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Enjoyment Takes Time: Some Implications for Choice Theory

Sergio Nisticò

Abstract
The paper suggests that casting the choice problem in terms of alternative time-consuming activities can foster the fruitful cross-fertilization between economics and psychology along the lines suggested by Scitovsky in the *Joyless Economy*. The first part emphasizes how mainstream, utility-based choice theory has eradicated "time" from the analysis, in contrast with the seminal contribution to the subjective theory of value proposed by Gossen in 1858. The limits of Becker's well-known approach to time-use are also analyzed. The second part opens with the presentation of an alternative approach based on activities, intended as productive processes allowing for pleasant time to be produced by consuming "direct" unpleasant time plus the "indirect" amount of unpleasant time equivalent to the market goods used up as inputs (Nisticò, *Production of (Pleasant) Time by Means of (Unpleasant) Time: Some Notes on Consumption Theory and Time Use*, 2014). Finally, the approach is applied to an intertemporal context by drawing on Hicks's temporary equilibrium method. Scitovsky's distinction between defensive and creative activities is discussed in conclusion, suggesting that individuals might refrain from engaging in more skilled, time-consuming activities because of the attractiveness of a certain, higher present-period rate of return of less skilled, goods-intensive activities.

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1 Introduction

The timeless model of choice suggested by standard consumption theory takes it for granted that individuals focus their attention on the 'utility' of the available goods and services that are seen as the direct source of their satisfaction. Within this model, there is room for neither the prologue nor the epilogue of this story, i.e. neither for the motivations underlying our choices nor for what happens after goods and services have been bought. In fact, one essential ingredient of the model provides individuals with the power to anticipate and 'extract utility' at the same moment in which they conclude their exchange contracts.[1]

Somewhat paradoxically, the seminal contribution by Gossen (1983 [1854]) to the subjective theory of demand did consider the duration and the frequency of repetition of the 'outcomes' associated with individual choices as the essential object of theoretical investigation. The importance of time in Gossen's theory can readily be grasped in the following passage from the opening chapter of Gossen's book:

> "Experience confirms beyond doubt that repeated satiation with the same fare causes a decrease of pleasure and a reduction in the enjoyable consumption … The poor man who has a roast only on holidays undoubtedly derives greater pleasure from eating his roast than one who has his daily fill of it; but for the latter, the pleasure afforded by eating all the roast he wants is all the more increased, the longer the enjoyment is delayed" (Gossen (1983 [1854]: 7–8).

However, in the subsequent developments of the marginalist theory, the path indicated by Gossen was abandoned and the timeless model finally emerged as reference point for the development of the standard demand theory.

An early attempt to widen the focus of standard choice theory is to be seen in Becker (1965), where households are viewed as production units that use what they have got on the marketplace, together with their time, as inputs of a process whose output is, in turn, what Becker calls 'commodities' yielding instantaneous utility according to the traditional axioms on preference orderings. Therefore, in

[1] The role of the people-know-what-they-want assumption is particularly striking in the inter-temporal version of standard theory, where on the basis of a given utility function and income streams for all possible future periods, individuals choose 'in one shot' the best bundles for all possible states of the world in all future periods. Lancaster's (1971) Axiomatic Theory of Consumer Time Preference is illuminating in this respect.

Becker's approach, consumption time shows up only to disappear immediately, once the time-consuming production process is over and its output generates an instantaneous level of utility. In the end, Becker's proposal preserves the clear-cut separation between preferences and constraints, where prices and income are, alone, able to account for both variations and differences in economic choices. Actually, Becker's approach to time use was later to be applied by Becker himself and George Stigler to claim that "one does not argue over tastes for the same reason that one does not argue over the Rocky Mountains—both are there, will be there next year, too, and are the same to all men" (Stigler and Becker 1977: 76). It is worth recalling that according to Stigler and Becker the fact that tastes and the Rocky Mountains show similar properties constitutes *per se* a good reason why *de gustibus non est disputandum*. In fact, the Rocky-Mountains assumption frees the economist from the need to resort to the traditional argument that runs "an explanation of economic phenomena that reaches a difference in tastes between people or times is the terminus of the argument: the problem is abandoned at this point to whoever studies and explains tastes (psychologists? anthropologists? phrenologists'? sociobiologists?)" (Stigler and Becker 1977: 76).

However, the traditional argument of why *de gustibus non est disputandum* will not lose its appeal. Only a few years later, Frank Hahn restated it in his introduction to *Equilibrium and Macroeconomics*:

> "Axioms, like special hypotheses, are there to specialize. It is not that they are divorced from experience or observation but rather that they mark the stage beyond which one does not seek to explain" (Hahn 1984: 6).

In the meantime, Tibor Scitovsky had published *The Joyless Economy* (1992 [1976]), one of the first comprehensive attempts to break down the boundaries between economics and psychology in the endeavor to give a comprehensive account of human satisfaction, covering what comes both before and after the individual's decision to buy goods and services in the marketplace:

> "Economists know a lot about what makes producers tick, while they know almost nothing about the motivation of consumers. Surely, knowledge of what makes consumers tick is just as important as knowledge of the way producers make decisions. Probing into consumer behavior and its motivation should give economists … a better judgment of how well the economy performs … Although economists have never analyzed the nature and origin of consumer preferences, others have, so we need not start from scratch. Psychologists have done a lot of work on the motivation of man's behavior, of which consumer behavior is part" (Scitovsky 1992: 4).

As to what comes before, i.e. what motivates individual choices, Scitovsky introduced the distinction between *comfort* and *pleasure*, the former being associated with the passing, almost instantaneous, feeling associated with the absence of discomfort, the latter with the 'dynamics' leading from discomfort to comfort and/or from boredom to stimulation, i.e. from levels of arousal[2] either too high or too low towards the optimum level:

"Perfect comfort and lack of stimulation are restful at first, but they soon become boring, then disturbing. At that stage the organism actively seeks stimulation. Fighting boredom is the opposite of relieving discomfort: the one raises too low, the other lowers too high, an arousal level" (Scitovsky 1992: 31).

"If the pleasing changes in arousal are changes from a level associated with discomfort toward the level associated with comfort, then it logically follows that pleasure will always accompany the relief of discomfort and will seem the more intense the greater the discomfort that is being relieved. It also follows that for the level of arousal to move towards its optimum, it must first be at a non optimum level" (Scitovsky 1992: 62).

As to what comes after the consumers' act of acquiring goods and services, consistently with his emphasis on pleasure being a flow magnitude, Scitovsky's approach is firmly grounded on the idea that human satisfaction is generated within time-consuming *activities* that, therefore, constitute the object of the individual's economic choices:

"Civilization consists in originating stimulating *activities* other than violence and back-breaking labor, developing the skills needed to exercise and enjoy those *activities*, … By now, the number and variety of enjoyable benign interests has become enormous: they comprise scientific research, exploration, literature, art, sports, games of skills and chance,

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[2] Actually, when discussing the state of sensory alertness indicated by arousal, Scitovsky is cautious about whether its optimum level lies in-between the extremes of too low and too high excitement: "While all agree that the optimum level of total stimulation is intermediate between too much and too little, opinions differ on whether the optimum level of arousal, which optimum total stimulation gives rise to, is also at an intermediate level, or whether it is at a minimum. Those who believe that arousal always rises with total stimulation obviously adhere to the first view. However, Professor Daniel Berlyne, one of the most important writers in the field, cites evidence that sensory deprivation raises arousal as measured by some indices, and he then argues that the level of arousal first falls, then rises, with total stimulation, with the lowest level of arousal defining the optimum. … For the sake of simpler exposition, I shall tentatively assume that arousal always increases with stimulation, so that the optimum is at an intermediate level both of stimulation and of arousal. That assumption will greatly simplify the presentation of much of what follows, although no part of my argument hinges on it" (Scitovsky 1992: 24–25).

and the offerings of the entertainment industry, among many other things. We need them all, considering that scientific research in turn is forever increasing our leisure …" (Scitovsky 1992: viii).

The circumstance that the relief from the discomfort caused by too high a arousal level, generated for example by satisfaction of the 'need' to remove sensations of hunger or cold, is just half the story of the psychology of human satisfaction, the other half being represented by the demand for stimulating activities, did not escape Alfred Marshall in his treatment of the matter, as can be seen in the opening chapters of Book III of his *Principles*:

"It is, again, the desire for the exercise and development of activities, spreading through every rank of society, which leads not only to the pursuit of science, literature and art for their own sake, but to the rapidly increasing demand for the work of those who pursue them as professions. Leisure is used less and less as an opportunity for mere stagnation; and there is a growing desire for those amusements, such as athletic games and travelling, which develop activities rather than indulge any sensuous craving … Speaking broadly therefore, although it is man's wants in the earliest stages of his development that give rise to his activities, yet afterwards each new step upwards is to be regarded as the development of new activities giving rise to new wants, rather than of new wants giving rise to new activities" (Marshall 1920: 88–89).

