Production of (Pleasant) Time by Means of (Unpleasant) Time: Some Notes on Consumption Theory and Time Use

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Abstract

The aim of this paper is to propose an analytical framework, wherein the individuals' choice problem is addressed in terms of alternative time-consuming activities rather than in terms of alternative bundles of goods and services. In particular, the paper reverses Becker's (1965) proposal to approach the problem of time allocation by transforming the time spent in consumption into foregone earnings.

The result of reversing Becker's approach is a model that represents each activity as a sort of productive process allowing to produce pleasant time by consuming 'direct' unpleasant time and the 'indirect' amount of unpleasant time equivalent to the market goods used up as inputs.

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1   Introduction

Standard consumption theory interprets the consumer's choice problem by resorting to the metaphor of a marketplace where individuals: 1) know what they need (or want) and to what extent the consumption goods or services brought for sale on the marketplace can satisfy their needs; 2) know their budget constraint; 3) choose and buy a bundle of goods and services, among the affordable ones, that at best satisfies those wants or needs. Moreover, the timeless metaphor of the standard theory takes for granted that individuals automatically 'extract utility' in the same moment in which they get what they have chosen to buy on the marketplace.

A first attempt to widen the focus of standard theory can be found in Becker (1965), who proposed to follow and observe households' behavior 'after' exchange has taken place. In Becker's metaphor, households are viewed as production units that use what they got on the marketplace, together with their time, as inputs of a process whose output is, in turn, a bundle of goods and services that yields utility according to the traditional axioms about preference orderings.

This paper proposes a metaphor of individual choices, different though similar to Becker's, in which individuals engage in time-consuming activities, which can still be interpreted as productive processes that use goods and services together with time units as inputs, whose output however is also time, namely a flow of pleasurable time. The result is an analysis of consumption choices founded on a 'what shall I do', as opposed to a 'what shall I buy' framework of analysis.[1]

The structure of the paper is the following. Section 2 summarizes Becker's approach to time use. Sections 3.1 and 4 contain, respectively, the methodological and analytical details of a model of time allocation among activities. Some implications of the model are discussed in section 5. Section 6 concludes.

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[1] On the distinction between the two frameworks, see Steedman (2001).

2   Becker on time use

The main and declared aim of Becker's 1965 work was to propose a revised theory of choice capable to take into account the cost of non-working time spent in consumption:

> "… the cost of a service like the theatre or a good like meat is generally simply said to equal their market prices, yet everyone would agree that the theatre and even dining take time, just as schooling does, time that often could have been used productively. If so, the full costs of these activities would equal the sum of market prices and the forgone value of the time used up. In other words, indirect costs should be treated on the same footing when discussing all non-work uses of time, as they are now in discussions of schooling … while, as already mentioned, I have been concerned with the use of time in education, training and other kinds of human capital, here I attempt to develop a general treatment of the allocation of time in all other non-work activities." (Becker 1965, p.494).

More specifically, in Becker's metaphor, "households are both producing units and utility maximisers. They combine time and market goods [x_i] via the "production functions" f_i to produce the basic commodities Z_i, and they choose the best combination of these commodities in the conventional way by maximising a utility function U= U(Z_i, … Z_m) = U(f_1, … .f_m) = U(x_1, … x_n; T_1, … T_m) subject to a budget constraint g(Z_i, … Z_m) …" (p. 496).

Becker's model can be summarized as follows.

If one assumes linearity and separate dependence on market goods and time, the production function $z_j = f_j\left(x_{1j},...,x_{nj};T_j\right)$ can be expressed as

(1)
$$\begin{cases} z_j = \sum_i \beta_{ij} x_i \\ z_j = \tau_j T_j \end{cases}$$

where β_{ij} is the quantity of the consumption commodity j produced by one unit of the market commodity i and, analogously, τ_j is the quantity of the consumption commodity j produced by one unit of direct time.[2] Inverting (1), we get

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[2] To avoid confusion, and differently from Becker's use of notations, two different indexes, i and j are here used for the different types of goods, x and z.

(2)
$$\begin{cases} x_i = \sum_j b_{ij} \cdot z_j \\ T_j = t_j \cdot z_j \end{cases}$$

where b_{ij} is the quantity of the market commodity i necessary to produce one unit of the consumption commodity j and similarly for t_j.

Households are supposed to solve the following optimization problem:

$$\max_{z_j} U(z_1, ..., z_J)$$

subject to
$$\begin{cases} \sum_j T_j + T_w = T \\ \sum_i p_i x_i = w \cdot T_w + V \\ \text{the production functions (2)} \end{cases}$$

where T_w is working time, p_i the price of the market good i, w denotes earnings per unit of working time and V income deriving from sources different from work.

Substituting the production functions and the time constraint into the market constraint, the optimization problem becomes:

$$\max_{z_j} U(z_1, ..., z_J)$$

subject to $\sum_j (b_{ij} \cdot p_i + t_j \cdot w) z_j = T \cdot w + V$.

