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THE ESSENCE OF BECKER:

AN INTRODUCTION

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May 1995

This paper is the introduction to the forthcoming *The Essence of Becker*, edited by Ramón Febrero and Pedro Schwartz (Hoover Institution Press, 1995). We wish to thank Gary Becker for his comments and suggestions to an earlier version of this paper.

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*Give me a fulcrum and I will move the world.*  
Archimedes

*It is often said or implied that the housewife...  
is actuated by a different set of motives  
in her economic transactions in the market  
and her non-economic transactions at home;  
but this is obviously not so.*  
Philip Wicksteed

**1. Introduction**

A simple glance at any of his papers makes it apparent that Becker's contributions to economics are anything but conventional. Gary Becker is without a doubt the leading figure in nonconventional economics. This volume contains a selection of Becker's papers which are considered representative of his approach to economics.

The papers selected in this book can be grouped under two broad headings: foundations of human behavior (Part I) and applications (Parts II to V). Part I consists of nine papers through which the reader gains access to the basics of Becker's approach to human behavior: fundamental premises, the time allocation problem, the concept of human capital, social interactions and preferences characterization. Parts II, III, IV and V comprise sixteen papers devoted (in this order) to family, marriage and fertility, discrimination, law, politics and macro behavior. All but one of these papers are examples of Becker's well-known unorthodox applications of economic theory. The exception is reading 22 (Part V), one of the quite rare cases of Becker's orthodox use of economic tools (in the area of monetary economics). The volume ends with Part VI where the reader can find Becker's personal survey of his own contributions.

The inflationary process economics bibliography has been undergoing in the last two decades would by itself justify the appearance of this volume. Let us just sketch two additional reasons. Firstly, no single collection of Becker's papers is presently available. Thus any information-gathering device such as this book may have a market. Secondly, is there any better reason than taking occasion of a Nobel Prize to promote the diffusion of worthwhile ideas?

The organization of this paper is as follows. Section 2 offers an abbreviated account of Becker's intellectual biography. Section 3 presents a brief guide to the fundamental contributions Becker has made to economics. In each of the topics chosen we will try to underline the key concepts and their principal implications. After reviewing, in subsection 3.1, what we call Becker's first principles, we devote subsections 3.2 to 3.4 to the analysis of three peculiar types of inputs: time, human assets and children. Then, in subsections 3.5 and 3.6 we deal with two important examples of social interaction: marriage and divorce, and discrimination. The last subsection, 3.7, is concerned with a singular kind of labor supply problem: criminal behavior. In Section 4, we concisely discuss the meaning

of economics in the light of Becker's work. Section 5 suggests some conclusions. An extensive bibliography of this work, containing all his books and main articles, is provided in the Appendix.

Finally, we would remind readers that this paper is not intended to be an account of each and every contribution Gary Becker has made to economics. The following pages are not so much a survey of Becker's economics as an invitation to read Becker's literature (at least an invitation to read the twenty-six papers selected in this volume).

## 2. Intellectual Biography

In presenting this selection of Prof. Gary Becker's scientific papers we wish to help the student of modern economics to know, criticize and extend the unconventional ideas developed in them. We also want to honor one of the most original economists of the 20th century, who has contributed to widening the scope of economics, to the point of being described as an empire builder! His originality was precisely one of the reasons cited by the Swedish Academy for awarding him, the Nobel Prize for Economic Science in 1992.

His approach has consisted in lifting some assumptions taken for granted in most microeconomic modeling, such as given tastes, homogeneous labor, risk neutrality, households as a one person consumption unit; and, with this minimal deepening in the level of explanation, apply standard neoclassical cost and utility theory in order to throw new light on previously unconnected and badly understood social phenomena. By using Ockam's razor to cut away ancillary assumptions, he reduces his axioms to one, that all actors in the social game are *homines economici*, economic persons, rational agents who maximize their advantages in different cost situations. Inductivists would not believe it, but, by

placing his models on this minimal unrealistic fulcrum, he shifts huge problems that other social scientists found immovable.

For normal science economics, Becker's hunting ground is unconventional (or rather, thanks to him, *was*). His minimal assumption starting point has allowed him to study persistent racial and sexual discrimination in labor markets; investment in human capital; crime and punishment; marriage, divorce, the quantity and quality of children; drug addiction; and other apparently noneconomic dimensions of society. In just recognition of the breadth of his research he is a University Professor at the University of Chicago in both the Departments of Economics and of Sociology.

Whatever the opinion that the reader may form of Becker's explanations, there is a test by which Becker will allow himself to be judged: empirical refutation (see Becker, Grossman, Kevin and Murphy, 1994). He is well within the tradition of the older Chicago School, as represented by his friends and masters Milton Friedman and George Stigler (on both of whom he has written), that holds mere theorizing to be insufficient and is ready to stand or fall by the ability of positive theory to solve empirical problems. Anybody in disagreement with Becker should try to convince him of error by testing his assumption shift with economic laboratory experiments, and his conclusions with statistical observations. But, by making it his specialty to question the assumptions of standard microeconomic theory, Becker has gone a step further than Friedman: for Becker the standard assumptions of neoclassical economics can also be challenged empirically!

Gary Stanley Becker was born in Pottsville, Pennsylvania, in 1930. He graduated at Princeton University in 1951 and obtained his Master and Ph.D. degrees at the University of Chicago, the spirit and tradition of whose Department of Economics left an indelible mark on him.

After holding an Assistant Professorship at Chicago, he moved to Columbia University in 1957, where he was made Professor of Economics in 1960. He returned to Chicago as a one year Ford Foundation Visiting Professor of Economics and George Stigler persuaded him to stay. This was a shrewd move by a keen talent spotter: Becker became the fifth Chicago Nobel Prize winner in Economics.

Much of his mature thought can be conveniently found in his books, which, uncharacteristically for the profession, are as important as his articles. But the articles themselves are sometimes indispensable and often illuminating, which explains the need for the present collection.

After a few articles on macroeconomics and monetary theory, Becker published his reworked doctoral thesis. Titled *The Economics of Discrimination* (Becker, 1957), it went unnoticed for a time, perhaps because the problem he addressed was still not quite in the news. In this work he tried to square the competitive model of labor markets with observed persistent color and sex differences in wages, by introducing a "taste" for discrimination in the utility function of employers and employees. He thus started to dig below the assumption of identical preferences in market actors.

The second book *Human Capital* (Becker, 1964) again broke new ground. This was a study of the formation of human capital by schooling, on-the-job learning, and labor training. This was a theory of differences in personal distribution of income, which had been adumbrated by Richard Cantillon and Adam Smith but was abandoned for nearly two centuries, with the exception perhaps of the labor market economist Jacob Mincer. In this case Becker's new idea was an immediate success and sparked off a spate of studies in the productivity of education, in the causes of underdevelopment, in wage differentials, and connected fields such as unemployment.

Becker was again innovative in considering time as a scarce resource constraining individual utility functions. In his article, "A Theory of the Allocation of Time" (Becker, 1965) and in a book he wrote with Gilbert Ghez, entitled *The Allocation of Time and Goods over the Life Cycle* (Ghez and Becker, 1974), he applied the view of time as a scarce input in production to modeling the family; and much later, to modeling destructive and constructive addiction (such as addiction to classical music and sport, or to drugs and alcohol).

His fourth fruitful idea was to treat delinquents as rational persons, who calculate the utility of rewards and costs of their peculiar calling, but who have a positive risk preference and discount the future. This "positivistic" view of crime had been explored initially by Jeremy Bentham in the late 18th and early 19th century but then abandoned even by Bentham himself for a "normative" conception of crime and punishment. Becker had published an article called "Crime and Punishment: An Economic Approach" (Becker, 1968). Later he edited a collection of *Essays in the Economics of Crime and Punishment* (Becker and Landes, 1974). Many other authors have researched in the sociology of crime following his suggestion that the criminal calculates the expected benefits and costs of crime.

Becker returned to parents and children in his *Treatise on the Family* (Becker, 1981a), a topic he had previously approached in a number of articles. In his *Treatise*, after lifting the standard assumption that the family was a one person consumption unit, he tried to explain cooperative behavior within the family, on the basis of the utility functions of its members. He even accommodated altruistic behavior by selfish family members with his famous "Rotten Kid Theorem". The family was modeled as a multiperson production unit, as a "factory", he likes to say to shock sociologists. The family produces joint utility, the inputs being the time, skills and knowledge of its different members. It is thus that he approaches

one of the most intractable economic conundrums: "Altruism in the Family and Selfishness in the Marketplace", as he entitled a later article (Becker, 1981*b*).