Notwithstanding his acute emphasis on time-consuming activities as the source of human satisfaction, Marshall completely lost sight of the need to approach the individual's choice problem taking into account that consumption takes time, and his timeless approach—with 'marginal utility' being considered as one and the same thing as the 'instantaneous' desire for the objects of exchange and total utility as a function of the *stock* of goods and services the individual is endowed with—became the standard treatment of consumption:

"Utility is taken to be correlative to Desire or Want. It has been already argued that desires cannot be measured directly, but only indirectly by the outward phenomena to which they give rise: and that in those cases with which economics is chiefly concerned the measure is found in the price which a person is willing to pay for the fulfillment or satisfaction of his desire. He may have desires and aspirations which are not consciously set for any satisfaction: but for the present we are concerned chiefly with those which do so aim; and we assume that the resulting satisfaction corresponds in general fairly well to that which was anticipated when the purchase was made. … The total utility of a thing to anyone (that is, the total pleasure or other benefit it yields him) increases with every increase in his *stock* of it, but not as fast as his *stock* increases. If his *stock* of it increases at a uniform rate the benefit derived from it increases at a diminishing rate. In other words, the additional benefit which a person derives from a given increase of his stock of a thing,

diminishes with every increase in the stock that he already has" (Marshall 1920: 92–93, emphasis added).

Marshall's 'conscious' departure from Gossen's conception is even more explicit in the following passage:

> "There is however an implicit condition in this law which should be made clear. It is that we do not suppose time to be allowed for any alteration in the character or tastes of the man himself. It is therefore no exception to the law that the more good music a man hears, the stronger is his taste for it likely to become; that avarice and ambition are often insatiable; or that the virtue of cleanliness and the vice of drunkenness alike grow on what they feed upon. For in such cases our observations range over some period of time; and the man is not the same at the beginning as at the end of it. If we take a man as he is, without allowing time for any change in his character, the marginal utility of a thing to him diminishes steadily with every increase in his supply of it" (Marshall 1920: 94, emphasis added).

The aim of this paper is to argue that the fruitful cross-fertilization between economics and psychology, advocated by Scitovsky, and now become an ever growing research program, can be fostered by exploring a new analytical framework that consistently takes Gossen's approach into consideration. In fact, we will assume that what human beings are trying to maximize when choosing the goods and services to buy on the marketplace is not the evanescent and immeasurable notion of their 'utility' but rather the amount of pleasant time that those goods and services can help to enjoy, and that any clock can easily measure.[3] In other words—and this is the argument we pursue in the present paper—besides questioning whether and to what extent individuals do maximize, we should also question the maximand itself.

In fact, as will be clear below, individuals can be assumed to be producers and, possibly, maximizers of pleasant time by engaging in activities that entail a certain amount of unpleasant time and the consumption of a bundle of goods and services as inputs. By expressing also the cost of these inputs in terms of unpleasant time, each activity (productive process) yields its actor a rate of return depending on the ratio between the pleasant time produced and the unpleasant time used up, directly and indirectly, during the process (Nisticò 2014). The different activities can be

[3] On the question of utility measurement see the brilliant account by Moscati (2013). The same author also provided an interesting account of the history of experimental research on economics and psychology (Moscati 2007).

considered as production processes, or techniques, varying not only in their intrinsic nature (going to a movie theater or staying home reading a novel) but also according as to whether they require a more or less intensive consumption of time or of goods and services (hiking up a mountain for hours, or taking a quick cableway, to reach its summit). The peculiarities, and the importance of work, or of any other activity carried on for the sake of earning the income needed to buy market goods and services, will also be explored assuming that, in principle, it can produce pleasant time in itself. Finally, the activities in which the individuals engage can be classified according to their degree of 'roundaboutness', so that for some of them the (possibly more rewarding) output can be both uncertain and 'located' in future periods beyond the one in which the activity starts. This latter approach will provide the analytical framework for the intertemporal dimension indicated by Gossen, thus raising the issue of how the what-shall-I-do framework relates with the discounted utility (DU) and expected utility (EU) theories and with the "growing number of 'anomalous' examples indicating that people reliably violate the EU and DU axioms" (Prelec and Loewenstein 1991).

The structure of the paper is the following. Section 2 summarizes Gossen's and Becker's seminal approach to time use. The methodological and analytical structures of the 'what-shall-I-do' model proposed here are described in Section 3. The intertemporal dimension is then added to the framework in Section 4 by drawing on Hicks's temporary equilibrium method. Section 5 shows how the intertemporal version of a 'what-shall-I-do' framework can be used to discuss Scitovsky's distinction between defensive and stimulating activities on the one hand and between skilled and unskilled (stimulating) activities on the other. Section 6 concludes.

2 More than a century after Gossen: Becker's treatment of time

One of the key features of Gossen's inquiry[4] into individual behavior lies in its intertemporal dimension. In particular, Gossen clarifies his concern about both the

[4] The idea that we might gain in insight into human behaviour by going 'zurück zu Gossen' (the German translation for 'back to Gossen') was recently stated by Ian Steedman in his book

possible deterioration of the individual's capacity to enjoy 'future' pleasures brought on by some types of 'present' enjoyments and the contrary case, namely the possible increase of the same capacity (to enjoy future pleasures) brought on by engaging in activities whose present reward is hardly discernible:

> "Now, on the one hand, the life of a human being covers a considerable time span, and there are large number of pleasures in life that man can obtain immediately; yet those pleasures have the consequence of imposing later, disproportionate deprivations. On the other hand, the most elevated, the purest pleasures become comprehensible, become real pleasures, only after man has educated himself for their appreciation. … In other words: *Enjoyment must be so arranged that the total life pleasure should become a maximum*" (Gossen 1983 [1854]: 3).

It is worth noting that Gossen's clear idea about the path-dependence of individual choices over activities flatly contradicts one of the fundamental postulates that, more than a century later, would serve Koopmans (1960) as a basis for the axiomatic foundations of DU theory:

> "Having rejected expenditure on consumption as a measure for the satisfaction levels reached in particular periods, we must find another means of labeling such levels. This can be done if we are willing to postulate that the particular bundle of commodities to be consumed in the first period has no effect on the preference between alternative sequences of bundles in the remaining future, and conversely" (Koopmans 1960: 292).

The second, fundamental feature of Gossen's approach lies in the identification of the choice variable that allows an individual to maximize 'the total life pleasure' with the flow of time devoted to the various 'acts of enjoyments'.

Figure 1 reproduces Gossen's own diagram showing his first law of pleasure, according to which "the magnitude [intensity] of pleasure decreases continuously if we continue to satisfy one and the same enjoyment without interruption"—the law that would later be considered (erroneously) as the first formulation of the idea of decreasing marginal utility of "a given increase of his stock of a thing" for an

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Consumption takes time (Steedman 2001) whose approach expands on Linder's (1970) seminal contribution on the role that time plays, besides income, in shrinking the set of bundles available to individuals. See also Metcalfe (2001) and Georgescu–Roegen's (1983) brilliant introductory essay to the English translation of Gossen's book. On the other hand, the present paper draws on Nisticò (2005 and 2014) to argue that we should also question whether the outcome of individual choices can actually be captured by a 'given' utility function whose features are independent of actual consumption choices.

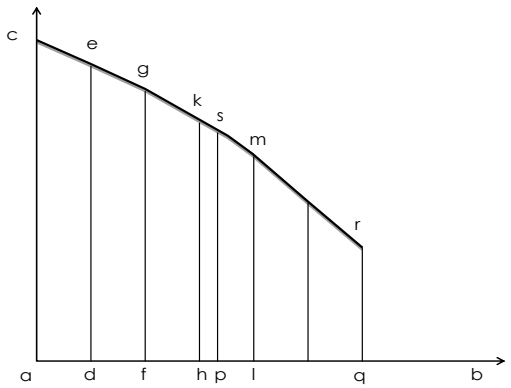

Figure 1: Gossen's graphical representation of his first law of pleasure

individual as Marshall put it. However, the following description by Gossen of his own graph shows that *Figure 1* is similar only in form to the 'marginal utility' as a function of the quantity consumed:

"The incalculable importance of the law makes it desirable to obtain the clearest possible notion of it. A geometric diagram may be of help here. … In our case, such a diagram can be drawn in the following manner: *Let the time during which a pleasure lasts be presented by line ab* … , so that any point on the line *ab* represents a corresponding instant of this time; hence every segment of the line represents a corresponding time interval. In this case, therefore, $\overline{ad}$, the first tenth, corresponds to the first tenth of the time period; $\overline{df}$, the second tenth, corresponds to the second tenth of the time period; and so on" (Gossen 1983 [1854]: 9, emphasis added).