The FOC conditions of the problem become therefore

(3)
$$\frac{\partial U}{\partial z_j} = \lambda \left(\sum_i b_{ij} \cdot p_i + w \cdot t_j \right), \forall j$$

plus the budget constraint. The meaning of (3) is quite standard: the ratio of the marginal utilities of consumption goods z_j must be equal to the ratio of their total cost, including the cost of the consumption time expressed in terms of forgone earnings. Notice that, in contrast with the standard approach, in Becker's there is no longer a condition on the marginal utility of leisure time, since leisure time disappears from the scene: all the available time is absorbed into the production of consumption goods (including the hours of sleeping time).

3   The other side of the coin

In most cases, money income is a good measure of the opportunity cost of enjoying our time. However, the pleasure possibly deriving from enjoying our time, or 'buying' someone else's time, is a good measure of the opportunity cost of earning income or holding wealth. In this perspective, the rest of the present paper aims at defining a framework of analysis in which the households' choice variable is time. The implications about the possible insights deriving from the reversed-Becker model here proposed will also be discussed.

3.1   The method

Treating households as production units requires the definition of two important aspects of the analysis: (i) the time horizon the proposed explanation refers to; (ii) the assumption about returns to scale that households face when they have to decide how much of their limited time to devote to the various activities.

3.2   Periodization

As to the first aspect, we will assume that the continuous flow of time can be divided into 'units' (say a minute) and 'periods' (say a week) and that each household faces a first problem of allocating time units among the various possible activities within a time period. However, each household normally acts also with a longer time horizon. For instance, Mrs Smith could take the intertemporal (or across-periods) decision to subscribe a yearly admission to all museums of her town, which implies a sort of commitment about how to allocate her time in the forthcoming periods of her life. In fact, insofar as the yearly subscription is non refundable, Mrs Smith's decision provides herself a strong incentive to allocate, recurrently, some span of her weekly time to enjoying art.

There is another way to see why the distinction between intra- and inter periods choices is relevant. In line with Marshall's distinction between a short and a long run, we can assume that in each period most of the individual choices are constrained by a series of elements that determine what we might call the 'satisfaction productive capacity' of the household. In fact, a series of elements, such as the characteristics of the job, the degree of flexibility of the housing market, the family ties

and other important constraints limit the individual capability to produce 'satisfaction' in the short run, the distribution of our time between alternative *types of* activities *in each period* being quite rigid. Mrs Smith can easily decide for a concert or for a movie as an alternative to exploiting her free admission to a museum next Saturday, but she can hardly decide for more culture and less work this week. However, Mrs Smith could engage in a time-consuming activity, such as search and preparation for a job with more flexible weekly hours that might produce the effect of enlarging her (satisfaction) productive capacity. However, the outcomes in terms of satisfaction of such a choice will possibly be 'perceivable' in the more or less distant future. Accordingly, activities could be labeled as consumption or investment according to the shortness of the production period required for the output (pleasant time) to show up. More *roundabout* techniques extend across multiple periods, and normally imply giving up present satisfaction in exchange of a greater capacity to produce satisfaction in the forthcoming periods; training in sports is a typical example of this type of investment.

3.3   Returns to scale

The individual decisions about how to allocate time among alternative activities depends on the consequences, in terms of satisfaction, of extending or shrinking the span of time devoted to each activity. Imagine that Mrs Smith has entered one of the museums in town, with her next activity (such as going to pick up her children at the end of their basketball course) being scheduled in two and half hours; and that after spending one hour to carefully looking at the museum's pieces of art, she realizes that the output of her ongoing activity has ceased being the uninterrupted enjoyment she has experienced so far, and that some kind of physical and intellectual distress is taking place. Mrs Smith could react in various ways; for instance by 'cutting' the ongoing process and switching to an alternative one, possibly available, such as visiting the shopping center on the other side of the street, while postponing the visit to the remaining rooms of the museums to one of the following days. Alternatively, she could take a rest and sit for a while in the museum's cafeteria, drink a coffee and then soon go back to enjoy, with renewed drive, the beauty of the museum. Whatever Mrs Smith's choice will be, the example suggests that (i) the extension through time of the same activity will, sooner or later, cause returns to scale to decrease; (ii) the repetition

of the same activity after a (long enough) period of abstinence can restore the enjoyment productive capacity of that activity.

Curiously enough, the link between human satisfaction and frequency with which individuals engage in the same consumption activities, has been the basis upon which Gossen (1854) has erected his seminal theory of consumer choice based on the notion of decreasing marginal utility. The essence of Gossen's contribution lies in his famous 'laws of pleasure':

> A.1. The magnitude [intensity] of pleasure decreases continuously if we continue to satisfy one and the same enjoyment without interruption until satiety is ultimately reached.

