A post-structure Kuhnian Evaluation of Capability and Utility in Economics: Is it Possible to Explain Capabilities Using Utility Functions?

Arthur Brackmann Netto[1]

Abstract

Thomas Kuhn's seminal attempt of explaining the evolution of scientific reasoning raised numerous interpretations. Amidst them, incommensurability was interpreted as incommunicability. However, this interpretation was severely renounced by Kuhn. As a result, after *The Strucuture*, Kuhn deconstructed relativism through reimagining paradigms as communities sharing similar languages and cultural backgrounds. Translation and interpretation, thus, became the tools of communication between different paradigms. Still, Kuhn rethought communication through the lenses of the natural sciences and, consequently, the author explained mainly the problems of translation between distinct well-established paradigms separated by time. In this circumstance, translation is a task solely of the historians of science. In a different manner, economics and the social sciences are structured on innumerous concomitant non-established paradigms. Based on such structure, translations are a reality for scientists themselves. Considering this background, the present paper attempts to explain scientific communication looking into one common example of translation inside economics: the translation to utility functions. The translation of capabilities into utility is observed using Kuhnian pos-Structure foundations. The analysis concludes that translations occur, but the consciousness of them is not guaranteed, which constraints the logical choice of paradigmatic solutions.

Keywords: Thomas Kuhn; Translation; Capabilities; Utility.

JEL Classification: A14; B41; D60

Uma avaliação Kuhniana pós-Estrutura de Capacitações e Utilidade na Economia: É Possível Explicar Capacitações Usando Funções de Utilidade?

Resumo

A tentativa seminal de Thomas Kuhn de explicar a evolução do raciocínio científico suscitou numerosas interpretações. No meio delas, a incomensurabilidade era interpretada como incomunicabilidade. No entanto, essa interpretação foi severamente renunciada por Kuhn. Como resultado, após *A Estrutura*, Kuhn desconstruiu o relativismo reimaginando os paradigmas como comunidades que compartilham línguas e origens culturais semelhantes. A tradução e a interpretação, assim, se tornaram as ferramentas de comunicação entre os diferentes paradigmas. Ainda assim, Kuhn repensou a comunicação através das lentes das ciências naturais e, consequentemente, o autor explicou principalmente os problemas de tradução entre paradigmas distintos, bem estabelecidos e separados pelo tempo. Nessa circunstância, a tradução é uma tarefa exclusiva dos historiadores da ciência. De maneira diferente, a economia e as ciências sociais são estruturadas em inúmeros paradigmas concomitantes não estabelecidos. Com base nessa estrutura, as traduções são uma realidade para os próprios cientistas. Diante desse quadro, o presente artigo procura explicar a comunicação científica em um exemplo comum de tradução dentro da economia: a tradução para as funções de utilidade. Assim, a tradução de capacitações em utilidade é observada usando as fundações Kuhnianas pós-Estrutura. A análise conclui que as traduções ocorrem, mas a consciência delas não é garantida, o que restringe a escolha lógica de soluções paradigmáticas.

Palavras-Chave: Thomas Kuhn; Tradução; Capacitações; Utilidade.

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Área ANPEC: 1 - Metodologia e História do Pensamento Econômico

[1] Mestrando do programa de pós-graduação em economia, ênfase em economia do desenvolvimento, da Universidade Federal do Rio Grande do Sul. E-mail: arthurbnetto@gmail.com

1) Introduction

Unlike natural sciences, economics and other social sciences are hardly defined by paradigms (Kuhn 2013 [1962]), scientific research programmes (Lakatos 1978) or any other form of definition (Drakopoulos and Karayiannis 2005). Still, these definition mechanisms are not useless for explaining social science's reasoning. Besides defining exactly the borders of scientific enterprises, paradigms and scientific research programmes are surrounded by several other interesting concepts formulated with the intention of explaining science. The present paper will focus on one of these aspects: translatability.

Kuhnian paradigms were the center of a controversy: the incommensurability thesis. Roughly, Kuhn's (2013 [1962]) incommensurability advocates members of different paradigms have disparate world views similarly to how individuals have divergent image perceptions in gestalt switches. The analogy inspired interpretations of relativistic scientific evolution. However, this reading was drastic and Kuhn affirmed several times it was not his intention to formulate a relativistic theory of scientific choice (1970a, 1970b, 1973, 1974, 1983, 1990). Consequently, Kuhn felt obliged to review his incommensurability thesis. In order to reformulate it, Kuhn introduced the analogy of paradigms as languages in the subsequent years after the publication of *The structure of scientific revolutions*. As a consequence of the new analogy, communication between different paradigms became possible throughout translation and interpretation.

Yet, Kuhn's focus – when reformulating incommensurability - was essentially the natural sciences, especially, physics. Natural sciences are defined by the existence of unique paradigms. As a result, translation and interpretation were mainly appointed as a channel of communication between well-established paradigms separated in time, likewise natural sciences paradigms. On the other hand, social sciences – certainly economics – are defined by the existence of diverse concomitant paradigms. This characteristic approximate economics of what Kuhn called "pre-paradigmatic" period. However, Kuhn never analyzed how translation occurs in pre-paradigmatic period, which is the period where the actual choice of paradigms has to be done.

In order to review the translation and interpretation processes in pre-paradigmatic period, economics presents itself as a good example of scientific enterprise. Inside economics, welfare evaluation is known to have at least two separate paradigms: utilitarianism and the capability approach. Hence, the focus of the present paper will be the translation problems illustrated by these two paradigms.

The paper will be divided into six different sections. After this brief introduction, the second section will approach Kuhn's incommensurability thesis. The third section will present Kuhn's reformulation of the incommensurability thesis. In the sequence, the similarities between Kuhn's paradigms and economics as a pre-paradigmatic science will be presented together with a brief review of the two welfare paradigms. The fifth section will illustrate a translation problem between both presented paradigms. Finally, some concluding remarks will be shown.

