

# **Bounded rationality and altruism: behaviourism in economics\***

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*This essay is intended to respond to the criticism of economic science that it builds its models on unrealistic assumptions from the start. Perfect rationality and the axiom of self-interest are indeed two of the main tenets of neoclassical economics. In this paper, however, we argue that the application of these doctrines is far from exclusive. Indeed, with the achievements of the behaviourist approach and behavioural economics, the theory of bounded rationality was accepted as early as the last century in this scientific area, along with the recognition of altruistic behaviour. Many of these achievements have been more or less integrated into mainstream thinking by now, and once applied, by relying on more psychologically realistic assumptions they may significantly contribute to improving the forecasting power of economic models.*

## **1. Introduction**

The 2008 crisis had massive repercussions, not only on the real economy but also on economic thinking,<sup>1</sup> and triggered profound changes in the approach to economic science and the public's view of the discipline. It has become commonplace to “blame” economics for its failure to either forecast or adequately cope with the recession. At times, this attitude prompts the lay public to call into question the justification for the very existence of economics, claiming that the models and conclusions of the discipline are rooted in axioms that are false even in their basic assumptions.

Providing an exhaustive response to these criticism – including a description of the specificities of modelling and a detailed account of the “trade-off” relationship between the models in terms of manageability – is beyond the scope of this paper. Accordingly, this paper focuses solely on the two main premises of economic

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<sup>1</sup> Compare, for example, writings, lectures and statements by Nobel Laureates Joseph Stiglitz and Paul Krugman before and after the crisis.

science: the topics of perfect rationality and self-interest. As a response to the criticism of the science of economics, we argue that the application of these axioms is not exclusive, even within mainstream economics. Indeed, the acknowledgement of altruism and the assumption of bounded rationality were not unknown to economics – at least to some of its schools – even in the previous century.

In this paper we attempt to confirm our propositions by outlining the succession of the relevant paradigms. Reflecting on the criticism that the core subject of economic analysis is an idolised person rather than a real individual, we open our essay with an overview of behaviourism, an approach that places human behaviour at the centre of interest, and summarise the main achievements of behavioural economics. We then proceed to the topics of bounded rationality and altruism, concepts that present certain traits of human behaviour within the theoretical framework of positivism, based on empirical behaviour patterns. Undoubtedly, these concepts have called into question the two most basic tenets of neoclassical economics. However, they did so not by a complete rejection of the previous theory, but by resolving certain simplistic assumptions; in other words, instead of destroying the neoclassical framework, they merely intended to supplement and enhance it further.

Obviously, this does not imply that the classical human model of homo oeconomicus is no longer considered the cornerstone of economic science. However, in contrast to the frequently voiced lay criticism, economic science is undeniably familiar with and uses the concepts of bounded rationality and altruism. It is also a fact that several achievements of behavioural economics have now been unquestionably integrated into mainstream theory, which, in many cases, may improve the forecasting power of models and contribute to capturing reality with more precision.

## **2. Behaviourism in social sciences**

Social studies, by nature, have never been entirely separable from the human being – the performer of actions – or human behaviour. Human behaviour has therefore always been considered in all social disciplines. The approach of behaviourism, however, has done so with far more emphasis: it attempted to understand social trends by placing the systematic study of human behaviour at the centre of focus, and demanded behavioural evidence for the verification of any hypothesis as a matter of course (*Graham 2010*).

Behaviourism first appeared in political science between the world wars. As opposed to the prevailing institutionalist approach which focused on the political establishment, its novelty was in its endeavour to analyse the political behaviour of the individual. In this particular form, behaviourism in political science represented a non-judgemental, positivist, descriptive trend, seeking to study various phenomena, as all other natural sciences, by relying on general theories (*Tóth–Török 2003*).

In psychology, instead of cerebral processes and the conscious mind, behaviourism put behaviour under scientific scrutiny. The rationale behind this approach was the fact that, while the former is open to subjective interpretation in many regards, behaviour is a “public” and visible phenomenon, with the required data and information readily available. According to behaviourist psychology, human behaviour depends largely on environmental conditions and stimulations; consequently, it attempts to capture different phenomena by the stimulus-response model (Atkinson et al. 2005; Csépe et al. 2007).