Becker has used the theory of the family to predict the choice of spouse, the increased frequency of divorce with female occupation in the market, and other outlandish phenomena as monogamy and polygamy. He even has addressed the historical question of "Human Capital and the Rise and Fall of Families" (Becker and Tomes, 1986).

His economic theory of the family also allowed Becker to rework and overturn the theory of population. For nearly two centuries economists had held that Malthus's theory of population (Malthus, 1798) was a fruitful hypothesis but that it was contradicted by fact. The escape hatch had traditionally been through normative preaching, telling people not to fall into the Malthusian trap and patting each other on the back for having been such successful neo-Malthusians. With his economics of the family Becker was able to model parental choice in the matter of offspring: the choice between quantity and quality of children when wealth increases; the effect one parent families, of divorce, of female employment, on family size; the repercussions on children of the educational level of the mother.

Becker has also shown some interest, derived perhaps from his studies of the labor market and union restrictions on entry (Becker, 1959), in public policy and pressure groups. But his latest unsettling move has been his attempt to model the formation of tastes. In an earlier article with George Stigler, "De Gustibus Non Est Disputandum" (Stigler and Becker, 1977), he had unyieldingly held the neoclassical ground that questioning preferences and utility maximization was not the way to solve social problems and that as much mileage as possible should be extracted from the structure of costs in each concrete case. In later years, however, and with the help of human capital theory and time scarcity, he has been able to model taste formation, constructive and destructive addiction,

advertising as a good and a bad; and he has even forayed into the direct relation between price and lines, and demand.

Again he has modeled the addict as a rational being. A person may be rational *and* unhappy, *pace* Bentham, if her or his time and risk preference lead to acquiring an “addiction capital”, which, like any capital, decays over time. He uses this capital, combined with a diminishing yield to increments in the consumption of the addictive “bad”, to explain unwelcome continued addiction, as well as “binges” when the addiction has been suspended for a while. (See Becker and Murphy, 1988).

Conversely, constructive addictions, such as the enjoyment of classical music or art, or of jogging or tennis, are again explained by the contribution of current consumption to the accumulation or restoring of an “addiction capital”. These are constructive because they have as a joint product the accumulation or restoration of other kinds of wanted human capital, such as pleasurable social intercourse or the maintenance of health.

Finally, we cannot conclude this section without mentioning his *Economic Approach to Human Behavior* (1976). In the introductory chapter of that book, Becker emphasizes what he considers to be the fundamental premises of the economic approach to human behavior: maximizing behavior, stable preferences and market equilibrium (see Section 4.1).

### **3. The Economics of Gary Becker: A Brief Guide**

#### **3.1 First Principles**

Things are not what they appear to be. First impressions can be quite misleading where the explanation of human behavior is concerned. This, we may well say, is the advice implicitly given by Becker to economists (and to noneconomists).

Many activities performed by individuals or families are not what they seem to be. Some economic activities traditionally interpreted as pure consumption actions are really something else. A family outing to a restaurant or the reading of a good book are good examples. For Becker they are not simply consumption activities. A deeper look at them reveals they are instead production of sustenance and investment in vocabulary activities, respectively. These activities cannot therefore be understood in the light of traditional consumption theory. *A reformulation of the economic theory of household behavior is needed. The new approach must bring production and investment theories into consumption theory.* This is in fact one of Becker's central contributions to economics (see Part I of selected readings, in particular Chapters 3 and 4).

Two ideas are fundamental to Becker's new household economic theory. The first one refers to *time*. Time is now a scarce factor input (also used in the production of nonmarket goods); it is indeed the household's primary scarce resource. Time is also a new restriction for household behavior; what agents have to solve is a more complex time allocation problem than the one involved in the textbook trade-off between leisure and work. The second idea is concerned with *human assets*. People can be seen as assets or durables. Embodied in ourselves is our human capital.

On the other hand many activities thought to be noneconomic in nature (by both the general public and the profession itself) are actually economic problems. Economic theory can be of great help in the explanation of phenomena traditionally located outside the scope of economics and studied by specialists in the areas of law, sociology, biology, political science and anthropology.

Exercising racial discrimination, choosing the number of children, entering the political arena or behaving as criminals is just a short list of the many possible examples. Economic theory can shed light on the comprehension of these phenomena.

*There is no reason why the economist should not extend the frontiers of economics and apply the tools of economic theory to the long neglected sphere of nonmarket activities.* The development of this *economic imperialism* (see Parts II, III, IV and V of selected readings), especially in the areas of marriage and fertility, discrimination, and criminal behavior is another significant contribution that Becker has made to modern economics.

What then is the novelty of Becker's contributions? The originality of Becker's economics does not reside in the tools employed. It is in the applications where Becker's creativity lies. By using standard (and mercifully nonsophisticated) economic tools Becker has widened the range of applications of economics. In Becker's words, what is new is not the starting point but where someone goes with the analysis.

In what follows we will select a small but, we think, representative sample of Becker's contributions. In each of the topics chosen we will try to underline the key concepts and their main implications. Subsections 3.2 to 3.4 are devoted to the analysis of three peculiar types of inputs: time, human assets and children. Subsections 3.5 and 3.6 treat two important examples of social interaction: marriage and divorce, and discrimination. Finally, Subsection 3.7 is related to a singular kind of labor supply problem: criminal behavior.

### **3.2 Households as Small Factories**

Since Adam Smith's *Wealth of Nations* consumption is regarded as the final stage of the economic process. The ultimate goal of economic activity is the maximization of utility by consumers. In conventional economic theory the arguments of utility functions are the quantities of nondurable market goods and services (including those provided by durable market goods) purchased by agents. No further transformation of these goods is needed for consumers to derive utility. In formal terms, households were traditionally assumed to maximize

$$U = U(x_1, \dots, x_m)$$

where  $U$  is a well-behaved utility function, and  $x_i$  represents the  $i$ th market good purchased by the household.

In this respect, Becker's approach to consumption theory (Becker, 1965; Michael and Becker, 1973) represents an important departure from conventional theory. The *new* theory introduces a new category of goods, *basic goods*, as the arguments of the utility functions of consumers (i. e., as the only utility-yielding goods). Basic goods are goods not purchased or sold in the market place. They are instead produced by consumers (for a given state of household technology), using both market purchased goods and time as factor inputs. Now households derive utility from market goods only in an indirect way. Basic goods exhibit also another unconventional characteristic, they have no explicit prices, since there are no explicit markets for them. This fact, however, represents no impediment to the development of an operative theory of household behavior, since *shadow prices* (i.e., prices based on home production costs) can always be assigned to basic goods. The new approach to the study of household behavior implies, then, the maximization of the utility function

$$U = U(Z_1, \dots, Z_m)$$

where  $Z_i$  is the basic good  $i$  that the household produces via the well-behaved production function

$$Z_i = Z_i(x_i, t_i), \quad i = 1, \dots, m$$

where  $x_i$  is a vector of market goods and  $t_i$  is a vector of time inputs used in producing the  $i$ th basic good.

A familiar example of a basic good is sleeping, which can be seen as the output of a production process where a bed, a house, some amount of time and, maybe, soft music, lullabies or pills, are used as inputs, and combined via a production function. Households (individuals or families) are then regarded as production units or small factories. Now, not only firms, (conventional theory) but also households, produce goods and services. Although firms produce market goods, the production of those goods that directly enter consumers' utility functions is under the control of households. Households, then, must make two kinds of decisions: how to produce at the minimum cost and how to consume at the maximum utility level. The *household production theory* points out, needless to say, that the relevant measure of global production of an economy is far from being the one estimated by national accounting standards.

Having said all that, a natural question follows. Why are not market goods *final goods*? What makes them *intermediate* goods from the point of view of households? Time is the answer. Consuming market goods takes time. In spite of being obvious for economists and noneconomists, this simple fact has been ignored by traditional economic theory. Time is an input in both market activities (labor market) and nonmarket (home) activities. Washing up at home or going to the movies are, for example, two cases of common activities requiring time and market goods as factor inputs.