The crucial role of time is even more pregnant in Gossen's second law of pleasure, according to which it is the frequency with which single types of enjoyments are repeated through time that governs the dynamics of pleasures:

"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]: 6, emphasis added).[5]

[5] For a graphic representation of Gossen's second law, see Nisticò (2005).

As mentioned above, it was only in 1965 that a prominent exponent of the neoclassical theory of choice felt the need to try to take into account the role of time in consumption theory—the role that Gossen had clearly envisaged from the very beginning of the development of the subjective theory of value.
The fundamental assumptions of Becker's model (Becker 1965: 497–498) can be summarized as follows:

- Individuals are endowed with a potential of "full income", i.e. the income level that can "be obtained by devoting [their] time and other resources … to earning income, with no regard for consumption", i.e. for extra consumption beyond the satisfaction of the basic needs.[6]
- When the full income is high enough, as it is in the richer countries, individuals "forfeit money income in order to obtain additional utility".
- In order to obtain additional utility, households need to act as producing units of some basic commodities (z_j) whose production requires time $\left(T_j\right)$ and market goods (x_{ij}).
- Individuals decide how to allocate their time and spend income on market goods in order to maximize the utility deriving from the basic commodities, while "time can be combined into a single overall constraint because time can be converted into goods through money income".

Becker's formal description of the model can readily be summarized by assuming linearity of the production function $z_j = f_j\left(x_{1j}, \ldots, x_{nj}; T_j\right)$, so that the inputs of the households' productive processes can be expressed as:

$$\begin{aligned} x_i &= \sum_j b_{ij} \cdot z_j \\ T_j &= t_j \cdot z_j \end{aligned} \qquad (1)$$

6 In fact, Becker clarifies that the expression 'with no regard for consumption' should not be considered *strictu sensu*. The choice to earn the full income implies, in fact, that some time and money be devoted to satisfying the essential needs such as food and sleep, but only to the extent required to maximise productivity and, hence, income.

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.[7] Households are supposed to solve the following optimization problem:

$$\text{subject to} \begin{cases} max\ U\left(z_1, \ldots, z_j\right) \\ \sum_j t_j + t_w \equiv T \\ \left(\sum_i p_i \cdot x_i = w \cdot T_w + V\right) \\ \text{the production functions (1)} \end{cases}$$

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 other than work. Substituting the time constraint into the budget constraint, the optimization problem becomes:

$$\text{subject to} \begin{cases} max\ U\left(z_1, \ldots, z_j\right) \\ \sum_j \left(\sum_i b_{ij} \cdot p_i + t_j \cdot w\right) = T \cdot w + V \end{cases}.$$

The FOC conditions of the problem become therefore:

$$\frac{\partial U}{\partial Z_j} = \lambda\left(\sum_i b_{ij} \cdot p_i + t_j \cdot w\right), \forall j \qquad (2)$$

plus the budget constraint. By looking at (2) one can readily understand that Becker's treatment of consumption time does not lead very far from the standard result: in order to maximize utility, individuals will have to choose the bundle of commodities in such a way that the ratio of the marginal utilities of consumption goods z_j be equal to the ratio of their total costs, including the cost of consumption time expressed in terms of forgone earnings. In Becker's reconstruction, time has a sort of 'primary' and natural destination, that of

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

producing income; and it is a sort of unfortunate circumstance that consumption needs a part of this time; from the analytical viewpoint, its inclusion on the cost side of the maximization problem as 'forgone earnings', according to the now popular view that 'time is money', solves the problem.

Becker's struggle to accommodate time within the stringent neoclassical framework saw a second, fundamental step forward a few years later with the above-mentioned paper, coauthored by Stigler, where the attempt is made to escape the seeming inconsistence between the 'Rocky Mountains' conception of tastes and the observation that our enjoyment producing capacity (our preference ordering) evolves through time—a fact that Gossen had recognized on the very first page of his book and that Marshall had simply excluded 'by assumption', perfectly aware of the contrast between allowing the passage of time to exert its influence on preferences and the analytical foundations of neoclassical theory. The interesting novelty proposed by Stigler and Becker lies in the introduction of a new argument of the production function of the basic commodities, namely the stock of human capital accumulated as a result of past production and consumption of the same basic commodity:

> "We believe that the phenomenon Marshall is trying to explain, namely that exposure to good music increases the subsequent demand for good music (for some persons!), can be explained with some gain in insight by assuming constant tastes, whereas to assume a change in tastes has been an unilluminating 'explanation'. The essence of our explanation lies in the accumulation of what might be termed 'consumption capital' by the consumer, and we distinguish 'beneficial' addiction like Marshall's good music from 'harmful' addiction like heroin" (Stigler and Becker 1977: 78).

More specifically, for a generic commodity Z, the production function proposed by Stigler and Becker is:

$$Z = Z_z\left(t_z, S_z\right),$$

which, for the sake of simplicity, ignores all inputs other than time $\left(t_z\right)$ and the stock of skills $\left(S_z\right)$. The intertemporal dimension of the maximization problem readily shows up in Stigler and Becker's proposal since:

- the skills available in each period are considered a function of the amount of the basic commodity produced and consumed in the previous periods (and indeed of education);

- the marginal cost of the basic commodities includes not only the cost (expressed in terms of foregone earnings) of the extra time needed to produce one extra unity of the basic commodity but also the present value of the sum of the changes in future time inputs deriving from the effect of the production of Z in the current period on subsequent skills (S_z) available in future periods; this latter component reduces the marginal cost in the case of benign addiction whereas it adds to it in the case of harmful addiction.

More specifically, the fundamental aim of Stigler and Becker to avoid any impact of current consumption on preference is pursued by expressing the marginal cost of a generic 'commodity' Z produced in period j as:

$$\pi_{zj} = w \cdot \frac{\partial t_{zj}}{\partial Z_j} - A_j \ , \tag{3}$$

where w is the wage rate, assumed constant across periods for simplicity, t_{zj} denotes the amount of time 'needed' to produce Z in period j and A_j captures the present value of the effect on the marginal cost of future periods, deriving from the impact on future consumption skills of producing/consuming Z in the present period. The authors assume that $A_j = 0$ for non-addictive commodities, whereas $A_j > 0$ or $A_j < 0$ according to whether addiction is benign or harmful. Given that the number of 'remaining' future periods declines with age, also the impact of A_j declines with age (though at young ages its percentage change is negligible). Moreover, given the impact of consuming Z in each period on S_z, also the first component of the marginal cost on the right-hand side of (3) decreases or increases with age in the case of benign or harmful addiction, respectively. It is precisely the endogenous change through time of the marginal cost of addictive consumption, e.g. the benign one deriving from listening to music, relative to the cost of the non-addictive consumption, which constitutes the evidence for the author to conclude that:

"On this interpretation, the (relative) consumption of music appreciation rises with exposure *not because tastes shift in favor of music*, but because its shadow price falls as skill and experience in the appreciation of music are acquired with exposure" (Stigler and Becker 1977: 79, emphasis added).

The side effect of this analytical construction lies in the consumption of the commodity 'music appreciation' parting company with the time devoted to it so that Stigler and Becker reach the quite paradoxical result that one can consume more 'music appreciation' while devoting less time to listening to music:

> "Although the price of music tends to fall with age, and the consumption of music tends to rise, *the time spent on music need not rise* with age because the growth in music capital means that the consumption of music could rise even when the time spent fell with age" (Stigler and Becker 1977: 80, emphasis added).

What is striking about the explanation provided by Stigler and Becker is that, in pursuit of their aim to explain any interpersonal difference (as well as any intrapersonal change) in consumption exclusively on the basis of income and prices, they keep consumption time on the cost side alone of the maximization problem and they define the basic commodities produced as some sort of 'states of mind' requiring no time flow to experience it. The names for the commodities produced by the household, such as *music appreciation* or *euphoria*, are particularly significant of the peculiarity of an approach in which not even the output unit of measure can be defined. And as we have seen, this approach is taken so far as to allow consumption of the basic commodity to move in the opposite direction to that of the time spent consuming it. The departure from Gossen's approach, deeply rooted in the idea that enjoyment takes time, could not be more striking.

As will be clarified in the following section, the shortcomings of the approach proposed by Stigler and Becker can be avoided by taking as direct source of human satisfaction the flow of time possibly enjoyed during the activities the individuals choose to engage in.