2) Kuhn's incommensurability

Thomas Kuhn's *The Structure of Scientific Revolutions* presented the science cycle as: normal science, anomaly, crisis and revolution. Briefly reviewing the cycle, scientific communities are usually concerned with the business of normal science, which it the task of solving scientific puzzles. The analogy with puzzles is important, once it determines that normal scientific problems *always* have a solution. Hence, not finding a solution discredits only the scientist. However,

eventually unsolvable problems appear, characterizing anomalies. If these anomalies become recurrent, a scientific crisis is installed. The crisis is solved when a new exemplar solution is found. The new exemplar sets a new way of solving community's problems. This change in the exemplary solutions is a "scientific revolution" and a change of paradigms.

On the one hand, the cycle accuracy is usually undisputed. On the other hand, its consequences are the source of debates. A scientific revolution, as defined by Kuhn, implies in the incommensurability thesis. Incommensurability was the term chosen to define impossibility or difficulty of communication between two different paradigms. However, impossibility and difficulty of communication are distinct and their impacts in the reasoning of scientific evolution are diverse. While impossibility of communication removes logical aspects of the choice between paradigmatic exemplars, difficulty does not.

The standard reading observes Kuhn's incommensurability is necessarily an impossibility of communication. Along these lines, Hoyningen-Huene (1990) points out three different interconnected incommunicability interpretations: (1) radical incommensurability; (2) abrupt and total revolutions; (3) non existence of rational comparisons. Radical incommensurability affirms that it does not exist any continuity point between two paradigms. Abrupt and total revolutions, very similarly, imply that *all* aspects of a paradigm change during a revolution. The third point, results from the other two, and affirms that the choice between two paradigms cannot happen in a rational way.

Yet, when Kuhn coined the term, was he really affirming incommunicability? The context in which *The Structure of Scientific Revolutions* emerged was critically opposed to incommunicability and specially to the relativism resulting from it. The main philosophical view of science in the first half of the twentieth century was the logical empiricism. Summarily, logical empiricists believed in science as a homogeneous, cumulative and non historical enterprise. Usually, their beliefs were based on the assumption of the existence of a unique observational language (Brown 2005).

In this context, Richardson (2007) affirms Kuhn's *Structure* was the most significant argument against logical empiricism. Kuhn used historical arguments to deconstruct the cumulative and homogeneous view of science. This was accomplished presenting episodes of the scientific enterprise where communicability was flawed. These episodes were followed by psychological analogies bolstering Kuhn's arguments. The deconstruction of logical empiricism is a long history and bypasses the scope of the present paper; however the history of the incommunicability thesis in the center of the deconstruction will be examined henceforward.

The question whether Kuhn affirmed incommunicability or not demands an exegesis of Kuhn's work. This is not the intention of this section. Thus, a reformulation of the problem is needed: was Kuhn's intention that incommensurability became understood as incommunicability? This question is somewhat easier to be responded. Kuhn affirmed several times throughout his career that relativism was not his idea of science evolution (1970a, 1970b, 1973, 1974, 1983, 1990), and relativism is a direct result from incommunicability. Two points may have allowed such interpretations. First, Kuhn had philosophical and space limitations when writing *The Structure of Scientific Revolutions*. Second, Kuhn repeatedly resorted to unmanageable analogies.

The first point is straightforward. Kuhn had his background in physics. Thus, his connection with philosophy was not through formal training. In the preface of *The Structure*, Kuhn (2013 [1962]) presented some autobiographical exposures where he confessed his readings of philosophy were offset by history and psychology studies. In other words, Kuhn recognized that philosophical, historical and psychological arguments were equally weighed in *The Structure*. In

addition, in the same preface, Kuhn admitted he had space limitations enforcing him to reduce the length of his arguments.

Dimension constraints and philosophical deficiencies created the necessity of expanding *The Structure's* discussions. Thus, seven years after the first edition of *The Structure*, Kuhn added a posface to the monograph in order to complement his thoughts. The posface intentions were to reformulate the concept of paradigm and reevaluate the points within it allowing relativistic interpretations. Thus, beginning with the posface, Kuhn gradually improved the paradigm idea philosophically (Bird 2002, 2004; Sankey 1993; Gattei 2008), corroborating the hypothesis that Kuhn's first arguments lacked a solid philosophical background.

The second point arises from the first. Balancing philosophical reasoning alongside ideas from psychology allowed Kuhn to use gestalt switches as an analogy for scientific revolutions in *The structure*. More specifically, Kuhn (2013 [1962]) contended that a scientific revolution was similar to perceptual variations in the observation of an image of a duck/rabbit in the psychological test. The analogy suited Kuhn's arguments because, for Kuhn (2013 [1962]), scientists in different paradigms were unable to understand one another just as one person who sees a rabbit can't see a duck in a gestalt switch. The abuse of this analogy granted a naturalistic reading for Scientific Revolutions. Along these lines, the analogy of gestalt switches allowed the interpretation that members of one paradigm were *completely* unable to understand world perceptions belonging to other scientific communities.

Perhaps, Kuhn's eagerness to deconstruct previous views centralized his discussions around a focal point. The psychological analogy and his formulation of the concept of paradigm focused in the *assimilation* of similar scientific solutions by members of a scientific community. The assimilations of paradigmatic solutions is unintentional and almost natural for Kuhn (2013 [1962]) and the analogy captured this characteristic. However, while the analogy was successful in explaining assimilation, it was confusing about the representation of scientific concepts. Kuhn condoned the problem regarding how scientists represented their work, or how they drawn their ducks and rabbits. The gestalt switches' analogy concerns individuals, whereas paradigms and representation concern communities (Hoyningen-Huene 1998). Therefore, the psychological analogy highlighted mainly assimilation and revolutionary aspects as a way of breaking the homogenous, cumulative and non historical view of science, but did not explain the representation aspects of paradigms.

The implicit interpretation of *complete* inability to understand different perspectives resulting from the analogy authorized relativistic readings. Hence, the analogy is central for the radical interpretations. As a result, Malone (1993) simply highlights Kuhn's ideas in *The Structure* may be understood without relativism if interpreted without the psychological analogies. Along these lines, Barker (2001) affirms: "Perhaps Kuhn was too successful in explaining his new concept. The Gestalt switches idea and the illustrations in terms of duck-rabbit figures were dramatic, and easy to understand, but misleading in crucial respects" (Barker 2001, p. 437). However, whether the psychological analogies and the lack of space and lack of philosophical arguments were a mistake is not the main point. The importance of these aspects lies in their significance as sources of misunderstandings, given that Kuhn never aspired to be understood as proposing relativism.