> A.2. A similar decrease of the magnitude [intensity] takes place if we repeat a previously experienced pleasure. Not only does the initial magnitude [intensity] of the pleasure become smaller, but also the duration of the pleasure shortens, so that satiety is reached sooner. *Moreover, the sooner the repetition, the smaller the initial magnitude [intensity] and the shorter the duration.* (Gossen, 1983 [1854], p. 6, emphasis added)*.

What is striking of Gossen's analysis, generally considered the origin of the modern theory of demand based on the notion of marginal utility, is its being based on the role of time as the essential choice variable. Yet Gossen's focus on how consumers can produce enjoyment through sequences of time consuming activities has disappeared from the analytical refinements of the subjective theory of value as it took shape in the works of, say, Jevons, Menger and Walras, where the demand problem was 'reduced' to, and analyzed in terms of, instantaneous optimal choices of alternative bundles of goods and services, with given preferences and constraints.[3] The way in which time will later show up in the intertemporal version of the general equilibrium theory developed by Arrow and Debreu - characterized as it is by the assumption that individuals maximize 'once and for all' their total utility by knowing and discounting all the relevant future variables - does not overcome the limits of an analysis that neglects the fact that 'extracting utility' from consuming goods and services takes time.

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[3] For a more comprehensive analysis of the differences between Gossen's and the later, standard, theory of demand see Steedman (2001, ch.2).

Just as firms need to engage in a series of sequential decisions (install the productive capacity, price the output, start producing and marketing, etc.), whose outcome in terms of profits can be observed only at the end of the temporary period, so too consumers have somehow to struggle with time and need to take a decision whether or not to buy a commodity before being able to feel the actual enjoyments it can induce since "except in a very few instances in modern societies (such as the customer who drinks in a lounge) no individual decides, say, how much bread to buy while eating bread" (Georgescu-Roegen, 1983, p. lxxxi).

The circumstance that utility is 'experienced' only after decisions have been taken, and that the reiteration of the same activity through time (in line with Gossen's second law) is generally associated with a different level of satisfaction, suggests that when analyzing consumption in terms of time-consuming activities, the need arises to takes into account a possible discrepancy between expected and actual satisfaction.

One way to cope with this uncertainty about the possible outcomes in terms of satisfaction of individual choices is to resort to Hicks's idea, laid down in chapter IX of Value and Capital (Hicks 1946), to split the continuous flow of time into a *sequence of weeks*. In particular, it will be assumed that:

• At the beginning of each week, (say on Monday morning), each household plans the activities to be carried on in the following week on the basis of a series of elements, among which her satisfaction-productive capacity determined by the past *investment activities*, the state of expectations concerning the degree of satisfaction associated with alternative activities and the budget constraint on the available inputs, i.e. the market goods and services necessary to carry on the satisfaction productive processes;

• during the week, the planned activities will be carried on and each household will experience the actual degrees of satisfaction associated with them;

• at the end of the week (say on Sunday night), according to the possible discrepancy between expected and actual satisfaction in the various activities, a new state of expectations will take shape, which will set the stage for the plan of forthcoming week.

It is important to notice that, in line with Hicks's method, in what follows the discrepancy between expected and realized satisfaction might turn out to be

'systematic', thus making the notion of a sequence of temporary equilibria at odds with the idea of equilibrium as a state of rest:

> ... it is the divergence between expected and realized prices which is of central importance theoretically. Whenever such a divergence occurs, it means (retrospectively) that there has been malinvestment and consequent waste. Resources have been used in a way in which they would not have been used, if the future had been foreseen more accurately; wants, which could have been met if they had been foreseen, will not be satisfied or will be satisfied imperfectly. Thus disequilibrium is a mark of waste, and imperfect efficiency of production (*Hicks 1946, pp.131-3*).

> Even when we have mastered the "working" of the temporary equilibrium system, we are even yet not in a position to … examine the ulterior consequences of changes in the data. These are the ultimate things we want to know about, though we may have to face the disappointing conclusion that there is not much which can be said about them in general. Still, nothing can be done about these further problems until after we have investigated the working of the economy during a particular week. (*ibidem, p. 246*)

4   A 'what shall I do' framework[4]

Becker's approach to treat market goods and consumption time as inputs of a production process can be pursued not only, as Becker himself did, by transforming consumption time into 'foregone earnings', but also by taking the opposite stand, namely to transform the monetary cost of the market goods into a time flow to be added to consumption time. In the end, the output of the households' production function is pleasurable time; and if one succeeds in transforming the costs of the inputs into a time flow, the 'efficiency' of the household's production process can be easily measured by comparing two homogenous magnitudes, precisely what happens for firms, whose performance is measured by the difference between revenues and costs.

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[4] "It is not surprising then if many people think to themselves in the morning – once they are capable of thinking anything at all – 'What shall I (or must I) do today? How shall I (or must I) spend my time today?' Far fewer, we may suppose, wake up and think 'What shall I spend today? What must I buy today?' Yet the received economic theory of consumer behaviour is firmly centred on the allocation of money expenditure amongst commodities and pays only marginal, or even no, attention to the consumer's allocation of time" (Steedman 2001, p.1).

