics. We must assume that individuals make rational choices. In consumer theory, choices are made based on preferences. We may order those preferences in order to construct a utility function for everyone. By analysing that individual utility function we may deduct what that individual prefers most. We may analyse their utility in choosing things. We assume that a greater utility gives us more pleasure and makes us happier. And this is the objective of our life.

And what about volunteering?
To be a volunteer an individual must spend part of his time doing that! Is he irrational, or is it that he has some advantages in being a volunteer.

An individual spends his time in two ways: work or leisure, so when they choose to be a volunteer they sacrifice work time or leisure time. As we said before, the individual makes choices based on his/her utility function. When someone chooses to be a volunteer we affirm that his or her utility function directs. So we deduct that in volunteering a person might get more pleasure than working or resting. Do they always prefer volunteering? I don't think so!
The individual doesn't always choose to be a volunteer. He must eat, and with other necessities must also work and rest to recuperate their strength.

When does someone choose to be a volunteer? Many studies show that, when an individual doesn't need to work many hours, because s/he has a high income, he might spend some of his time doing volunteer work instead of paid work. We may assume that the individual has a greater willingness to volunteer when he has satisfied his other more basic necessities.

What happens when he chooses volunteering as an alternative to resting? In that situation he must appreciate more being a volunteer. When might it happen? In this case we also may assume that individuals need some rest but after that s/he measures volunteering as higher in his preference scale or utility function, than resting.

In those cases his utility function graph doesn't have the same inclination all the time, it changes from more utility for work/leisure to more utility for volunteering, passing through an indifferent point (45º inclination curve passing through point zero on the graph). So the utility function has approximately an "S" shape.

Making decisions based on utility function has the objective of increasing our utility, meaning that we get pleasure from the things we do. When we increase our pleasure we definitely increase our happiness.

Key words: Utility, Utility Function; Rational Choice; Volunteering; Happiness.

1. INTRODUCTION

It has been more and more important to study the individual motivation to voluntary work. We may find some theories in literature about this motivation. The subject of this paper is to analyse the individual utility function and to demonstrate that people use the individual preferences expressed on the utility function to evaluate the utility of their time. It will be showed that the individuals sometimes prefer volunteer work than another alternative to spend their time Classical utility theory and written literature will be analysed. It is also an important issue for this paper, the personal knowledge of social economy and professional experience.

Volunteer activity is perceived as an increasingly important economic activity and has more and more weight in western countries. The characteristics attributed to this sector are considered a very important component of stable economics. (Badelt 1985). A volunteer gains much importance every day in view of the European imperfect public welfare system (Kakoi R, Ziemek S.2001). Measuring the total values of voluntary work activity in the economy becomes an important issue. Some economists (Kakoi R, Ziemek S. 2001) tried to do that evaluation. They found that the weigh of voluntary work in modern countries is very high.

Table nº 1

Volunteer Value Addition 1995

Country	Share of Volunteers' Value Addition in GDP
United States	**5.78%**
United Kingdom	**5.57%**
Ireland	**4.22%**
France	**4.06%**
Finland	**3.27%**
Australia	**2.81%**
Spain	**2.13%**
Belgium	**2.13%**

Source: Roy K., Ziemek S. (2000), "*On the Economics of Volunteering"*, ZEF Discussion Papers on Development Policy nº31

High unemployment rates and socio-economics trends of the last years have made policy makers pay more attention to volunteering as a possible solution. On average, it has been

accounted that the volunteer involvement means about 2.4 percent of total non-agricultural labour or over one-third of non-profits labour. In some countries (Sweden, Norway and Finland) that percentage overpasses half of non-profit workforce. The volunteers work mainly in social services and culture, but also the advocacy and environment are a especially important field to volunteers (Studies from John Hopkins University).

As we can see on table nº1 the importance of volunteering is very significant. The absolute value annually, for example, in UK estimates over £3 billion and counting the replacement cost (paid replacement to the same activity) almost £8 billion per year.
The John Hopkins Comparative Nonprofit Sector Project indicated also the significant growth in non-profit sector -- over three time more that overall economy in eight West European countries in five years (1990-1995).

2. VOLUNTEERING AND ECONOMICS – SURVEY OF RELATED LITERATURE

The objective of economic studies on voluntary work is to make a connection between the individual behaviour to decide to volunteer and economic theory to analyse that phenomenon and to explain the choice to volunteer on economic terms

2.1 Supply of volunteering labour

First we must define voluntary work: The voluntary activity referred the free choice of the individual to do a work without any kind of reward.
Since the volunteer hasn't received any payment, it may be very important to look for his motivation.

Volunteering motivations

Because in economics every resource is limited, even time, (we have only 24 hours a day to do everything we ought to do), what reason makes the volunteers "sacrifice" their time to volunteer?

