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CONSUMER THEORY: THE NEOCLASSICAL MODEL AND ITS OPPOSITE EVOLUTIONARY ALTERNATIVE

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Contents

While distributing this free software that interactively explains you the basic microeconomic theory of consumption, we shall briefly introduce you to its tenets, suggesting some easy experiment with the computer application. More importantly, we shall propose you the alternative approach for interpreting real consumers' choices that is taking growing consensus among economists.

1. Introduction to the neoclassical model of consumer choice

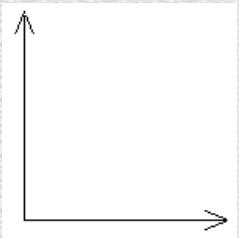
The standard textbook model of consumer is an outstanding example of the neoclassical paradigm in economics [1]: a hyper-rational agent maximises something by choosing an "optimal" bundle of things.

Here, the hyper-rational consumer maximises utility (i. e. an overall generic measure of well-being) by exhausting a given budget.

He has a pre-defined income to spend on - for simplicity's sake - two goods, called X and Y, respectively.

He could spend his entire **income** buying only X, thus purchasing a quantity of X equal to income divided by the price of X.

Let's take a numerical example that you find here in the animated graph and that you can replicate with the software: when his income is 50 and the **Y price** is 10, the consumer can purchase 5 units of Y (higher red point on Y axis).



If the graph is not animated, just reload this page or pass to a more modern Internet browser.

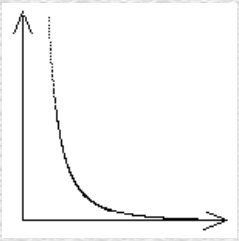
Or he could spend his entire income buying only X - the other good - thus purchasing a quantity of X equal to his **income** divided by the **price of X**. If X price is 6, the consumer can purchase at most 8.33 units of X (lower red point).

Or he can afford (at most) to buy any combination of quantities of X and Y that costs exactly as the income. These combinations give rise to the **budget line** you see between the two red points.

How to choose? Well, by having a consistent set of judgements about how much utility the consumer will enjoy by consuming each possible bundle of goods.

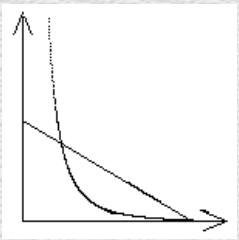
The typical well-behaved structure of utility of bundles is offered by **indifference curves**, i.e. all bundles giving the same level of utility to the consumer.

Here below you can see two indifference curves: the **higher indifference curve** is characterised by a **higher level of utility**.



Now, we should consider - at the same time - both the **budget constraint** (the **budget line**) and the **utility structure** (the **indifference curves**).

The **optimal bundle of goods** belongs to the **highest possible indifference curve crossing the budget line**.



The red point is the rational consumer's choice (the chosen bundle), since it maximises utility, given the budget constraint.

Everything sounds very logical and convincing - within the **unrealistic setting** offered by this kind of mathematics. The deductive style of this microeconomics in consumer theory takes very little care of empirical analysis and of any reasonably open experimentation. Still, let's now see some numerical examples of what we said.

2. How to use this software

Based on Hicksian approach to indifference curves and budget lines, this is a free software to draw economic graphs, diagrams, demand curves, singling out individual choices of (hyper)rational consumers choosing the optimal bundle. If you are a student, you can use as interactive exam preparation guide.

The program starts with a consumer having 50 as income and facing the price of some X good of 6 and the price of Y of 10.

The "Draw" button produce the graphical representation of the **budget line**, i.e. the quantities of X and Y that the consumer can afford exhausting his income.

Push it a first time: you are drawing the budget line and computing the value of its slope, equal - in absolute value - to the relative price of X to Y.

Increase income and re-draw the graph. The quantities on the budget line are systematically higher. No surprise.

Make more experiments varying income and prices. What happens when you increase the price of X? See it on the screen rotations and traslations and ask yourself the reasons.

As we said, the neoclassical approach uses "indifference curves" to represent the preferences of the consumer. By choosing an **indifference curve type** (instead of "none" - the default), you'll see - always with the button "Draw" - which combination of X and Y the consumer will optimally choose. For instance, by choosing the well-behaved **Cobb-Douglas type** you obtain (in the default position of income = 50, px = 6, py = 10) that the consumer buys 5.83 units of X and 1.5 units of Y. In this way he reaches **a utility level** (a general happiness) of 3.88.