We will assume that all individuals devote a fraction of their time to work and that, in their perception, each 'unit' of time flow can be given either one of the two attributes, pleasant or unpleasant. This simplification allows a rather easy analytical treatment of the time-based production function, with the 'intra-period' rate of return for each activity depending on the ratio between the shares of pleasant and unpleasant time involved in that activity. More specifically, if one assumes that in each period individuals are engaged in j activities (j = 1, 2, … L) – the L-th being work – whose carrying out generates a flow of pleasant time P_j while requiring some unpleasant time E_j and the consumption of a basket of market goods g_i (i = 1, 2, … z) whose unit price is m_i, and that the market goods are non durable (wear out at the end of the activity),[5] the relationship between pleasant and unpleasant time for all the js activities can be expressed by the following system of equations:

(4)
$$\left[\sum_{i=1}^{z} g_{i1} \cdot (m_i/w) + E_1 \right] \cdot (1+r_1) = P_1$$
$$\left[\sum_{i=1}^{z} g_{i2} \cdot (m_i/w) + E_2 \right] \cdot (1+r_2) = P_2$$
$$\ldots\ldots\ldots \quad \ldots\ldots\ldots \quad \ldots\ldots\ldots$$
$$\left[\sum_{i=1}^{z} g_{iL} \cdot (m_i/w) + E_L \right] \cdot (1+r_L) = P_L = 0$$

where r_j is the 'rate of return' associated to the activity j, and w the wage rate earned during work time, assumed uniform for all individuals for the sake of simplicity.[6] Notice that the sum $E_i + P_i$ represents the whole, direct, time devoted to activity j and that the expression (m_i/w) represents the amount of working time implicitly devoted to buy one unit of good i so that, insofar as all units of time devoted to work are felt as unpleasant, the expression in square brackets represents the whole amount of unpleasant time directly and indirectly necessary to produce P_j units of pleasant time

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[5] Alternatively, one could assume that the g_is represent the services of the durable market goods and that the m_is represent their rental prices.

[6] One should acknowledge that all consumption goods are 'durable' to a certain extent, since their services allow the repetition of any consumption activity through time. The role of durable consumption goods is investigated in section 5.8 below.

by engaging in activity j. In a first approximation, we will assume that the length of working time is institutionally fixed for all individuals, say eight hours a day for five days a week. In system (4) it is moreover assumed that all working time is felt as unpleasant[7].

However, if one wants to take into account the circumstance that also working time can be pleasurable to a certain extent, it is convenient to express both unpleasant and pleasant time as shares, e_j and p_j, of the whole time T_j devoted to activity j so that system (4) becomes

(5)
$$\left[\sum_{i=1}^{z} g_{i1} \cdot (m_i/w) \cdot e_L + e_1 \cdot T_1\right] \cdot (1+r_1) = p_1 \cdot T_1$$

$$\left[\sum_{i=1}^{z} g_{i2} \cdot (m_i/w) \cdot e_L + e_2 \cdot T_2\right] \cdot (1+r_2) = p_2 \cdot T_2$$

$$\ldots\ldots\ldots \qquad \ldots\ldots \qquad \ldots\ldots$$

$$\left[\sum_{i=1}^{z} g_{iL} \cdot (m_i/w) \cdot e_L + e_L \cdot T_L\right] \cdot (1+r_L) = p_L \cdot T_L$$

where $e_L < 1$ reduces the indirect cost, expressed in terms of unpleasant working time, of acquiring the market goods necessary to perform all activities, while $p_L > 0$ allows for an intrinsic motivation in performing work activity, besides the extrinsic or instrumental one as a mean to acquire the market goods necessary to perform all other, possibly pleasant, activities.

The following constraints hold:

(6)
$$e_j + p_j = 1 \quad \forall j$$

$$\sum_{j=1}^{L} T_j = \overline{T}$$

$$\sum_{j=1}^{L}\sum_{i=1}^{z} g_{ij} \cdot m_i = T_L \cdot w + I - \Delta W$$

where $\overline{T}$ denotes the length of the time period, i.e. the weekly time available to each individual, I denotes the individual income whose source is unrelated with working

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[7] If all working time is felt as unpleasant, $r_L = -1$, which makes sense (only) within an institutional context in which work is 'compulsory'.

time (e.g. rent), and ΔW the change in individual's wealth. The first of (6) simply restates the assumption that each unit of time devoted to any activity j can be either pleasant or unpleasant[8] According to the second of (6), since time cannot be saved, it must necessarily be spent in some activities; finally, the third sets the monetary budget constraint by allowing the individual to change her wealth level according to a possible discrepancy between total earnings and total expenditure on market goods. One should also notice that contrary to the usual 'vitality' condition of the production processes, according to which the amount of (intermediate) goods used up as inputs cannot exceed the amount of the same goods available or produced, the same constraint does not hold when time is the unit of measure of both inputs and output of the js activities, since nothing prevents the whole amount of unpleasant time devoted to perform any activity j to exceed the amount of pleasant time 'produced'. In other words, some, or even all, rates of return in system (5) could be negative.