When economists want to explain the volunteer motives they identify some models:

- Public goods model
- Private consumption model,

- Impure altruism model - investment model.

Public Goods Model.

The public goods model explains volunteer motivation in order to increase supply of the public goods. As public good, per definition, non-rival and non-excludable, an increase of the supply of these goods suggest that everybody benefits from the consumption of those goods. When the individual volunteers for the benefits of others, without receiving something in return, it may be defined as pure altruistic.

The preferences of the altruistic individual are therefore not only defined by his consumption level but also by the other people's consumption levels. (Badelt 1999: 445). Following Andreoni (1989), the preferences of the altruistic volunteers depend on the private consumption and the aggregate supply of the public goods.

Based on that, the altruistic individual will reduce his donations when contributions of others will be increased and vice versa to maintain the public good stable in order to maintain the utility obtained form the public goods.

Private Consumption Model

Contrary to the public goods model, this model defends that the individuals increase directly this utility by their attitude of giving. As Andreoni (1998:1448) said " people have a taste for giving: perhaps they receive status or acclaim, or they simply experience a "worm glow" from having "done their bit"".

Based on this model, "individual donations are treated as a normal utility-bearing goods, the amount volunteered vary directly with the wealth of an individual" (Kakoi, Ziemek 2001).

Impure Altruistic Model - Investment Model.

In impure altruistic model it is showed that when the individuals volunteer they don't carry direct utility but they have expectation to gain something with volunteering, something

like a better opportunity in the future, the exact finding when somebody invest on scholarship or on professional qualifications – investment model.

In the investment model the volunteers' motivations are strictly related by what they might obtain trough the volunteer work. They may receive training and acquire new skills, and they may have an opportunity to get new social contacts, which may provide them a best job in future. The volunteer motivations are treated here as an investment in human skills, so "the individual will be motivated to supply volunteer labour when the expected value of future income gained though volunteer experience, net the opportunity cost of volunteering is positive" (Kakoi, Ziemek, 2001). The individual retains the good bargaining position in terms of his labour market value comparatively to other individuals and he will eventually lead to an expansion of job opportunities in the same social fields where are higher levels of government spending (ex.: health or education).

Income and opportunity costs

Other approach analyses the role of intrinsic and extrinsic motivation on volunteering supply of labour.

The individual is intrinsic motivated when he doesn't receive some reward for the activity he's done. The intrinsic motivation is as opposition to extrinsic motivation when the agent requires explicit monetary compensation to modify his behaviour. Frey (1992:162)

We may assume that the volunteer is intrinsically motivated. Because of that, he faces a big opportunity cost. Now, we may assume that the reward was introduced in order to diminish the opportunity costs of voluntary work – extrinsic motivation, and to increase the supply of voluntary work labour.

When the individuals are intrinsically motivated, an introduction of a direct reward (Banks J, Tanner S, 1998) to volunteers "could reduce the time dedicated to more intrinsically rewarding activities and increase the time devoted to alternative tasks". The monetary incentive seems to "crowd-out" intrinsic motivations. Empirical findings (Frey, 1992) show that direct monetary compensation reduces voluntary work labour supply, because they affect the intrinsic motivation. Even so, direct reward reduces the opportunity costs of volunteering.

Opportunity costs might have a great impact in voluntary work labour supplies. Frey and Götte argued that the opportunity costs of time have negative impact on volunteering. On

the other hand, Freeman found that "persons with characteristics associated with higher value of time – better educated, the employed, those with higher incomes, and so on –are more likely to be asked to volunteer than others. [..] We might expected persons with higher valuation of time to reject request to volunteer, but in fact the opposite is true: those with greater education, family income, and so on, are more likely to accede to requests for volunteer activity"

Banks J. and Tanner S. studies developed in Italy (1997,1998) confirm the Freeman findings that said that introducing the direct rewarding for the voluntary work induced its decrease means that the intrinsic motivation for volunteering is more important than the opportunity costs of voluntary work labour supply. The "motivation crowding out" theory gains field on these studies.

By analysing studies, some contradictory results might be found: positive effect of income on volunteer time, especially for men in Brown and Lankford, (1992:327), and a negative price income elasticity of demand of volunteering estimated by Menchik and Weisbrod (1987).

Other features influence the voluntary work labour supply.

Freeman (1997:164) found other interesting voluntary work motivations. The author suggests that:

1- "People value the particular charitable activity a " conscience good", a kind of public good for witch people are willing to contribute time, even if they would prefer free ride on the provision of that good";
2- "The request carries some social pressure with it: you are more likely to accede to personal requests then to telephone or written requests"; to requests from somebody you know rather than a stranger.

There are other factors that influence the utility of volunteers. Menchik and Weisboard mention on their study:

- The individual's age (life cycle – the individual volunteers more when retired; because of investment motivation young individuals volunteer more;
- The wage rate of the individual - many studies are not conclusive.

