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*The economic consequences of  
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# The economic consequences of *homo economicus*: neoclassical economic theory and the fallacy of market optimality

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**Abstract:** This essay presents a critique of the standard ascension from the rational agent to the optimal market in economic theory. Critiques of *homo economicus* are found unsatisfactory on grounds that its employment allows for the prediction of essential features of actual markets. Using this same criterion we introduce Gary Becker's essay, 'Irrational Behavior and Economic Theory,' which demonstrated that the same features of markets could be derived from non-rational behaviour. Thus, non-rationality is equally predictive but is less restrictive than rationality. Once the assumption of rationality is relaxed, the concept of market optimality (though not market order) must also be sacrificed.

**Keywords:** neoclassical economics, rationality, philosophy of social science

## Introduction

The critiques of the market commonly referred to in the worlds of economics and economic sociology tend to be some variant on the following: externalities, public goods, information failures, and concentrations of economic power (Wright & Rogers 2010). Once these problems are detailed, sociologists and other social scientists often follow neoclassical economists in an advocacy of markets that is rooted in economic efficiency. Neoclassical economists however employ the economic concept of efficiency in a fairly idiosyncratic manner. Here economic

efficiency refers to the market transaction as a utilitarian good, which 'optimizes', inadvertently extracting all latent surpluses out of the system. It was an Italian economist named Vilfredo Pareto (1909) who most famously expounded the theory behind the claim, arguing that voluntary market exchange allows for the optimization of any initial endowment of goods and income between economic actors.[1] Thus the market works ceaselessly to make some actors better off without making any worse off until an optimal allocation is reached and no more societal gains are realizable. Of course, inequalities may still result, but it is claimed that they can be compensated for retroactively given the surplus that has been achieved. So, once externalities, information asymmetries and power asymmetries are abstracted away, the high theory of microeconomics, and more broadly neoclassical economics, provides scholars and pundits alike with a formidable ideological weapon against any disruption of the ostensibly optimal operation of the market.

However, below the surface sits a peculiar creature upon which the house of neoclassical economics rests: *homo economicus*. The behaviour of this much-maligned hypothetical subject underlies the aggregate result of the optimal market. In fact, neoclassical economics posits that the macro-level reality of the market is no more than a scale model of the actions of this 'representative agent.' But not just any agent will do. The important result of the *optimal* market depends in the last instance on the ability of the representative agent to consistently make gain-maximizing choices. For if the choices of the individual actor are not uniformly rational, and hence do not maximize his personal utility, then the exploded version of himself, the market, cannot be said to be efficient.[2] Beyond the initial set of qualifications, economic sociologists and other social science analysts of economic life also tend to reject the concept of *homo economicus* as a false description of reality (DiMaggio 1994; Hirsch, Michaels & Friedman 1990). While we do not disagree, we believe that faulting the assumptions of a model is unsatisfactory. Instead, herein we try to introduce a fundamental and internal critique of the market to an broad inter-disciplinary audience that is neither a mere qualification of the neoclassical economic model, nor a facile rejection of its underlying assumptions.

The aim of this essay is to submit an immanent critique of the standard ascension from the individual agent to the optimal market. In our view, a successful critique of this ascension— particularly one that employs the methodological criterion of appraisal internal to the discipline rather than directly critiquing its 'hard-core' philosophical principles [3]— serves to weaken the basic ideological conclusion of

neoclassical microeconomics stated above. To this end, section two first presents the idiosyncrasies of the rational agent and reconstructs the Paretian logic by which rational agents combine to form the optimal market. Next, section three summarizes critiques of *homo economicus* emerging from psychology, economics, sociology, and political science. These critiques are found to be unsatisfactory by way of the methodological criterion outlined by Milton Friedman (1953) in his essay, 'The Methodology of Positive Economics,' which argued for *prediction* as the only method of appraising the assumptions in models. According to this reasoning, the assumption of rationality is valid insofar as its employment allows for the prediction (or retrodiction) of essential features of actually existing markets, in particular, as will be shown, downward-sloping demand curves. Using this same criterion, section four introduces Gary Becker's (1962) essay, 'Irrational Behavior and Economic Theory,' which demonstrated that the very same essential features of market reality could be derived from a wide variety of non-rational behaviour. That is to say, market-level order including downward-sloping demand functions can be derived from individual actors that employ *non-rational* decision rules but are subject to a specified budget constraint. Given this result, it is argued that in accord with Friedman's criterion, the rationality assumption ought to be expanded to include non-rational behaviours; this offers the very same predictive power but is less restrictive. However, once the extraneous assumption of rationality is relaxed, we by necessity must sacrifice the concept of market optimality (though not market order). We should clarify at the outset that this exercise does not offer positive or substantive reasons for accepting the failure of rationality. Instead, the paper considers the *methodological* reasons for its ineffectiveness. Finally, after considering critiques of Becker's original piece, section four specifies the particular conditions under which our conclusions remain plausible.

## ***Homo economicus* and the Paretian logic**

*Homo economicus* defies all class designation. Unlike the pigeonholes of classical political economy, the neoclassical agent is to some degree a part-time worker, a part-time capitalist, and a part-time landowner. This prerequisite is necessary to allow the blown-up version of himself to isomorphically parallel the market. With the shackles of class distinction resolved, or dissolved, the sole purpose of the rational actor is to choose; that is, rationality on the consumption side means consuming those commodities which maximize one's subjective utility, with the budget as the only constraint. To this end, microeconomics usually imposes four

conditions upon the rational economic man.[4] His preferences must be *continuous*, such that for any change in the amount of a commodity consumed, there must be a corresponding change in personal utility derived. They must be *transitive* to render all bundles comparable, such that if peaches are preferred to apples and apples preferred to pears, pears cannot be preferred to peaches. His preferences must be *monotonic*, such that any increase in the bundle of commodities consumed increases utility, implying that the agent's needs are insatiable. Finally, his preferences must be *convex*, such that the consumption of each additional apple realizes less utility than the apple consumed before it. Given our set of immutable preferences *homo economicus* is birthed, as if out of thin air.