5   Some comments

5.1   Work

By dividing both sides of the last of (6) by w, one gets:

$$(7) \qquad \sum_{j=1}^{L}\sum_{i=1}^{z}\frac{g_{ij}\cdot m_i}{w} = T_L + \frac{I - \Delta W}{w}$$

where the left-hand side measures the labour time necessary to buy the whole set of market goods necessary to perform the js activities, and the right-hand side is the sum of the individual's own working time and the extra-working time that she can 'buy' with other non working sources of income (such as rent) and by accepting a reduction in her wealth level. By looking at (7), a strong rationale emerges for Adam Smith's consideration of labour as a suitable *numéraire* of the price system:

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[8] Notice that this assumption implies that pleasantness or unpleasantness cannot vary in intensity. This rather strong assumption can be easily relaxed by assuming that each time unit be multiplied by an intensity factor. However, one should not forget that assumptions of this sort are not infrequent in economic theory. See for instance Shapiro and Stiglitz (1984) whose assumption that workers' effort can be either zero or one, allows them to argue that the payment of efficiency wages can determine unemployment equilibria. On this point see Nisticò and D'Orlando (1998).

The real price of every thing, what every thing really costs to the man who wants to acquire it, is the toil and trouble of acquiring it. What every thing is really worth to the man who has acquired it, and who wants to dispose of it or exchange it for something else, is the toil and trouble which it can save to himself, and which it can impose upon other people (*Smith 1976 [1776], p.34*).

By following Smith's suggestion to measure the value of goods and services in terms of *labour commanded* it is possible, on the one hand, to give account of the twofold nature of the working activity, whose output ($p_L \cdot T_L$) depends not only on actual pleasantness of the time spent in it, .i.e. on the degree of self-realization in work, but also on the expected satisfaction deriving from the access to those market goods necessary to perform the other *js* activities of system (5) from which the individual gets her satisfaction. We will assume that the value of p_L captures the pleasure of earning income or of increasing one's wealth level in itself.[9]

On the other hand, Smith's suggestion gives also account of a strong rationale for the accumulation of wealth, as an instrument for the individual to buy someone else's unpleasant labour, thus paving the way to a possible pleasant use of her own time.

Therefore, the output of the last equation in system (2), i.e. the pleasant time possibly enjoyed while working, does not depend only on the 'direct' pleasantness of the working activity, but also on the possible perception of the instrumental role of work as a mean to achieve indirect satisfaction through access to the market goods needed to perform other more rewarding activities. One should also acknowledge that human beings' capability to enjoy a full day of pleasant time is limited and that 'hours of boredom' are in most cases the alternative to, and hence the opportunity cost of, work.[10]

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[9] The assumption that work is 'concentrated' within one activity only has been made only for the sake of simplicity and could be easily removed. Actually, many activities, such as do-it-yourself, are both self rewarding and instrumental, in that they produce market goods that should, alternatively, be bought on the market. The widespread diffusion of 'time banks' is just another example of the dilution of work among various, even substantially different, activities.

[10] Think, for instance, to the satisfaction that many young people feel when they get their first job and to the enthusiasm with which they 'go to work' precisely for the feeling that the opportunity cost they are paying is low, whereas the benefit they are gaining is the access to those market goods

5.2 The pleasure-expenditure function

Similarly to what happens in any productive process, the share of pleasant time enjoyed during any activity (the output) can be considered a function of the market goods necessary to perform it (the inputs). In other words, one can assume that

$$(8) \qquad p_j = f\left(\sum_{i=1}^{z} g_{ij}\right).$$

After deciding the type and variety of market goods necessary to perform an activity, we could still decide to increase our expenditure on those inputs. For instance, a tennis player - who owns the essential inputs such as an ordinary racket, used up shoes and balls, and is accustomed to play on a cheap-to-rent court located in the middle of a parking place – might decide to change her habits and start to rent a better court nicely located far from the traffic noise and shadowed by beautiful trees. By taking such a choice, besides the pleasurable time units enjoyed while trying to mark good points, the player could enjoy also the time units spent on collecting the balls spread around the court before starting a new game. As a consequence, the share of pleasurable time felt during the 'playing tennis activity' could increase.

One can therefore assume that for all activities the following condition for the partial derivative of (8) holds:

$$(9) \qquad \frac{\partial p_j}{\partial g_{ij}} \geq 0 \,.[11]$$

5.3 Two other partial derivatives

The following conditions on partial derivatives will also be assumed to hold:

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necessary to perform more pleasant activities than the idleness they were used to. "Civilization consists in originating stimulating activities other than violence and back-breaking labor, developing the skills needed to exercise and enjoy those activities,, and making available the education needed to learn the requisite skills and discipline." (Scitovsky 1992, p. vii).