- Full income – the perceived value of volunteering would be assumed to crowd out labour hours to some extent for the individual who has sufficient income to cover basic expenses.
- The cross price of contributing money rather then contributing volunteer hours- a person who sees a need to help may contribute the money rather then the labour, the money contribute is tax deductible.
- Demographic information – the individual who has children volunteers more in school activities, community safety programmes etc.
- Education, religiosity – those characteristics may help to differentiate potential volunteers. Through education some individuals may believe that it's important to help on non-profits causes.
- Municipality demographics – residing in a small town presumably engenders a different level of personal involvement in local volunteer activities.
- Local and state government spending – a high level of government spending could crowd out personal volunteering through the reduction of the necessity for non-profit programmes.

Some researches (Wittman D. 1996, p:) find that the **liability exposure of volunteers** is an important issue to consider in volunteer's analyses. Wittman found that the offer of volunteer work may be negatively affected by the lawsuit or a volunteer liability index which depend on:

- "An index of real legal exposure to volunteers;
- An index of public consumer information about legal exposure for volunteers
- An index of state litigiousness in general."

Because of this lawsuit risk, it may be necessary to compensate volunteers by some special kind of protection.

The results of the carried out done by Judd T. (1998) on liability questions in volunteering suggested that "potential volunteers focus on general liability climate rather then law specific to volunteering, than potential volunteers may not realize that they are more protected as volunteers and the federal law may have little effect in increasing volunteerism".

In his study, Jacob (1991:29) found out that the amount of volunteering is influenced by socio-economic situations, which means there are more voluntary work supply when uncertainty crises are predominant.

2.2 The utility function approach to volunteering

Holt C. and Loury S. have introduced to the utility function an altruism parameter. On their studies the choice to contribute (money or work) depends on the relative size of the altruism parameter **(α).** They used the alternative model of Nash standard game theory in the standard linear voluntary work contribution game.

They showed that utility function (u_i) is :

$$u_i = \pi_i + \alpha \sum_{j \neq i} \pi_j = C + (m - v + (n-1) \alpha) x_i$$

When:

- x_i – means contribution of individual **i** to the public good ;
- π_i – means individual money earnings;
- **X**- means total contribution from all individual to the public goods;
- **v(E- x_i) –** means value of private consumption – v normalized to be one;
- **MPCR** – means "marginal per capita return" from investing in the " group exchange" - marginal value of the public good relative to that of the private good- MPCR is **m/v;**
- **mX** - means value of public goods for each individual;
- **α (n-1)** – effect of the individual altruistic concern**;**
- **C**- Means constant includes all terms that are independent of the person's own contribution x_i.

Holt and Laury (1997) concluded that "with linear altruism, the utility function is linear in the decision x_i, so that the optimal choice is to contribute all or nothing, depending on the relative size of the altruism parameter.[…]Given a distribution of α parameter across individuals, increases in MPCR and group size tend to increase the probability of full contribution."

3. APPLICATION OF UTILITY FUNCTION TO VOLUNTEERING DECISION.

3.1 POSTULATES

First we must refer some postulates that in our opinion support the proposal of application of utility function to volunteer decision. To start with, it's important to specify the classical approach to construct the utility function.

3.1.1. **Postulate1** - Utility function application to making decisions

The most fundamental assumption on utility theory is that the decision makers always choose the alternative for which the expected value of utility is maximum. The utility function is the rule by which the assignment is done. That function depends on the individual preferences.

The source of utility function is on the consumer theory. A core problem of that theory is the choice problem. An individual, as a consumer makes his choices based on indifference curves, which show his preferences.