As economists like to say, *there is no such a thing as a free lunch*. Time is no exception in that it is an input in fixed supply. One immediate implication of all this is that time has a price, an explicit price in market activities and a shadow price (approximated by the market wage rate) in nonmarket activities. Another

implication is that time, in itself, represents a restriction for consumers, i.e., a new restriction in addition to the conventional budget constraint. The new time restriction makes clear that time not spent working in the labor market is not leisure, as traditional theory suggests, but time spent in nonmarket activities (i.e., time spent producing basic goods). The need to consider both restrictions led Becker to define a new scale variable in the utility maximization problem that households are supposed to solve. It is now *full income* (i.e., the maximum money income a household can achieve when devoting all the time and other resources to earning income), that is the relevant resource constraint that limits household choices.

The fact that *time is money* (i.e., it has a positive price) is equivalent to saying that the relevant price of a good is not its market price. Several factors determine the *full or effective price* of a good. Full prices depend on the price of time, the time and market goods intensities, the price of market goods, and the state of household technology. Differences in these factors will originate differences in the effective price of the same good. This brings us to a striking conclusion. Two different consumers do not pay (in general) the same price for the same good even if the market under consideration is perfectly competitive. Rather than a price, there is a distribution of prices associated with each good.

It is also important to note that the price of time is not equal for everybody either. It changes, for example, through the week. For working persons, the opportunity cost of time is normally lower at weekends than on working days. The price of time changes also with the level and composition of income. Thus time will be cheaper for a poor man than for a rich one, for a woman (generally) than for a man, for a worker than for a rentier, or for an unemployed person rather than for a person with a job. The importance of these conclusions for firms cannot be exaggerated. Firms can reduce the effective price of a given good without lowering its market price, by just offering more convenience to the consumer.

They can either decrease the amount of time spent consuming that good (e.g., by offering free parking, quick service, etc.) or reduce the cost of time devoted to its purchase (e.g., by opening at weekends). These considerations allow us to define a new (full income) budget constraint as

$$\sum_{i=1}^m \pi_i Z_i = S$$

where  $\pi_i$  is the *full price* of a unit of  $Z_i$  and  $S$  is the household *full income*. The full price  $\pi_i$  is, in turn, defined as

$$\pi_i = a_i p_i + b_i w$$

where  $p_i$  and  $w$  are the prices of the market goods and of the time, respectively, used per unit of  $Z_i$ , and the coefficients  $a_i$  and  $b_i$  measure the goods and time intensity, respectively, of  $Z_i$ .

A number of interesting conclusions can be derived from the comparative statics of Becker's model. One concerns the effects of a rise in wages. The first order conditions of the household problem show that for consumption to be optimal the marginal rate of substitution between any two basic goods should equal their full price ratio, and that optimal production requires that the marginal rate of technical substitution between time and market goods be equal to their relative prices. Thus, unlike conventional theory, an increase in the wage rate now leads to two types of substitution effects. The first one is the conventional substitution effect away from time spent on nonmarket activities (leisure in the old fashion theory). This effect leads households to replace time by goods in the production of each basic good. The second type is the new substitution effect created by the changes in the relative full prices (or relative marginal costs) of nonmarket activities that the increase in the wage rate normally induces. A rise in the wage rate increases the relative full price of more time-intensive goods and this leads to a substitution effect that moves households away from high to low

time-intensive activities. This new effect changes the optimal composition of household production. The two substitution effects reinforce each other leading to a decline in the total time spent consuming and an increase in the time spent working in the labor market.

Another conclusion from the comparative statics of the model is that the effects of a rise in income differ according to the source of the income rise. A rise in property income does not produce the same effect as that induced by a rise in wage income for no changes in full prices are involved. It is also of interest to note how the model enables us to evaluate the effects from shocks or differences in *environmental variables* (age, education, climate and so on). In traditional theory the effects of these variables were reflected in consumers preferences; in Becker's theory, however, changes in these variables affect households production functions that cause, in turn, changes in household behavior through income and substitution effects.

Becker's model has had applications in areas such as labor supply, the sexual division of labor, income taxation, household technology and the computation of income elasticities. The new consumption theory can explain a great number of everyday facts. For example, why rich people tend to prefer goods low in time-intensity (say having dinner at a restaurant instead of preparing a meal at home), why women, rather than men, tend to go to the supermarket, why consumers tend to buy labor-saving consumer durables or hire house-keeping services as they reach higher wages, or why husbands work fewer hours when their wives' wage rates are higher. Thanks to Becker's work households are not *black boxes* any more. These and other ordinary aspects of households behavior, traditionally attributed to exogenous factors in conventional theory (usually differences in tastes or shifts in preferences), can now be endogenized and related to differences in prices and incomes.

### 3.3. Investing in Ourselves

Consumers not only carry out production activities as if they were small firms, they are also engaged in investment activities. We do not refer to investment in the conventional sense, i.e., investment in physical (plant and equipment) or financial capital. We refer to investment in a very special kind of capital, the capital embodied in ourselves, our human capital. Apart from inherited talents and skills, people build up their human capital stock by investing in themselves. Schooling, on-the-job training, medical care and acquiring information about the economic environment, are the main forms of investment in human capital. Embodiment is what distinguishes human from nonhuman capital. You cannot separate human assets from their owners (except under slavery). This explains why you cannot buy or sell human capital units in modern societies, i.e., there are no human capital markets. Of course, this does not preclude the existence of a related market, the labor market, where you can offer the services rendered by your own human capital, or hire someone else's human capital services.

The study of human capital is another field where Becker has become a leading figure. Traditionally, spending part of our income in, say, training or health has been considered to be a consumption activity. At least this has been the dominant view in the profession. Becker's view (1964 [1st ed.], 1975 [2nd ed.], 1993 [3rd ed.]) on this again signifies a departure from mainstream economics. The point made by Becker is that you cannot apply conventional consumption theory to explain investment behavior. You need to take a different approach and treat your expenditure in education, training, health and so on, as what it is, additions to your human capital. In other words, you have to apply to human capital the traditional framework used to analyze investment in other capital.

Investment in human capital, like any other type of investment, implies a transfer of resources from the present to the future. Behind any investment

decision lies the problem of choosing between resources available today and resources that will be available tomorrow. This intertemporal nature of investment in human capital does not fit in with the standard (static) theory of consumer behavior. Since expenditure in the production of your own human capital is future oriented, you cannot simply compare costs today with benefits today to determine the optimal amount of human capital.

Now, in Becker's model things are quite different. Households solve an intertemporal optimization problem where they maximize an intertemporal utility function subject to two production functions per period (one of consumption goods and the other of human capital), the law of motion of the stock of human capital, a new *time constraint* per period, and an intertemporal *goods budget constraint*. The new time constraint is a revised version of the one we encountered in the previous section. Now time has to be allocated between labor market activities, consumption activities and investment in human capital (i.e., a third use to be added to the two considered in the previous section).

In this model a cost today need not be compensated by an equal benefit today. Instead, people must compare the present value of the marginal (*full*) costs of investing in human capital (i.e., including foregone earnings) with the present value of future returns. Investing in human capital is worthwhile only if the present value of benefits is as large as the present value of costs. As correctly emphasized by Rosen (1987), the compensatory nature of earnings on prior investments is the fundamental insight of human capital theory. This model of investment in human capital can explain, among other things, why the amount of time spent investing in human capital tends to decline with age (e.g., people are in school, attend college education, are on-the-job-training, change jobs and locations, or have children –see next section– at younger ages) or why *impatient* people (i.e., with a low subjective discount factor) tend to invest less in human capital.

Viewing people as stocks resulting from both an initial inherited capital and a sequence of investments over time has important implications in many respects. One of them refers to the degree of heterogeneity of workers and the corresponding differences in their earnings. Differences in earnings will tend to reflect differences in productivity that, in turn, reflect differences in the investment efforts made by people in the past. In this regard, a great deal of attention has been paid to education as a central factor in explaining earnings differences. Becker's empirical work (see his *Human Capital*) supports the proposition that a higher education level is correlated with higher earnings.

A second implication is quite obvious. Standard accounting procedures valuing exclusively physical and financial assets, underestimate the true wealth of agents and nations. The same applies to the treatment given to family expenditures in education, health and so on. Part of what national accounting regards as consumption activities is in fact an investment effort that will help expand future production.

Another implication has to do with the interaction between financial markets and human capital. Embodiment represents an important limitation when it is necessary to finance human capital since it is not always possible to use human assets as collateral. Thus, people whose only asset is themselves will be liquidity constrained. This implication is of great relevance for investment in education and is one reason why human capital theory has found its place in public policy discussions. Another well-known reason is, of course, the externalities that education generates and the subsequent discrepancies between private and social returns.

