

# **Economics for Real**

Uskali Mäki and the place of truth in  
economics

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First published 2012  
by Routledge  
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

Simultaneously published in the USA and Canada  
by Routledge  
711 Third Avenue, New York, NY 10017

*Routledge is an imprint of the Taylor & Francis Group, an Informa business*

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*British Library Cataloguing in Publication Data*

A catalogue record for this book is available from the British Library

*Library of Congress Cataloging in Publication Data*

A catalog record has been requested for this book

ISBN: 978-0-415-68654-9 (hbk)

ISBN: 978-0-203-14840-2 (ebk)

Typeset in Times  
by Wearset Ltd, Boldon, Tyne and Wear



Printed and bound in Great Britain by  
TJI Digital, Padstow, Cornwall

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## 10 Pragmatism, perspectival realism, and econometrics<sup>1</sup>

*Kevin D. Hoover*

It does not follow that, because a mountain appears to take on different shapes from different angles of vision, it has objectively either no shape at all or an infinity of shapes.

E.H. Carr

### 1 The metaphysics of the econometrician

Modern economics is a modeling science. The fact that econometric research of various sorts dominates the journals suggests that it is also an empirical science. Naturally, these facts together raise questions about models and their relationship to the world. In particular, what do economic or econometric models represent about the world? In a recent book, Ronald Giere (2006: 3–4) refers to the ‘hard realism of many philosophers of science’ and the ‘objective realism’ of physical scientists. Giere himself offers an alternative to objective realism that he calls *perspectival realism*.<sup>2</sup>

Economists frequently model themselves on the scientific aspirations of the natural sciences. So it is surprising that econometricians often (perhaps even typically) do not share the physicists’ taste for objective realism. Reflection on the metaphysical and epistemological bases for econometrics is relatively rare among econometricians – practitioners usually just want to get on with the job. One source of philosophical reflection is found in Haavelmo’s ‘The Probability Approach in Econometrics’ (1944). His views are widely shared in the profession – in no small measure because his seminal monograph shaped econometric thinking. A second source is the remarkable conversation among the econometricians David Hendry, Edward Leamer, and Dale Poirier published in the *Econometric Theory* in 1990.

Econometricians are drawn to what Giere characterizes as ‘constructivism’ or to other varieties of anti-realism such as ‘instrumentalism’ or ‘nominalism.’ Haavelmo (1944: 3) writes: “whatever ‘explanations’ we prefer, it is not to be forgotten that they are all our own artificial inventions in search of an understanding of real life; they are not hidden truths to be ‘discovered’.” Leamer rejects the reality of one of Hendry’s key concepts: ‘I ... don’t think there is a true data generating process...’ (Hendry *et al.* 1990: 188). And later, Leamer

questions the reality of the parameters that econometricians estimate: 'parameters are useful constructs for helping me understand complexities in the world. They are creations of my own intellect and not real features of the world' (Hendry *et al.* 1990: 197). Leamer is the most constructivist of the participants in the dialogue. Yet, even Hendry allows that some parameters are fictions. And in discussing 'causality', Hendry argues that it 'is only definable within a theory' (Hendry *et al.* 1990: 184).

Even while maintaining such constructivist views, econometricians continue to feel the tug of realism. Hendry, for example, continues his discussion of causality:

Nevertheless, one is looking for models which mimic causal properties so that we can implement in the empirical world what the theorist analyzes: namely, if you change the inputs, the outputs behave exactly as expected over a range of interesting interventions on the inputs.

(Hendry *et al.* 1990: 184)

If there is a property of the world that can be mimicked, in what sense is it that causal relations exist *only* as properties of a theory or model? Haavelmo (1944: 12) talks of econometricians constructing systems to 'copy reality'. A model is, of course, a construction; yet a *copy* is not an unconstrained construction.