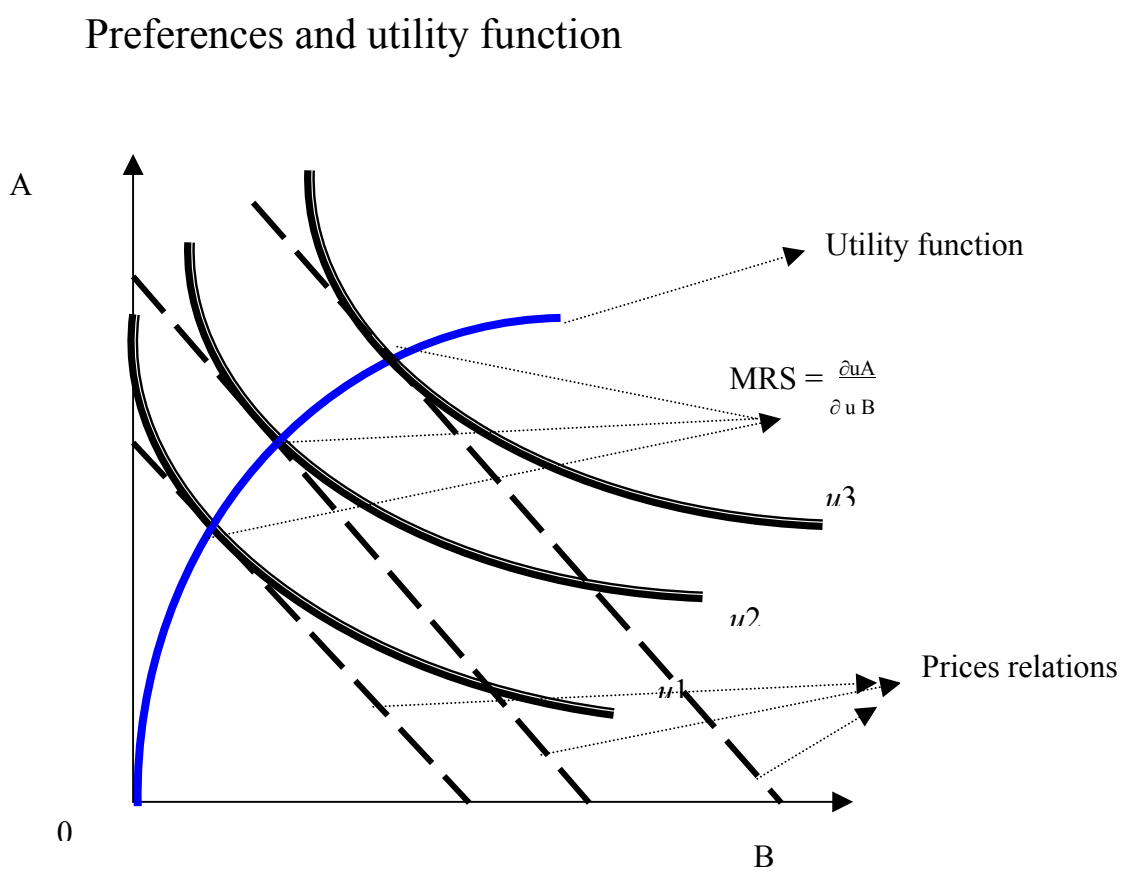
The preferences are analysed on utility terms. When we say that we prefer one bundle of goods to another its means that the first one gives us more satisfaction/utility then the other. Looking from another point of view, we may say that preferences define our choices and we may observe those choices on indifference curves.

All the points on the same indifference curve makes us equally satisfied - they have the same level of utility. In our analyses we used cardinal theory, which attaches significance to the magnitude of utility. We want to measure the utility using the Marginal Rate of Substitution (MRS), which gives us an observable magnitude.

For each point, the MRS indicates the slope of the curve and we may find it relation by, analysing the increase of utility of consuming of one unit of the good A, divided by decrease of utility related to consuming one unit of good B. Considering the consumption

theory, the optimal point for the consumer is the one, were the MRS is equal to relation of these goods prices.

Graph 1



As Varian said " A utility function is a way of assigning a number to every possible consumption bundle such that more-preferred bundles get assigned larger numbers then less preferred bundles".

Because of his conclusion, we may order hierarchically the preferences and through the monotonic transformation we may build the utility function for everyone. A function which represents the monotonic transformation of preferences is generally represented by f(u) expression. Based on the principle announced by Varian (1993.p:55) " a monotonic transformation of a utility is a utility function that represents the same preferences as a original utility function".

This principle indicates some characteristics (Varian (1993, p:57)) of utility function like:

1 "If u (x_1, x_2) present particular preferences and if u(x_1, x_2)> u(y_1,y_2) if and only if (x_1, x_2) > (y_1,y_2) ;
2 If f(x) is a monotonic transformation, then, u(x_1,x_2)> u(y_1,y_2) if and only if , f[u(x_1, x_2)] > f[u(y_1, y_2)];
3 Therefore, f[u(x_1, x_2)] > f[u(y_1, y_2)] if and only if, (x_1, x_2) > (y_1,y_2), represents the preferences in the same ways, as the original function u(x_1, x_2)."

3.1.2 Postulate **2** - Theory of labour supply

The second postulate we will use is the theory of labour supply.

In the present society we may verify some trends in labour supply as:

- Younger persons arrive to the market later;
- Males have been retiring, either wholly or partially earlier – the participation rate for male has declined from about 90% at the beginning of the twenty century to about 78% today (in Europe)[1],
- Weekly hours of work have declined;
- The number of weeks worked per year has declined;
- Increase participation of females on labour market- at the turn of century the female participation rate was about 30% it's about 68 %.[2] in Europe, in contrast to rising participation , weekly hours worked had also showed downward trend.

Besides those trends we also ought to consider long run trends:

- The decreasing number of people available to supply labour associated with the size and structure of the population, due to demographic factors;
- The amount of education, training and experience.

All those factors influence the supply of volunteer labour.