Unlike the three previous implications, the fourth one we would like to stress is related not to household behavior, but to firm behavior. As Becker reminds us in his *Human Capital*, theories of firm behavior have traditionally ignored the effect of the productive process itself on worker productivity. When on-the-job

training is explicitly taken into account, two interesting conclusions, among others, are obtained. The first one refers to the profit maximizing conditions for competitive firms. Now, the equality between physical marginal product and real wage no longer holds, even if we assume a world with perfectly competitive labor and product markets. Marginal productivity can be greater or less than the real wage rate. The conventional profit maximizing condition has to be replaced by the equality between the present value of receipts and the present value of expenditures (which would include training outlays in the periods when job training was given). The second conclusion is related to the first one and has to do with Becker's distinction between *general* and *firm-specific training*. In this regard, Becker's analysis implies that quit and layoff rates are inversely related to the amount of specific training. This means that the turnover of employees will be lower in firms that provide firm-specific training because that training cannot be used in other firms.

Becker's approach to human capital has given rise to a number of interesting predictions. Thus, it has important implications for the distribution of income (e.g., why the distribution of earnings is more skewed than the distribution of abilities), the shape of age-earnings profiles (e.g., age-earnings profiles tend to be steeper among more skilled and educated persons) or the effects of specialization on skill (e.g., a possible explanation for the greater unemployment among unskilled than skilled workers may be that the latter have more specific human capital, or, as another example, profit maximizing firms pay generally-trained employees the same wage and specifically-trained employees a higher wage than they could get elsewhere, although people tend to believe the contrary).

Another field where human capital theory has proven fruitful is growth theory. Although modern growth theorists recognize the importance of human capital (since *growth accounting* –see Denison (1962)– showed in the 60's how big was the “measure of their ignorance”, also called “Solow residual” or “total

factor productivity”), it is only recently that human capital concepts have been given a proper role in growth models. Traditionally, growth models have overemphasized the role played by physical capital in explaining the rate of growth of per capita income. After Lucas (1988), the *endogenous growth* theory developed in the 80’s has become a natural framework for the application of human capital theory.

### 3.4. Children, an Instance of Consumer Durables

If people are assets or stocks of human capital, what would you expect children to be in Becker’s view? The answer should not come as a surprise to readers of previous sections. For parents, children are consumer durable goods (although they may become also capital goods).

Becker’s analysis of fertility is a natural extension of both his theory of allocation of time and his theory of human capital. Children are seen as consumer durables similar to cars or washing machines. Children provide parents with a flow of valuable services (psychic and monetary in nature) over time. Of course they are not free goods, children are costly in that they also imply a flow of costs over time. These costs include market purchased goods (medical care, education, food and so on) and parental time. All this makes the decision of having children (procreating or adopting them) an economic decision (to be more accurate, an investment decision). Parents will have to compare the present value of children services with the present value of children costs. Once again, Becker’s way (Becker, 1960; Becker, 1981 [1st ed.], 1991 [2nd ed.]; Becker and Lewis, 1973; Becker and Tomes, 1976) of addressing a nonconventional topic, in this case, fertility has proven to be pathbreaking.

Becker’s approach to fertility allows us to relate family size to economic variables. The determination of the optimal family size can be expressed as the

outcome of a utility maximization program where parents have to choose between children and all other goods. As in standard economic theory, we can explain the demand for babies in terms of the price of children relative to other goods, and of the size of the parents' budget. It is worth noting that the price of children will differ from one set of parents (or from one mother) to another, i.e., costs per child will vary with parental characteristics. Thus differences in the input mix (market goods-time consumption) chosen by parents in child production, in the parents' price of time or in household technology, will be reflected in children's prices. Given that child's production is a time intensive activity, parents' price of time –and particularly the mother's price of time– has become a variable of especial relevance in Becker's analysis.

The aspect of child demand behavior that has attracted most attention from researchers is the one concerned with the role parents' income plays in the determination of family size. Children, like other durables, are expected to be normal goods. Empirical evidence, nevertheless, shows quite the opposite: wealthier families tend to have fewer children. Should we take this as a proof that babies are *inferior goods*? Becker rejects this interpretation. Two explanations can be given to this puzzle by using Becker's framework: the *female time-cost hypothesis* and the *quantity-quality interaction hypothesis*, the latter being emphasized by Becker. In both explanations the *effective price* of children increases with income, and this produces a substitution effect (away from children) strong enough to counteract the corresponding income effect.

Let us first consider the *female time-cost hypothesis*. How do exogenous changes in wage rates affect the demand for children? In principle, you cannot reach a conclusive answer because two effects of opposite sign are involved when the wage rate changes. A change (say a rise) in the wage rate makes children more expensive than other goods and this leads to a negative substitution effect away from children. But, on the other hand, this wage rise

makes parents wealthier and induces a positive income effect (if we are prepared to assume children are *normal goods*). The total effect on child demand will then be uncertain. However, a rise in the mother's wage rate is likely to produce a strong substitution effect since the price of the mother's time is a major component of the price of children. Indeed, empirical evidence supports this prediction, i.e., married women's demand for children is negatively sloped. Now, given that women's wage rates have been rising over time as countries become more productive, this hypothesis can explain why families in modern societies tend to have fewer children. On the other hand, given that richer men tend to have wives with higher price of time, the female time-cost hypothesis would also explain why the desired number of children decreases with family income.

The *quantity-quality interaction hypothesis* is the explanation stressed by Becker. For Becker the above puzzle can be solved by adding a new dimension to the demand for children: child quality. Most of the increased expenditure on children at higher income levels goes to increased child quality, not to increased numbers. In other words, richer parents prefer higher quality children rather than higher numbers, and it is this fact which accounts for a negative relationship between income and family size as we shall see in a moment.

Let us examine Becker's hypothesis in more detail. Parents care not only about the number but also the quality of children. These two arguments of parents' utility functions, quantity and quality of children, are not independent of each other. In fact, they interact in such a way that even a "pure" rise in income will increase the *effective price* of children leading to a strong substitution effect away from the quantity of them. This is due to the fact that the shadow price of children with respect to number is positively related to the level of quality, and the shadow price of quality, in turn, is positively related to income. This quantity-quality interaction works as follows. Higher income families want children of higher quality. The higher expenditure in quality raises the shadow price of

numbers, and this induces an initial substitution effect away from numbers (fertility) and toward both quality and other goods. The induced reduction in numbers lowers the shadow price of quality, while the induced increase in quality raises the shadow price of numbers further. These two effects will reinforce the initial substitution effect from numbers and toward quality. The process will continue until an equilibrium position is reached. The final result will be a strong substitution effect away from numbers that will dominate the corresponding income effect. It is convenient to note that this strong substitution effect takes place even if the quantity and quality of children are not close substitutes. Thus, the decline in the demand for children (quantity) may occur, even though the "true" income elasticity of demand for children is positive and large.

In addition to the predictions already mentioned, Becker's theory of fertility has many other implications. It can explain, for example, why rural fertility has traditionally exceeded urban fertility or why education per child tends to be lower in families having more children. Becker's approach can also improve our understanding of topics of great interest such as the relationship between parents' education and children's education, or the relationship between child mortality and family size. Of great interest are also two more recent extensions of the economic analysis of fertility that we shall just mention. The first one refers to the relationship between fertility and economic growth. Barro and Becker (1989) are the pioneers in discussing the dynamics and comparative statics of a neoclassical growth model in which fertility choices are based on parental altruism. In Barro and Becker (1988) it is shown that fertility in open economies depends positively on the world's real rate of interest, the degree of altruism and the growth of child-survival probabilities, and negatively on the rate of technical progress and the growth rate of social security. Of related interest is also the paper by Becker, Murphy and Tamura (1990). The second is concerned with intergenerational mobility (Becker and Tomes, 1979; Becker and Tomes, 1986). A well-known (and no doubt striking) fiscal policy implication of Becker's analysis of

intergenerational mobility is that a progressive tax and public expenditure system may widen the inequality in disposable income in the long run.

### 3.5. Marriage or the Importance of Gains from Trade

In modern economies there is a great diversity of markets through which agents can allocate their scarce resources. When the word *market* is used, people tend to think about explicit markets like the stock exchange or the market for bananas. Not all markets are however *explicit markets* where *explicit prices* are determined by the interaction of demand and supply. One of these nonexplicit markets is the *marriage market*. People try to find marriage partners in a *marriage market*, where they compete for the best mate. In a marriage market equilibrium allocation men and women are assigned to each other, or remain single while waiting for better opportunities in the future. An important property of such an equilibrium allocation is that it implies a Pareto optimal assignment, i.e., persons not assigned to each other could not be made better off by marrying each other.