The voluntary economic transactions between *homo economicus* and others of his own species generate an inexorable optimality in the aggregate market model. It is necessary to briefly rehearse Pareto's basic argument, which is reducible to a two-agent transaction, in order to understand the neoclassical road to market optimality. Imagine a simplified market model where A wants a car and B has a car to sell. Both agents have their own subjective preference sets, and hence value the car differently. Assume that A would not pay more than \$5,000 for the car, and B would not take less than \$4,000. These subjective valuations are what microeconomics calls 'reservation prices'; our agents will only enter into voluntary exchange if they obtain their reservation price or better. After negotiation the agents might agree on a price of, say, \$4,500 and trade. In this instance, the agents receive something (the money or the car) they value at \$500 more than their reservation price. That is, the agents achieved a net benefit given each individual reservation price and the actual price. This net benefit is seen as an economic surplus on both buyer and seller sides of the market. In this context the surplus refers to the money value of a given transaction to the actors in the market. Economists like to then calculate the buyer's and seller's surpluses given the nature of the demand curve and the supply curve, respectively. The total surplus is generally taken to be the sum of the buyer's and the seller's surpluses, or the difference between the buyer's and the seller's reservation prices.[5]

The exchange generated an unambiguous Pareto improvement; that is to say, the exchange resulted in all participants either increasing or maintaining their initial endowments (for a Pareto improvement, at least one must increase her endowment without any other endowment decreasing). Additionally, this allocation is a Pareto optimal outcome insofar as it cannot be improved upon or altered without hurting at least one of the agents in the market. In a market where endowments are given,

voluntary exchanges will take place up until that optimal point where no one can be made better off without hurting someone else— a rational maximizing agent would never voluntarily enter into an exchange that did not make him better off. Accordingly, the market has produced an outcome where all individual utilities have been maximized and the net utility has been increased. It is then concluded that the market produces, without recourse to compulsion, an optimal outcome that squeezes all possible economic surpluses out of the system.

It is worth recalling that these are purely theoretical results. Economists, it should be emphasized, do not claim that a competitive equilibrium will necessarily be reached in actually existing markets. Instead the textbook claim is that actual markets reach competitive equilibria only if a number of carefully specified individual level and market level assumptions can be accepted. If any of these axioms were violated in any given market setting, then the neoclassical economists' expected result would be a market with shortages or surpluses, or some kind of disequilibrium.

## **Critique and defence of the instrument of *homo economicus***

Since the theoretical result of the optimally efficient market rests upon the shoulders of *homo economicus*, it is not peculiar that he has been thoroughly vilified for over one hundred years.[6] The critique traditionally takes one of two forms. First, rational utility ranking and consumption is said to be a wholly metaphysical construct. For Joan Robinson (1962), who popularized this critique, metaphysics is defined in Popperian fashion, namely that which is unfalsifiable. Since there is no conceivable quantification of a consumed util, the theory of utility maximization transgresses the bounds of Popper's demarcation criterion into the realm of non-science. She insists that individual rational calculations cannot be transformed into an aggregate, for 'a unit of measurement implies an agreed convention that is the same for everybody. Locked in the individual's subjective consciousness, it is not a unit at all' (1962, p. 66).

Bruce Caldwell (1994, pp. 150-3) offers a more restrained version of the metaphysics critique. He points to five empirical tests aiming to provide substantiation of the rationality hypothesis (including one that attempts to demonstrate that rats have downward-sloping demand curves). He argues that all five experiments are plagued by such ambiguous interpretations that the rationality assumption could never be

confirmed. For Caldwell, thus far, the thesis is untestable, and one must either reject an ultra-empiricist methodology or abandon the rationality hypothesis as metaphysical (1994, p. 158).

This position will be elaborated on below, however more important for this essay is the second and more common critique, which argues that the comportment of *homo economicus* is wholly 'unrealistic'. Much work in economic sociology implicitly or explicitly makes this point. That is, the imputed assumptions of the *homo economicus* model are plainly said to be false descriptions of real behaviour. Economist Daniel Heymann once remarked that 'practical men of affairs' often distrust academic economics as it seems to describe the behaviour of incredibly smart people in unbelievably simple situations (Leijonhufvud 1993, pp. 1-2). Three-quarters of a century prior, institutionalist economist Wesley Mitchell shared the same scepticism:

In the social sciences we are suffering from a curious mental derangement. We have become aware that the orthodox doctrines of economics, politics, and law rest upon a tacit assumption that man's behavior is dominated by rational calculation. We have learned further that this is an assumption contrary to fact (Mitchell 1918, p. 161).

Thorstein Veblen, too, has forwarded memorably caustic critiques of the 'assumed primordial hedonistic calculus' (1909, p. 633). Political scientist Herbert A. Simon, who coined the term 'bounded rationality', concluded that,

Both from these scanty data and from an examination of the postulates of the economic models it appears probable that, however adaptive the behavior of organisms in learning and choice situations, this adaptiveness falls far short of the ideal of 'maximizing' postulated in economic theory. Evidently, organisms adapt well enough to 'satisfice'; they do not, in general, 'optimize' (Simon 1956, p. 129).

Aside from those arguing contra to Simon a satisficing-as-maximizing line, or those pointing to the immense costs of deliberation, the organisms described in the above quote are not substantiations of *homo economicus*; instead, they use rules-of-thumb that generate suboptimal outcomes.

More recently, detailed empirical descriptions of human behaviour appear to systematically violate the stipulates of *homo economicus*. Findings of this nature abound in the behavioural economics literature.[7] Elizabeth Anderson (2000, p. 173) has concluded that we cannot consistently order preferences; we are poor judges of probabilities; and we do not address risk in the perspicacious manner of the rational man. John Conlisk (1996, pp. 670-2), summarizing a vast amount of



empirical literature in psychology, points to evidence demonstrating that people are capable of a wide variety of reasoning errors which undermines the standard theory of optimization behaviour. In response to the two types of critique posed here, two defences of the rational actor hypothesis, one weak and one strong, are presented below.

Paul Samuelson's (1948) defence, the weaker of the two, aims to respond solely to the question of metaphysics. His theory of revealed preference attempts to provide an empirical basis for utility theory. Samuelson reconstructs utility by approaching its measurement *a posteriori*, so as to ground it in the observable world. According to Wong's (2006) rational reconstruction, revealed preferences were treated— at least in 1948— as the observable counterpart of utility theory.[8] In order to free neoclassical economics from the burden of metaphysics, and set it comfortably back within the realm of science, the introduction of the consistency postulate of behaviour refers only to observable phenomena. Thus, if an agent chooses X instead of Y, she does not in the same moment choose Y instead of X.[9] However, for Mirowski and Wong, this is scientifically awkward as people do not buy the same basket twice at the same time (Mirowski 2006, p. x). Further, if time is allowed to pass, there is the major complication of the possibility of potential changes in tastes. Arguably, this compromises the original goal of operationalizing the old utility theory. For Mirowski, the theory is either a 'tautology' or remains 'entirely toothless' (2006, p. x). On a more basic level, Wong (2006) was able to show that even the most elemental concepts in economics including price and quantity are in fact theoretical and do not correspond to observable phenomena.