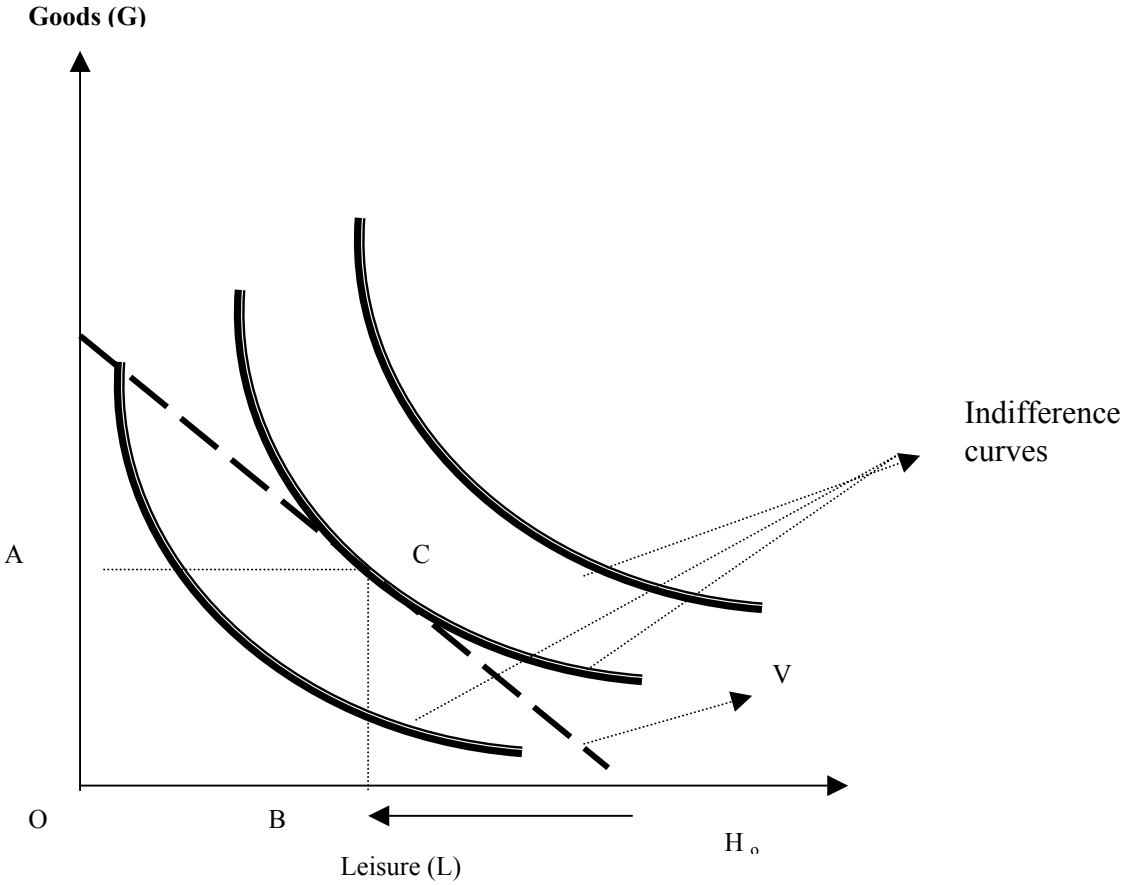
We may assume that, in the labour market as well as in other markets each individual maximises his utility. In short-run labour supply, he maximises his utility choosing the

[1] Eurostat – European Commission – A Europa dos Quinze: Números Chave – Edição 2000
[2] idem Eurostat.

better quantity of goods – related with paid labour and leisure - that we're going to assume as another good.

Graph 2

Short-run labour supply



Hours worked **(H)** = Total time available **(T)** – Leisure **(L)**

AC- non-labour income

CB – Labour income

OA/OB – represents the wage rate

V – budget constrain

The indifference curves above have the usual properties and show trade off between the hours someone will work and will rest, and the goods they can obtain from this work and income from the leisure, while keeping their utility constant.

As the individuals maximise their utility, their utility function is:

$$u = u(G, L)$$

Considering the marginal utility law, the marginal rate of substitution of leisure for goods (MRS_{LG}) is :

$$MRS_{LG} = \frac{\partial u / \partial L}{\partial u / \partial G}$$

Considering the graphical presentation and the equation above we have;

$$\frac{\partial u / \partial L}{\partial u / \partial G} = \frac{w}{p}$$

Where:

w- Presents non labour (related to leisure) income.