There appears, then, to be a tension in the methodological thinking of econometricians. They are pulled sometimes in the direction of constructivism and other times in the direction of realism. Econometricians, even methodologically reflective ones, are not philosophers, and a principle of interpretive charity suggests that we not try to parse every utterance. Rather, we should look for an interpretation that supplies maximum coherence to their views, while at the same time clarifying genuine differences among them. My suggestion is that Giere's perspectival realism provides a starting point for that charitable interpretation. I also want to suggest that perspectival realism is ultimately a form of pragmatism. Pragmatism is frequently seen as a species of anti-realism, which may well be true if William James and John Dewey are regarded as its exemplars. I prefer to draw on the original pragmatism of Charles S. Peirce, which supports an account of realism that both enriches Giere's account and suits the metaphysical attitude of econometrics.

## 2 Perspectival realism

Uskali Mäki (1998: 404–406) tells us that particular forms of realism are distinguished according to what entities they claim to exist and according to their epistemic attitude – that is, according to how existence is related to knowledge of the entities claimed to exist. Bas van Fraassen (1980: 8) – not himself a supporter of the view – characterizes 'scientific realism' (in this context a synonym for objective realism): 'Science aims to give us, in its theories, a literally true story of what the world is like; and acceptance of a scientific theory involves the belief

that it is true.'<sup>3</sup> The scientific realist, on this account, claims that the entities in models and theories – if they are correct – provide *uniquely* true descriptions of the entities in the world and that the existence of those entities is independent of the scientist.<sup>4</sup> As Mäki points out, the independence of real entities from the scientist can be filled out in various ways; but social sciences, which invoke intentional behavior as essential, if they are to be compatible with scientific realism, require a weak form of independence: for example, that a social or economic entity '*exists independently of any particular act of representation of it*' (Mäki 1998: 406).

Giere contrasts perspectival realism with scientific realism. The perspectival realist can say:

According to this highly confirmed theory (or reliable instrument), the world seems to be roughly such and such. There is no way legitimately to take the further objectivist step and declare unconditionally: 'This theory (or instrument) provides us with a complete and literally correct picture of the world itself'.

(Giere 2006: 6)

The scientific realist is committed to the uniqueness of true models – not to the assertion that current models are the true ones, but to the notion that the target of scientific inquiry is a uniquely true model. Constructivists deny the uniqueness of true models. It has become a commonplace that an infinity of competing models of phenomena always exist. Taken synchronically, this claim appeals more to the philosopher than to the practitioner, who often finds that even *one* adequate model is beyond reach. Yet taken diachronically the point is more compelling: the history of science is a history of model succeeding model, with entities that appear essential in an earlier model disappearing from the conceptual framework of later models. This is the history that supports the 'pessimistic induction' that scientific theories will not converge on the one true theory (Laudan 1981). The non-uniqueness of models in scientific practice gives comfort to the relativists and poses a problem in need of resolution for the scientific realist. The issue is reflected in the debates in economics over instrumentalism.<sup>5</sup>

Giere bases his account of perspectival realism in a characterization of the relationship of representation. Representation is not, Giere suggests, a two-place relationship between, say, a model or theory and the world. Rather it is a four-place relationship: an agent *S* uses *X* to represent an aspect of the world *W* for purposes *P* (Giere 2006: 60). Here *X* can be filled in a various ways, including, for example, with an econometric model; and *S* can be filled in as 'an individual scientist, a scientific group, or a larger scientific community'.

The perspectival element of representation is clear in the intentional content of agents acting for purposes (*S* and *P*) and in the implicit understanding that *X* is not unique. It is less obvious where the realism lies in representations conceived in this way. Giere's favorite example of a perspective is not, as in the

original reference of the term, to geometry but to color vision (Giere 2006: ch. 2). He provides an account of the mechanisms of color vision that shows how colors are the product of an interaction between the physical facts, such as electromagnetic frequency, and biological mechanisms. On this account, colors are not properties of the world independent of perceivers. Yet color perceptions do correspond to how the world really is from a particular point of view or perspective. Perspective matters: the world really is colored differently from different perspectives. Colors change with, for example, changing light. The colors perceived by birds with a tetrachromatic visual apparatus and sensitivity to ultraviolet light are different from those perceived by humans with a trichromatic visual apparatus, which, in turn, are different from the colors perceived by humans with a dichromatic visual apparatus (color blindness).