In a seminal essay from *Philosophy and Public Affairs*, Amartya Sen (1977) demonstrated what could be interpreted as a potential escape from the circularity of revealed preferences. He noted that neoclassical economics long ago incorporated the difficult reality of altruistic action into *homo economicus* with the sympathy principle. This allowed the rational actor to maximize gains while simultaneously engaging in seemingly selfless behaviour. Along these lines, if an individual chooses to donate to charity it must be because he feels better if the recipients gain the amount donated. Conversely, he would feel worse if the recipients went without. While this allows neoclassical economics to account for a vastly wider array of behaviour, it also amounts to a 'heads I win, tails you lose' scenario. We can always say that, *ex post*, compared against all possible options, the donation must have realized the highest utility for the individual. However, Sen's discussion of commitment driven exchanges as contrasted with sympathy driven exchanges allows for the possibility that some actions may be regarded as non-gain maximizing.

Sen offers an example (1977, p. 328) where there are two kids, kid A and kid B, with two apples, one small and one big. A asks B which apple she wants, and B says she wants the bigger one. Afterwards, A is upset, so B asks which one he would have picked. A says, 'I would have picked the smaller one'. B then replies, 'well you got what you wanted then!' Sen shows that A's hypothetical choice must have come from a sense of commitment or duty to the principle that one should allow another to have a bigger portion, but not from sympathy with B (which would lead to the conclusion that in all circumstances A should hope that B gets the larger apple).

If some decisions and actions are rooted in commitment and not sympathy, then all action cannot be deemed necessarily rational in advance. The fact that action is not necessarily, *prima facie* rational, may serve as a defence of the rational actor, for it removes the concept from metaphysics. The concept is buttressed further if one could show that commitment based consumption is relatively marginal. Accordingly, economists frequently argue that rationality does not describe, by necessity, every action; rather, it is a dominant tendency, and as such it is justified for the heuristic purposes of models, which aim only to bring essential features— such as consistency and priority ordering— into relief. Sen's logical demonstration that all consumptive behaviour need not always be considered as tautologically and automatically rational opens up space for rationality-as-broad-tendency arguments. Economist and game theoretician Ken Binmore has taken this fairly unconvincing defence: 'It is true that *homo economicus* is not a carbon copy of *homo sapiens*. But the discrepancies quoted by critics usually involve deviations from rationality that cost very little, or else occur only rarely' (1998, pp. 13n).

It can be argued that a much stronger, and less contingent defence of *homo economicus* can be constructed out of Milton Friedman's (1953) methodological intervention. Specifically, it is the 'unrealistic' assumptions of the rational actor model, surviving despite years of abuse, which can be justified in part by the so-called F-twist. Friedman's essay concluded that economists need not worry about unrealistic assumptions in their theory. The only valid method of theory appraisal is prediction, and if reductive assumptions generate good predictions, then they are justified retroactively.<sup>[10]</sup> Since the world is infinitely complex, and we must select certain factors and ignore others when we build models, what *other* criteria ought to determine our theoretical assumptions? Differently put, what in particular can tell us that the inclusion of, say, the hair colour of economic agents is spurious? By Friedman's standard, we have a tool instructing us that hair colour ought to be excluded if a more general and less constrained economic agent, with abstractly colourless hair, can generate the same predictions. The criterion allows

us to ascertain which features are relevant or irrelevant for a particular model, and further, how broad or narrow our assumptions ought to be. To extrapolate, the rationality hypothesis discussed here may be warranted if it can be used to predict in a way that a broader and less constrained conception of an economic actor does not. Conversely, rationality may be defended if inclusion of narrower assumptions, hair colour for instance, does not yield better prediction.

The intent of this essay is not to advocate Friedman's methodology in a monistic fashion. The recurrent debunkings that pepper the philosophy of economics literature in the half-century since its publication are not difficult to stumble upon, nor are they insignificant. Eugene Rotwein (1959), a self proclaimed empiricist who saw no problem of induction, criticized Friedman on the grounds that each individual premise of a theory must always be verified. Alan Musgrave (1981) has argued that Friedman is mistaken in overlooking different categories of assumptions employed in economic theories. Daniel Hausmann (1992) has argued that Friedman's criterion is invalid, as it does not allow theory to guide investigation to new application and circumstances.

Lawrence Boland (1979, 1987) has declared that all of Friedman's critics are wrong and upheld an instrumentalist interpretation of Friedman's piece, where theories are mere predictive instruments.[11] The instrumentalist interpretation of Friedman poses a response to the problem of induction, for instrumentalists deny the realist claim that theories make real references; realism is irrelevant in the instrumentalist view, for theories are neither true nor false, they are but instruments. Thus, the F-twist deems the *homo economicus*-as-metaphysical-conception critique irrelevant while wholly embracing, and inverting the *homo economicus*-as-unrealistic-assumption critique. In our view, rather than wading through the extensive secondary literature on Friedman's essay, it is more interesting to take him on face value and employ his method instrumentally. We believe that by his own methodological standard, the venerated logic of neoclassical economic theory can be shown to break down, or at the very least, lose its 'positive' conclusions, namely, the economic optimality of markets.

## **From the individual to the market**

Armen Alchian (1950) set the scene for Becker's contribution discussed below in that he first pointed to the unimportance of the assumption of individual rationality for the derivation of economic theory at the macro-level. Alchian regards

the absence of a proportionate correspondence between decisions and results to be a major defect of the rational maximization program. Further, he argues that,

The existence of uncertainty and incomplete information is the foundation of the suggested type of analysis; the importance of the concept of a class of 'change' decisions rests upon it; it permits of various conflicting objectives ... yet it does not destroy the basis of prediction, explanation, or diagnosis. It does not base its aggregate description on individual optimal action; yet it is capable of incorporating such activity where justified (Alchian 1950, p. 221).