Similar trends began to evolve in economic science as well. Although the appearance of the positivist approach in economics is traditionally attributed to *John Neville Keynes (1890/1999)* and the detailed description of its methodology is associated with *Milton Friedman (1953)*, even the classical school was committed to observing human behaviour, and the methodological impact of natural sciences left its mark on marginalists. A behaviour-oriented approach manifests itself in the work of *Marshall (1920)* as well, who defined political economy and economics as “a study of mankind in the ordinary business of life” in the introduction to his book. Although from a different perspective, the two Nobel Laureates, *Stigler and Becker (1989:111)* had a similar approach to the issue. In their opinion, “the economist continues to search for differences in prices or incomes to explain any differences or changes in behaviour”. *Simon (1959: 253–254)* – another Nobel Prize winner who unquestionably belongs to the behaviourist school based on his work – in turn, defines economics as “the science that describes and predicts the behaviour of several kinds of economic man”.

On the whole then, it is indisputable that even though different schools of economics place different phenomena at the centre of their studies (e.g. exchange, institutions, macroeconomic trends), they cannot disassociate their work from human behaviour. The significance of this thought is underpinned in *Becker (1976)*: “What most distinguishes economics as a discipline from other disciplines in the social sciences is not its subject matter but its approach. [...] I contend that the economic approach is uniquely powerful because it can integrate a wide range of human behaviour, [...] the economic approach is a comprehensive one that is applicable to all human behaviour” (quoted in *Hámori 2003a:8*). It is this general approach to human behaviour that has inspired, in recent decades, references to “economics imperialism”; in other words, the application of the approach and methodology of economics to a broad range of social sciences (*Hirshleifer 1985*).

### 3. Behavioural economics

Beyond a fundamentally positivistic and behaviour-centred attitude, behaviourism proceeded on a unique path within the realm of economic science and, to a certain

degree, bypassed the concepts described above. This led to the evolution of behavioural economics. Although it initially came into being as a heterodox school, it has now increasingly been integrated into the mainstream to become an extension of traditional economic analysis (*Koltay–Vincze 2009*). One of the novelties of behavioural economics is that it is based on a human model distinctly different from that of the neoclassical school: it dispenses with some of the characteristic features of the traditional homo oeconomicus. Some of them are basic premises constituting the backbone of neoclassical economics, while others are “less cardinal”; most of them, however, simply consider the natural constraints of the individual. The intention is to increase the realism of the psychological underpinnings of economic analysis in order to generate theoretical insights that are verifiable in practical terms, improving the quality and reliability of predictions and policy recommendations (*Camerer–Loewenstein 2004*). Thus, as regards its subject, behavioural economics point beyond *Stigler and Becker’s (1989)* aforementioned definition by observing human behaviour not only in terms of prices and incomes, but also in relation to other, “more human” factors. As such, behavioural economics is not a radical challenger of traditional theories; it is more like an amendment to them that helps expand the horizons opened up by its predecessors and hence, allows even the mainstream to integrate some of its results.<sup>2</sup>

We can state overall that in examining the behaviour of individuals and the drivers of their decisions, the trend relies heavily on the premises of neoclassical economics; however, it often supplements them with psychological insights, psychologically grounded features and emotional motives (*Camerer–Loewenstein 2004; Méréó 2010; Rabin 2002*). Thus, behavioural economics can be viewed, in certain regards, as the borderline between economics and psychology.

In respect of its methodology, behavioural economics draws heavily on empirical studies, including experiments. In contrast to natural sciences, however, economics cannot be regarded as an experimental science, as many economic phenomena (e.g. a crisis or decision on the base rate) cannot be exactly reproduced multiple times under controlled conditions. In recent decades, however, parallel to – or, to a certain degree, overlapping – behavioural economics, experimental economics (*Smith 1989, 1994*) has also gained significant ground in academic circles. Designed to model certain decision-making situations, these experiments pointed out that in certain situations people tend to systematically deviate from behaviour patterns considered rational by economics (*Hámori 2003a; Méréó 2010*). To a large degree, therefore, both experimental and behavioural economists base their assertions on empirical results (*Sontheimer 2006*). However, while experimental economists

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<sup>2</sup> It follows from this that behavioural economics does not form a uniform school; in many cases, the authors express fundamentally different opinions. This is precisely why it is so difficult to provide a fully comprehensive overview of the trend.

define themselves explicitly along the lines of this method, behavioural economists are not committed exclusively to experiments; they merely use experiments as a research tool (*Camerer–Loewenstein 2004*).