Following this line of thought, Hoyningen-Huene (1998) notes that Kuhn was tormented by misreadings of his piece: "Kuhn was thus constantly challenged to articulate and refine his thesis in greater detail, in the course of which his position also shifted in some important aspects." (Hoyningen-Huene 1998, p. 6). Similarly, for D'agostino (2013) Kuhn was "verballed – i.e.

represented as saying things he actually denied" (D'agostino 2013, p. 536). Consequently, after *The Structure*, Kuhn dropped the psychological analogies and reformulated the concepts of paradigms and revolutions.

Kuhn was thus trapped by the incommunicability interpretations he allowed. The first step he took to deconstruct the interpretations was reformulating the concept of paradigm. When reformulating it, Kuhn opted for a new analogy. Instead of gestalt switches and other psychological analogies, Kuhn opted for treating paradigms as different language communities. This option was embedded in philosophical substance, found in Wittgenstein and Polanyi (Kindi 1995; Jacobs 2002). The new analogy was essential for presenting the possibilities of communicability between paradigms. As communicability between paradigms is the focus of the present paper, Kuhn's new analogy will be revised in the next section.

3) Communicability

During the 70s, 80s and early 90s Kuhn reviewed the incommensurability concept (1970a, 1970b, 1973, 1974, 1983, 1990). In order to avoid relativistic interpretations, Kuhn reformulated paradigms in a form analogous to languages - mainly in his 1983 discussion about communicability (Kuhn 1983). Several new concepts were presented in this discussion and a brief sketch of them shall be enough for the present purpose.

Initially, a clarification of the incommensurability term is necessary. The term is borrowed from mathematics, where its frequent use refers to problems in which there are no common measures allowing comparisons. One simple example is the circumference of a circle and its radius, both are incommensurable since there is no integral number capable of representing their relation. However, no common measure does not imply in impossibility of comparison. (Kuhn 1983, p.35)

Incommensurability as a borrowed term, then, must not imply in incomparability. For Kuhn: "[…] the term 'incommensurability' functions metaphorically. The phrase 'no common measure' becomes 'no common language'" (Kuhn 1983, p. 36). As a result, like in any two languages, translatability is possible with most part of the terms, and there is just a few number of words for which no perfect translation is available. Consequently, incommensurability becomes restricted to those terms without translation and is better understood as "local incommensurability". Being locally constrained guarantees incommensurability is not equal to radical incommunicability.

Complementing his new analogy, Kuhn (1983) argues communication can be established in two different forms: translation and interpretation. Translation is the act done by an individual who knows two or more languages. Knowing them grants the ability to substitute words and/or string of words belonging to one language by terms belonging to the other one. Interpretation is a different process, although it is connected to translation. When interpreting, an individual must not know the new language. Therefore, interpretation is a process of acquiring a new language.

Thus, communicability can be established with translation. Yet, whenever there is a local incommensurability, the translation process is restricted. An individual may surpass the incommensurability only through interpretation: she must learn the new language. But in what exactly consists learning a new language? According to Kuhn (1983), the immediate intuition would claim that learning a new language consists in sharing referents. Unfortunately, in what concerns learning a language, referents are not enough, considering that knowing them do not concede the knowledge of sense or intention of the terms. A paradigm is a shared language

representing its particular culture. Each word acquires meaning embedded in this culture and, consequently, has special uses, references and contrast sets according to it. This means a language is learned as a whole or, at least, in blocks.

Kuhn (1974) offers an example of the process. A child learns with his father how to differentiate ducks, geese and swans in a zoo. With his father help, the child guesses the species of the birds and gradually understands which one is what. Two important aspects arise from this example. First, to learn what a duck is, the child had to learn what geese and swans were. The term could not be learned without its contrast set. Second, the criteria the child used to contrast the birds exemplars may be different from the criteria his father used. Still, both of them acquired the same referents and contrast sets, allowing communication. Transferring to science, Kuhn frequently illustrates this process with the Newtonian paradigm, where 'mass' and 'force' cannot be understood alone.

Several examples may be found in natural languages. In Brazilian Portuguese, for instance, one word is frequently stated as being untranslatable into English: "saudade". "Saudade" could be roughly translated as missing something or someone. However, "saudade" is also a melancholic feeling of missing something or someone and could perhaps be better translated as the feeling of longing. Following Kuhn, neither translation is perfect, these words or strings of words are not embedded in Brazilian culture and may miss important parts of the sense and intention of the "saudade" felling.

Notwithstanding, this may be the only possible way of transmitting the knowledge of the word without living the culture. As a result, the problem does not lie in translating inadequately - since any other translation would be impossible; the problem is not acknowledging something may be missing in the process. Therefore, the consciousness of the mistranslations is essential for Kuhn's translation process.

4) Pre-paradigmatic communicability?

When Kuhn (1983) discussed communicability, he suggested interpretation was an "enterprise practiced by historians and anthropologists" (Kuhn 1983, p. 38). Anthropologists practice interpretation considering that they are the ones who visit new communities and have to learn new cultures and languages. Historians use communication tools, on the other hand, because they are the ones who visit antique paradigms from the lens of the present paradigms. Therefore, interpretation is the process that allows anthropologists and historians to learn different cultures.

However, in assuming interpretation is a task solely of historians and anthropologists, Kuhn is implicitly affirming that interpretation is a process occurring exclusively between two well-established paradigms. Take historians of science as an illustration. Historians *consciously* choose to observe different cultures and learn new languages with the objective of explaining them in their own paradigmatic terms. They know pieces of expertise may miss when transmitting their new acquired knowledge through simple translations, but they also know this shall not be a problem, given that there is no need of fully understanding the surpassed paradigm. As the paradigm being studied has already been overcome, the translations do not occur as way of allowing choice and comparison, but as way of doing history of knowledge from one well-established paradigm to another.