Since we cannot properly link decisions to results, there must be some *external* criterion that generates those predictable phenomena.

Focusing on firms, rather than micro-level rationality of individuals, Alchian forwards a positive profit criterion as a 'survival filter' in a particular environment (1950, p. 211). Firms that continually end up with positive (not maximal) profit tend to be 'selected' for survival. For Alchian, Darwinian survival, chance, particular circumstances, or imitative and trial-and-error behaviour may be more important in determining positive profit than rational motivation on the individual level. Thus, Alchian, in deemphasizing the role of the decision maker, shifts the focus of analysis to the rationality of the market.

Following Alchian's lead, in 1962 Gary Becker sought to resituate analysis at the market level, where economists are more comfortable. Moreover, he sought to rescue the macro-level conclusions of neoclassical market theory by reconciling them with the reality of the existence of 'irrational' behaviour at the micro level. He would do this by formally deriving the downward-sloping demand curve of the aggregate market without the ostensibly crucial assumption of rationality (Becker 1962, p. 2). The negatively inclined demand curve, known as the law of demand, illustrates the inverse relationship between the price of a good and the quantity of that good demanded.

Arguably, the downward-sloping demand curve is a necessary but not a sufficient condition for well-ordered markets. Put more precisely, it is but one testable implication of neoclassical economics. There are, of course, other important implications that would offer useful evidence for this project, for instance, consumer behaviour with respect to inferior goods, normal goods and luxury goods (that is, adherence to 'Engel's law'), or producer behaviour with respect to a single production function for an economy.[12] Broadening and reinforcing this project demands the study of the significance of microfoundations with respect to a handful

of key relationships and results in neoclassical economics. Anwar Shaikh (2004, forthcoming) has in fact been leading this charge by specifying the mathematical conditions under which Becker's model can be extended.

The law of demand, however, is indeed critical as it is a basic and foundational postulate about the nature of consumer behaviour made in microeconomics. Moreover, the law of demand is recognized as an empirically corroborated characteristic of various and diverse markets (Becker 1962, p. 4; Hood 1955; Chiappori 1985; Hardle et al 1991; Wurgler et al 2002). Though testing the law of demand is not perfectly equivalent to testing the entire scope of implications generated from the core of neoclassical theory, we believe the connection between economic rationality and the observed behaviour of markets calls for exploration because the negative relationship between the price of goods and the quantity demanded has frequently been used to illustrate the existence and usefulness of individual economic rationality. It therefore seems a fitting place to question the relationship between the two.

Although Friedman himself did not accept the *homo economicus* model, we believe that Friedman's criterion may be interpreted as a defence of *homo economicus* by virtue of the accuracy of its predictive power regarding macro level theoretical claims.[13] Becker, in turn, defended that macro-level theory by showing that it can be derived without utility maximizing behaviour. Thus, rational or not, the individuals that make the market unwittingly produce a well-behaved market irrespective of the method by which they might make their decisions. The fact that it can be demonstrated that the rationality postulate is not a necessary condition for downward-sloping demand curves rescues important neoclassical macro-level theoretical contributions, but as will be shown, presents problems for equally important auxiliary conclusions.

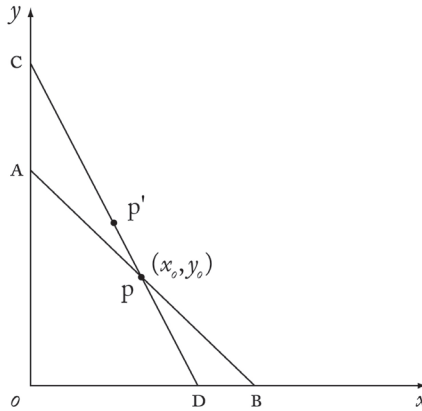
Though Becker clearly specifies the agents in his model it may be considered a macro-level theory in that it is not particularly sensitive to the details and specific characteristics of the micro agents. It is thus unlike the traditional ascent story of neoclassical economics in that it does not start from the micro to explain the macro. The story is in fact a lot closer to the story of emergence in the language of complex systems theory.[14] Here, unlike neoclassical economics, changes in scale may generate qualitative changes such that there is no longer an isomorphic parallel between the whole and the sum of the parts. Another way of talking about emergence is with respect to the unintended effects of individual actions. In our discussion of Becker, it is not as though agents are ignored, but rather market level

order can be seen as an unintended social consequence of their actions. Like the disorganized complexity of the Law of Large Numbers, as more independent agents are added, stochastic uncertainties come to average out (Miller & Page 2007, pp. 46-8). We return to these points below.

Becker's model derives downward-sloping demand curves from two extreme individual agents: impulsive and inert consumers (1962, p. 2).[15] Becker's example begins in two-dimensional space. Here, agents' consumption baskets consist of some combination of two goods and are subject to a finite maximum that is a result of prices and endowment. In other words, the non-rational agents have an endowment that is made up of some amount of one good and some amount of another. In order to model the actions of impulsive consumers, Becker has their choices determined by a probability mechanism that randomly generates values in accordance with the constraints imposed by their budgets (the budget is often referred to as the 'opportunity set' as it represents an agent's opportunity to consume given commodities). Accordingly, rather than consumption decisions being made in order to maximize utility from some consistent and well-ordered set of preferences, they are chosen at random so to avoid even the semblance of rationality. Thus the consumption of any single agent cannot be determined in advance. However, the consumption of a large number of agents would 'be at the middle of the opportunity set' (Becker 1962, p. 5). That is to say, due to the random nature of selection, the aggregate market will exhibit order based on the distribution of the random agents on the demand curve, and this will statistically generate a market wherein reductions in prices correspond to increases in levels of consumption and vice versa. To be sure, this is the same aggregate result generated with assumptions of perfectly rational agents, the downward-sloping demand curve.

Below (Fig. 1) is a slightly modified version of Becker's model (1962, p. 4) of two commodities, X and Y, where AB is the initial budget constraint, with point p as the initial equilibrium given a large number of impulsive agents. CD is the new income compensated budget constraint with point p' representing the new amount of X and Y chosen on average by a large number of impulsive agents. Where rational agents, after the price shift settle at an equilibrium between C and p, the average consumption of numerous impulsive agents lies at the middle of the line CD, or p'. In both cases there is a shift, up and to the left, reflecting the fact that X has become more expensive relative to Y. Thus, as captured by the downward-sloped demand curve, when price increases, quantity demanded decreases.