In addition to psychological considerations and empirical results, the findings of neuroeconomics also provide assistance to behavioural economists. This area seeks to understand human decisions and make behavioural predictions from the workings of the brain, using neuroscience (*Camerer 2007; Camerer et al. 2005*).

All of this demonstrates that the “toolset” and “subject pool” of behavioural economics is broader than those available to the neoclassical approach, and behavioural economists explicitly seek to replace unrealistic assumptions with better grounded premises. As a result, researchers in this area have arrived at results such as the description of benchmarks, sunk costs, commitment, packaging and validity bias, representativeness bias, alternative cost or the certainty effect (*Camerer–Loewenstein 2004; Hátori 2003a, 2003b*). A common trait of these results is that they dispense with such neoclassical axioms as the theory of perfect rationality or the assumption of exclusive self-interest (*Vanberg 2006*). In the next part of the paper we focus on these two topics, examining their presence in neoclassical economics and taking account of the alterations introduced by the behavioural school.

#### **4. Rationality in neoclassical and behavioural economics**

One of the core assumptions of the neoclassical tradition is the rationality of economic agents (*Vanberg 2006*). This cannot be separated from the maximisation paradigm, a concept already present in the classical school. At that point, however, it was merely interpreted as “preferring more rather than less”, and even this assumption was primarily used to capture the production side. The next full step forward – the application of this theory to consumers – was taken by the marginalists: their rationality hypothesis was manifested in utility maximisation subject to budget constraints. And this approach, due to the anatomy of the demand curve, demanded the knowledge of the prices of all products on the market (*Arrow 1986*).

Subsequently, several versions and definitions of the rationality assumption were formulated; however, elaborating on them is beyond the scope of this essay (for more details, see *Rubinstein 1998; Schiliró 2012; Simon 1955*). Overall, it can be said that they mainly identify requirements in relation to consumer preferences, such as the criteria of completeness, transitivity, reflexivity and comparability (*Hirshleifer et al. 2009; Varian 1991*). Without their detailed overview, this paper is limited to the presentation of the main elements of more general definitions.

*Stigler (1987)* identified three criteria of rationality: (i) consumers have stable preferences; (ii) they perform the correct cost calculations; and (iii) they make utility-maximising decisions. *Koltay and Vincze (2009)* set similar requirements for rational consumers: (i) they have intrinsic, consistent and complete preferences; (ii) they select the most beneficial option subject to their own physical and information constraints; and (iii) the assessment of their opportunities is only limited by their own lack of information. These criteria are profoundly reflected in the premise of instrumental rationality (rational tool selection). In essence, the concept of instrumental rationality asserts that – regardless of their objectives – decision-makers are assumed to choose the best tools to achieve their goals (*Kolodny–Brunero 2013*).

This rationality assumption of neoclassical economics has received much criticism. An example is related to the work of one of the most acclaimed pioneers of behavioural economics, *Herbert Simon (1947, 1955, 1959, 1972, 1986, 1991)* and his bounded rationality theory. This may be because *Simon's (1959)* approach to economics was behaviouristic in the first place: he criticised normative microeconomics for wanting to know how economic agents “ought to behave, not how they do behave”. In addition, even his personal experiences motivated him to develop the theory of bounded rationality. As a fresh graduate, he landed his first job at the local public administration. He was astonished to find that none of his economics training was put to use at the workplace: rather than comparing the marginal benefit of a proposed expenditure with its marginal cost, decisions were made on the basis of entirely different considerations (*Simon 1999*).

The approach that recognised that economic agents were bound to face uncertainties and risks in their decisions did a great deal to soften the model of perfect rationality in itself (*Jones 1999; Simon 1972*). Thus, since the actor has incomplete information about the consequences, in order to maximise the expected return, he must make a choice by assigning probabilities to individual options (according to the “hard” approach, this is still performed completely rationally).