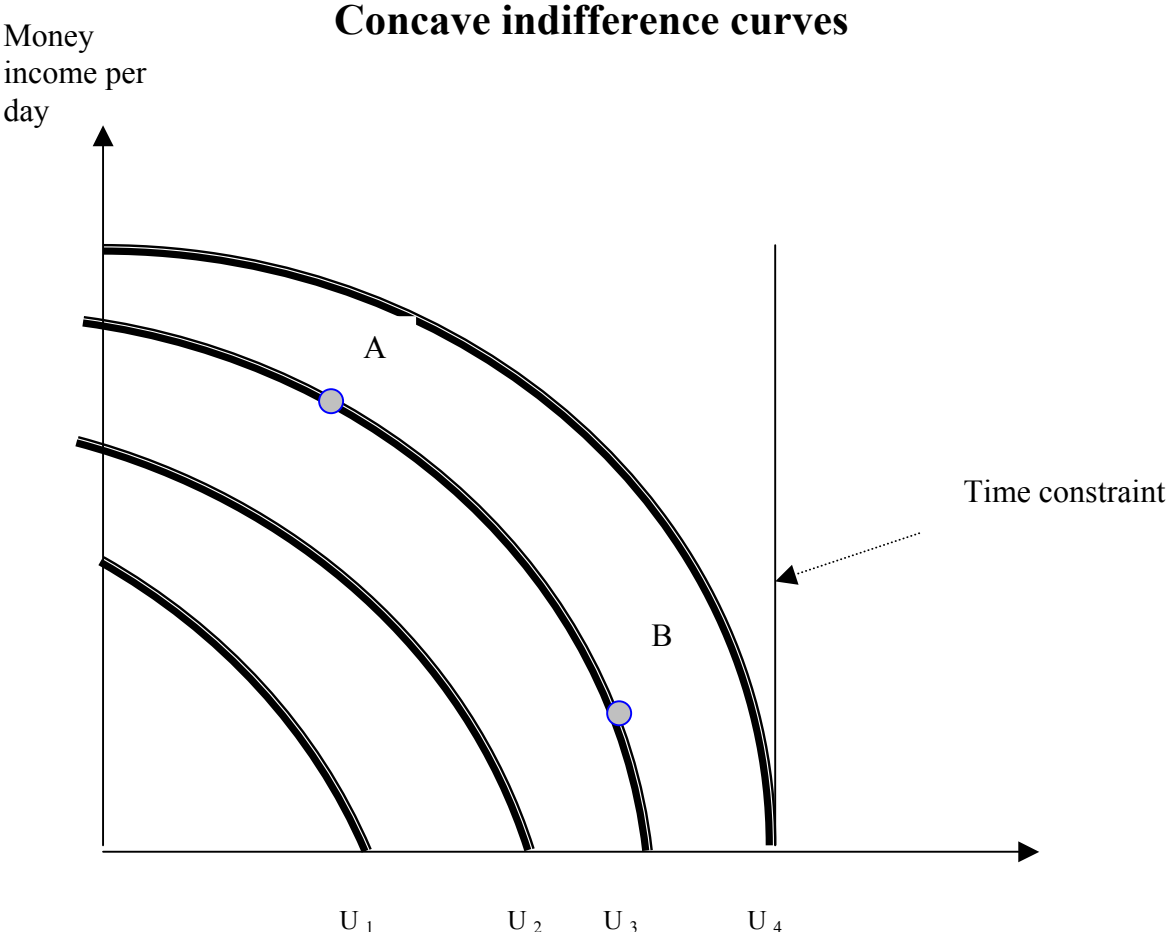
p- Presents price of goods.

Indifference curves are negatively sloped because if leisure hours are increased, the others are reduced in order to maintain the same level of utility. Both of them are preferred.

Following Ehrenberg and Smith (quoted by Lehmann H.2002) we may analyse the indifference curve as concave to the origin and we found out the situation below:

Graph 3

Concave indifference curves



If the income is big enough, it's preferred to lose some of money in order to increase the leisure, which is relatively scarce –point A. On this point the utility of the lose of 1 unit of money is relative by small compared with the utility of the increase of the leisure.

We have a scarce resource – time. We have only twenty-four hours a day to do everything: paid work, leisure or voluntary work work.

As we don't have a possibility to have more of everything we must choose. What do we choose?

It's possible that if we are on point A situation, we might prefer a little more leisure. That is an income effect. With a big income and small leisure time we may appreciate more an increase of leisure and sacrifice a little of income.

On the contrary if we are in B point it may be expected that we prefer to abdicate of the some of leisure and work more, in order to increase our income. We substitute the leisure hours to work hours. – a substitution effect in labour market.

3.2 Hypothesis

Ho: Individual uses the utility function to be a volunteer.

It has been assumed that, that the decision to work or to leisure is also to possible apply the volunteering decision. It has been applied the utility function to the two alternatives: to leisure and volunteering or to work and volunteering.