Color vision is offered principally as an analogy to clarify what is meant by *perspective*. Birds, people with normal vision, and the colorblind do not share a perspective on color, but there is no fundamental incompatibility among their perspectives, even if they support different capabilities. The reality of color-relative-to-perspective resides in Giere's view in the constraints that generate intersubjectively reliable judgments from each perspective. The analogy is, however, imperfect for the purpose of analyzing models or theories perspectively. The perspectives implicit in Giere's analysis of representation as a four-place relationship are intentional (agents represent the world for purposes) and voluntary (there is a choice of representational instruments). Color vision typically displays neither intentionality nor voluntariness, except in special cases: for example, when perspective is modified through the use of filters. The special cases provide closer analogies to Giere's main point that theories, models, scientific instruments, and so forth create perspectives, which are nonetheless constrained; so that while we cannot say that a representation is true in an unqualified way, we can say that it is true from such and such a perspective.

### 3 Pragmatism

#### *Realism and Peirce's theory of inquiry*

Realism is an ontological doctrine; perspective is an epistemological consideration. As already observed, Mäki's (1998) taxonomic analysis notices the tension between realism, which stresses the independence of existence from thought, and perspectivism, which stresses relativity with respect to certain instruments of thought. Some realisms require only *independence* from particular acts of representations. Perspectival realism seems to imply *dependence* at least on certain classes of representation – i.e., representations from particular perspectives – if not on any particular acts of representation. Though Giere focuses more on perspectivism than on realism, he nonetheless embraces the tension inherent in tying them together. I want to suggest that Peirce's pragmatism can substantially relax the tension and elaborate perspectival realism in a manner that restores some of the balance between realism and perspectivism and complements Giere's approach.<sup>6</sup>

Peirce's pragmatism begins with a theory of inquiry. Inquiry begins in doubt and doubt in surprise (CP 2.242).<sup>7</sup> A surprise is a disappointed expectation – the world does not work as we believe that it should (CP 5.512). Surprise induces the uncomfortable state of mind that we call doubt. The object of inquiry is to alleviate doubt – i.e., to fix belief so that what was previously surprising is compatible again with our beliefs (CP 2.1). Belief, then, is the key; for we can be surprised only against a background of belief.

But what is belief? According to Peirce its main properties are, first, that it is the object of awareness; second, that it appeases doubt; and, third, that it establishes a habit or rule of action (CP 5.397). Consider these properties in reverse order.

For Peirce, the third property states the connection between belief and action. What we believe is what we are actually prepared to act on. A rule of action provides the basis for surprise. We expect things to develop according to a rule, and a surprise is the exception to the rule. Without the rule, there can be no exception.

The second property underlines the mutual relationship of belief and doubt. Doubt is a form of unease or indecision with respect to action. One may feel doubt; nonetheless, doubt is not fundamentally a psychological condition but a failure to find a stable rule of behavior. Doubt inhibits action; belief provides a guide to action (CP 2.210, 2.148, 5.27–32, 5.417). The point of inquiry is ultimately the fixation of belief.<sup>8</sup>

The first property raises a question: what is it that we are aware of when we are aware of our beliefs? Or, to put it differently, what is the object or content of our beliefs? Peirce's answer is the *pragmatic maxim*:

Consider what effects, that might conceivably have practical bearings, we conceive the object of our conception to have. Then, our conception of these effects is the whole of our conception of the object.

[CP 5.1]

Peirce's pragmatism is not an account of truth – 'whatever works is true'. Nor is it practicalism that ranks beliefs on their instrumentality (CP 5.1, 5.3, 5.412). Rather it is an account of meaning. The meaning of any claim rests in the actions that it supports. (Peirce adopts a wide conception of action that includes a sphere of intellectual action.) The identity conditions for beliefs are related to action.