The theory of bounded rationality moves beyond this approach by asserting that the individual faces a number of constraints in making practical decisions (*Simon 1972*). The lack of individuals’ information on the alternatives, the cognitive limitations of their minds and the finite amount of time they have to make decisions are examples of such constraints (*Schiliró 2012*). These factors are also interrelated. The premise of neoclassical microeconomics, which presumes the presence of “search goods” in the economy (commodities on which all information is readily available with no additional cost), fails to work in practice (*Weimer–Vining 2011*). In reality, gathering information is an expensive and potentially time-consuming process; consumers therefore are not tempted to collect all relevant information in support of their decision. They would not have a chance to do so in any case, given the time

constraints and the natural cognitive limitations of the human mind. Thus, according to *Simon (1955)*, the theory of bounded rationality underpins the practical, rather than the logical impossibility of perfect rationality.

The strength of the theory is demonstrated by the fact that its statements raise serious questions even in the most basic situations of neoclassical microeconomics. An example for that is the case of the pure monopoly which, in practice, would have to amass an enormous amount of complex information in order to understand the demand curve for its product and hence maximise its profit. It further complicates the monopoly's predicament that any new pricing decision on its part will prompt other companies to follow suit. This in turn will have a repeated impact on the demand for the monopoly's product, and the monopoly will have to start gathering information again (*Arrow 1986*). It is easy to see that this would be rather cumbersome in practice, if possible at all.

Due to its empirical orientation, the theory of bounded rationality has found ready acceptance in political science, whereas the theoretical discipline of economics largely ignored it (*Jones 1999; Simon 1999*). It has become clear, however, that economics cannot afford to ignore the notion of bounded rationality for long. Indeed, it is not only embraced by the behavioural school today, but it has also proven itself in the mainstream.

The theory of bounded rationality is accepted even by authors who do not use it as a point of reference. They often cite the "as if" argument (see for example, *Friedman 1953*); namely, they profess to focus on the behaviour of decision-makers (and the results thereof), and are not concerned about how agents make their decisions. From this perspective, it is enough if the individual acts "as if" his decisions were perfectly rational, even though it is not the case in reality (*Conlisk 1996; Rubinstein 1998*).

In addition to the above, the theory of bounded rationality was an excellent starting point for studying human behaviour and decision-making, enhancing academic thinking and connecting the insights with other topics. Noteworthy topics include, for example, the "Two Systems" theory (*Kahneman 2003*), which is closely related to cognitive sciences and describes the two modes of decision-making, and the rational ignorance theory, which models the political votes of voters (*Downs 1990*). The theory of *March (1991; 1994)* and *March and Olsen (2004)* about the "logic of appropriateness" i.e. rule-following modelling human decision-making is also worth mentioning. As opposed to the model of rational decision-making, in their paper the authors propose a framework where, faced with the complexity of the problems to be solved, instead considering a rational cost-benefit analysis the individual makes his decision by trying to answer the following question: "What does a person such as I do in a situation such as this?" In addition to this, the theory of bounded rationality

– or more precisely, *Simon (1991)* himself – largely contributed to the understanding of organisational behaviour and the decision-making processes of organisations by laying the foundations of procedural rationality. Indeed, the limited cognitive abilities of individuals may explain why, rather than maximising, organisations tend to adopt task performance rules, which give rise to complex role structures and routinise the decision-making mechanisms of the organisation (*Jones 1999*).

It is apparent that the workings of human decision-making are far more complicated than the rationality model of neoclassical economics envisaged. This, however, does not imply the inevitable rejection of the classical rationality postulate, nor does it suggest that we should surmise the irrationality of economic agents from the deterioration of rationality. Quite the contrary: the theory of bounded rationality underscores that, while economic agents intend to be rational in their decisions, they fail to do so in practice (achieve perfect rationality) because of their cognitive limitations (*Jones 1999*).

The recognition of the limitation of rationality benefited mainstream economics itself, while providing a basis for extensive research in behavioural economics as well. Its gradual integration into mainstream thinking facilitates a more realistic approach to the problems arising, encouraging the use of multiple perspectives and potentially less simplification. Thus, although the behavioural school has questioned a core assumption of neoclassical economics, by developing the bounded rationality model it complemented, rather than destroyed its results and opened up new avenues for exploration.