Figure 1 Becker's model



Source: Authors' adaptation of Becker's model (1962, p. 4)

Inert agents are seen as the opposite extreme of impulsive agents in Becker's analysis, where agents aim to habitually choose what they have previously chosen. After the price change (or after the original budget constraint AB shifts to CD), those inert agents in the pB area would be 'forced' to shift consumption, while those inert agents in the Ap area could remain inert. Those consuming more than level D of commodity X must reduce their consumption. The effect is a downward-sloping demand curve, for after the price change, market consumption of X on average must drop and market consumption of Y on average must rise.

Since the consumption bundle randomly selected by each non-rational consumer must be contained within their opportunity set, changes in the opportunities (due to changes in relative prices) will correspond to aggregate consumption patterns in the market. In Becker's view, agents are 'forced' to act at least somewhat rationally; since they are not able to consume what they cannot afford a change in price results in a direct adjustment in consumption patterns even though this relationship need not hold in each individual case (1962, p. 12). An increase in the price of one good will increase the relative opportunity to consume other goods therefore leaving less opportunity to consume the good in question, thus, most of the individual demand curves will be downward-sloping (Becker 1962, p. 12). Furthermore, while some individual agents may very well have demand curves that are not negatively

inclined, because the aggregate market demand curve will be downward-sloping, so too will their mathematically expected demand curves (Becker 1962, p. 6). The assumption of rationality, therefore, is not required to have a representative agent that reflects the reality of the market, nor is it, most importantly, required to generate a market that obeys the logic of the law of demand.

The conclusions and implications of Becker's work are stunning; however, his work is not without its critics. Israel Kirzner (1962) attempted to demonstrate why Becker's thesis could not be declared a success. He showed that while an aggregate of impulsive or habitual agents may, as Becker showed, respond to changing prices, there is absolutely no explanation of the actual generation or trajectory of those prices. Thus, Kirzner accepts Becker's analysis, however, he claims that Becker ignores the central problem of price determination (1962, p. 382). Price theory for Kirzner requires systematic revision by purposive consumers, where the obstructed plans of the past generate better ones in the present. Inert and impulsive consumers cannot ensure any equilibrating tendency toward the 'right' price. While Becker does not mention this difficulty in his piece, nor does he acknowledge it in his reply (1963) to Kirzner, in our view, the original piece implicitly assumes the existence of a Walrasian auctioneer crying out prices for our impulsive and inert agents. That is, like other neoclassical economists, it might be that Becker assumed his consumer to be a passive price-taker amidst an immeasurable horde of other identically passive price-takers, guided by the rational planning of a Walrasian auctioneer.[16] If this is indeed the case, it is difficult to see how to retain determination at the macrolevel of the market.

Instead of relying on an omniscient designer such as the Walrasian auctioneer, another way to think about price movement can be found in complexity theory. We may look back to discussions of the double auction in Vernon Smith (1962) who demonstrated that in experimental settings, double auction markets would generate prices that parallel those of neoclassical equilibrium. These decentralized experimental markets employing double auction rules still maintained agents motivated by money (or in classroom settings, course credit). What Gode and Sunder (1993) were able to show is that it was the macro level rules alone that were responsible for the movements in prices toward equilibrium values. The authors replaced Smith's human agents with programmed robot traders (called 'zero intelligence' traders) choosing bids and asks randomly from a predefined range. Gode and Sunder's interesting result is that under the restriction of a budget constraint, after a few rounds the robot traders' paths of transaction prices



resembled that of the human agents, both of which represent near equilibrium price series.[17] Similar research (Rust, Miller & Palmer 1992) has shown that instead of clever and self-interested market participants, under specified conditions the mere existence of a set of macro-level rules can generate sets of predictable prices.

Other research into the economy as a complex system has focused on explaining price changes as an emergent property. Transcending the microfoundation of price shifts, recent work in 'econophysics' focuses on 'herding' and 'feedback effects', where price behaviour is heavily dependent on past price behaviour.[18] One relevant finding (Liu et al 1999) is that return distributions at the tails in existing equity markets is characterized by 'power law' behaviour, where small price shifts likely follow small price shifts and large price shifts likely follow large price shifts. The important point is that these regularities are not particularly sensitive to microlevel details.

Taking a general view on price movement inspired by this research, the objection raised by Kirzner dissolves. The emergence view neither assumes strongly rational and purposive price makers as does Kirzner, nor does it assume price-takers guided by a Walrasian auctioneer, as we believe Becker to. Rather than an ultimate reliance on a central planning authority, we believe that the story of emergence is not only compatible with Becker's initial experiment but that it is strongly in the spirit of that project.

## Conclusions

Historically, many economists have observed the macro order of markets, and consequently assumed, *ex post*, the existence of the rational agent as a mere scaled down replica at the micro-level. Conversely, those studying individual behaviour, including empirically-minded economic sociologists, who have frequently regarded the rational actor as a mere fabrication, can easily arrive at the existence of an disorderly market, despite evidence to the contrary. The assertion that agents' purchase decisions are determined by a rational process, guided by a clear and unchanging set of preferences seems, in light of Becker's contribution, to be *just one* possible explanation for predictable market outcomes. Allowing for the existence of non-rational behaviour does not deny the possibility that some decision-making may miraculously accord with the ideal construct of *homo economicus*. However, it does sanction a model that is much less restrictive. William Milberg (2009, p. 45) has noted that while economics is currently in methodological disarray, the goal

of generalization— or deriving the same result with weaker assumptions— has long been accepted as a criterion for the advancement of economic knowledge. As Donald McCloskey put it, 'Relaxation of assumptions is the essay-maker of modern economics' (1985, p. 71).

The dissolution of the rational actor by Friedman's criterion may be regarded as a forward move within neoclassical economics, for the predictive power of the negatively sloped demand curve is maintained while allowing for the freedom to account for a wide spectrum of individual behaviours. The function of the model is preserved but its applications are now much broader. It is no longer necessary that individuals be considered rational in order to explain the functioning actuality of the market. Whether or not agents are rationally maximizing their utility, they are disciplined and limited by the macro order of the market to the extent that their opportunity to consume is restricted by their actual budget. Hence, the fact of the market may analytically coexist with a wide variety of empirically observed individual behaviours.