As in any other aspect of human behavior, when deciding to marry, divorce, or remain single, people act as if they maximized their utility functions, subject to their budget and time constraints, both dependent now on the marriage market equilibrium conditions (and, therefore, taking into account that no one could change mates and become better off). Accordingly, and given that participants in marriage markets act under uncertainty (due to their imperfect information about the utility they can expect with potential mates), people will marry if they *expect* to be better off than if they remained single. (In the same way, people will divorce when the utility expected from marriage falls below the utility expected from divorcing and, if such is the case, remarrying.) Hence marrying is a decision related, ultimately, to the *expected net gains (benefits minus costs) from marriage* (compared to remaining single). Assuming risk neutrality, the necessary

condition for marrying simplifies to the condition that the expected wealth or expected income (in a static framework) of potential mates should be higher when married than when remaining single.

The above considerations constitute the (do we need to say unorthodox?) starting point of Becker's analysis of marriage (Becker, 1973; Becker, 1974; Becker, Landes and Michael, 1977; two editions of his *Treatise*). Thus utility maximizing behavior and marriage market equilibrium conditions are the two fundamental premises of Becker's economic theory of marriage.

Again, Becker's approach deviates from conventional theory. In the latter, marital status has been traditionally seen as an exogenous aspect of human behavior, assumed to be determined by biological or institutional factors, and, in any case, of no relevance to household behavior. Becker departs from this view by endogenizing marriage and divorce decisions in terms of preferences, prices and incomes, and linking marital status to home production, fertility, labor market participation, and income distribution. For Becker, marriage is not simply a matter of physical attraction, or cultural or institutional factors. Marriage is an economic problem. When choosing the best mate, people behave as if they tried to maximize the total income or wealth (in expected terms) produced by the marriage.

Becker's analysis has, among other things, important implications for the likelihood of marriage and divorce. The key factor for explaining the likelihood of marriage is, as we said before, the expected net gains from marriage. The greater this gain, the greater the likelihood of marriage. The fundamental factor that influences the gain from marriage is the *complementarity* between men and women. The more complementary the time of spouses and market goods, the greater the gain, the reason being that when substitution is imperfect, single persons cannot produce small-scale equivalents of the optimal combination of inputs achieved by married couples (Becker, 1973). This complementarity

between inputs is due, basically, to the desire to produce or invest in *own children* (a desire that Becker considers to be the feature that best distinguishes married from other types of households) and explains why households with men and women are more efficient than households with only one sex. It is precisely the importance of own children which explains why the gain from marriage is lower for people desiring few or *low-quality* children. Not surprisingly, these people tend to marry later (or to divorce earlier).

The gain from marriage for any two persons is also positively related to their incomes, the relative difference between their wage rates, and the level of nonmarket-productivity-augmenting variables (such as beauty, intelligence and education). Becker's analysis predicts that a rise in property income, necessarily, and a rise in wage rates, possibly, increase the incentive to marry. As Becker recognizes, this prediction (that is supported by empirical evidence) contrasts with the popular opinion that poor persons marry earlier (and divorce less) than rich persons.

It is also of interest the role played by the *husband-wife wage gap* in a number of aspects of household behavior (such as the household division of labor between husband and wife, the specialized investments in human capital made by married men and women, and the gain from marriage). Here we are faced with a traditional problem of differences in *comparative advantage*, although now instead of countries, as in standard international economics, we are dealing with husbands and wives. Thus, other things being equal, the higher the husband's wage rate, relative to his wife's, the greater the opportunity for specialization within the household, the greater the gains from trade (marriage) to be shared by spouses and, therefore, the greater the incentive to marry. Given the wage ratio (greater than one) between men and women in the labor market, husbands tend to have comparative advantage in market work and wives in home work. Acting rationally, each member of the household will, then, tend to

specialize in those activities in which they have comparative advantage (i.e., women in home activities and men in market activities) and will invest in the type of human capital they will have to use (i.e., women in household capital and men in market capital). These specialized investments will, in turn, reinforce the initially given difference in comparative advantage between husband and wife. Hence the husband-wife wage ratio and the corresponding *sexual division of labor* can be seen as due, at least in part, to the gain from specialized investments. Then, as Becker (1974) concludes, married women spend less time in the labor force because their wage rates are lower, and these are lower because they spend less time there!

Specialized investments are not, however, the only possible explanation for the observed patterns of *sexual wage gap* and sexual division of labor. Suppose that men and women are equally productive in the sector market and earn the same wage rate. It can be argued that, even in this case, women will have comparative advantage in the home sector for biological reasons (especially in bearing and rearing children). As Becker admits, it is hard to disentangle biological from investment induced causes of the division of labor between men and women. All we can say, in this regard, is that differences in the specialized investments made by men and women reinforce the effects of biological differences between them.

Having reached this point, it is worth noting that Becker's conclusions about the household division of labor conflicts with the well-known feminist claim that men and women should fully share households tasks. In this regard, one of Becker's predictions is that if all members of an efficient household have different comparative advantages, all (except at most one of them) will tend to specialize in either the market or the household sector. This implies that the feminist stance would lead to an inefficient allocation of resources within the household.

Becker's analysis can be easily extended to the explanation of divorce. Thus, as the wife's wage rate rises, the difference in comparative advantage narrows and the gain from marriage reduces, making divorce more probable. This rise in the wife's wage will also increase her labor market participation. Both the change in her time allocation and the increased likelihood of divorce will induce her to reduce her investment in home specific capital (e.g., having children). (Note that the relation between divorce and fertility works, also, the other way around: a decline in fertility reduces the gain from marriage and raises the likelihood of divorce. The same can be said of the rise in women's labor force participation: it is a cause of, as well as a result of, the rise in marital instability.)

Besides the expected gain from marriage (or, in this case, the gain from divorce), Becker stresses also the importance of imperfect information (in the marriage market) as a determinant of the likelihood of divorce. Divorce is, partly, a consequence of the imperfect information available before marriage. This factor makes the decision of marrying a risky one (i.e., outcomes from marriage may be less favorable than expected). In the language of the familiar *mean-variance approach* used in finance, we may well say that the likelihood of divorce is higher the lower the expected gain from marriage and the higher the variance of the probability distribution of gains from marriage. But not only finance can be of help in the analysis of divorce, *search theory* can also shed light on the determinants of divorce. Among others, one implication of the explicit consideration of searching in the marriage market is that the longer the search the more appropriate the mate chosen. This would explain why persons marrying much younger than average are much more likely to divorce.

Regarding Becker's conclusions about the likelihood of divorce, it should not go unnoticed that in Becker's analysis, and contrary to popular opinion, the decision to divorce is largely independent of divorce laws. As Becker (1987) points out, the legislation that affects the gains from divorce (aid to mothers with

dependent children, negative income tax and so on) is more important than the legislation that affects the conditions for divorce.

Another aspect of *marriage economics* discussed by Becker is the characterization of a marriage market equilibrium. Two kinds of properties are emphasized: assortative mating properties and efficiency properties. About the latter, Becker's conclusion is that a market equilibrium implies a Pareto optimal assignment and involves the maximization of the aggregate output of household commodities (not of the aggregate output conventionally defined in national accounting). Concerning the former, Becker's theory predicts both positive and negative assortative mating depending on the characteristic under consideration. Becker predicts the predominance of positive assortative mating with respect to personal characteristics that are complements in the production of commodity income (such as education, height, intelligence, age, property income, physical attractiveness and so on), while negative assortative mating for substitutes (such as wages). This implies that marriage markets increase the inequality in traits, and thus in commodity income across families, but reduce the inequality in money income.

Finally, a few words on marital forms. Becker shows under a number of simplifying assumptions (all men and all women identical, equal number of men and women, diminishing returns from additional spouses) that a monogamous sorting would be optimal, and therefore would maximize the total output of commodities over all marriages. Regarding polygyny, if the productivity of men differs, a polygynous sorting could be optimal. Becker's theory predicts that polygyny would be more frequent among more productive men, as shown by empirical evidence. In George Bernard Shaw's words, "the maternal instinct leads a woman to prefer a tenth share in a first rate man to the exclusive possession of a third rate one" (quoted by Becker, 1991, pp. 90-1).