3 Choosing among activities

If, on the one hand, it is true that income earned while working (for those who have such an opportunity!) is a good measure of the opportunity cost of enjoying one unit of time, on the other hand, looking at the other side of the coin, the pleasure possibly deriving from enjoying one unit of our time is a good measure of the opportunity cost of devoting one unit of our time to earning income. And since coins are neither transparent nor necessarily symmetrical, looking at the other, yet

unexplored, side of the time-earnings trade off could expand our comprehension of the forces that drive individual consumption choices. In fact, Becker's approach, treating market goods and consumption time as inputs of a production process, can be pursued not only as Becker did, by transforming consumption time into 'foregone earnings', but also by taking the opposite stance, namely by transforming the monetary cost of the market goods into a time flow to be added to consumption time. As mentioned above, in a what-shall-I-do framework, the output of the households' production function is pleasurable time and the costs of the inputs of the Becker-type production processes are also computed in terms of (unpleasant) time, so that the 'efficiency' of the household's production process can readily be measured by comparing two homogenous magnitudes—namely two time flows (Nisticò 2014). By assuming that in the individuals' perception, each unit of time flow can be given either one of the two attributes, 'pleasant' or 'unpleasant',[8] the time-based efficiency of each activity depends merely on the ratio between the shares of pleasant and unpleasant time involved in that activity. My claim is that by focusing on the inextricable connection between what we choose to buy and what we choose to do in calendar time, the way can be opened to further cross-fertilization between economics and psychology. What seems to be needed in particular is a new approach to intertemporal choice and choice under uncertainty, now that the first wave of research has so amply evidenced the weaknesses of its traditional, neoclassical, version.

The basic structure of such approach is outlined in the remaining part of the present section, while possible extension of it to intertemporal choice and choice under uncertainty within the frame of a temporary equilibrium method is discussed in sections 5 and 6.

Contrary to Becker's (1965) assumption that individuals derive their utility from the 'instantaneous' consumption of the basic commodities Z_i, the amount of pleasant time enjoyed while carrying out the *j*s time-consuming activities ($j = 1, 2, \ldots L$)—the *L-th* being work—is taken as the direct source of individuals' satisfaction, without any need to resort to a utility function.

I will provisionally assume that working time is wholly unpleasant and no sources of income other than paid work exist, so that the money needed to buy the *i*s inputs ($i = 1, 2, \ldots Z$) can be computed, *via* the wage rate, in terms of unpleasant

[8] See footnote 11 below.

labor time. Under these assumptions the whole cost of activity *j* in terms of unpleasant time is

$$\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} + E_j \,, \tag{4}$$

where the g_{ij}s represent the services of all market goods used up during the activity *j*, m_i their market price, w the individual's wage rate and E_j the flow of unpleasant time (e.g. washing dishes after enjoying dinner at home) necessary to perform activity *j*. Note that the ratio m_i/w represents the amount of working time (supposedly unpleasant) necessary to buy one unit of g_{ij}.

Since the output of each activity can also measured by a (pleasant) time flow, denoted as P_j, the rate of return of the *j*-th activity can be expressed as: [9]

$$r_j = \frac{P_j}{\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} + E_j}. \tag{5}$$

Individuals whose income depends exclusively on the hours of labor services that they sell face the following constraints:

$$\begin{aligned} &\sum_{j=1}^{L} T_j \equiv \overline{T} \\ &\sum_{j=1}^{L} \sum_{i=1}^{Z} g_{ij} \cdot m_i = T_L \cdot w, \end{aligned} \tag{6}$$

where $\overline{T}$ denotes the length of the time period. According to the first of (6), since time can neither be saved nor borrowed, $\overline{T}$ must necessarily be spent on at least one of the *j*s activities;[10] the second of (6) sets the budget constraint.

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[9] Note that limiting the output of the production process to pleasant time only implies that many rates of return (5) could be negative. Moreover, expressing the rate of return of each activity through (5) neglects the 'temporal order' of unpleasant and pleasant time within the activity. In fact, those activities whose pleasant component comes first should imply, *ceteris paribus*, (i.e. for given flows of pleasant and unpleasant times) a higher rate of return than that 'implied' in the case of those activities where individuals have to endure effort and unpleasantness before the pleasure arrives. On the other hand, a more complex formula able to take into account the order of the flows could provide a framework for psychological research into individual tendencies to savor pleasure in advance, so that the delay of pleasure can be a pleasure in itself.

In order to take into account the possibility that work may also be pleasant to a certain extent, an extension of the basic model is suggested in Nisticò (2014), wherein the total time spent in each activity *j*, including work, is expressed as:

$$T_j = \left(e_j + p_j\right) \cdot T_j,$$

where e_j and p_j represent, respectively, the unpleasant and pleasant shares of the time devoted to activity *j*.[11] Therefore, (4) can be rewritten as

$$\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} \cdot e_L + e_j \cdot T_j, \tag{7}$$

where e_L represents the unpleasant share of the time devoted to work. On the other hand, (5) can be rewritten as:

$$r_j = \frac{p_j \cdot T_j}{\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} \cdot e_L + e_j \cdot T_j}. \tag{8}$$

Note that $e_L < 1$ reduces the cost of the working time necessary to buy the market goods used up during activity *j*, thus highlighting the impact of work satisfaction on all rates of return (8).

On the other hand, also the right-hand side of the budget constraint can be extended to take into account the existence of sources alternative to selling labor services to finance the cost of inputs, so that the second of (6) becomes:

$$\sum_{j=1}^{L} \sum_{i=1}^{Z} g_{ij} \cdot m_i = T_L \cdot w + I - \Delta W \tag{9}$$

where *I* denotes any forms of income other than work (such as rents or social security benefits), and ΔW the change in individual's wealth (or the inverse of the

[10] In fact, some of the *j*s activities could be 'composed' of two or more single activities. On the possibility of 'joint activities', e.g. multitasking, see Nisticò (2014: 294–295).

[11] Possible differences in 'intensities' of both pleasant and unpleasant time units could easily be taken into account by multiplying both e_j and p_j by the average intensity of pleasantness or unpleasantness of the time units wholly spent in activity *j*.

change in her debt position). Given the impact of e_L on all rates of return (8), it is convenient to multiply both sides of (9) by e_L/w so that it becomes:

$$\sum_{j=1}^{L}\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} \cdot e_L = e_L \cdot \left(T_L + \frac{I - \Delta W}{w} \right). \tag{10}$$

Presenting the budget constraint in this new shape raises the question as to whether the term $m_i \cdot e_L/w$ in (7), i.e. the unpleasant time 'indirectly' necessary to buy market goods, is applicable also for those individuals who do not need to sell labor services in order to finance their expenditure and whose e_L/w tends to be indeterminate.[12] I will assume, resorting to Adam Smith's tenet of labor commanded as the 'subjective' value of any type of wealth, that (10) be an appropriate measure of the 'psychological' cost of the market goods, also for those who derive their income from non-labor sources:

> "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]: 34, emphasis added).[13]

Finally, the right-hand side of constraint (10) raises the question of all the (possibly bi-directional) links between job satisfaction, as measured by the complement of e_L, and degree of dependence on work to finance one's expenditure, as measured by the relative weight of T_L within the parenthesis on the right-hand side of (10). For instance, the widespread inclination of low-income, but possibly also low-skilled, workers to spend a significant share of their income on lotteries, might also be connected with their strong need/hope to become less

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[12] Alternatively, one could argue that also holders of wealth have 'to struggle' with their tenants to collect their rents or with their managers to have a decent return on their financial assets, and therefore all individuals need to devote a part of their weekly time to 'work'. By so extending the notion of work, the strict inequality $T_L > 0$ would hold even for *rentiers* or retirees with their income rate (w) being equal to the ratio I/T_L. Under this interpretation, I would disappear from the right-hand side of (10).

[13] Given that 'income per unit of time' is different across individuals, the average wage of the economy should be applied to calculate the Smith-like value of wealth on the right-hand side of (10).

dependent on their poor quality-low paid work (high ratio e_L/w) to access the market goods necessary to perform their weekly activities.[14]

4 The allocation of time 'through weeks'

Extending Hicks' (1946) temporary equilibrium approach to household decision-makers, we can frame the theory within the 'ordinary' viewpoint that sees the continuous flow of time conventionally divided into 'units' (say minutes) and 'periods' (say weeks); and that each household faces an initial problem of allocating time units among the various possible activities within a period. A second, more challenging, problem is that of formulating a Gossen-type plan that extends across multiple weeks. Hick's method is founded on the idea that economics should accommodate the role of time by framing the analysis in terms of a sequence of temporary equilibria characterized both by the individuals' attempts to optimize their 'weekly' plan and by the recognition that each new weekly plan is built on the possible shortcomings of the previous one, in a dynamic sequence that hardly converges towards any intertemporal equilibrium path:

> "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" (Hicks 1946: 246).

Hicks' method, according to which individuals can be considered optimizers (though possibly unsuccessful) of their intra-week plan, can be coupled with Marshall's well-known sensible definition of short run for firms' decisions. The analogy I propose here for households is to define a 'temporary' period, characterized by a given capacity (skills) to produce enjoyment, as well as by a series of institutional constraints, such as the impossibility to change job or place of residence within a week's time. However, each household normally acts also with reference to a longer time horizon, precisely with the aim of adapting the

[14] On the inclination of low-income workers to go in for lotteries, see Haisley et al. (2008).