It should be noted here that this paper is not a study of the behaviour of individuals. Quite the opposite, if one accepts Becker's contribution and then employs Friedman's method, it can be conceded that neoclassical economics need not confine itself to a particular vision of individual behaviour. Surely, the employment of a non-rational agent captures nothing of interest, or *essential*, about actual people. This need not be a jarring conclusion. After all, unlike psychology, neoclassical economics, as we see it, has never been the *direct* study of individual behaviour; it is the study of the ramifications of that behaviour. In fact, lack of commitment to a particular kind of individual behaviour can be a useful research strategy. For example, the Becker-Tomes (1979) overlapping generations model includes certain individual level assumptions that are wildly unrealistic. The model projects a world populated only by females that have non-interacting dynasties, each with a single child across time. And yet, this class of model can elucidate certain kinds of empirical problems (e.g., the intergenerational transmission of socioeconomic status) but certainly not others (e.g., basic demographic problems in the social sciences). This usefulness will depend on the question being asked and the answers they facilitate.

We should also say, that if these kinds of conclusions do help to open up space for a reconceptualization of the individual, this time, Friedman's method will be useless as a guide. Instead, the only direction toward this end can be the vast amount of available empirical evidence. As noted above, despite the emphasis on choice,

neoclassical economics has never taken much interest in understanding the nature of those choosing subjects who, as David P. Levine notes, 'do not always, or often, know what they want, truly want what they imagine they want, or gain satisfaction from acquiring what they think they want' (1998, pp. 1-2). Philip Mirowski, on the other hand, is sceptical of any possibility for the reconceptualization of the individual within the field of economics: 'The hot deliquescence of the *homo economicus* is the dirty little secret of fin-de-siècle neoclassical economics, one that only becomes increasingly apparent with every subsequent game-theoretic model. Nothing seems poised to reverse the neoclassical hollowing out of human beings into hulking mechanical shells....' (2002, p. 564).

The power of the concept of the non-rational agent is not descriptive in any way—or, in instrumentalist language, the concept does not make any real references—but its employment does compromise the latent or effective project of the rational actor model, which has been to justify the institutions of modern society. Additionally, the employment of a non-rational agent may have the important effect of curtailing the tendency to narrowly and deductively define individual ontology, and in turn, shift neoclassical economists' research focus entirely to actually existing markets.

Even more ambitiously, it can be argued that the introduction of the non-rational actor demands broad methodological repercussions. Even Sir Karl Popper (1957, p. 149) believed that the social sciences ought to be concerned with the unintended rather than intended effects of individual action. Where the rational actor model demands the reduction of all social facts to individual calculations, the non-rational actor reveals asymmetries between micro and macro realms, demands the abandonment of the reductionist project and allows for the possibility of a separate and irreducible study of the social.

In this paper, our new and essentially blank individual provides a kind of defence of the predictive power of the neoclassical supply and demand macro model. However, this lifeless agent carries with it grave implications. The optimality of markets is based on the maximizing behaviour of their constituents. Even if we put all market imperfections to the side, given Becker's contribution, neoclassical economists cannot justifiably say *a priori* that the individuals that constitute the market are maximizing their utility. Accordingly, if utility is not being maximized in market interactions, then we can no longer follow Pareto in claiming that the outcomes arrived at through the market are optimal. It is then no longer possible to wed the aggregate maximization of utility to actual markets in any definite way.

More than half a century ago, Milton Friedman demonstrated that the best way to devastate one's opponents is to adapt their methods and employ them to alternate ends in a more inventive way. This paper has argued that Friedman's prediction criterion combined with Becker's macro derivation of key aspects of market order allows for the abandonment of the rationality postulate. Of course, no neoclassical economist is comfortable with the rejection of the concept of individual rationality. Nobel Prize winning economist Kenneth Arrow once declared that 'an economist by training thinks of himself as the guardian of rationality, an ascriber of rationality to others, and the prescriber of rationality to the social world' (1974, p. 16). He was well aware of what is at stake, for without individual rationality we must do away with the optimal market construct. But without market optimality, the market loses its most powerful justification; in other words, it becomes, just another institution incapable of claiming the vaunted prize of optimality. With the laissez-faire market as just one conceivable system of resource allocation, the practical question of social welfare must be separated from the theoretical concept of economic optimization. Once we abandon the model of an autonomous and external force as neutral manager of the optimal social welfare, we are forced to rethink the macro coordination of socioeconomic decision-making, and perhaps, divorce it entirely from the fantastical sphere of the purely economic.

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## Endnotes

[1] See also Hutchison (1953, pp. 216-30) for an influential reading of Pareto.

[2] It should be noted that we use masculine pronouns in this essay only because they seem wholly appropriate to the construct of the rational economic man.

[3] In the jargon of philosopher of science, Imre Lakatos (1978), the 'hard-core' elements of a scientific theory are those irrefutable premises from which all refutable hypotheses are born. Arguably, an important element in the 'hard-core' of

neoclassical economics is rational individual action. See Glass and Johnson (1988) for a defence of the metaphysical foundations of neoclassical economics.

[4] For standard textbook interpretations, see Varian (2003, p. 35) and Pindyck and Rubinfeld (2005, p. 66).

[5] See Frank and Bernanke (2003, pp. 81-2) for a typical discussion along these lines.

[6] It is worth noting that *homo economicus* is a creature rooted in the ideals of the Enlightenment. While this individual reflects the spirit of free will and rationality so celebrated in the philosophy and literature of the 19<sup>th</sup> century, it equally reflects the new partitioning of social knowledge and the attendant possibility of a separate economic science. Moreover, this ideal type was informed by the real historical shift to a society that relied more and more on capitalist markets and impersonal political institutions as contrasted to a society of command and adherence to absolute authorities.

[7] See DellaVigna (2009) for a summary of recent evidence from behavioural economics.

[8] See also Mirowski's (1989, p. 364) interesting discussion of Samuelson and Wong.

[9] See Kavka (1991) for a discussion on a parallel to the intransitivity problem of collective choice at the level of the individual.

[10] Much more than the influence of Popper, Friedman's essay is best understood in the context of the empirical challenge to neoclassical theory in the 1940s. Richard Lester, a labour economist drew attention to survey data on the decision making of business people that contradicted a number of central claims of marginalist thinking. Friedman's contribution is in part a reaction to the claim that economic theory ought to be rooted in the practice of business management. For elaboration on this controversy, see Backhouse (2009).