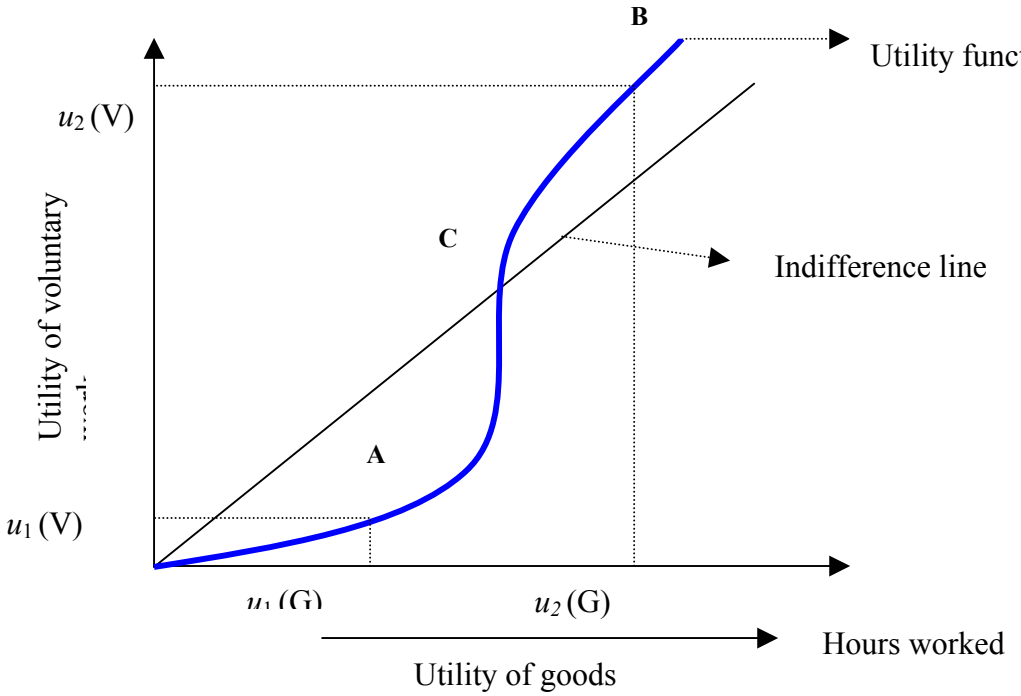
3.3 Test of Hypothesis - Ho

In order to confirm the hypothesis Ho has been tested the utility function for each alternative using two kinds of analyses: the graphical analysis and mathematical analyses:

3.3.1 Graphical analysis

Graph 4

The voluntary work and paid work – utility function



It's possible to assume that initially individuals choose to work in order to pay their bills to live, after that and according to marginal utility law and the theory of labour supply, they

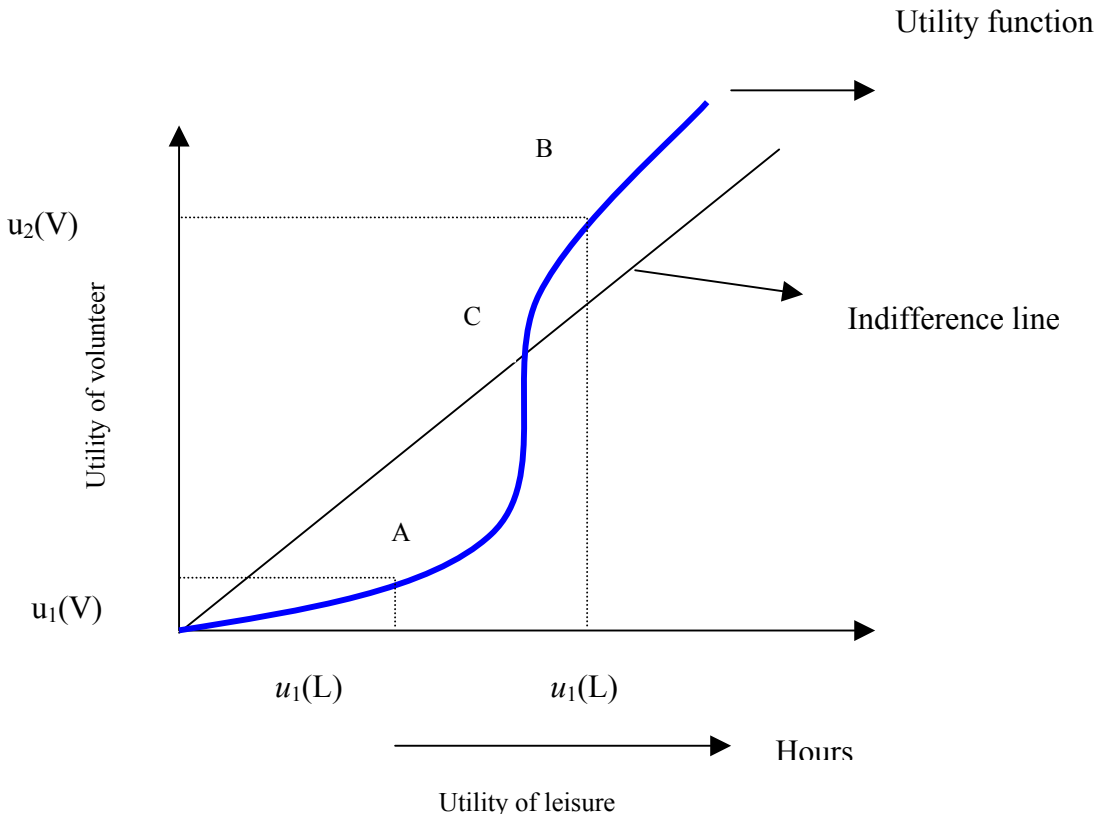
value more the resting then the working so the utility of resting is bigger them utility of working.