### 3.6. Discrimination, a Matter of both Prejudice and Price

Discrimination was the first nonconventional area where Becker fruitfully applied price theory. The economic analysis of discrimination was the subject of his doctoral dissertation, *The Economics of Discrimination* (1957, 1st ed.; 1971, 2nd ed.), where he utilized international trade theory to study the effects of discrimination in the market place. In this work Becker focused on racial discrimination and concentrated on the analysis of discrimination by three different types of agents: employers, employees and consumers.

The starting point of Becker's theory of discrimination is that people behave as if they derived utility or disutility from the personal characteristics of those with whom they have "contact" in the market place. These personal attributes or characteristics include race, gender and religion. People are, then, not indifferent to the kind of group, defined in terms of these personal characteristics, they associate with. Becker's approach to discrimination implies a reformulation of the standard objective functions that economic agents are assumed to maximize (e.g., discriminatory employers do not maximize profits any more, but their utility functions, which depend now on both profits and the personal characteristics of those workers hired by the discriminator). The fact that person *Y*'s characteristics enter the utility function of person *X* is, in Becker's view, the ultimate reason why *X* may practice discrimination (nepotism) against (towards) *Y*. Hence people can be said to have a *taste for discrimination* (or for nepotism). In sum, *X* discriminates against *Y* because the association with *Y* becomes in itself a source of disutility, a psychic cost, for *X*. Discrimination is, therefore, a matter of preferences or tastes.

Discrimination, however, is also a matter of prices. Since people have a taste for discrimination, they will be willing to pay something, either directly, in the form of a higher price, or indirectly, in the form of a reduced income, to be

associated with some groups instead of others. It is precisely this consideration which makes Becker's theory operative. Discrimination will have to be reflected in prices. This enables the analyst to move from unobservable preferences to observable market prices. To do so, Becker establishes the concept of *discrimination coefficient*, and distinguishes between individual and market discrimination coefficients.

The discrimination coefficient of an economic agent (employer, employee, or consumer) is a money measure of her or his "taste for discrimination". The introduction of discrimination coefficients in his analysis allows Becker to differentiate between the *money* costs of a transaction and its *net* or *true* costs (i.e., net of psychic or non-pecuniary costs). Thus, if an employer faces a money wage rate of  $w$  for workers, then  $w(1+d_i)$  defines the corresponding net wage rate, where  $d_i$  is the discrimination coefficient against this factor. An employee, offered a wage rate of  $w_j$  for working with the factor discriminated against, acts as if the net wage rate were  $w_j(1-d_j)$ , where  $d_j$  is her or his discrimination coefficient against this factor. A consumer, faced with a unit money price of  $p$  for the commodity produced by this factor, acts as if the net price were  $p(1+d_k)$ , where  $d_k$  is the discrimination coefficient against this factor. These discrimination coefficients take on any value between zero and plus infinity, and the quantities  $wd_i$ ,  $w_jd_j$ , and  $pd_k$  are the exact money equivalents of the above-mentioned psychic costs.

Market discrimination is said to occur against members of group  $N$  who are perfect substitutes in production with members of group  $W$  if their equilibrium wage rates differ. In the absence of discrimination and if the labor market were perfectly competitive, the equilibrium wage rate of  $W$  would equal that of  $N$ . Under discrimination, however, the equilibrium wages of  $W$  and  $N$  *could* differ. (Notice that wage or price differentials are not the only possible outcomes of discrimination. Under certain conditions, discrimination is likely to produce

segregation rather than differences in prices or wages.) The market discrimination coefficient (*MDC*) is defined as

$$MDC = \frac{w_W - w_N}{w_N}$$

where  $w_W$  and  $w_N$  are the equilibrium wage rates of  $W$  and  $N$ , respectively. The value of the *MDC* measures the extent of discrimination in the corresponding market.

It is interesting to note that the relation between individual discrimination coefficients and the market discrimination coefficient is more complex than it is normally assumed. Individual discrimination coefficients interact with other factors to determine the degree of market discrimination. As Becker stresses, although the magnitude of the *MDC* depends in an important way on each individual discrimination coefficient, to use merely some measure of the average discrimination coefficient does not suffice. Becker shows that the *MDC* depends on the distribution of discrimination coefficients between individuals (i.e., not only the average taste for discrimination but also the dispersion around the average influence the *MDC*), the degree of competition in the labor and product market (i.e., competitive industries tend to discriminate less than monopolistic industries), the degree of substitution between  $W$  and  $N$  workers (e.g., in the case of employee discrimination, if  $W$  workers and  $N$  workers are perfect substitutes in production, discrimination leads to market segregation, that is, separate establishments, but not to wage differentials between the two groups) and the relative size, in economic and quantitative terms, (see below) of the group discriminated against (e.g., the larger the minority compared to the majority, the more harmed, in terms of their incomes, are the members of the majority; this could explain why South African apartheid eventually broke down).

Let us now turn our attention, for the remaining of this section, to Becker's well-known international trade model of discrimination. To study the economic

effects of discrimination, Becker develops a model in which  $N$ (egro) and  $W$ (hite) sectors are treated as if they were two different countries. The model assumes perfect competition, only one good in the world economy, two inputs (capital and labor), perfect substitutability between  $N$  and  $W$  factors, a higher capital-labor ratio in the  $W$  sector, and identical technology represented by a linear homogeneous production function (which implies trade only in the factors of production). In the absence of discrimination,  $W$  would export capital (or import labor) to the point where the marginal products of capital and labor are equal in both sectors. Now, if we assume that  $W$  members have a taste for discrimination against  $N$  members, exported capital must receive a higher equilibrium return (or marginal product) than at home, to compensate for working with  $N$  labor. Discrimination, therefore, restricts trade between sectors  $W$  and  $N$ , that is, reduces capital exports and labor imports to a level below free trade levels, and decreases output because of the induced inefficient allocation of resources. Discrimination is, consequently, equivalent to the imposition of a *tax on exported capital* in this model.

Two fundamental implications from this model are that the total net incomes of *both*  $N$ ,  $Y(N)$ , and  $W$ ,  $Y(W)$ , must decrease with discrimination and that all factors are not affected in the same way. Thus the return to  $W$  capital and  $N$  labor decreases, but the return to  $W$  labor and  $N$  capital increases. Hence  $W$  capitalists and  $N$  workers lose with discrimination, while  $W$  workers gain. These conclusions question conventional wisdom about the effects of discrimination. As Becker (1971, pp. 21-22) points out, "There is a remarkable agreement in the literature on the proposition that capitalists from the dominant group are the major beneficiaries of prejudice and discrimination in a competitive capitalistic economic system. If  $W$  is considered to represent whites or some other dominant group, the fallacious nature of this proposition becomes clear, since discrimination harms  $W$  capitalists and benefits  $W$  workers. The most serious non sequitur in the mistaken analysis is the (explicit or implicit) conclusion that, if tastes for

discrimination cause  $N$  laborers to receive a lower wage rate than  $W$  laborers, the difference between these wage rates must accrue as “profits” to  $W$  capitalists”.

Another important set of implications stemming from Becker’s model is concerned with what Becker calls *effective discrimination*. There is effective discrimination against  $N$  when the total  $MDC$  defined as

$$MDC = \frac{Y(W)}{Y(N)} - \frac{Y_0(W)}{Y_0(N)}$$

is positive, where  $Y(W)$  and  $Y(N)$  are the actual incomes of  $W$  and  $N$ , and  $Y_0(W)$  and  $Y_0(N)$  are their incomes without discrimination. Becker proves (1971, appendix to chapter two) that a necessary and sufficient condition for effective discrimination to occur against  $N$  at all levels of discrimination by  $W$  is

$$\frac{Y_0(W)}{Y_0(N)} > \frac{l_N}{l_W}$$

where  $l_N$  and  $l_W$  are the amounts of labor supplied by  $N$  and  $W$ . That is, if in the absence of discrimination  $N$ ’s net total income relative to  $W$ ’s were less than  $W$ ’s supply of labor relative to  $N$ ’s, discrimination would reduce  $N$ ’s income by a greater percentage than would  $W$ ’s. In this case, discrimination would cause a decrease in both absolute and relative income of  $N$ . Or in Becker’s words, “a necessary and sufficient condition for effective discrimination against  $N$  is that  $N$  be more of an economic minority than a numerical majority”. In this model it is also shown that if there is effective discrimination against  $N$ ,  $N$  members cannot avoid the effects from discrimination by trying either to segregate themselves or to retaliate against members of  $W$ .