Yet, Kuhn's cycle is not limited to well-established paradigms. Kuhn's cycle contains a crisis and a revolution and the process from crisis to revolution is called pre-paradigmatic period. In this period several lines of thought compete as exemplar solutions for beating the anomalies

presented by the crisis. Pre-paradigmatic period distinguishes itself from normal science periods as a result of the fact that, while in normal science periods solely historians are interested in translating and interpreting, in pre-paradigmatic periods scientists themselves are sympathetic to the processes. Scientists in pre-paradigmatic periods do not have the privilege of knowing the exemplary solutions like historians in well established paradigms. They have to choose which paradigm offers the best answer to the anomalies presented. Therefore, translations and interpretation are necessary in order to logically compare the solutions.

However, scientists are science's practical part. Their task is not translating or interpreting distinct paradigms. Accordingly to Kuhn, scientists apprehend naturally their forms of practical reasoning. A paradigm, in Kuhn's sense, is a tacit shared knowledge and, as such, is part of subconscious reasoning. Therefore, for Kuhn, knowing how to employ the paradigmatic solutions is a natural habit, similar to the beating of our hearts (Kuhn 2013 [1962]). Therefore, paradigms - if interpreted as languages – are the natural acquired languages of scientists.

Pre-paradigmatic communicability, then, differs from communication between normal science periods in, at least, two different forms. First, insofar historians translate mainly from past paradigm to current paradigms, scientists in pre-paradigmatic period may translate interchangeably between paradigmatic languages. The causality relations of historian's translations are predictable, unlike pre-paradigmatic translations. Second, while translations done by historians are conscious, scientists acquire new languages naturally and not necessarily acknowledge the process. As a result, translations can occur unconsciously in pre-paradigmatic period.

If paradigms are as natural for scientists as Kuhn points out, questions about the scientists' capacity to choose arise: Do scientists in pre-paradigmatic periods perform translations? Do they perform interpretations? Do they consciously perform those acts? For removing entirely the relativistic interpretations of Kuhn's work, it is necessary to review the ability of scientists themselves of translating and interpreting different paradigms than their own. Translating between Newtonian and Copernican terms may be a good illustration of the historian's work and may even present a basis of how communicability occurs. But, interpretation and translation are options for anthropologists and historians in well established paradigms, while interpretation and translations are scientists' obligation in pre-paradigmatic periods. It's an obligation considering that scientists are in a logical and not random search for an established paradigm and thus must choose between competing lines of thought. Therefore, Newtonian and Copernican translations do not resemble pre-paradigmatic translations.

5) Welfare, economics and paradigms

Economics is a rich scientific enterprise to review scientists' communication capacity. Kuhn's cycle is usually a good fit for natural sciences. Normal science, anomaly, crisis and revolution may be a good explanation to Copernican revolution where pre-paradigmatic period is ephemerons, but when used to explain the evolution of social sciences its power vanishes. Drakopoulos and Karayiannis (2005), for instance, review several papers in which Kuhnian paradigms were tried to be applied to economics concluding that all approaches presented flaws.

Paradigms, in fact, are very loosely defined in *The structure of scientific revolutions*. Therefore, their compatibility with natural sciences is also controversial. Still, dissonance reasons are distinct. In contrast with the natural sciences, economics' scientific structure is not monolithic. Economics - as a knowledge enterprise - is characterized by the presence of several schools of

thought competing for the mainstream position and Kuhn's cycle was not intended to explain such heterogeneous practice.

Alternatively, two possible solutions arise in philosophy of science for describing economics structure. The first one is Lakatos' ideals - very popular in economics in the last quarter of the twentieth century. In Lakatos (1978) way of thinking, competing "scientific research programmes" are common, similar to economics structure. However, Lakatos ideas are not free of critics themselves (Drakopoulos e Karanyiannis 2005). Both in paradigms and in scientific research programmes, defining the borders of schools of thought is difficult. Vagueness of definition is a critic both ideas carry. Opting for one may not be better than opting for the other.

The second solution is less popular, and implies in insisting in Kuhn's ideals: The solution is accepting economics is in crisis. Therefore, economics lives an indefinite pre-paradigmatic period. While this may not be the case, assuming this characteristic is credible for two distinct reasons. First, Kuhn asserts: "research during crisis very much resembles research during pre-paradigmatic period". Then, logically, if it is possible to portray schools of thought as well-established paradigms, it is also possible to define them as pre-paradigmatic paradigms. Second, Kuhn' paradigms are surrounded by important concepts capable of explaining economics as a scientific enterprise. Obviously enough, the present paper focus on one of those aspects: communicability. Hence, vagueness and looseness of the definition of paradigms are a problem that may be never overcome. Yet, they may be overlooked in order to review other aspects of paradigms.

For these reasons, economics will be assumed as a pre-paradigmatic science. This means innumerable concomitant paradigms compete as exemplary solutions for an array of different problems. For the present purpose of reviewing scientists' communicability capacity, one of these problems will be reviewed: welfare evaluation. Welfare evaluation is a complex problem and paradigms compete as much in economics as in other knowledge enterprises, such as political philosophy and ethics. In economics three main paradigms exist: rawlsian, utilitarian and the capability approach. The translation problem presented in the sixth section concerns only utilitarian approach and the capability approach. As a result, both paradigms will be briefly presented in the next two subsections.

5.1) Utilitarianism

Utilitarianism is a moral theory constructed as a special form of consequentialism, where the consequences are measured through utility. The moral rightness of an action is evaluated according to its outcome in utility for society. Normally, utilitarianism can be defined by the combination of three elements: (1) consequentialism; (2) welfarism; (3) ranking method.

Consequentialist views defend that nothing but the consequences have value for evaluating outcomes. Utilitarianism concerns itself especially with two sources of outcomes: actions and rules. Therefore, there are two different types of utilitarianism according to those two: act utilitarianism and rule utilitarianism. Act utilitarianism evaluates outcomes directly from actions, while rule uilitarians evaluate rules according to their utility outcomes and actions are evaluated through their agreement with these rules.

The second element, welfarism, is the essential part of utilitarianism. It states that nothing but individual well-being matters when evaluating outcomes. Individual well-being, in its turn, depends on utilities' quantities associated with the outcomes. Before dealing with welfarism and utility, the third element can be explained. As welfarism implies that only individual utilities

matter for evaluating outcomes, there needs to be a way of aggregating those individual utilities. Usually, individual utilities are summed, and the greatest sum of utilities is the best outcome. However, methods of aggregating utilities by mean values may also be found. It is important to notice that any ranking method assumes individual utilities are comparable, without assuming comparability aggregation would be impossible.