'enjoyment-productive capacity' and/or to remove the obstacles to important changes in future weekly plans.

4.1 Intra-period behavior

Here I will not go into the fundamental issue of the extent to which we can choose all the details of our weekly plan rather than being 'forced' to accept most of it, as a heritage of a combination between our past choices and social constraints.[15] Limited as the opportunities may be to draw up an 'optimum' weekly plan, it must be recognized that individuals do tend to maximize their weekly amount of pleasant time, while minimizing the unpleasant time directly or indirectly needed to perform the various activities. The following passage, from Winston (1982), is illuminating about how, on the one hand, we have very little scope to draw up our ideal plan while, on the other hand, our limited task is facilitated by the predictability of the weekly routine in which our choices on activities are made:

> "The household does things more or less easily at different times in large part because it exists an environment that is different at different times. … Stores open and close; trains leave; children get home from school and friends from work; the sun comes up, bringing cheap light and the inputs for a suntan. These environmental changes, given endowments, preferences, prices, and production functions, determine the household's utility-maximizing schedule of activities. The particular elements of the environment that are incorporated into this analysis are those entirely repetitive, rhythmic, and hence fully anticipated changes that occur in equilibrium day after day or week after week or year after year. It is, of course, a rhythmic equilibrium because it reflects adjustment to a rhythmic environment. And because that environment is exogenous, the household is linked irrevocably to the real time of the world outside it" (Winston 1982: 190).

Actually, contrary to what Winston seems to believe, the optimal intra-week allocation of the time flow, net of all those activities we cannot reschedule without a sufficiently long inter-week plan, can easily be identified without any need to resort to a utility function. In fact, I need only assume that individuals are able to

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[15] '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: 1).

distinguish between pleasant and unpleasant time units for the following condition to ensure the optimality of the weekly plan, i.e. the distribution of the 'available' time among activities in order to enjoy the maximum pleasant time allowed for by the constraints:

$$\frac{\partial r_j}{\partial T_j} = k \quad \forall j \neq L_h, h = 1,2,\ldots,n \quad , \tag{11}$$

where L_h denotes the activities, possibly including work, that individuals cannot readily reschedule within a single temporary period and k is the common value of all r_j s allowed for by the time (and budget) constraint.[16]

On the other hand, an assumption alternative to maximizing is 'targeting', on the basis of which we may assume that some individuals behave in order to enjoy a sensible amount of pleasant time compatible with their constraints and their satisfaction (enjoyment) capacity, as if they were firms that set a profit margin on the basis of a planned output level. In fact, according to the literature on firms' behavior, in order to ensure that their ability to earn profits endures through time, firms keep some spare productive capacity utilization, and adjust its actual degree according to the relationship between expected and actual sales, rather than adjusting prices in order to maximize profits under the prevailing demand conditions.[17] Similarly, we may assume that each individual sets a target, i.e. aims at enjoying a given amount of pleasant time in each period. In this perspective, both the day-end and the week-end play the role of a sort of potential capacity to produce enjoyment in various forms that will be activated or not according as to how the first part of the day, or of the week, has actually developed, i.e. in terms of boredom, excitement, stress, laziness etc. Targeting, as an alternative to maximizing, can be expressed by means of the following condition:

$$\sum_{i=1}^{L} p_j \cdot T_j = h \ , \tag{12}$$

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[16] For a graphical illustration of condition (11), see Nisticò (2014: 289). Convexity of the activities, deriving from Gossen's first law, is required for the condition to obtain.

[17] See, for instance, Andrews' (1949) model, based on the idea that pricing policies do not aim at maximizing profits under all circumstance but rather at stabilizing them at a 'reasonable' level. See also Nisticò (2002). Another, convincing, example of targeting can be found in Camerer et al. (1997).

where h denotes the amount of pleasant time that the individual sets as 'satisficing' when elaborating the weekly plan.

Whether individuals *try* to maximize or simply 'target' their weekly pleasant time, the essence of Hicks's method lies in the sensible recognition that the passage of time generates a tendency for actual realizations to depart from the expected ones. The plan for the forthcoming day or week will, then, take into account the distance from the target of the actual development of the previous plan, according as to whether the distance from the target was due to occasional or structural reasons. Note that the new plan might well include decisions about reshaping enjoyment-productive capacity, i.e. enlarging the set of activities through which we can produce pleasant time, or about removing the obstacles to experiencing new activities (i.e. moving to a bigger town that offers more cultural or sporting events or better job opportunities).

4.2 The flow of weeks and adjustment of plans

In a 'learning by doing', path-dependent search for our satisficing plan, what we liked to do in the previous weeks is not necessarily what we will like to do in the forthcoming weeks. Similarly, what we started to do in the present week will not necessarily be repeated the next week. However, before addressing the case of discrepancy between expectations and realized outcomes, it is worth looking into the case in which, small and casual shocks apart, the individual is satisfied with her past choices and, given the budget constraint, starts to reiterate the same plan through the weeks. It is here that the importance of Gossen's second law of pleasure comes into play. In fact, contrary to the widespread and now established version of the law of diminishing marginal utility, which emerges as a consequence of 'quantity' (atemporal) adjustments, Gossen's second law emphasizes precisely the negative effect on pleasure of reiterating *through time* the *same* activities and the consumption of the *same* bundle of market goods. Moreover, there is no reason why this should be true only for addictive activities or that the optimum, or targeted, weekly plan could somehow escape the operation of such a law.

We can, therefore, assume that once the individual has identified her preferred plan, its reiteration through time with a constant frequency of repetition of the

various activities can, at best, ensure the enjoyment of the same pleasure already experienced in the past, so that, *ceteris paribus*,

$$p_{j,t} \leq p_{j,t-1} \ \forall j,^{18} \tag{13}$$

whereas, for the sign of (13) to be reversed, some innovative change in the weekly plan is required. Moreover, since the shape of the curve represented in *Figure 1* differs for different activities and the curves shift downward and become steeper to different degrees when the activities are, *ceteris paribus*, repeated with sufficient frequency, the preference ordering within a given plan tends inevitably to change with the passage of the weeks.

It should be clear, therefore, that Gossen's extremely reasonable assumption is incompatible with any approach that postulates that individuals have a set (Rocky Mountains-like) preference ordering captured by a given utility function, governing their intertemporal consumption plan. On the other hand, let us not forget that the idea that individuals have stable preferences through time, i.e. that they have, under the same circumstances, only one right thing to do, or bundle to choose, is the basis upon which mainstream economics minimizes the findings of behavioral economics by categorizing them under the label of 'situationalism', defined as "the idea that decisions are made based on local influences, not *long-run well-being*" (Glaeser 2004: 408, emphasis added). This interpretation acknowledges that lab experiments can successfully identify instances, like the Allais Paradox, in which actual individual behavior is at odds with explanation of it in terms of constrained maximization of a long-run, Rocky Mountains-type, utility function. However, when acting 'outside the lab', those individuals who fail

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18 According to Gossen: "This decline of pleasure resulting from continuous and repeated enjoyment of the same object should not be confused with the increase that anyone can achieve through the exercise of the senses of enjoyment. Exercise of the eye, ear, taste and mind increases, in general, the enjoyment of the objects serving these senses; but continued and repeated enjoyment of one and the same object is subject, nevertheless, to the process of diminution" (Gossen 1983 [1854]: 8). One should admit that, according to Gossen's own idea (Gossen 1983 [1854]: 8–14) a small enough frequency of repetition of the same activity can in principle restore its enjoyment potential. Therefore reiterating a *set* of well-distributed activities week after week can, in principle, escape the operation of Gossen's second law. However, it is sensible to assume that in the absence of some, possibly moderate, degree of novelty in our weekly set of activities (a new book or a different TV show), the ratio between pleasant and unpleasant time within a week will show a tendency to decline with the passage of weeks.

to maximize their latent utility function will, sooner or later, correct their errors, provided that they have an incentive to do so. In other words, besides the celebrated invisible hand that guides markets towards their optimum, also a second invisible hand would be there to guide individuals towards redemption after they have been led into *errors*, or deviations from what is 'good' for them, by peculiar situations, e.g. framing effects, that can be artificially created in a lab or might randomly crop up in reality. On the other hand, I am fully sympathetic with Glaeser's view that his firm belief in the existence for all individuals of a latent, long-run order of preferences over all possible choices is shared also by those who advocate paternalistic government intervention precisely because of the errors emphasized by behavioral economics:[19]

> "Behavioral economics has occasionally been seen as an excuse for paternalism. Situationalism implies that decisions are formed by ephemeral factors that have little to do with long-run well-being. If widespread cognitive errors mean that private decision-makers do a poor job of maximizing utility, then is it not the case that the government should maximize for them?" (Glaeser 2004: 411–412).