Becker’s main predictions from his international trade and migration model of discrimination can, then, be summarized in the following simple terms. Discrimination decreases the total net incomes of both  $N$  and  $W$ . Minorities lose

more than majorities when there is discrimination. Minorities still lose more if they try to segregate themselves or retaliate against majorities.

### **3.7. Crime as a Labor Supply Problem**

Conventional wisdom about criminal behavior reflects the great influence of sociologists on this subject. From the sociological standpoint criminals are either sick persons whose behavior is not far from being irrational, or passive victims of the social environment. According to this view people neither freely, nor consciously, nor rationally choose to be criminals. It is beyond their control to behave that way. Exogenous factors, of a biological or social nature, force people to behave as criminals. For sociologists criminal behavior is a matter of mental illness or social oppression, and, not surprisingly, a problem whose solution can be synthesized in one emblematic word: rehabilitation. In this view punishment is thought to be the wrong approach to public policy against crime.

Few fields show as clearly as criminal behavior does, how incompatible the conclusions from sociologists and economists can be. Although the roots of the economics of crime can be traced back to Bentham, the seminal paper of the modern literature is Becker's "Crime and Punishment" published in 1968. Becker's analysis of criminal behavior implies the rejection of the sociological view subsumed in current conventional wisdom. For Becker, criminals are not different from other people as far as rationality or maximizing behavior, and preferences is concerned. The cost-benefit analysis employed in the study of households, firms, investment in human capital, marriage and fertility, and discrimination can be fruitfully utilized also in the area of criminal behavior.

Two closely related ideas are central to Becker's approach. The first one is that criminals are neither victims nor irrational agents. Criminals behave in the same manner as the average person. They act as if they maximized their (expected) utility subject to their full income constraint in a world with

uncertainty. Criminals are then *rational actors* faced with a standard time allocation problem. Choosing to become criminals is a decision problem not different from choosing any other occupation. "Crime is a part-time or full-time occupation like carpentry, engineering, or teaching" (Becker, 1987). People decide to become part-time or full-time criminals when the net return from this activity surpasses that of any other alternative occupation. It is therefore differences in return between legal and illegal activities, and not differences in preferences, what lies behind criminal behavior. This would explain, for example, why criminal activities like robbery and theft are committed mainly by poorer persons, the reason being that their insufficient education and training limit greatly the return they can obtain from legal activities. Thus Becker relates criminal behavior to prior investment in human capital (training and education). Likewise unemployment increases the volume of crimes against property because it implies a reduction in the return from legal activities.

The second idea is that criminal behavior is, contrary to what is generally believed among sociologists, *price-elastic*. Criminals (i.e., the suppliers in the market for illegitimate activities) react to changes in prices in the same way as consumers and workers do. Thus, all other things equal, the higher the net return from criminal activity the higher the crime rate (i.e., the "production" of crimes) is expected to be. The most important "price" in the cost-benefit analysis that criminals are supposed to apply when making a decision is punishment. A major public policy conclusion from the economic analysis of crime (and, probably, the most controversial) is that the higher the punishment associated with an illegal activity the lower will be the net return from this activity and the number of persons devoting their time to it. In Becker's words, "punishment works" (Becker, 1987), that is, punishment deters criminal activity. The equivalence between punishment and prices, and the consideration that criminals preferences are not different from the preferences of other persons, invalidate the traditional distinction between crimes of passion and economic crimes regarding the

deterrence effect of punishments. There is no reason why crimes of passion should be less price-elastic than economic crimes. No less unconventional is the related conclusion that capital punishment is likely to have a strong deterrence effect on murder.

Compared to his other contributions Becker's analysis of crime presents the differential feature of focusing on public policy issues. Becker develops a social welfare analysis applied to crime. He uses a particular form of a social loss function, in which the relevant criterion is social real income, to derive normative propositions concerning criminal activities, i.e., to determine "how to combat crime in an optimal fashion". Of particular relevance for public authorities is the distinction between the two basic dimensions of punishment: severity,  $f$ , and likelihood,  $p$ , (i.e., the probability of being caught). These are the two *policy variables* that authorities can use to minimize the social loss from crime, that is,

$$L = D(X) + C(p, X) + bpfX$$

where  $L$  is the function measuring social loss,  $D(X)$  is the net damage to society from  $X$  offenses,  $C(p, X)$  is the total costs of apprehension and conviction, which depend on the probability  $p$  of apprehension and conviction and the number of offenses  $X$ , and  $bpfX$  is the total social loss from punishments, where  $b$  is a parameter greater than one if the punishments take the form of imprisonment.

From the first order conditions of this social welfare problem Becker deduces many interesting implications about the optimal magnitudes of severity and likelihood of punishments. A very well-known conclusion is that "social welfare is increased if fines are used whenever possible". This is due to the fact that probation and institutionalization use up resources, and fines do not. Fines provide compensation to victims also.

The first order conditions of the social welfare problem allow us to characterize *optimal fines*. An optimal fine can be seen as an *optimal tax* on a

negative externality (in this case crime). Optimal fines should be equal to the sum of the marginal harm and the marginal cost of apprehension and conviction. Criminals must compensate at the margin for the cost imposed on their victims and the cost of catching them.

Another important result is that under certain conditions authorities can exchange  $f$  for  $p$  without affecting the corresponding deterrence effect. Authorities could reduce the cost of their policy against crime by imposing large fines with a low probability. This leads Becker to conclude that the *optimal probability of conviction* would be close to zero.

#### 4. So, What is Becker's Research Program?

##### 4.1. The Economic Approach to Human Behavior

As Becker said in his Nobel Prize acceptance speech, his is an "Economic Way of Looking at Behavior" (Becker, 1993). For Becker, economics not only deals with explicit markets and explicit prices, as traditional economics assumes. This traditional view unnecessarily limits the scope of economics. What distinguishes economics from other sciences is not the area of human behavior under consideration (market activities, political behavior, criminal behavior, racial and other types of discrimination, and so on). It is the *way of looking* at such diverse activities which characterizes economics. In Becker's view the scope of economics is as wide as the range of aspects of human behavior in which two essential elements, *scarce means* and *competing ends*, are present. Becker, therefore, extends Robbins's (1962) definition of economics to *all* human behavior, since "decisions about the allocation of a consumer's nonmarket time and decisions about his choice of a religion, a marriage mate, a family size, a

divorce, a political party, or a "life style" all involve the allocation of scarce resources among competing ends" (Michael and Becker, 1973).

Regarding those decisions, Becker emphasizes the importance of aggregate behavior as compared to the behavior of microunits like firms and households. Thus he claims (Becker, 1971, pp. 2), "our main interest, as is that of most economists, is in the market behavior of aggregations of firms and households; although important inferences are drawn about individual firms and households, we try mainly to understand aggregate responses to changes in basic economic parameters like tax rates, tariff schedules, technology, or antitrust provisions".

As far as the scope of economics is concerned, this is fine. But, what can be said about the economic approach in itself? What are the distinctive features of the economic approach? In Becker's introductory chapter to his *Economic Approach* (1976, pp. 5) we find the answer: "the combined assumptions of maximizing behavior, market equilibrium, and stable preferences, used relentlessly and unflinchingly, form the heart of the economic approach as I see it". In recent years, Becker has progressed to modeling preferences, and thus the above phrase could be amended by a pedant to saying "functionally stable preferences".

The assumption of *maximizing* or *rational behavior* implies that agents behave as if they maximized their own utility functions subject to their budget constraint, time constraint and production constraints, which can all be combined into a single *full income* (or full wealth, in a dynamic model) *budget constraint*. The utility functions of households relate (in ordinal terms) households welfare to their consumption of *basic goods* (not of market goods), i.e., goods which are not purchased or sold, but produced by households, and whose prices (shadow prices) are determined by their production costs. Through the prices and incomes that enter their full income budget constraints, household behavior is restricted by *market equilibria conditions*, even if there are no explicit markets and prices (e.g., marriage markets).