[11] The assumption is here implicitly made that whenever a market good of better quality (new tennis shoes) replaces an old one of lower quality (old tennis shoes) the 'quantity' of that output increases.

(10) $\quad \dfrac{\partial r_j}{\partial e_L} < 0 \quad \forall j$

(11) $\quad \dfrac{\partial r_j}{\partial g_{ij}} = \dfrac{\partial r_j}{\partial p_j} \cdot \dfrac{\partial p_j}{\partial g_{ij}} > 0 \quad \forall j$

According to (10), given the indirect, negative impact of the unpleasant share of time devoted to work on all activities, any change in the degree of work unpleasantness determines, *ceteris paribus*, a change of opposite sign on the rate of return of all activities, thus providing the importance of those policies aimed to raise work satisfaction. [12]

According to (11), the impact, *ceteris paribus*, of an increase in the amount of market goods used up during any activity *j* on the rate of return of that same activity is positive, given that it can be expressed as the product of two positive partial derivatives, namely that of the rate of return of activity *j* with respect to degree of pleasantness of the same activity and that of the degree of pleasantness with respect to the amount of market goods, which is positive according to (9).

5.4 Production processes vs investment projects

In line with Becker's approach, equations in system (5) could be intended as representing production processes, i.e. precise technological relationships between the given inputs (the unpleasant time directly and indirectly needed to perform each activity) and the output (the flow of pleasant time enjoyed during the activity). However, this interpretation is problematic from various viewpoints and an alternative one in terms of 'investment projects' rather than in terms of production processes seems to be more satisfactory. In fact:

1. Production processes can be 'repeated' with the same degree of efficiency, i.e. the same output level can be obtained by employing the same inputs in a subsequent production period, whereas the flow of pleasant time 'earned' by reactivating any of the *j* consumption activities can either increase or decrease with

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[12] One could say that, in Sraffa's (1960) terminology, work is the only 'base' activity within system (5).

respect to past experiences, and in any case depends on the frequency of repetition in accordance with Gossen's laws.

2. Similarly to what happens with investment projects, the rate of return of any consumption activity, given by the relative shares of pleasant and unpleasant time felt while performing them, cannot be reasonably predicted before choices have been taken.

5.5   The optimum distribution of time within a period

If one considers working time as fixed in length, one can interpret individual choices as aimed at maximizing the overall rate of return (R) on all activities other than work given by:

$$(12) \quad R = \frac{\sum_{j=1}^{L-1} P_j}{\sum_{j=1}^{L-1} E_j} - 1.$$

If the individuals time horizon were a single week, [13] and one would impose some sort of 'convexity axiom' together with some additional properties on individual (expected) preferences over activities, one could identify an optimum condition such as:

$$(13) \quad \frac{\partial r_1}{\partial T_1} = \frac{\partial r_2}{\partial T_2} = \ldots = \frac{\partial r_{L-1}}{\partial T_{L-1}},$$

which postulates the equality of the marginal rates of return on all activities. It is interesting to note that condition (13), together with (9) and (11), allow identifying the optimum distribution of income among all bundles of market goods necessary to perform the various activities. [14]

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[13] In each single week, the E_j are given and constitute a sort of technological constraint on the individual's capability to increase the value of R. Engaging in investment activities (

[14] The possibility that the same durable market goods (such as shoes) can be used to carry out various activities is here ruled out for the sake of simplicity.

However, condition (13) can hardly obtain in reality. On the one hand, optimization might require some types of (small) adjustments that contrast with the circumstance that actual choices about time allocation are 'bounded' by heavy institutional constrains according to which some unpleasant activities can hardly be reduced in length, whereas those activities whose rate of return is positive cannot be extended. On the other hand, the relationship between instrumental activities, such as housekeeping, and more self-rewarding activity, such as reading a novel on a sofa (which can be clean or dirty according to how much housekeeping we perform in a week) is extremely complex and uncertain. Instrumental activities exhibit a negative rate of return but they can contribute to increasing the rates of return of many other activities.

In fact, in the metaphor here proposed, individuals face a double task. They have to plan the optimum combination of time and market goods for each activity and have also to decide the optimum distribution of time among the *j* activities (a plan that normally extends also over future periods).

As to the former task, one should decide about whether carry on activities with a more good-intensive or time-intensive technique and about which market goods should be used in the various activities. Think about the 'getting food activity' that can be performed either by devoting a lot of time to it, including ingredients gathering, home cooking and dish washing, or by getting a meal in a restaurant; and once such a choice has been taken the further 'maximisation problem' arises about what to cook or where to go out for diner. The circumstance that we observe individuals currently switching from one to the other of the two 'techniques' and alternating both the type and cost of the inputs to be used for each of the two possible ways of getting food, raises the question of whether it is reasonable to assume that individuals actually 'search for an optimum'.