It is, instead, the main contention of this paper that the flow of time, *à la Gossen*, should *significantly* be taken into account when shaping a positive theory of individual choice, wherein observed behavior cannot be labeled as 'consistent' or 'inconsistent' according as to whether it can be accounted for in terms of constrained maximization of a 'long-run' utility function. And one of the aims of the framework proposed here is to suggest that an explanation of how individuals take present *economic* decisions—i.e. based on a rational comparison of perceived costs and benefits of both time-use and market goods—can be arrived at taking into account that the individual's perception of costs and benefits depends on experienced outcomes, and on the possibility to exploit new potential future enjoyment opportunities in the evolving social context.[20] Moreover, the cost-benefit approach proposed here requires 'simply' that individuals take their decisions trying to distinguish what will prove pleasant from what will prove unpleasant to them in a non-ergodic environment, without the need to resort to any assumption about Rocky Mountains-type of preferences. The flow of time lowers, according to (13), the overall rates of return; repetitive life can be pleasantly

[19] For a discussion of paternalism in behavioral economics, see Collewet (2014).

[20] On how preferences might evolve according to social interaction, see Hargreaves Heap (2014).

restful, to a certain extent, but it generates boredom, which individuals tend to fight by introducing 'changes', small though they might be, in their weekly plan. Investment and innovation are at least as necessary for a consumer (Bianchi 1998) as they are for a firm in a competitive and evolving business environment, or for Shumpeter-like entrepreneurs looking for new profit opportunities when the working of competition has eroded the old ones. Similarly, Keynes's idea that entrepreneurs' investment decisions are driven as much by animal spirits as by the weighing of expected rates of return from investment projects against the market interest rate can be extended to consumers, whose possible revision of the weekly plan to create new enjoyment opportunities may be driven more by an urge to change than by rational calculation, very much like an investment project under uncertainty. The approach to choice theory, typical of economics, is still there in that the assumption is retained that maximizing, or targeting, pleasant time, still represents the (underlying) force largely accounting for our weekly choices. However, a more open approach should be taken to explain decisions regarding the transition from one weekly plan to a new one incorporating changes that do not necessarily derive from changes in income or prices, but rather, as Scitovsky observed, from our innate 'Pursuit of Novelty', whose strength increases when our ability to satisfy the recurrent needs lowers arousal to an excessively low, and thus disturbing, level:

> "What does an organism do when all its needs are satisfied, all its discomforts eliminated? The original answer, nothing, is now generally recognized to have been wrong. … [W]hile discomfort is usually specific and is fully relieved only by satisfying the particular need causing it, boredom is general and can be escaped through a great variety of activities. Boredom, therefore, is much harder to analyze … Observation and experiments alike show that anything new, not new in the sense of being situated later in time, but new in being surprising, different from what went before and was expected, will catch the attention and be stimulating" (Scitovsky 1992: 31–34).

5 Scitovsky's other half of the story

The neoclassical atemporal theory of choice may be found to be perfectly adequate to deal with the demand for goods and services capable of satisfying recurrent needs, but it can hardly be denied that, even in its intertemporal version, it is unable to deal with the 'other half of the story', namely the demand for stimulating

activities that attracted Scitovsky's interest but was disregarded by Marshall, who recognized its inconsistence with the theory he was involved in developing (see section 1 above). In fact, a comprehensive theory of human satisfaction requires a unifying explanation of the many different instances in which individuals take economic choices:

> "The premise of this study is that among actual economic events there is a continuum from repetitive to unique events—from those that take place day after day or year after year with a fixed rhythmic periodicity to, at the other end of the continuum, those utterly unique events that happen only once in a lifetime for a person or family or society. Most events and certainly most economic events lie somewhere in between. But the pure extremes define the appropriateness of the pure models economists use: Austrian analysis is appropriate to unique non repetitive events with their inevitable uncertainties and the dark importance of future ignorance; time-specific neoclassical analysis is appropriate to repetitive, rhythmic events with their high degree of predictability and even equilibria and perfect knowledge" (Winston 1982: 9).

Drawing on Scitovsky's terminology, we can distinguish between two types of activities (and goods), the *defensive* and the *creative* ones.[21] Defensive activities aim to satisfy a recurrent need and as such to generate a predictable output in terms of pleasant time, whose duration, however, is limited to the very short time needed to lower the arousal level, otherwise increased by the emergence of the need. Creative activities, on the other hand, in that they aim to generate a positive pleasure 'out of nothing', entail revision of one's weekly allocation of time and/or the uses of new market goods in exchange for an outcome that is both uncertain and located in future periods. Also the duration of the pleasure associated with creative activities is uncertain, since it depends on how much they contribute to extending our satisfaction productive capacity in the face of the instances in which we will need to increase our arousal level, otherwise lowered by the satisfaction of our needs and the emergence of boredom.

As to the difference in duration of the creative activities, Scitovsky introduces the further distinction between skilled and unskilled stimulating activities:

> "I have already mentioned some forms of stimulation whose enjoyment requires virtually no skill and no effort on the recipient part;

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[21] As Scitovsky (1992: 109) recognizes, the distinction between defensive and creative activities dates back to Hawtrey (1925: 189–202).

…Time-budget surveys and various sociological studies tell us that the main sources of stimulation in the United States are watching television, driving for pleasure and shopping – all of which are sources of stimulation requiring no skill. Why do we find them less stimulating and satisfying than listening to music or reading literature? They are not less so, not as long as they provide a flow of information commensurate with our requirements for pleasant stimulation. Television, driving around, and shopping can all be very stimulating, up to a point. Many television programs are enjoyable and interesting; going to a colourful market or shopping center, … looking at the latest fashions in elegant department stores or inspecting next year's models of automobiles can all be fun. The same is true for driving … Yet the flow of novelty and stimulation available from those three sources is limited. What we get out of TV, shopping and driving is fully adequate for pleasant, sometimes even maximally pleasant stimulation when the time devoted to their enjoyment is suitably limited, spaced and selected, but it quickly becomes redundant, unsurprising, and monotonous as we devote more time to them in the vain hope that our intake of novelty will keep step with the increased time we spend on them" (Scitovsky 1992: 232–233).[22]

5.1 Goods-intensive strategies: Process innovation

Although reiteration of the same weekly plan tends to lower the overall rate of return,[23] one can hardly deny that the growth of real income together with technical progress, making new and better-quality market goods available to individuals, can to some extent compensate for the emergence of boredom. In other words, the novelty content that we need in order to counteract the operation

[22] Note how Scitovsky recognizes how any instrumental activity, such as driving or shopping, similarly to work, has a clear potential to become pleasant in itself, to a certain extent. In fact, Scitovsky should have admitted that we could all become skilled also in driving or shopping. Moreover, those activities tend to become pleasant when they are instrumental to accomplish another activity we are 'savouring' as it is pointed out by Shackle with his notion of 'enjoyment by anticipation' (Shackle 1943: 103). Participating in e-bay auctions or shopping to buy a durable good, or driving to meet a beloved person are typical instances in this respect.

[23] The overall rate of return is defined as:

$$R^* = \frac{\sum_{j=1}^{L} p_j \cdot T_j}{\sum_{j=1}^{L}\left(\sum_{i=1}^{Z} g_{ij} \cdot \frac{m_i}{w} \cdot e_L + e_j \cdot T_j\right)}.$$

of Gossen's second law can be 'embodied' in the market goods, i.e. the inputs of our activities, thus generating a sort of 'process innovation'.

In fact, much like what happens in any productive process, the share of pleasant time enjoyed during any activity, i.e. its output, should be considered a function of the market goods necessary to perform it:

$$p_j = f\left(g_{ij}\right). \tag{14}$$

By introducing the simplifying assumption that our decision to experience a new input, such as new piece of furniture or a new cell phone or television set, can be represented by an increase in the quantity g_i,[24] we may assume the following sign of the partial derivative of (14) to hold in each period t:

$$\frac{\partial p_{j,t}}{\partial g_{ij,t}} > 0. \tag{15}$$

Moreover, given that according to (8) it is also true that

$$\frac{\partial r_{j,t}}{\partial p_{i,t}} > 0,$$

it readily follows that

$$\frac{\partial r_{j,t}}{\partial g_{ij,t}} > 0. \tag{16}$$

According to (16), whenever our budget constraint allows us to do so—for instance because of a rise in our weekly wage or the possibility to draw on our financial assets or increase our debt position—extra spending on market goods is an effective way to escape from the operation of Gossen's second law, and/or to increase the pleasure felt during the L_h activities that we cannot decide to limit or

[24] It is assumed, in other words, that new durable market goods that incorporate 'novelty' expand the set of characteristics with respect to the 'old' goods *à la* Lancaster, and that those extra characteristics can be expressed in terms of a greater quantity of g_i. In the opening section of his well-known contribution on the characteristics approach, Lancaster observed that "perhaps the most important aspects of consumer behavior relevant to an economy as complex as that of the United States are those of consumer reactions to new commodities and to quality variations. Traditional theory has nothing to say on these. In the case of new commodities, the theory is particularly helpless" (Lancaster 1966: 133).