You can see the effect of changes in income and prices on demanded quantities (so-called "income elasticity" and "price elasticity) and on utility by changing the input data.

In particular, **an increase of income will normally boost both quantities of X and Y** [2] - as well as the utility enjoyed.

Instead, the effect of price on demanded quantities shows that the increase of the price of X is a damage: utility falls and the quantity of X decreases as well. Try on the contrary to fix a (almost) zero price of X or Y: what does it occur? And what when X or Y are absolutely free? The optimal quantity goes to infinity... Since air is free, how much of it a human would inhale, according to this model?

Try now some systematic experiment. Keeping income at the same level, gradually increase the price of X, as it would happen maybe due to rising business costs. How does the quantity bought of X change? By collecting your observations, you'll get the **demand function**, linking the quantity purchased of a good with its price.

To see the computer do the same, click on the "Issues" Menu, on its line "Demand" - and the new "Draw" button - of course.

You'll find out - not surprisingly - that **demand curves are negatively sloped**, i.e. that an increase of price produces a fall in the quantity bought (try to modify both prices of X and Y to see the effect of general price level changes). If consumers are identical, this graph software generates the market demand curve.

Simmetrically, by keeping prices at the same level, changes in income give rise to the **Engel curve**, as you can see from the graph in the screen activated by the line "Engel's curve" in the "Issues" Menu.

The (indirect) link from income to utility - mediated by the optimally chosen bundle of goods - can be represented by the so-called "**indirect utility function**". The indirect utility function is the maximum utility attained with given prices and income.

You should first experiment in the basic screen by annotating the utility levels obtained at different levels of income, then draw more systematic curves in the new screen opened by the "Effects of income and prices on utility" line of the "Issues" Menu.

Now reflect: if an increase of income fosters utility whereas an increase of price depresses it - and everything is very precise - there should be the possibility of keeping the consumer exactly at the same level of utility by giving some additional amount of income to compensate for the price increase.

This is exactly the idea of the so-called "Hicksian compensation": the consumer is given sufficient income to reach his original utility level, the price increase notwithstanding.

Try out to compensate price changes with income movements or simply go to the "Substitution and income effects" screen accessible from the usual "Issues" Menu [3].

If you are new to these arguments, you'll need some weeks to understand all details and have a complete picture of the whole thing. But, then, come back again, because the story hasn't finished, yet.

3. Comparing the neoclassical model with its opposite alternative

How do you really choose in a supermarket, facing thousands of goods and brands?

Do you have a single figure (utility) attached to any good and any combination of quantities of every good, expressing your future enjoyment?

Is your choice completely independent from what others decide or what you have already at home?

Is your pocket empty when exiting? Do you exhaust always your budget?

Is what you chose "optimal" so that next time, given your unchanged income and the same prices, you'll choose exactly the same thing?

Many students at the end of the course in Microeconomics are very sceptical about the realism of the neoclassical theory, especially the part about consumers, since they have direct expericence of buying acts and they know how they choose. And they find no trace of high mathematics and optimisation procedures. They don't use computer software to compute optimal choces.

Evolutionary economics is the main competitor of the mainstream perspective in the micro-foundation of consumption. It has already reached some clear theoretical foundations as well as formal models (as this). It has been applied to choices in Point of Sales (such as these)

Here we present some very schematic comparison of the two approaches.