Returning to welfarism, utility has not been defined and thus welfarism is not well characterized. Then, what is utility? The meaning of utility is the source of controversies. Broome (1991a, 1991b) and Sen (1991), for instance, debate about their understandings of utility and do not reach total agreement. As has been already stated, utility is a measure of well-being. As a result, to explain utility and welfarism it is necessary to explain what the utilitarian's understanding of well-being is. As a starting point, Bykvist (2009) distinguishes well-being definitions between objective and subjective conceptions:

> "Whereas the subjective conception claims that what makes something good for a person is always a fact about the person's psychological states, the objective conception denies this and claims instead that some objective states of a person can make something good for the person." (Bykvist 2009, p. 35)

Utilitarianism is an individualist consequentialism. As a result, it does not assume any objective list of outcomes. There are no intrinsic good outcomes or outcomes that have value in themselves. Outcome goodness – its utility – is measured according to a subjective individual understanding of well-being. Consequently, utility is a mental state of affair. Unfortunately, this definition does not solve the problem. A "good" mental state of affair may be understood in several different forms. Historically, two forms of judging mental states of affairs have been mostly used: hedonistic and desire satisfaction.

The first branch of utilitarianism, hedonistic, can be associated with the views of Bentham, Mill and Sedgwick during the 18th and 19th centuries. Hedonistic utilitarianism main idea is that a mental state of affair can be measured through "pleasure" and "pain", or through "happiness" and "unhappiness". Therefore, the happier, the more utility an individual presents. The concept is simple, but its operationalization is complex and its philosophical implications are odd. For example, being a hedonist without constraints involves accepting that pleasures, as mental states, are greater in importance than the facts themselves. Thus, there is no need for factual pleasure, just for feelings. For instance, someone can be living happy in a virtual world while its body and mind rot and still be in a state of mind considered good. Connecting everybody to the matrix seems like a good idea for a hedonistic utilitarian. Besides having peculiar philosophical implications, hedonistic utilitarianism is quantitatively unmanageable. Cardinal or ordinal measures of pleasures and happiness are difficult – if not impossible – to be implemented. Therefore, formal models constructed in a hedonistic perspective never reached high levels of credibility.

Overcoming the problems of hedonism, desire-based - or preference-based -utilitarianism emerged in the 20th century. Gadjour and Lauterbach (2003) affirm that preference utlitarians "measure utility in terms of satisfaction of preferences or desires. Thus, preference utilitarianism uses satisfaction of preferences as a proxy for utility" (Gadjour an Lauterbach 2003, p. 241 - 242). According to Harsyiani (1977) preference utilitarianism surpass other utilitarianism forms because: "preference utilitarianism is the only form of utilitarianism consistent with the important philosophical principle of preference autonomy. By this I mean the principle that, in deciding what

is good and what is bad for a given individual, the ultimate criterion can only be his own wants and his own preference" (Harsyiani 1977, p. 645)

The transition from hedonism to desire-based started in economics. According to Baujard (2013) the ordinalist revolution changed the definition of utility in economics. Ordinalism allowed economists to rank preferences without exact numerical comparability between them. But, more important, ordinalism was the fundament to construct an axiomatic theory of utility. From then on, preferences that conformed to a set of axioms could be represented by a utility function (Broome 1991). Although this concept may be familiar, remembering its definition is useful. According to Varian (1992):

> "In economic analysis it is often convenient to summarize a consumer's behavior by means of a utility function; that is, a function $u : X \rightarrow R$ such that $x \succcurlyeq y$ if and only if $u(x) > u(y)$. It can be shown that if the preference ordering is complete, reflexive, transitive, and continuous, then it can be represented by a continuous utility function. [...]. *A utility function is often a very convenient way to describe preferences*, but it should not be given any psychological interpretation." (Varian 1992, p. 95)

Baujard (2013) stresses that utility functions of microeconomic textbooks are based on the "strong preference" model. The strong version of the preference model counts only the "revealed" preferences as actual preferences of an individual - usually associated with Samuelson's revealed preference proof of the second quarter of the 20th century (Samuelson 1947). In other words, only preferences revealed through real actions have value. Thus, the strong preference model assumes individuals reveal their preferences when choosing between different actions. On the other hand, weak versions of the preference model do not imply that preferences have to be revealed by actual choices.

However, the weak version can't determine definitely the preferences of an individual, while the strong version can. This characteristic make the strong version mathematically treatable and, consequently, preferred by social scientists and economists (Haslett 1990). Even though the stronger version of preference utilitarianism overcomes hedonistic versions and can be operationalized mathematically, it still has ethical and practical flaws. Those don't mind the scope of the present paper and can be found in, for example, Baujard (2013) and Bykvist (2009).

From the point of view of paradigms, assuming preference utilitarianism is the exemplar approach chosen by economists to analyze welfare is quite credible. Microeconomics textbooks, as already argued, always present utility functions based on preferences. Hence, in a way or another, economists are trained to approach welfare issues via their outcomes in utility - as proxies of preferences. Along these lines, Angner (2015) affirms that standard economics – "the approach first year graduate students are taught in a mainstream economics department" (Angner 2015) – have primarily in mind a preference-satisfaction account to access welfare problems.

5.2) Capabilities

Defining exactly the capability approach as a paradigm is impossible, not just because the borders of the paradigms are not clear, but because the literature associated with the capabilities approach is wide and vast. The approach may be found in several areas, from economics to ethical philosophy. Amartya Sen and Martha Nussbaum are the two most prominent authors of the capabilities approach, and both are prolific. Sen, for instance, wrote more than 20 books and more

than 200 papers and articles. This vast collection of knowledge is still growing and, thus, the capability approach is in constant change (Gasper 2007; Robeyns 2005).

Therefore, this section will focus solely on giving a brief sketch of the capability approach, defining its core principles and ideas. As the welfare paradigms being defined relate to economics, Sen's work will be in the center of the definitions. Nussbaum's work shall appear, if necessary, only as a comparison point.