For Becker, rational behavior is a broader concept than *selfish behavior*. This means that *altruistic behavior* can also be interpreted as a form of rational behavior. Becker expresses the altruistic behavior of person *X* with respect to *Y* by considering *Y*'s utility as an argument of the utility function of *X*. Proceeding this way *Y*'s welfare become a new basic good for *X*. It is precisely this device which enables Becker to solve the problem of aggregation of preferences in multiperson households and to define the decision-making problem of a household in terms of a single utility, the *household's* or *family's* utility function, the latter being the utility function of the "head" of the family. In his popular "Rotten Kid Theorem" Becker (1974) shows that, under certain conditions, if the head of a household is altruistic (and, therefore, incorporates in her or his utility function the utility functions of the other household members), all other household members, even if they are selfish (i.e., they are only interested in maximizing their own individual utility functions), will nevertheless behave as if they were altruistic toward the family head, because that raises their own welfare. This implies that the household or family decision-making problem can be stated in terms of a single utility function, the one that represents the family head's preferences, and a single full income (or wealth) budget constraint, the one that delimits the possible uses of the joint income or wealth of the entire family.

Altruism is not the only kind of human behavior that it is thought to threaten the validity of economic theory. It is also normally argued that irrational behavior implies the rejection of standard economic predictions. Becker (1962) shows that economic theory is more compatible with irrational behavior than had been generally believed. Becker distinguishes between individual and market rationality. He proves that irrational consumers and firms would often be forced into rational *market* responses. Accordingly, the standard market demand (negatively sloped) and supply functions (positively sloped) can be derived even when households and firms behave irrationally. His analysis leads Becker to the astonishing conclusion that households and firms can be said to behave "as if"

they were rational, but also “as if” they were irrational. The explanation given by Becker relies on the role played by the *scarcity principle* in the allocation of resources, a principle general enough to include a wide class of irrational behavior as well as rational behavior.

The assumption of stable preferences serves as “a stable foundation for generating predictions about responses to various changes, and prevents the analyst from succumbing to the temptation of simply postulating the required shift in preferences to “explain” all apparent contradictions to his predictions” (Becker, 1976, pp. 5). For a correct understanding of the assumption of stable preferences we should not forget that basic goods, and not market goods, are the only utility-yielding goods. Accordingly, Becker’s assumption about the stability of preferences refers to the stability of preferences with respect to basic goods such as health, prestige, sensual pleasure and so on. One should note that this kind of stability need not imply the stability of preferences with respect to market goods for, as Becker (1971) reminds us, basic goods do not always bear a stable relation to market goods and services. It is also of relevance for the proper understanding of the stability assumption to observe that it should be interpreted in both cross-section and intertemporal terms. In other words, “tastes neither change capriciously nor differ importantly between people” (Stigler and Becker, 1977, pp. 76).

The approach based on rational behavior and stable preferences differs greatly from the traditional economic approach. A comparative analysis of the two approaches is provided by Stigler and Becker (1977). “On the traditional view, an explanation of economic phenomena that reaches a difference in tastes between people or times is the terminus of the argument” (pp. 76). However, in Becker’s (and Stigler’s) approach “one never reaches this impasse, the economist continues to search for differences in prices or incomes to explain any differences or changes in behavior” (pp. 76). The new approach has “partly translated

“unstable tastes” into variables in the household production functions for commodities. The great advantage, however, of relying only on changes in the arguments entering household production functions is that *all* changes in behavior are explained by changes in prices, and incomes, precisely the variables that organize and give power to economic analysis” (pp. 89). In conclusion, “when an apparently profitable opportunity to a firm, worker, or household is not exploited, the economic approach does not take refuge in assertions about irrationality, contentment with wealth already acquired, or convenient ad hoc shifts in values (i.e., preferences). Rather it postulates the existence of costs, monetary or psychic, of taking advantage of these opportunities that eliminates their profitability –costs that may not be easily seen by outside observers” (Becker, 1976, pp. 7).

Finally we end this section with a brief remark on the nature of the assumptions of maximizing behavior and stable preferences. For Becker (1976b), the postulates of maximizing behavior and stable preferences are not simply primitive assumptions. Behind them lies the principle of *natural selection*. These assumptions can be explained by the selection over time of traits having greater survival value. In Michael and Becker’s (1973) words, “if genetical natural selection and rational behavior reinforce each other in producing speedier and more efficient responses to changes in environment, perhaps that common preference function has evolved over time by natural selection and rational choice as that preference function best adopted to human society”.

#### 4.2. Methodology and Becker’s Approach

Methodological disputes are deemed singularly unproductive in economics. Ever since the *Methodenstreit* between Karl Menger and Gustav Schmoller, the prejudice of the profession goes against wasting time on method. Becker has not

made any overt pronouncements that we know of on these questions, but in practice he has profoundly transformed the way in which many economists look at how they should proceed in building their science. He can even be seen as innovative in relation to that luminary of the older Chicago School, Milton Friedman (Friedman, 1953).

Friedman, Stigler and Becker, and other colleagues, such as Schultz and Fogel, all worked or are working within the general framework of Karl Popper's methodology (Popper, 1959): for these economists, hypothesizing is free, to the point even of being "counterfactual" if necessary; but theory has to be tested by comparing its predictions with observations. So far is clear.

Some cross has accumulated around the views of Popper, which has obscured their understanding. One sort of confusion arises from Imre Lakatos' belief that a school of thought is characterized by a common "research program". Another kind of confusion arises from another idea of Lakatos', that a research program always has a hard core which none of the members ever question (Lakatos, 1976).

Though Becker quite clearly conceives of economic research in the same Popperian spirit as Stigler or Friedman, it would be less than useful if all three were presented as having the same research program. All three can be seen as followers of Marshall, in their wish to solve practical problems using partial equilibrium tools, or, to speak more accurately, assuming away some systemic or general equilibrium feedbacks to focus on observable causes. But their research programs must be seen as differing in quite fruitful ways: Becker's is to apply little-used tools, such as human capital, time preference, risk aversion, to explain widely dispersed social phenomena.

Again Becker is the best refutation of the idea that the older Chicago School defended a crystallized citadel of first principles which they never questioned.

One can observe Becker moving away from the principle that "tastes must not be caviled at", to endogenizing preferences and modeling them along the same lines that apply to individual consumption or savings, or to a firm's production.

As Popper maintained, each scientist, even though belonging to a school, can have her or his own research program, or a number of them along the years; and no assumption or theoretical axiom need be immunized from criticism and revision.

Becker can be observed at present as receiving the influence of the new Chicago School, as he does not seem content with the comparative statics of his early years and is moving towards a more dynamic analysis, along the lines suggested by the new classical economics of Lucas, Sargent and Barro.

## 5. Conclusions

Things need not be what they appear to be. The economist should go beyond surface in order to acquire a better knowledge of human behavior. This seems to be Becker's implicit proposal for the profession. Becker's share of this task has been remarkably fulfilled by bringing production and investment theory into consumer theory. Since Becker's reformulation of the theory of consumer behavior, households are no longer seen as passive consumers. Becker's work has shed light upon the *black box* view of the household enabling us to see them not only as utility maximizers but also as rational *producers* and *investors*. Now, households are *producers* of basic goods, *investors* in themselves, in their human capital, and *investors* in their own children. They also have to make decisions about their *marital status* (remaining single, marrying or divorcing), not taken as given any more, and about the subsequent *home division of labor* between their members. The additional structure Becker gives to households means that aspects of households behavior traditionally attributed to exogenous factors in

conventional theory (usually differences in tastes or shifts in preferences) can now be endogenized and related to differences in prices and incomes.

Becker's economics differs from traditional economics in two fundamental respects: scope and approach. Economic theory is a much more powerful tool than noneconomists and even professional economists tend to think. Economics is not only the science of explicit markets and prices. Economics is a way of thinking. A whole world of nonmarket activities is waiting to be fruitfully analyzed by applying economic tools. The economic theory of marriage, fertility, criminal and political behavior are outstanding examples of this *imperialistic* view of economics, in which Becker has become a leading figure. Armed with the postulates of stable preferences, maximizing behavior and market equilibrium, the economist can offer new insights into areas not traditionally viewed as the province of economics. More often than not, these insights are, it is worth emphasizing, at variance with casual observation, conventional wisdom or established propositions from other sciences. Thus, babies are not inferior goods, criminals are not passive victims of society, full sharing of household tasks between husbands and wives is not an efficient arrangement, capitalists do not gain by discriminating against black workers, marriage is not simply a matter of physical attraction, or cultural or institutional factors, divorce is largely independent of divorce laws, and so on.

These considerations capture, we believe, the essence of Becker.

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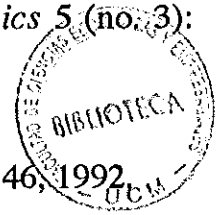
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