extend within a week's time. In other words, (16) provides a strong rationale for the many forms of consumption, generally labeled as 'conspicuous'—such as driving to work and back home with a new fancy car wearing new shoes or clothes, exploring the features of a new smartphone while commuting by train or buses—as a way to introduce some novelties while avoiding complex revisions of one's weekly plan, whose outcome would be highly uncertain. In fact, one could define as 'conspicuous' those forms of consumption that can simply overlap on the existing time allocation, requiring no extra, specific, time to be devoted to them. In this sense, one can say that they increase the good-intensity of our activity plan. And let us not forget, when considering process-innovation strategies, decisions to spend on those goods that technical progress makes available to reduce the time we have to devote to purely defensive, instrumental activities (such as housekeeping) that, generally, do not produce any pleasant time in themselves, apart from the brief moment of arousal reduction that their accomplishment brings with it. Insofar as those innovations are not coupled with the presence of some excess-capacity to produce enjoyment by means of a thoroughgoing adjustment of the plan, when technical progress makes more time rather than more income available to the individual, the time 'saved' in those defensive activities, 'naturally' flows into the 'residual' activities—such as relaxing at home reading a book, watching sport or entertainment in TV:

> "…The switch from radio to TV is obviously explained by technical progress, but most of the other changes go from planned and structured activities to unplanned, unstructured, residual ones, and they are the sorts of changes one would expect to occur when the high cost of time makes people anxious to save it, leaving them with more time on their hands than they know what to do with … It is natural to save time on activities that have to be decided upon, prepared for, or planned in advance; it is also natural to waste time on those one can take up at a moment's notice, linger over at will, or drift into unwittingly" (Scitovsky 1992: 163–64).

Let us also recall that, at both the micro and macro level, the question as to what to do with the time saved on defensive activities is the challenge that affluent societies are now facing and that an economic theory centered on the assumptions of scarcity on the one hand, and given preferences on the other, is hardly able to tackle.

Some clarification is needed about the durable nature of goods. In fact, although all goods are to some extent durable when consumption time is taken into

account, even a fruit salad or an ice cream, some goods can deliver their services across multiple periods of time taken as reference by the theorist, in our case a week. In fact, I have assumed so far that the prices m_i of all market goods correspond to the services of all market goods, as if they were all rented weekly rather than bought. However, also the non-durable, as well as the services of durable goods, must generally be bought 'before' consumption takes place; in fact "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: lxxxi). Coherently with Georgescu's observation, buying consumption goods should also be treated as decisions to 'invest', although, in some cases, with a predictable intra-period, rate of return. In fact, in the case of goods-intensive strategies, where no extra effort E_j is required, the expected 'own' rate of return of the extra-expenditure on the new consumption good i to be used in activity j can be expressed as:

$$\frac{\varphi \cdot \left(\Delta p_{j,t}\right) \cdot T_j}{\Delta g_{ij,t} \cdot \frac{m_i}{w} \cdot e_L}, \tag{17}$$

where φ, generally lower than one, is the discount factor capturing both delay and uncertainty of the pleasant time to be enjoyed.[25] Note that whenever the decision to adopt a goods-intensive strategy stems from an 'exogenous'—i.e. not perceived as compensation for an extra effort—rise in income, or in a 'windfall' change in the wealth position, for a given T_L, the component m_i/w might be felt as negligible and the perceived value of (17) could thus be very high. It is the 'rational impulse' to increase pleasant time 'now' that might account for the way forms of 'mental accounting' (Thaler 1991: 25–47) can influence the way we introduce novelties in our weekly plans; and a sort of 'certainty effect'—according to which $\varphi \cong 1$—might add further value to (17).

In cases where technical progress allows for reduction in the time devoted to either one of the instrumental activities (i.e. a reduction in the time to be devoted

[25] In the case of durable consumption goods, formula (17) underestimates the own rate of return of the strategy, for it neglects the extra pleasant time enjoyable in future weeks. The correct formula will be provided in the next section.

to housekeeping thanks to new appliances) the rate of return of diverting time from the activity L_h to the residual activity j can be expressed as:

$$\frac{\varphi \cdot \Delta T_{j,t}\left(p_{j,t} - p_{Lh,t}\right)}{\Delta g_{iLh,t} \cdot \frac{m_i}{w} \cdot e_L} \tag{18}$$

where $\Delta T_{j,t} = -\Delta T_{Lh,t}$ and also in this case $\varphi \cong 1$.

5.2 Time-intensive strategies: Activity innovation

On the other hand, individuals often engage in activities whose beneficial effects will emerge only in subsequent periods. For instance, an increase in income could be devoted to financing enrollment in a master course, completion of which—with a significant effort (unpleasant time) to be subtracted from more pleasant activities—could, with a reasonable probability of success, pave the way to a better paid and more congenial job. Severe as the revision of the future weekly plans might be, e.g. the need for the whole family to move to a new town, the expected gain in terms of pleasant time to be enjoyed in future weeks could prove high enough to justify the 'investment'. Apart from such path-breaking behaviors—the decision to emigrate under very risky and dramatic conditions being perhaps the clearest example—most of the 'instrumental', effortful activities we engage in allow for the 'production' of a quantity of pleasant time greater than we could otherwise enjoy without having to go through those preparatory activities.

In this perspective, Scitovsky's skilled activities could be considered as more roundabout techniques for the production of pleasant time, *à la* Böhm-Bawerk/Wicksell. On the other hand, the expected flows of pleasant and unpleasant time, possibly estimated on observation of (or hearsay about) other people having already experienced that type of activity, represent the costs and benefits to be weighed in order to decide about 'the investment'. Accordingly, the expediency of starting an activity j of this sort, extending across multiple weeks, say n, valued at the beginning of period t, depends on the following evolution of its $n+1$ expected (weekly) rates of return:

$$\underbrace{\frac{\varphi_t \cdot T_j \cdot p_{j,t}}{\rho_t \cdot T_j \cdot e_{j,t} + \sum_{i=1}^{z} g_{ij,t} \cdot \frac{m_i}{w_t} \cdot e_{L,t}} - 1}_{t}; \underbrace{\frac{\varphi_{t+1} \cdot T_{j+1} \cdot p_{j,t+1}}{\rho_{t+1} \cdot T_{j+1} \cdot e_{j,t+1} + \sum_{i=1}^{z} g_{ij,t+1} \cdot \frac{m_i}{w_{t+1}} \cdot e_{L,t+1}} - 1}_{t+1}; \ldots$$

$$\ldots; \underbrace{\frac{\varphi_{t+n-1} \cdot T_j \cdot p_{j,t+n}}{\rho_{t+n-1} \cdot T_j \cdot e_{j,t+n} + \sum_{i=1}^{z} g_{ij,t+n} \cdot \frac{m_i}{w_{t+n}} \cdot e_{L,t+n}} - 1}_{t+n} \tag{19}$$

where ρ is the discount factor capturing both delay and uncertainty of the unpleasant time (effort) expected to be incurred during the multi-period plan, and:

$$\begin{aligned} \varphi_{t+i} &= g\left(\sum_{j=0}^{i-1} T_{t+j}\right) \\ \rho_{t+i} &= h\left(\sum_{j=0}^{i-1} T_{t+j}\right) \end{aligned} \tag{20}$$

define the evolution of the discount factors as a function of the time allocated to the activity in the past weeks.[26] Whereas it is sensible to assume that individuals are aware of the learning process implied by (20), it should be clear that the exact 'shape' of functions (20) will be revealed only 'by doing', thus accounting for the possibility that roundabout activities be truncated before week $t+n$ comes, or extended beyond week $t+n$. People starting a six-week tennis course might well decide either to take a second, more challenging, course and become recurrent tennis players starting from week 7 or to drop out before the course ends. The same holds for many other path-breaking activities we start to engage in, successfully or regrettably, since not only entrepreneurs but also consumers sometimes fail.

[26] The values of both factors through time will also reflect the extent to which the roundabout process involves Shackle's 'enjoyment by anticipation' (see footnote 22 above). The simplifying assumption is made that the expenses on market goods are not discounted.

It is worth noting that it is precisely thanks to the temporary period framework *à la* Hicks that those many instances in which we either extend or cut our planned, roundabout activities can be accounted for. In this perspective, the initial values of the discount factors φ_t and ρ_t — which determine the value of the first component in (19), though not depending on functions (20)—are crucial in determining how attractive the plan is for the individual at the moment of evaluation. In fact, they affect the 'initial' individual perception of the costs and benefits of the *specific* activity j under evaluation. Indeed, there is no reason why the discount factors of an individual should be identical for all activities. We know that people inclined to invest in some sporting activity are not necessarily inclined to invest in musical culture or in learning a foreign language (although many are), while people already engaging in one sport are more easily attracted by the possibility to go on to a new one. We discount the costs and benefits of a yet unexplored activity—as they are available to us through word-of-mouth or other channels of information—according to our 'past' experiences. Our consumption history influences, above all, the degree of 'uncertainty' of the future outcomes of our present choices. In other words, insofar as the values of φ_t and ρ_t reflect our degree of confidence in the reliability of the available information on the shares of pleasant and unpleasant times of the roundabout activity j, they must also be influenced, in contrast with Koopman's assumption mentioned at the beginning of Section 2 above, by the outcomes of our past choices. Therefore, besides being different for different activities, they differ for the same activity in different periods of time.