In order to present a credible core of the capability approach, three focal points of Sen's work must be clear: functionings, capabilities and agency. The three concepts were formulated in several places (Sen 1980; 1984; 1985a; 1985b; 1988; 1990; 1992; 1993; 1999), still there is a high degree of uniformity between their definitions. To begin with, Sen (1993) affirms: "Perhaps the most primitive notion in this approach concerns 'functionings'" (Sen 1993 p. 31). Functionings are defined as all the things a person may value doing or being. In Sen's words:

> "The concept of "functionings," which has distinctly Aristotelian roots, reflects the various things a person may value doing or being. The valued functionings may vary from elementary ones, such as being adequately nourished and being free from avoidable disease, to very complex activities or personal states, such as being able to take part in the life of the community and having self-respect." (Sen 1999, p. 75)

However, well-being is more than just achieving functionings for Sen. The space where well-being has to be truly evaluated is the capability space. A capability is a set of different functionings available for a person. Not just formal functionings, but real ones. Frequently, the capability set is related to real opportunities or freedoms as a way of conceptualizing them. This can also be seen in Sen's words:

> "It [capability] represents the various combinations of functionings (beings and doings) that the person can achieve, Capability is, thus, a set of vectors of functionings, reflecting the person's freedom to lead one type of life or another" (Sen 1992 p 40)

Well being, thus, reflects the possible choices available. Several examples are useful for understanding how well-being can be evaluated via capabilities. In abstract, any situation where two people achieve the same functioning, while one is forced and the other chooses the functioning, clarifies how a wider set of functionings is better. For a concrete case, imagine that two persons work at the same place and both of them go to work using public transportation. However, one of them has a car in the garage - which he can use whenever he wants - while the other doesn't have enough resources to buy a car and is obliged to use public transportation in order to get to work. The one who has a car has a wider set of choices and, consequently, his capability set is better. He is free to choose between different options. A more dramatic example concerns the differences between fastening and starving: someone who starves is forced to live without food, considering that there is none available.

The above examples focus on two people with different opportunity sets. This difference in choice options determines the well-being freedoms of individuals. However, a situation where two individual have the same capability and, yet, achieve different functionings is possible to be imagined. The capability approach, in Sen's sense, does not assume any particular order of functionings' preference. For this reason, well-being is not evaluated merely by achieved

functionings, but it is also evaluated in the freedom space. Yet, how is the freedom space characterized?

Sen (1992; 1999) distinguishes between well-being freedoms and agency freedoms. Agency is the capacity of choosing between options even when one of them harms well being in some sense. Usually, these options are related to wider goals than one's own well-being. As an illustration, Sen (1992) asserts that agency freedom includes being able to stop a crime even though in the process the individual may get hurt - reducing its own physical well-being. The capability set is the set of well-being freedoms. As result, the capability approach is concerned with the freedom of opting in the space of the individual well-being, as the above examples have already shown. Although neither space of information can subsume the other, agency must not be forgotten since there are direct connections between agency freedoms and well-being[2].

Therefore, individual freedom is the main quest of the capability approach and, consequently, there is no pre existing objective list of functionings. Yet, eventually Sen's work presents passages about the existence of "basic capabilities" (Sen 1980, for instance). Those are functionings necessary to survive and escape from poverty. However, the term "basic capabilities" appeared just in the beginnings of Sen's capability approach. With the passage of time, Sen possibly made the option of not pointing any basic capabilities, and started to indicate that the ranking of capabilities has to occur in a democratic manner. On the other hand, Nussbaum (2000) lists several essential capabilities. Besides, she divides capabilities in three separate categories: basic, internal and combined. On this matter, Nussbaum's view of capabilities is more objective than Sen's one.

In contrast, Sumner (2006) points out that Sen's capability approach is neither an objective nor a subjective view of welfare. The capability approach is not objective because it does not focus on the presentation of lists of functionings. Moreover, Sen's capability's ideas are also not subjective because they do not focus solely on individual states of affairs. Hence, the capability approach stands in the middle of the objective/subjective continuum of the evaluation of well-being. From this point of view, Sen acknowledges that there is more than one form of evaluating well-being inside the capability approach. A capability set represents the real opportunities and the wider the scope of possible lives the better. However, achieved functionings have to be considered when evaluating well-being as well.

The differences are subtle and they are in the center of contemporary debates. The main point is that neither functionings nor capabilities alone are perfect measures of well-being. Sen frequently signalizes that well-being must be evaluated with the widest range of information possible. Limiting the analysis to objective or subjective may imply in missing important questions of individual well-being.

Widening the scope of information requires admitting differences between human beings exist. In other words, human diversity has to be considered. The capacity of agency differs between genders, cultures, ages and several other characteristics of people. This means resources have different uses depending on who has their possession. Freedom in the capability approach is more than formal opportunities: people have to truly be able to choose between different functionings and have to be able to convert resources into functionings. Robeyns (2005; 2011) salients three different conversion factors: personal, social and environmental. In her reading of the capability approach, Sen acknowledges the human diversity: (1) personally when he accepts

[2] Even though the capability approach does not understand well-being as a "mental state of affair", it does not exclude such information. As a result, the impacts of agency in well-being may occur through increased "mental states of affairs", such as happiness or desire-fulfillment.

people have distinct metabolisms, sex and intelligences; (2) socially when he accepts people live in different cultures with varied sorts of public polices and social norms; (3) environmentally when he asserts people live in dissimilar geographical regions with distinct access to water; food and other resources.

6) Translating capabilities into utility functions: what's missing?

Besides the characteristics already shown in the fifth section, economics' utilitarianism has a very special aspect which has to be taken into consideration: the scope of preferences capable of being represented by utility functions is unlimited. The utility framework can be used to discuss from banal consumer's problems to eccentric marriage problems and criminal problems. It can be also used to any other problem that can be written as a choice problem.