## **5. Self-interest in neoclassical and behavioural economics**

Besides rationality, another basic premise of economics is self-interest. The concept appeared initially in *Adam Smith's The Wealth of Nations (1776)* and subsequently crystallised in *Edgeworth<sup>3</sup> (1881)*. The assumption of an economic agent's self-seeking – which initially served as a countervailing force to passion (*Hirschman 1998*) – did an excellent service to economics. It can be used to capture different economic trends by means of “well behaved” and easy to calibrate models. However, the empirical results of behavioural and experimental economics demonstrated that people are far from being self-seekers in all situations.

Before presenting an overview of the criticism, it is important to stress that self-interest is a neutral attitude, far from being identical with resentment, jealousy or malevolence (*Hámori 2003a*). Of course, this does not mean that these categories are unknown to behavioural economics. Their inclusion in the theory, however,

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<sup>3</sup> Although *Edgeworth (1881:16)* asserts that “The first principle of Economics is that every agent is actuated only by self-interest”, some of his models may well be considered the forerunners of the use of social incomes, to be outlined below in the context of Becker.

is made possible precisely by a broadening of perspective which paved the way for studying – in addition to neutral self-interest – goodwill, altruism or any other emotional motivation.

Initially, the economic school that presumes strict self-interest could not interpret altruism at all, even though its existence had been proved time and time again by everyday observations and by the research of experimental economics (see for example, *Rose-Ackerman 1996; Gächter et al. 2012*). The economists who presumed the existence of some benevolence, considered it to be a part of human nature (*Becker 1976*), and associated it with given preferences (*Stigler–Becker 1989*). That notwithstanding, the phenomenon of altruism has now been examined by several authors, based on various approaches and interpretations. Since their full presentation is beyond the scope of this paper, we limit our comments to a few general characteristics and two more profound interpretations of altruism.

Although the literature does not offer a precise definition of altruism, its different manifestations can be classified into the following three categories: selfish altruism, reciprocal altruism and pure altruism (*Hámori 2003a*).

We talk about selfish altruism when a person behaves as if he was acting unselfishly, while in reality he is driven by his own interests. In practice, this type of altruism is not very different from pure self-interest, and the ostensibly altruistic action is all but a tool to maximise profit. Reciprocal altruism can be best described by the concept of “gift-exchange” (*Gächter et al. 2012*). In essence, the person exercises altruism because some day he expects to be rewarded in kind. This differs from selfish altruism in the sense that the reciprocal altruist does not expect reciprocity in the same transaction, from the same person he benefited. He merely counts on receiving the same generosity in a similar situation from another member of society. In this regard, reciprocal altruism does not represent a mutually beneficial transaction between two persons, as is the case in market exchange; it merely expects good deeds to be reciprocated over the long run at the level of society. Beyond all this, pure altruism is the phenomenon when a person exercises altruism toward others truly unselfishly, without hope for some future reward<sup>4</sup> (*Hámori 2003a*).

From the perspective of evolution, the dominance of self-interest was a notion broadly advocated by natural sciences as well; at the same time, similar to their peers in economics, some biologists and geneticists asked themselves the following

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<sup>4</sup> Critics of the category often argue that even pure altruism can be traced back to a form of self-love (*Hámori 2003a*). They claim that good deeds done for others by an altruist imply a utility increment benefiting the altruist himself; ergo, his behaviour can be practically attributed to self-seeking utility maximisation. Although below we will touch upon an interpretation where the usefulness of other persons is also included in the utility function, for the purposes of this paper, we will not attempt to provide justification for the existence of this category.

question: if self-interest has the highest survival value, why can we observe altruistic behaviour among animals as well as human beings? In other words: why should altruistic behaviour – which, by definition, reduces the individual's chances of survival – also survive? Sociobiology sought an answer to this question by building models with group selection. They propose that altruism can be observed between kin, i.e. individuals sharing the same gene pool. According to this approach, although the altruistic deed reduces the chances of survival for the altruist himself, it improves the genetic fitness of his kin. At the group level, then, altruism is a rational behaviour (*Becker 1976; Hirshleifer 1978*).

According to *Becker (1976)*, this altruism interpretation can be also applied to economics. He built a two-person model in which he introduced, as a new category, the altruist's social income which, besides his own income, also includes the income of the beneficiary partner. As a result, an altruistic attitude can be reconciled with the features of the self-seeking homo oeconomicus by inserting the utility (or income) of the beneficiary partner into the utility function maximised by the altruist. Thus, the positive effects deriving from connecting different utilities may be sufficient to dominate the direct disadvantages of being altruistic.