[11] It is worth noting that Friedman has completely accepted Boland's interpretation (1987, p. 2).

[12] Engel's law asserts that with given preferences, the percentage of an individual's total income spent on a good such as food will decline as total income increases.

[13] Despite the dictates of his own methodological criterion, Friedman preferred his famous 'as if' postulate (1953, p. 22). Phenomena, in the world of observation,

do not actually have to behave in accordance with the assumptions made; rather, given the predictive effect of the assumption, it is 'as if' the observation operated in accordance with the assumption in a highly simplified world. Friedman's actors are not rational themselves, but in effect, they are forced to behave as if they were rational. The conditions in which market actors exist impel them, at threat of their survival, to take account of costs and benefits. However, this admission gives away everything, for if actors do not rationally weigh options as an ingrained function of their inner psychology, but rather are forced to make choices as a result of external pressures, then they cannot be said to maximize their subjective utilities. Consequently, non-utility maximizers, when aggregated, must generate a non-utility maximizing market.

[14] Though debate on what defines a complex system is to some extent open, John H. Miller and Scott E. Page argue that the field 'challenges the notion that by perfectly understanding the behavior of each component part of a system we will then understand the system as a whole' (2007, p. 3). For an interesting retroactive application of complex systems theory to various debates in classical political economy, see Foley (2003); he argues that unlike the comparative statics of much microeconomic thinking, classical political economists from Smith to Marx, largely understood problems of demography, competition, and technical change as emergent and complex phenomena.

[15] John F. Chant (1963, p. 505), in his comment on Becker's piece, argues that in fact, the two agents do not lie on either extremes of one spectrum; rather, it is argued that the two agents exist on entirely separate continuums. Hence, the intent of Chant's argument was to demonstrate that the consistency of Becker's irrational agents with economic theory is not as general as claimed.

[16] The Walrasian auctioneer is a concept that allows for the determination of consumer and producer decisions given already established prices. In effect, it is an imaginary central planner who calls out market clearing prices leaving agents simply to decide on output. This negates the process whereby market agents test out markets, potentially fail to buy or sell, and affect the price structure. It leaves out the problem of exchange under disequilibrium. In this thinking, disequilibrium exchange may not realize preferences, for the knowledge of economic opportunities available exists in the form of equilibrium prices and with that knowledge distorted the market cannot realize individual preferences. Instantaneous equilibration does away with this problem by giving equilibrium prices to agents before exchange even occurs. It should be noted that this scheme arguably removes competition, at least

in the Smithian sense. Smith's process of dynamic equilibration is very different in that exchange is always disequilibrium exchange. Equilibrium in this different sense refers to the centre of gravity around which prices tend toward and fluctuate around over time (Foley 1998, p. 55).

[17] The budget constraint here simply disallows buyers to issue bids greater than the redemptive value of the asset and similarly, sellers cannot make offers for less than cost.

[18] See Bouchaud (2001, pp. 162-4) for empirical evidence and simple models on the effects of herding on price shifts.

## References

- Alchian, Armen. A. (1950), 'Uncertainty, Evolution, and Economic Theory', *The Journal of Political Economy*, 58(3), 211–21.
- Anderson, Elizabeth (2000), 'Beyond Homo Economicus: New Developments in Theories of Social Norms', *Philosophy and Public Affairs*, 29(2), 170–200.
- Arrow, Kenneth (1974), *Essays on the Theory of Risk Bearing*, North Holland, Amsterdam.
- Backhouse, Roger E. (2009), 'Friedman's 1953 Essay and the Marginalist Controversy', in U. Mäki (ed.), *The Methodology of Positive Economics: Reflections on the Milton Friedman Legacy*, Cambridge University Press, Cambridge.
- Becker, Gary S. (1962), 'Irrational Behavior and Economic Theory', *The Journal of Political Economy*, 70(1), 1–13.
- \_\_\_\_\_ (1963), 'Rational Action and Economic Theory: A Reply to I. Kirzner', *The Journal of Political Economy*, 71(1), 82–83.
- Becker, G. and N. Tomes. 1979. 'An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility', *Journal of Political Economy*, 87(6), 1153-1189.
- Binmore, Kenneth (1998), *Just Playing*, MIT Press, Cambridge, MA.
- Boland, Lawrence A. (1979), 'A Critique of Friedman's Critics', *Journal of Economic Literature*, 17(2), 503–522.

\_\_\_\_\_ (1987), 'Boland on Friedman's Methodology: A Summation', *Journal of Economic Issues*, 21(1), 380–389.

Bouchaud, Jean-Phillipe (2001), 'Power-laws and Scaling in Finance: Empirical Evidence and Simple Models', in M. M. Novak (ed.), *Emergent Nature: Patterns, Growth and Scaling in the Sciences*, World Scientific Publishing Co, Singapore.

Caldwell, Bruce (1994), *Beyond Positivism: Economic Methodology in the Twentieth Century*, Routledge, London.

Chant, John F. (1963), 'Irrational Behavior and Economic Theory: A Comment', *The Journal of Political Economy*, 71(5), 505–510.

Chiappori, Pierre-Andre (1985), 'Distribution of Income and the 'Law of Demand'', *Econometrica*, 53(1), 109–127.

Conlisk, John (1996), 'Why Bounded Rationality?', *Journal of Economic Literature*, 34(2), 669–700.

DellaVigna, Stefano (2009), 'Psychology and Economics: Evidence from the Field', *Journal of Economic Literature*, 47, 315–372.

DiMaggio, Paul (1994), 'Culture and Economy', in N. Smelser and R. Swedberg, (eds.), *The Handbook of Economic Sociology*, Princeton University Press, Princeton.

Foley, Duncan K. (1998), 'Introduction', in P. S. Albin and D. K. Foley, *Barriers and Bounds to Rationality: Essays on Economic Complexity and Dynamics in Interactive Systems*, Princeton University Press, Princeton.

\_\_\_\_\_ (2003), *Unholy Trinity: Labor, Capital, and Land in the New Economy*, Routledge, New York.

Frank, Robert H., and Ben S. Bernanke (2003), *Principles of Microeconomics*, 2nd ed., McGraw-Hill/Irwin, New York.