> "[...] 'Consumers act so as to maximize *U*.' What are the restrictions on the filling instructions for *U*? Answer: very few, if any. Often enough people are modeled as deriving utility from some material gain but models do not cease to be economics models if they are more interested in immaterial goods such as reputation or fame, or world peace for that matter." (Reiss 2013, p. 139)

As a result, preference utilitarianism in economics - as an approach to well-being - is unconstrained, creating a choice theory. Different kinds of criticisms arise from this characteristic. However, instead of analyzing them, the following example will take this characteristic and demonstrate how it is used as a translation mechanism. Specifically, the example will demonstrate how capabilities are understood through utility functions. Ravallion (2016) presents the following framework:

> "An encompassing way of thinking about welfare is to define it as a common function of capabilities—the attainable functionings of that person.We can write this as follows:
>
> $$Utility = U(Functionings).$$
>
> It is assumed that the function *U* does not vary across people. (When using only a partial set of observed functionings in practice, this assumption need not hold). Functionings depend in turn on commodities consumed and personal characteristics:
>
> $$Functionings = f\,(Commodities\ consumed, characteristics).$$
>
> Substituting this equation into the first we are back to a more familiar form for economists:
>
> $$Utility = u(Commodities\ consumed, characteristics).$$
>
> (Ravallion 2016, p. 138)

The first conclusion Ravallions's function allows is: translations are done by scientists in pre-paradigmatic periods. Two very plausible assumptions have to hold in order to this conclusion be valid. First, economics has to be a pre-paradigmatic science. Arguments favoring this assumption have already been briefly presented. Second, Ravallion has to be a scientist. This second assumption is easily provable, since neither utilitarianism nor the capability approach are unquestionable paradigms. Therefore, Ravallion's utility function is not a historic process, but a translation between two concomitant paradigms. Thus, the translation is not a historian's work.

Now, knowing translations are done by scientists in pre-paradigmatic periods, one must ask: what are scientists missing in these translations? The problem at stake is not only acknowledging utility functions may use capabilities as inputs, but also accepting that, in pre-

paradigmatic periods, the assessment of certain paradigms occurs through the lenses of other paradigms. This assessment can occur consciously or unconsciously, either way it occurs through translations and may imply in losing information.

To begin with, it is useful to review a Sen's citation where he defends that for assessing the standard of living "the right focus is neither commodities, nor characteristics (in the sense of Gorman and Lancaster), nor utility, but something that may be called a person's capability." (Sen 1983, p. 160). This quote is illuminating since it affirms directly the incapacity of commodities, characteristics and utilities of representing well-being. Coincidently – or not -, Ravallion's (2016) function is a utility function with commodities and characteristics as inputs. This coincidence defines exactly how translation can be misleading. As in any translation process, especially in science, incommensurable terms are inevitable. Capability and functionings do not have exact surrogates in utilitarianism. Consequently, the terms must be adapted to fit utilitarian's language. This adaptation is not perfect and generates loss of information.

Utilitarianism, as a language, cannot comport capabilities and functionings full meanings as a result from paradigmatic differences regarding informational basis. Well-being in the capability approach is analyzed via a compound of freedoms and achievements, while utilitarianism homogenizes these spaces of information into only one: "mental states of affairs". Indifferently whether happiness, desire-fulfillment or pleasure is the "mental state of affair" representing utility, the one chosen will always be the only sort of information utilized for evaluating well-being. Therefore, freedom and achievements can be used by utilitarians as a measure of well-being only if translated into their return in some abstract sense of utility and thus have just instrumental value. Considering this, utilitarianism *excludes* non-utility information. Thus, for Sen, utilitarianism is a special form of welfarism imposing "'informational constraint' in making moral judgments about alternative states of affairs" (Sen 1979, p 471).

Informational constraints start methodologically, but spread to moral implications. "Utilitarianism attaches exactly the same importance to the utilities of all people" (Sen 1992, p. 14). This means the marginal utility of every individual is equally weighed when socially maximizing utility. In the case where all human beings are equal and thus have the same utility function, this approach seems acceptable (Sen 1979). However, human beings are knowingly distinct and this may be expressed through moral problems in the utilitarian maximization problem.

Sen (1979, 1992) utilizes the example of a disabled person to show the omissions resulting from the equality of utility weights. As a result from its condition, a disabled person may need more income than other individuals to achieve the same level of utility. In utility jargon, a disabled person marginal utility may be lower than a normal individual marginal utility. Therefore, the disabled person should receive less income from the "pleasure-wizard". Of course, this does not have to be the case, once the disabled may have higher marginal utility in other imagined world. Still – when accepting the possibility of this case - the situation does not seem right or good.

However, the blindness of diversity does not solely affect the disabled. Any minority with lower marginal utility than average is, obviously, outweighed in the utility maximization problem. Accordingly to Sen (1999), utilitarianism is indifferent about distribution. Every individual has the same weight in the objective function being maximized. Furthermore, usually these minorities adapt themselves to their realities. Consequently, the necessary comparability implied in the utilitarian approach "may be a very dubious guide to well-being" (Sen 1985, p. 190).

Therefore, the capability approach, with its terms, is formulated with the intention of not missing diversity problems. Human beings are not equal. They differ in culture, environment,

resource possession and even individually. Each individual has its own identity formed by his background and history. These aspects have to be taken into consideration in evaluating well-being accordingly to the capability approach. Yet, when translating capabilities and functionings into commodities and characteristics, all individuals become the same utility maximizer. Their individual importance is lost amidst the maximization problem.

In fact, utilitarianism is concerned solely with achieved utility levels. Non utility information is discarded. Hence, individuals are considered equal in the utility space and any other form of inequality can be dismissed. As Sen (1992) affirms:

> "The utilitarian approach is characterized by (1) confining interpersonal comparisons for social assessment to achievements only, and (2) identifying achievements with the utilities achieved. The two together yield the utilitarian informational focus on interpersonally compared individual utilities for personal and social assessment." (Sen 1992 p. 32)

The capability approach distances itself from the narrow focus on achievements. The capability set is the set of valuable beings and doings a person may have – their functionings. As a result, a functioning does not have necessarily to be achieved to have importance. The capability set goes even further representing an array of functionings. Thus, the capability approach accepts the existence of functionings which have value in themselves – even without being achieved. The mere possibility of doing or being whatever one deserves has to be taken into account. The translation of the above terms into a utility function misses exactly these points. The utility function of commodities and characteristics transforms freedom into achieved levels of utility. Accordingly to Sen (1992):