Topics	Neoclassical approach with well-behaved preferences	Agent-based evolutionary economics approach
The context of choice		
Timing	All buying choices are taken at the same time (simultaneously).	Choices are sequential.
Information available to consumer	The consumer has full information about all existing products, their use and their effects on his welfare (utility).	Limited information.
Degree of difficulty of the choice	Zero. The choice is always easy, with all pros and cons already evaluated and compressed in a monotonic measure (utility).	Choice can be easy, moderate or extremely difficult, depending on the situation.
Importance of advertising	None. The consumer has its own tastes and they can't be changed.	The limited information of the consumer can be extended by advertising. Depending on the decision-making style, advertising can have an important influence beyond the mere information.
Importance of the opinion of others	None. The consumer stands alone in her/his preferences.	The consumer can explicitly ask others or at least have contact with the opinion of others, who are stratified according to the relationship to the consumer (e.g. friends, teachers,...).
Importance of the information flows from the producer via e.g. the label	None.	The consumer can receive instruction to appropriately use the product and enjoy it better. The label can show third party certification of quality, e.g. environmental friendliness by ECOLABEL.
Mistakes	The consumer does never make mistakes in computation and choices.	The consumer can make mistakes.
Refusal to sell	The consumer is always served or the refusal to sell of one specific firm is motivated by short-run marginal costs being higher than the current price. The consumer does not suffer from the refusal and promptly switches to another firm with an identical product.	Refusal is usually painful but not motivated by marginal cost reasons.
Consumption and purchases	Consumption decision and their psychological laws determine purchase acts.	Buyer don't need to be the direct consumer. Buying decision may have an intrisic logic different from consumption (e.g. to buy large quantities when the good is cheaper and store them for long

		periods).
The role of experience	None. The consumer ex-ante knows everything and actual consumption does not change his evaluation of the utility.	The first-time purchase is characterised by expectations; repurchase is, at least in part, based on the experience gained through personal experience.
The place where choice is made	Non explicit; it's a virtual decision in the consumer's mind.	In shops, supermarkets, and other Point of Sales; through Internet or other non-store distribution channels. The available commercial offer does influence final choice.
The shopping experience	Irrelevant. The utility depends on the good, not on the time spent on shopping.	Some people enjoy going shopping, show their knowledge and skills in choosing (or good luck in finding amazing bargains). Other feel that shopping is boring and try to spend as little time as possible on it. Still others have different attitudes to the issue. This adds to the nuber of reasons why people are heterogeneous.
Relationship between choice and execution of choice	No difference: all choices are executed.	Actual purchase can be postponed, modified or cancelled because of external pressure and conditions.
How the consumer decides		
Consumer rationality	Full rationality based on consumer's huge mathematical skills.	Bounded rationality based on simple decision-making rules with almost no mathematics.
Budget	The consumer has a money budget limit which is systematically exhausted (the budget constraints are always binding and reached).	The consumer keeps always a reserve of slack resources to cope with further expenditures.
Budget softening	Consumer cannot take a loan, unless you switch model and focus on savings, leaving aside the problem of which goods to consume. In the latter case, loans are automatically granted by request.	The institutional setting can facilitate consumer credit (apart from banks, also directly at the Point of Sale), while the use of credit cards can further relax immediate budget constraints. Moral self-directive guidelines by the consumer and his/her family may exert an influence on how much to seize this opportunity and the corresponding risks. Conversely, credit providers evaluate the debtor risk.
Treatment of multiple requirements over the good (e.g. shape, weight, colour, safety, energy consumption, social acceptability, etc.)	Automatic and implicit: all features of the good can be measured, balanced, and summarised in a unique value (utility).	Explicit; the consumer can have minimum / maximum thresholds of acceptability for each requirement. Different algorithms available for using the

		information about how the good fits the requirements.
Non-monetary constraints	Absent.	**Time** is a non-monetary, non-purchasable constraint in many choice; in grocery purchases, at physical commercial premises the **weight** of the purchased basket can be a constraint (lower for consumer coming back home by foot and higher for car users).
Consideration of past purchases	None.	Past purchases built up a cumulative bundle of goods, whose properties influence present purchases. For instance, the consumer might not duplicate an item that has already at home, even if he/she could afford it and likes it very much.
Definition of substitution between the goods to be chosen	Two goods are substitutes when a fall in consumed quantity in one can be perfectly compensated by an additional quantity of the second (so that consumer's utility is constant).	Two goods are substitutes when they fulfill the same need(s).
Substitution foundation	Completely subjective, given, expressed in terms of a linear or non-linear indifference curve.	Interpersonally validated.
Mathematics used in formal models to solve the problem of the consumer	Equations and systems of equations are the main formal devices.	Tree algorithms and disequations are the main formal devices; extensive use of IF-THEN statements.
What the consumer buys		
Chosen set of goods	The chosen bundle of goods maximises utility (graphically: it is on the highest indifference curve) and exhausts the budget (it is on the budget line).	The chosen good is the "first solution matching certain sufficiency criteria" or is selected across simple comparisons, possibly taking into account the cumulative bundle.
Effects of marginal changes in prices	Small changes in one price modify the quantity bought of all goods.	No change of quantity or discrete changes on the few goods concerned
Range of purchased goods	All good (X, Y,..) are bought by the consumer.	A specific consumer buys only a small selection of all existing goods.
Post-purchase dynamics		
Satisfaction from purchased good	Always equal to expectations, by design. However, an explicit consideration of a possible random component of expectation in addition to the "real value", maximization of expected utility would systematically produce disappointment. This argument was first made by March, Harrison (1984).	Dependent on mood at the moment of consumption and the occurrence of overlooked features that can increase or reduce satisfaction. Over time, the consumer can get used to the good, get bored or annoyed and desire something else.