A related problem is to what extent Mrs. Smith can substitute her weekly activities for one another when she feels that something is wrong with them. Quite apart from the problem of the rigidity of the length of working activity, a question that could be considered contingent to the present state of economic institutions and not a definite feature of market economies, notions such as *hierarchy of needs* (e.g. Georgescu-Roegen 1954 and Lancaster 1971), *self-control* (e.g. Schelling 1984), and a

series of other contributions on the limits of the rational choice theory[15] can be given a sound interpretation in terms of difficulty that individuals face in achieving a global maximization by continuously adapting the activation level of each available activity when they face the alternative between repeating past experiences or exploring new ones. Here, some important notions such as *barriers to entry*, *sunk costs* or *roundaboutness* should start to be considered relevant also within a time-based consumption theory. The analytical framework here proposed makes it evident that a plausible assumption is that individual, rather than aiming at maximizing, 'simply' strive to increase, period after period, their overall level of pleasure, an assumption which is possibly close to Simon's notion of *satisficing*.

5.6 Labour supply

If one drops the assumption that work time is fixed by institutional constraints, and that the individual can choose the extension of the working activity, this latter choice problem amounts to assessing to what extent an extension/contraction of the work time can actually increase the overall rate of return (12).

By looking at system (5), and recalling (9), one should acknowledge that the reasons that might induce individuals to extend or to shrink the amount of weekly time devoted to work have much to do with the individuals' capability to produce pleasant time through engaging either in goods-intensive (money consuming) or in time consuming (and possibly money saving) activities. However, the standard theory has addressed working time mainly (if not only) in terms of its responsiveness to possible changes of the wage rate. In this respect, it is hard to see why the commonly taken for granted result $\dfrac{\partial T_L}{\partial w} > 0$ should necessarily hold. In fact, there seems to be no reason to take for granted that an increase of the wage rate, which reduces the cost in terms of indirect unpleasant time of the market goods employed in all activities, should prompt the individual to increase her working time and hence to reduce, given the second of (6), the time devoted to any of the other, now more rewarding, consumption activities.

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[15] See Hargreaves Heap et al (1992).

5.7 Expectations and consumption skills

Suppose that an individual has found her way to a satisfying plan about how to distribute her time among the *j* activities with the expected marginal rates of return on all activities all equal to each other. As the second of Gossen's laws of pleasure suggests, the possible repetition through time of the same set of activities will normally decrease the rate of return for most of them, thus leading to a sort of 'boredom state of rest', which can generally be broken by some innovative behavior, such as the acquisition of consumption skills or by more radical changes, such as leaving one's country or similar path-breaking choices.[16]

On the other hand, some activities might reveal to be investment activities in that, not only the rate of return in that same activity will increase period after period, but also the individual's capability to enjoy other, yet unexplored, activities, might increase. In fact, for some activities, such as playing chess, acquiring consumption skills can determine the rate of return to increase with the repetition of the same activity through time. However, for most of our consumption activities, repetition in the current period of an activity already experienced in past weeks can, at best, ensure the enjoyment of the same pleasure already experienced in the past, so that

(14) $p_{j_t} \leq p_{j_{t-1}}$.

Those activities for which condition (14) holds can be considered as driven by the aim of relieving from a discomfort and will therefore be labeled as comfort- or *defensive* activities, as opposed to the *creative* ones for which (14) does not hold. [17]

In any case, the passage of time (weeks) seems to lead either to sort of a tendency for the general rate of return to fall, or to a systematic mismatch between expected and realized rates of return.[18]

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[16] Here, Schumpeter's notion of entrepreneurship as some one capable to 'break' the competitive equilibrium, characterized by a zero-profits allocation of the productive capacity, should probably be resumed by focusing on the process of innovations in consumption.

[17] The distinction between defensive and creative goods was first proposed by Hawtrey (1926) and then resumed by Scitovsky (1992).

[18] Some *ad hoc* assumptions about the elasticities of expectations in the various activities could be made to study possible dynamic paths leading to an equilibrium allocation characterized by fulfilled

5.8   'Joint production' and conspicuous consumption

In section 5.6, it has been argued that it is hard to see why individuals should be attracted by longer working times when wages rise, the point being that the second of (6) would force individuals to reduce pleasure deriving from all non working activities. Actually, individuals try to escape the time constraint by letting working or other merely instrumental activities (such as transmitting an information by phone) overlap to - rather than crowding out – other activities such as getting food. The rather high figures of working times and of 'eating-while-driving habits' in some countries, such as US, seem to suggest that 'joint production' is much more widespread among individuals than system (5) seems to imply. In the case of teenagers-type massive use of earphones is an example of joint production where a 'pleasant' activity overlaps to a 'boring' one.[19]

The same type of argument seems to be relevant also for an understanding of conspicuous consumption. Although going to the opera is a highly time-consuming activity, during the hours wholly needed for moving from home to the theatre, enjoying the performance and returning home, one can freely exert the choice about consuming alternative goods: one can choose what to wear, formally or informally, and how to reach the theatre, by bus or by driving a new car, and so on. In other words, people can easily increase their average consumption (and pleasure) per unit of time by appropriately 'overlapping' different types of consumption. Moreover, conspicuous consumption can easily overlap with a long working time. Again, one can choose whether to go to the work place by car or by bus (both activities satisfy the same need but can be felt pleasant or tedious), whether to wear the same shoes every

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expectations of satisfaction in all activities, "though - as Hicks reminded in the passage quoted above - we may have to face the disappointing conclusion that there is not much which can be said about them in general…".