Besides incorporating altruism into his theory by relying on the orthodox tools of economics and describing altruism as a rational activity, *Becker's* model yielded additional positive results. Most importantly, by using his model involving an altruist and a related egoist, he pointed out that, due to the linkage between their utility functions, the behaviour of the altruist may be an incentive for the egoist to act as if he himself were an altruist. Thus, in some cases, even the egoist will refrain from steps that would reduce the income of the altruist or, in other cases, may even tolerate the reduction of his own income if it sufficiently increases the altruist's. *Becker (1974)* described the practical manifestation of this theory using a multi-player family model as an example and by outlining the "*rotten-kid theorem*". *Fehr and Schmidt (1999)* used a similar method – inserting relative income distribution into the utility function – to provide evidence that economic agents do not necessarily prefer inequality; in some cases they tend to have a preference for altruism even to the detriment of their own utility. Similarly, *Charness and Rabin (2002)* build their model along the lines of social preferences (consideration for others' social welfare) demonstrating that subjects are more willing to take sacrifices to increase the payoffs for low-payoff recipients.

Despite these positive results, the approach presented above is also open to theoretical criticism: the application of interdependent utility functions may be challenged. While the existence of group-level rationality might be acceptable in sociobiological arguments, it is not necessarily true from the perspective of economics, a science firmly rooted in individual-level rationality. Indeed, the application of interdependent preferences (*Pollak 1976*) violates the core

assumption of the discipline, the principle of methodological individualism (*Frey–Stutzer 2000*), rendering the preferences of players instable (*Hámori 2003a*). That notwithstanding, the method is undeniably good: in certain situations, it captures the behaviour of individuals better than the neoclassical approach; thus, subject to methodological reservations, its existence within the discipline can be justified.

In contrast to the above, *Simon (1990, 1991, 1993)* relied on the theory of bounded rationality to derive the operating logic of altruism. He maintained that, instead of perpetually performing cost-benefit calculations, in certain decision situations individuals are inclined to act on the basis of learned patterns (cf. *March 1991, 1994; March–Olsen 2004*). According to Simon, these patterns may derive from other members of the society and, given that altruism – as sociobiologists found – benefits the entire society at group level, society itself may be inclined to encourage easily influenced (docile) individuals for altruism.

In summary, it is apparent that altruism has numerous interpretations and methodological approaches, even within the behavioural paradigm. This suggests that we are faced with an existing phenomenon. We may not be able to explain altruism with one hundred per cent precision, but we cannot ignore the phenomenon, especially in view of its capability of improving the predictive power of economic models and the accuracy of forecasts.

## 6. Summary

This essay was intended to demonstrate that, as early as the previous century, the science of economics was aware of and to a certain degree acknowledged the theories of bounded rationality and altruism. This is all the more true in light of the heterogeneous nature of economics: outside of the realm of the uniform mainstream, there are numerous heterodox schools, different in approach, methodology and assertions alike. This paper has focused on one of them, behavioural economics, and responded to the criticism of “economics as a whole”.

As we pointed out, one of the main aspirations of the behavioural school was to use the approach of behaviourism to build its theories on more realistic benchmark assumptions. Important building blocks in this endeavour included the recognition of the individual’s cognitive limitations and altruistic attitudes towards others, and the insertion of these elements into the modelling of human nature. Since most of these results have now been accepted into mainstream economics, it would be a mistake to assume that the science of economics (whether in general, or limited to certain schools) is unaware of these categories.

Nevertheless, the science of economics – including its conclusions – should always be open to criticism, all the more so as this is a good incentive for researchers

to capture reality better. Such challenges may have ultimately led to the results presented above and integration of most of the achievements into the mainstream. Thus, as we pointed out, critiques asserting that the discipline only recognises the rigorous human model of homo oeconomicus can be refuted. In this paper we provided evidence to the contrary by demonstrating that a far more extensive range of tools is available to researchers, modellers and forecasters, and henceforth, the utilisation of these tools hinges only upon their responsible decisions and available resources.

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