Social communication	None.	The consumer talks about her/his purchases to friends and other people, especially if the good turn out to be extraordinarily positive or negative. Network effects, with news spreading.
Cumulative bundle	None.	The consumer builds up a structured set of durable and stored non-durable goods, at the disposal for her/his immediate use.
Market		
Market demand	Market demand is the sum of individual demand of totally independent consumers.	Market demand is the sum of individual demand but consumers may interact (e.g. imitate others'choices) and communicate
Heterogeneneity of consumers	Consumer differ because of income.	Consumer differ because of income, skills, decision-making routines, etc.
Heterogeneneity of consumers	Consumers differ because of utility functions (Cobb-Douglas, sum-of-squares,...) - never used in real marketing research.	Consumers differ because of parametres which have empirical counterparts.
Who reacts to changes in prices	Changes in prices modify the behaviour of all consumers.	Most consumers continue to behave as before, only some change so to produce the entire market effect.
Diffusion of a specific good in the population	All consumers buy the good.	Most consumer do not buy.
Shape of demand curve	Depending on individual preferences, usually assumed of the same shape for all consumers.	Mainly depending on income distribution, with polarised income distribution leading to convex demand curves and wide-middle-class society having concave demand curves.
Determinants of the speed and scope of diffusion of the good in the population	Income, preferences, and features of the good and of its substitutes	Population distribution of income, skills, social networks; Lock-in effects and complementary assets. The cumulative bundle of people, having or not having products coherent with the new one.

As you can see, there are many empirically testable differences that can be used to discriminate between the evolutionary economics consumer theory and the neoclassical one.

4. Concluding remarks

The neoclassical model of consumer, widely presented in standard textbooks as it is, does not represent the "unique game in town". The evolutionary paradigm, taking up many lessons from managerial marketing science, is offering an interesting alternative.

To see how it works, we offer you a first model with bounded rational consumers facing competiting goods. Consumers in the model follows alternatively three rules of behaviour. These rules are so common, that you can even check here

to which group of consumer you belong (or not).

The choice is up to you. What we can do is to invite you to explore the evolutionary perspective throughout this site and beyond.

NOTES

[1] Think for instance to Hal Varian "Intermediate Microeconomics: A Modern Approach", to Paul Samuelson "Economics", Pindyck and Rubinfeld "Microeconomics", Gregory Mankiw "Principles of Microeconomics", David Besanko and Ronald Braeutigam "Microeconomics" with a special reference to parts devoted to "Consumer behavior", "Consumer preferences", "Indifference maps", "Budget constraints", "Revealed Preferences". Flynn and McConnell "Microeconomics: Principles, Problems, and Policies" includes some elements of behavioral economics but just small bits, to suggest that it extends neoclassical theory rather than replacing it.

[2] Here lies the neoclassical explanation of the macroeconomic relationship from income to consumption.

[3] The name mirrors the important Engel's Law, stating - in 1857 - that food expenditure rises less than proportionally at the increase of income (the rich spend for food a smaller percentage of his income than the poor).

To see data confirming even today the Engel's Law see here. The interesting fact is that a well-behaved Cobb-Douglas curves is in contrast with Engel's Law because it generates constant budget shares devoted to the different class of goods.

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