It is a curious fact that Marshall, who was not interested in elaborating a formalized and axiomatic intertemporal theory, was well aware of the need to acknowledge the heterogeneity and variability of the discount rates:

> "The same person will vary in his mood, being at one time impatient, and greedy for present enjoyment; while at another his mind dwells on the future, and he is willing to postpone all enjoyments that can conveniently be made to wait. Sometimes he is in a mood to care little for anything else: sometimes he is like the children who pick the plums out of their pudding to eat them at once, sometimes like those who put them aside to be eaten last. And, in any case, when calculating the rate at which a future benefit is discounted, we must be careful to make allowance for the pleasures of expectation. The rates at which different people discount the future affect not only their tendency to save, as the term is ordinarily understood, but also their tendency to buy things which will be a lasting source of pleasure rather than those which give a stronger but more transient enjoyment; to buy a new coat rather than to indulge in a drinking bout, or to choose simple furniture that will wear well, rather than showy furniture that will soon fall to pieces. It is in regard to these things

especially that the pleasure of possession makes itself felt. Many people derive from the mere feeling of ownership a stronger satisfaction than they derive from ordinary pleasures in the narrower sense of the term: for example, the delight in the possession of land will often induce people to pay for it so high a price that it yields them but a very poor return on their investment" (Marshall 1920: 120–21).

We may contrast the potential attractiveness of the goods-intensive and time intensive strategies by assuming that they produce Scitovsky-type effects. The three graphs reported in *Figure 2* represent the hypothetical dynamics of the weekly rates of return of an individual who has reiterated through time her preferred intraweek plan up to week $t-1$, and is considering how to introduce some degree of novelty to counteract the force of Gossen's second law that would, otherwise, progressively lower the overall rate of return below its initial value R^*. The effects of the process-innovation strategies on the weekly rate of return, as measured by either (17) or (18), are mirrored by the oscillatory, bold curve. The assumption is made that two 'expenditure shocks' take place at t and $t+2$, the second being necessary to renew the very short positive effect of the first. Also the second positive effect is quite short-lived and will have to be renewed with further expenditure on market goods in $t+n$.[27]

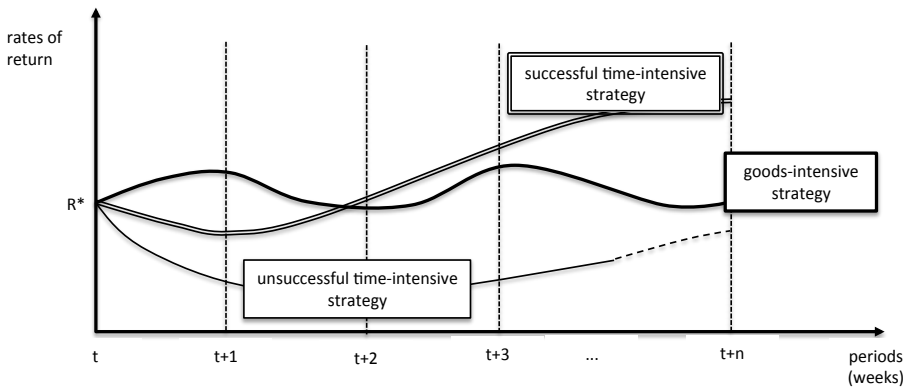

Figure 2: The possible evolution of the weekly rates of return for different strategies

[27] In fact both expenditures produce their effect only for one period, as shown by formulas (17) and (18) Note that the actual path of the lines within each time-period is arbitrary. On this point, see Nisticò (2005).

The double line mirrors the evolution through time of the weekly rate of return of a 'successful' roundabout strategy as measured by (19). The decision to invest some unpleasant time to expand the satisfaction-productive capacity—i.e. to give up some pleasant time otherwise enjoyable in the first period by means of the goods-intensive strategy—produces its positive effect starting from $t+1$. The weekly rate of return of the successful time-intensive strategy constantly exceeds that of the goods-intensive strategy from $t+2$ onwards.

On the other hand, the solid thin line shows the evolution of the weekly rate of returns for the unsuccessful time-intensive strategy. The investment is never repaid and, even if the weekly rate of return starts to increase around $t+3$, the activity is truncated before $t+n$.

When facing the alternative between a goods-intensive (process-innovation) and a time-intensive (activity-innovation) strategy, we cannot tell whether the latter will prove to be successful. In period t we can evaluate the reliability of our information about the pleasant and unpleasant flows of time in the first element of (19) on the basis of our past consumption history, whereas 'experiencing' is necessary, according (20), to update, reliably, the values of φ_{t+i} and ρ_{t+i}. Given the 'radical' uncertainty, *à la* Keynes, as to whether the time-intensive strategy will be successful or not, only our *animal spirits* induce us, occasionally, to revise our weekly plan and take the risk of failing rather than relying on the moderate, transient but sure gain implicit in the goods-intensive strategy. After, and only after, we have decided to invest our time in a roundabout technique, will we discover whether some virtuous loop will foster our exploratory behavior. In fact, extending Marshall's thoughts quoted above, one could say that individual discounting changes through time with some regularity rather than with our passing mood. In fact, insofar as any investment in skills increases our satisfaction-productive capacity, it might also enhance our ability to evaluate the flows of future investment plans, thus reducing the uncertainty as to whether the time-intensive strategy will be successful or not.

6 Conclusions

In this paper, I explored whether a fruitful approach to choice theory can be pursued by building upon Gossen's 'submerged and forgotten' assumption that the

enjoyment of pleasant time is the ultimate goal of individual economic choices. In order to do so, I departed from Becker's treatment of consumption time as a pure cost and from his unconvincing notion of 'commodities' as the output of the consumption processes. I did so by reversing Becker's approach to treat time as forgone earnings, i.e. by measuring the monetary cost of the goods and services consumed in terms of unpleasant time (foregone pleasant time). The advantage that I see in my proposal lies in the possibility to define 'activities' in such a way that their efficiency can be measured by the ratio of pleasant to unpleasant time, with no need to resort to the traditional notion of utility. Finally, given that breaking the boundaries between economics and psychology implies, above all, a path dependent conception of preferences, I needed a method to let the 'before' and 'after' of individual choices have a non-trivial influence on how individuals allocate their time (and their budget) in any single period. The sequence of temporary periods that Hicks developed for his theory of production and the traditional notion of roundaboutness served my purpose.

In a time-based choice theory, the economic problem of allocating time among activities links up with that of allocating other type of endowments, such as financial or real wealth. Considering the budget- and time-constraints together might imply that some theoretical predictions of standard microeconomic theory are simply wrong, as shown by Steedman (2001). On the other hand, I tried to show how the what-shall-I-do framework described above, coupled with some of Scitovsky's path-breaking insights about consumer's motivations, can be used to understand the mechanisms through which individuals strive to ensure an adequate level of novelty in their lives; a problem that the traditional approach, based on the assumption of given preferences, is hardly able to tackle. Well before Scitovsky, John Stuart Mill (1848, book IV, Ch. 6) and Keynes (1930) had envisaged that most of the future economic problems would be centered around the what-shall-I-do question.[28]

The ongoing increase in life expectancy will make the Mill-Keynes-Scitovsky problem even more pressing. It will soon be clear that fostering the accumulation of wealth during middle-age, possibly extending the uninterrupted working period

[28] The fact that in order to answer the questions raised by Mill, Keynes and Scitovsky we need to investigate on how individuals react to 'satiation' rather than to income and price changes, has recently been addressed by various authors in Witt (2001).

up to fifty years, is an untenable strategy. Individuals tend to reject the idea (Eurobarometer 2012: 55–57) of performing the same play with the tiny variations offered by new consumption goods, for such a long, uninterrupted period of time. Moreover, the long-awaited retirement will prove too long and too 'empty' if not supported by an adequate satisfaction-productive capacity, which will be as necessary to enjoyment of the long weeks free from work as the financial resource of the pension.

Market institutions have won their intellectual battle against planned economies essentially on account of their ability to provide individuals with a greater variety of market goods. The new challenge is now that of providing a true variety of alternative activities, and freedom to choose among them, throughout the life-cycle. It will be the task of the welfare institutions, yet to be designed, to create conditions for the necessary rearrangement of our activities to become easier than it is now.

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