> "While being happy may count as an important functioning, it cannot really be taken to be all there is to leading a life (i.e. it can scarcely be the only valuable functioning). If the utility-based valuation is done in terms of pleasure or happiness, then in effect the other functionings would get disenfranchised, and would be valued only indirectly and only to the extent that they contribute to pleasure or happiness." (Sen 1992 p. 54)

One last mistranslation has to be accounted. The essential fundament of utilitarianism is welfarism and welfarism is "an informational constraint for moral judgments about states of affairs" (Sen 1979, p. 472). This results from the fact that locating utilitarianism in the objective/subjective continuum is simple considering that its evaluation of well-being is totally subjective. The lack of objectivity in the assessment of well-being obliges utilitarianism to discard objective information. To illustrate, it is possible to imagine – following Sen (1979) - two scenarios: one with torture and one without. The torture scenario, in a purposely contradictory manner, has a higher total utility than the non-torture. As higher utility is preferred in the utilitarian approach, an utiliatrainist has to prefer the torture scenario.

The choice above, in utilitarianism, is exactly equal to the choice between two scenarios of, for instance, taxation and the absence of it, or other less morally problematic imagined worlds. Higher utility is always preferred. This automatic option is not an error in the utilitarian approach, but it *excludes* moral discussion. Utilitarianism is not interested in the moral options of the individuals. In fact, it is common to find utilitarian approaches assuming some kind of perfectly informed individual. This individual would live in a morally normal world and, consequently,

scenarios where torture is preferred would not exist. However, assuming or not this level of rationality, moral discussions are discarded. In the first case they are discarded given that morally wrong options would not exist; in the second case the renounce occurs because non-utility information is not necessary.

Finally, the translation of capabilities into utility misses several aspects of the capability approach, especially the diversity and moral discussions involved in it. It also transforms the evaluation of well-being in totally subjective, while the capability approach takes into account objective aspects of well-being. For Sen (1992):

> "The selection of space can also have a good deal of discriminating power, both because of what it includes as potentially valuable and because of what it excludes from the list of objects to be weighted as intrinsically important. For example, the capability approach differs from utilitarian evaluation (more generally 'welfarist' evaluation) in making room for a variety of doings and beings as important in themselves (not just because they may yield utility, nor just to the extent that they yield utility)" (Sen 1992, p.43)

One practical example may illustrate the mistranslation. We could imagine the problem of donating a book for two different individuals, one who can read and the other who can't. In the utility function the commodity book with its characteristics of being readable, able to entertain and impersonator of some level of credibility would be the inputs. As the achieved level of utility is the only important aspect when evaluating the well-being of two individuals, it is quite possible that the one who cannot read has a higher utility from receiving a book just because of what it represents. Imagine someone who has a bible in their bedside but cannot read. For the utilitarian approach being able to read is not necessary and teaching such skill would be unimportant. On the other hand, the capability approach values the ability to read for itself. Even though the book may represent something, giving it without teaching how to read would not increase the individual capability set.

7) Concluding remarks

Is it correct to assume from Ravallion's example that the capability approach is untranslatable to utilitarianism? First of all, Ravallion's utility function was a way of illustrating how common is translation in pre-paradigmatic period. An individual who is embedded in one paradigm naturally reads another with the lenses of its own. In fact, it may be even impossible to do otherwise. Now, that does not mean that every translation is incorrect. Although, Kuhn (1983) would point out that some terms cannot be understood by scientists who are not part of their paradigm. For instance, "force" and "mass" outside Newtonian paradigm do not mean the same; likewise "phlogiston", "principle" and "element" have especial meanings which can't be reached with modern chemistry language. In the same way, capabilities and functionings may not be understandable outside the capability approach paradigm.

Yet, unlike welfare evaluation translations, translating "force" and "mass" or "phlogiston" and "principle" is the task solely of historians of science. They already know their paradigm and thus they don't have to choose. Pre-paradigmatic scientists do not have this privilege. They live a science in which exist several competing paradigms and they are usually trained in only one of

them. However, they must choose or, at least, explain why other paradigms are incorrect in explaining scientific anomalies.

Three possibilities arise from such scenario. First, scientists trained in one paradigm are completely unable to understand other paradigms' languages. This would be the case of utilitarians using Ravallion's utility function without any concerns and not even noticing there is information missing. This scenario is the incommunicability one: there is no logic in scientist's choices. Unfortunately, although discarding completely this scenario would be a wish of any scientist, it is possible that in every day science no translations occur and scientists live in their own bubble. Second, scientists can learn an infinite series of paradigmatic languages and can choose whichever suits the best for their problems. This would be the case of a scientist which would opt either for the capability approach or for utilitarianism according to the problem he is facing. Obviously, this second case is not plausible since rarely a scientist is trained in more than one paradigm.

The third option is the more plausible one – and hopeful one – translations occur as way of starting interpretations. Information will be missing, but throughout discussion problems may be identified. Actually, this process may be the only way of learning a new paradigm. Hence, it is the first step towards being capable of understanding more than one scientific language, and solely through this process a logical choice is possible. Unfortunately, it is possible that scientists translate but do not think about the information they are missing. For instance, using Ravallion's utility function without underlining the mistranslations may be a usual utilitarian practice. Therefore, the consciousness of the translation process is essential for a logical choice of paradigms.

Scientists, especially those inserted in sciences without a well established paradigm, may be lost amidst several different languages. However, it is not impossible for them to find logic in their choices. One must expect solely that science, unlike our every day rationality, seeks this logic. While our every day rationality is blinded by innumerous cognitive bias (Kahneman 2011), scientific reasoning must not be biased by mind tricks. Thus, one must expect that biases such as "group bias" or "confirmation bias" don't play a role in scientific reasoning and the urge to translate is real and eventually conscious. In other words, the process of discussion done above has to be commonly done in the pre-paradigmatic scientists' mind.

Concluding, the definition of the paradigms and the translation process illustrated above can be further worked. In fact, the interpretation process encourages such improvements. Therefore, minor mistakes in defining or translating cannot prevent the understanding that the focus is doing translations and discussing the misunderstandings between paradigms until a logical choice is possible.

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