[19] This is why the role played by time in constraining consumption possibilities – as it has already been explored not only by Becker but also by other (e.g. Linder, 1970; Georgescu-Roegen, 1983; Steedman, 2001, ch. 1; Metcalfe, 2001) – should not be overstated. In fact, the recurrent idea in those contributions is that, once working time is deducted from the whole, the remaining time could be scarce enough to dissuade individuals from choosing those bundles they would select solely according to income and price constraints.

day or alternate various types of shoes during the week. This overlooked circumstance gives a highly rational foundation to the phenomenon of conspicuous consumption as a way to avoid complex reshuffling of one's time allocation, whose outcome is uncertain, in the face of recurrent increases in income.[20]

6   Conclusions

This paper has tried to point out a series of questions for which a 'what shall I do' framework can possibly provide new insights with respect to the already explored approaches to consumption and time allocation. The present attempt to provide an alternative viewpoint to the established choice theory will possibly prove to be sterile.

However, some developments in an economic treatment of time allocation seem to be needed. Data about time-use in various activities are being collected since decades around the world; an ever growing mass of data that standard economics can hardly interpret. Non standard microeconomics has traditionally been reluctant to address the issues of individual choice, possibly inspired by William Petty's endeavor to express himself "in terms of Number, Weight or Measure, to use only arguments of sense and to consider only such causes as have visible foundations in nature leaving those that depend upon the mutable Minds, Opinions, Appetites and Passions of particular Men to the consideration of others. (Petty, 1986, p.244).

However, measuring and comparing time units, both in cross section and longitudinal analysis, is a much easier task than measuring and comparing monetary variables.

References

Becker, G. (1965). A theory of the allocation of time, *The Economic Journal*, vol. 75, no. 299, 493–517

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[20] This reluctance to reshuffle one's previous allocation of time provides also a rationale for 'idleness' (such as watching TV) when retirement makes more time rather than more income available to the individual.

Georgescu-Roegen, N. (1954). "Choice, Expectations and Measurability", *Quarterly Journal of Economics*, 48, 4, pp.503-34.

Georgescu-Roegen, N. (1983). *Herman Heinrich Gossen: his life and works in historical perspective*, introductory essay to The Laws of Human Relations, by H. H. Gossen, Cambridge MA, MIT Press

Gossen, H. H. 1983 [1854]. *The Laws of Human Relations and the Rules of Human Action Derived Therefrom*, Cambridge MA, MIT Press

Hargreaves Heap, S. et al (1992). *The Theory of Choice: A Critical Guide*. Oxford: Wiley-Blackwell

Hawtrey, R. (1926). *The Economic Problem*, London, Longmans, Green

Hicks, J. R. (1946). *Value and Capital*, 2nd edn, Oxford, Clarendon Press

Lancaster, K. (1971). *Consumer Demand: A new Approach*. New York: Columbia University Press

Linder, S. (1970). *The Harried Leisure Class*, New York, Columbia University Press

Metcalfe, J. S. (2001). Consumption, preferences and the evolutionary agenda, in Witt, U. (ed.), *Escaping Satiation. The Demand Side of Economic Growth*, Berlin, Springer

Nisticò, S. (2005). Consumption and time in economics: prices and quantities in a temporary equilibrium perspective, *Cambridge Journal of Economics*, 29, 943–957.

Nisticò, S. and D'Orlando F. (1998). "Some Questions for New Keynesians", in *New Keynesian Economics/Post Keynesian Alternatives*, edited by Roy Rotheim, London: Routledge.

Petty, W. (1986) [1899]. The Economic Writings of Sir William Petty. Edited by C. H. Hull. New York: Kelley.

Schelling, T.C. (1984). Self-Command in Practice, in Policy, and in a Theory of Rational Choice, *The American Economic Review*, Vol. 74, No. 2, Papers and Proceedings of the Ninety-Sixth Annual Meeting of the American Economic Association, pp. 1-11

Scitovsky, T. (1992) [1976]. *The Joyless Economy: The Psychology of Human Satisfaction*, revised edn, Oxford, Oxford University Press

Steedman, I. (2001). Consumption Takes Time—Implications for Economic Theory, London and New York, Routledge.