The individual always chooses the rest? It is possible that he may choose the non-paid work? In what circumstances? It's possible that they may choose non-paid work when the utility of this kind of work will be bigger then the utility of goods.

On point A the utility of goods is very high and utility of volunteering is small so the individual chooses the goods but on point B the situation is different. On this point the utility of volunteering is much bigger then utility of goods. The C point indicates the inflection point where the utility of goods and utility of volunteers is the same – the indifference point.

Graph 5

The leisure or the volunteer work - utility function.



Analysing many studies we may say that initially the individuals chose to rest in order to recuperate their strength, according to marginal utility law they may value more the

volunteering then the resting so we may assume the utility of volunteering is bigger then utility of resting.
On point A the utility of leisure is higher and utility of volunteering is small so the individual chooses the leisure but on point B the situation is different. On this point the utility of volunteering is much bigger then utility of leisure. The C point indicates the inflection point where the utility of goods and utility of volunteering is the same – the indifference point.

Using the utility function as support to decide between leisure or paid work we may also ask ourselves what we want to do: paid work or voluntary work work; leisure or voluntary work work.
I think that we may explain our choice based on utility function. Evaluating the alternatives we may decide what is the best for us.
It is irrelevant that we volunteer because of "worm-glow" question or any other.

3.3.2 Mathematical analysis

Using the labour supply theory and introducing the voluntary work question we have:

$$u = \mathrm{u}(\mathrm{G}, \mathrm{L}, \mathrm{V})$$

Considering the marginal utility law, the marginal rate of substitution of voluntary work for goods (MRS_{VG}) is:

$$\mathrm{MRS}_{\mathrm{VG}} = \frac{\partial u/\partial \mathrm{V}}{\partial u/\partial \mathrm{G}}$$

Considering the mathematical presentation we have;

$$\frac{\partial u/\partial \mathrm{V}}{\partial u/\partial \mathrm{G}} - \frac{\mathrm{v}}{\mathrm{p}}$$

Where:

v- Represents voluntary work income(worm glow, expected earning(investment – theory) etc.

p- Represents price of goods.

Considering the voluntary work substitution of leisure we have the marginal rate of substitution of voluntary work work for leisure (MRS_{VL}) is :

$$MRS_{VL} = \frac{\partial u/\partial V}{\partial u/\partial L}$$

Considering the mathematical presentation we have;

$$\frac{\partial u/\partial V}{\partial u/\partial G} - \frac{v}{w}$$

Where:

v- Represents voluntary work income(worm glow, expected earning(investment – theory) etc.

w- Represents non labour related to leisure income.

On the second case we have a pertinent implication to voluntary work of retired individuals. We may find many studies that show us the increasing participation of retired individual on voluntary work work. This fact has a growing importance if we consider the increases of human live and the available time of retired individual to participate in more active way in communities. This is also a way to make this individual useful to society and make him feel better because of that.

3.4 Diagnosis of confirmation test of hypothesis Ho

As it was showed by graphical analysis and by mathematical analysis the volunteering decision might to be based on the individual utility function.

4 CONCLUDING REMARKS

Volunteering means a lot in modern societies. The relevant value ofthis kind of activity and very sensitive fields were the activity is important means that governments make take care on volunteering. On economic term the value of volunteering is increasing every day.

Because of it, is more and more important to create the sustaining economic framework to analyse the activity of individual decision taking – behaving of economic agents or macro analysis. In the micro scale it's important to analyse the individual decision of volunteer labour supply.

This paper intends to make a little contribution to the theory of volunteering decision of labour supply based on decision theory of utility function, however this is not a closed issue and must be tested and certainly may be improved.

The volunteering decision has important social welfare consequences. Since there is an increasing trend to reduce government expenditure on social issues due to budgetary constrains, voluntary work in the future may provide an answer to help solving some social problems.

On the other hands, individual behaviour is one of open issues in modern economics. The good use of time makes individuals happier because of their utility perception on use of time – the perception that they are not wasting scarce resource.

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