Friedman, Milton (1953), 'The Methodology of Positive Economics', in M. Friedman (ed.), *Essays in Positive Economics*, University of Chicago Press, Chicago.

Glass, C., and W. Johnson (1988), 'Metaphysics, MSRP and Economics', *British Journal for the Philosophy of Science*, 39(3), 313–29.



- Gode, Dhananjay K. and Shyam Sunder (1993), 'Allocative Efficiency of Markets with Zero Intelligence Traders: Market as a Partial Substitute for Individual Rationality', *The Journal of Political Economy*, 101(1), 119–137.
- Hardle, Wolfgang; Werner Hildenbrandm and Michael Jerison (1991), 'Empirical Evidence on the Law of Demand', *Econometrica*, 59(6), 1525–1549.
- Hausmann, Daniel M. (1992), *The Inexact and Separate Science of Economics*, Cambridge University Press, Cambridge, UK.
- Hirsch, Paul; Stuart Michaels, and Ray Friedman (1990), 'Clean Models vs. Dirty Hands: Why Economics is Different from Sociology', in S. Zukin and P. DiMaggio (eds.), *Structures of Capital: The Social Organization of the Economy*, Cambridge University Press, Cambridge.
- Hood, William C. (1955), 'Empirical Studies of Demand', *The Canadian Journal of Economics and Political Science*, 21(3), 309–327.
- Hutchison, Terrence W. (1953), *A Review of Economic Doctrines, 1870-1929*, Clarendon Press, Oxford.
- Kavka, Gregory (1991), 'Is Individual Choice Less Problematic than Collective Choice?', *Economics and Philosophy*, 7(2), 143–165.
- Kirzner, Israel M. (1962), 'Rational Action and Economic Theory', *The Journal of Political Economy*, 70(4), 380–385.
- Lakatos, Imre (1978), *The Methodology of Scientific Research Programme*, Cambridge University Press, Cambridge, UK.
- Leijonhufvud, Axel (1993), 'Towards a Not-Too-Rational Macroeconomics', *Southern Economic Journal*, 60(1), 1–13.
- Levine, David P. (1998), *Subjectivity in Political Economy: Essays on Wanting and Choosing*, Routledge, London&New York.
- Lui, Yanhui, Parameswaran Gopikrishnan, Pierre Cizeau, Martin Meyer, Chung-Kang Peng and H. Eugene Stanley (1999), 'Statistical Properties of the Volatility of Price Fluctuations', *Physical Review E*, 60(2), 1390–1400.
- McCloskey, Donald (1985), 'A Conversation with Donald McCloskey about Rhetoric', *Eastern Economic Journal*, 11(4), 293–296.

- Milberg, William (2009), 'The New Social Science Imperialism and the Problem of Knowledge in Contemporary Economics', in S. Gudeman (ed.), *Economic Persuasions: Studies in Rhetoric and Culture*, Berghahn Books, New York.
- Miller, John H. and Scott E. Page (2007), *Complex Adaptive Systems: An Introduction to Computational Models of Social Life*, Princeton University Press, Princeton.
- Mirowski, Philip (1989), *More Heat than Light: Economics as Social Physics, Physics as Nature's Economics*, Cambridge University Press, Cambridge, UK.
- \_\_\_\_\_ (2002), *Machine Dreams: Economics Becomes a Cyborg Science*, Cambridge University Press, Cambridge, UK.
- \_\_\_\_\_ (2006), 'Wong's Foundations after 25 Years', in S. Wong, *The Foundations of Paul Samuelson's Revealed Preference Theory: A Study by the Method of Rational Reconstruction*, Routledge, London, pp. ix-xi.
- Mitchell, Wesley C. (1918), 'Bentham's Felicific Calculus', *Political Science Quarterly*, 33(2), 161–183.
- Musgrave, Alan (1981), 'Unreal Assumptions' in Economic Theory: The F-twist Untwisted', *Kyklos*, 34(3), 377–87.
- Pareto, Vilfredo (1909), *Manual of Political Economy*, reprinted in A. S. Schwier (ed.) (1971), Augustus M. Kelley, New York.
- Pindyck, Robert S. and Daniel L. Rubinfeld (2005), *Microeconomics*, 6th ed, Prentice Hall, Upper Saddle River, NJ.
- Popper, Karl (1957), *The Poverty of Historicism*, The Beacon Press, Boston.
- Robinson, Joan (1962), *Economic Philosophy*, Penguin Books, New York.
- Rotwein, Eugene (1959), 'On the Methodology of Positive Economics', *Quarterly Journal of Economics*, 73(4), 554–75.
- Rust, John, John H. Miller, and Richard Palmer (1992), 'Behavior of Trading Automata in a Computerized Double Auction Tournament', in D. Friedman and J. Rust (eds.), *The Double Auction Market: Institutions, Theories, and Evidence*, Addison-Wesley, New York.

\_\_\_\_\_ (1948), 'Consumption Theory in Terms of Revealed Preference', *Economica New Series*, 15(60), 243–253.

Sen, Amartya K. (1977), 'Rational Fools: A Critique of the Behavioral Foundations of Economic Theory', *Philosophy and Public Affairs*, 6(4), 317–344.

Shaikh, Anwar (2004), *Microfoundations and Budget Constraints*, Unpublished manuscript.

\_\_\_\_\_ (Forthcoming), *The Economic Analysis of Advanced Capitalism*.

Simon, Herbert A. (1956), 'Rational Choice and the Structure of the Environment', *Psychological Review*, 63(2), 129–138.

Smith, Vernon L. (1962), 'An Experimental Study of Competitive Market Behavior', *The Journal of Political Economy*, 70(2), 111–37.

Varian, Hal R. (2003), *Intermediate Microeconomics*, W.W. Norton and Company, New York.

Veblen, Thorstein (1909), 'The Limitations of Marginal Utility', *The Journal of Political Economy*, 17(9), 620–636.

Wong, Stanley (2006), *The Foundations of Paul Samuelson's Revealed Preference Theory: A Study by the Method of Rational Reconstruction*, Routledge, London.

Wright, Erik O., and Joel Rogers (2010), *American Society: How it Really Works*, W. W. Norton and Co, New York.

Wurgler, Jeffrey and Ekaterina Zhuravskaya (2002), 'Does Arbitrage Flatten Demand Curves for Stocks?', *The Journal of Business*, 75(4), 583–608.

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