The essence of belief is the establishment of a habit; and different beliefs are distinguished by the different modes of action to which they give rise. If beliefs do not differ in this respect, if they appease the same doubt by producing the same rule of action, then no mere difference in the manner of consciousness of them can make them different beliefs, any more than playing a tune in different keys is playing different tunes.

(CP 5.398)

In his early essay 'How to Make Our Ideas Clear' (CP 5.388–5.410), Peirce illustrates his point with two figures. Figure 10.1 is a pattern of 97 dots arranged in an octagon; Figure 10.2 is a 45° rotation of Figure 10.1.<sup>9</sup>

To believe that any objects are arranged as in Fig. 1 [here referred as Figure 10.1], and to believe that they are arranged [as] in Fig. 2 [Figure 10.2], are one and the same belief; yet it is conceivable that a man should assert one proposition and deny the other. Such false distinctions do as much harm as the confusion of beliefs really different, and are among the pitfalls of which we ought constantly to beware, especially when we are upon metaphysical ground.

[CP 5.398]

In a manner consistent with his claim of the identity of a tune with its transposition into another key, Peirce seems to suggest that the relationships between the dots constitute reality, while the orientation relative to the reader does not.

Peirce stigmatizes the distinction between the two figures as false or imaginary. Implicitly, their reality inheres in what the two figures share in common. Can we relate this implicit understanding of reality with Peirce's explicit metaphysics? Peirce's metaphysics ultimately developed around three categories, elaborated in various ways throughout his life.<sup>10</sup> The categories can be summarized as *firstness* or presentness; *secondness* or struggle; *thirdness* or law. Our focus is on secondness and thirdness. *Secondness* is epitomized by existence or resistance. Experience is largely second: ideas are irresistibly borne in upon us. Truth is similarly second: 'The essence of truth lies in its resistance to being ignored' (CP 2.139). Thirdness is reflected in generalizations, laws, and universals. *Realism* for Peirce is the doctrine that generals exist, which is the

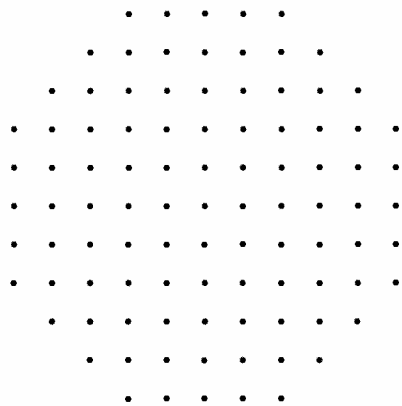


Figure 10.1 Source: *Collected Papers of Charles Sanders Peirce*, vol 5, para. 398).

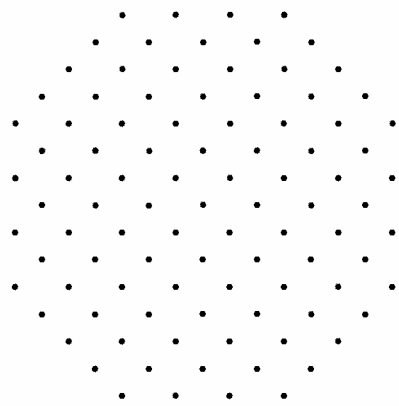


Figure 10.2 Source: *Collected Papers of Charles Sanders Peirce*, vol 5, para. 398).

secondness of thirdness. Peirce's realism is of the type classified by Mäki (1998: 404) as *Aristotelian realism*. Peirce himself refers to his position as *scholastic realism*, which is consistent, since the scholastics took Aristotle as their touchstone (CP 5.93–5.102).

While truth is largely second, the objects that are truly represented are largely third. Peirce connects generality with habit. What is ultimately real is what is truly represented in our beliefs. And Truth is the opinion that is ultimately destined to be believed. The Truth is what will be beyond all doubt in the fullness of time (CP 5.416, 5.565, 5.569, 7.187). To acknowledge the Truth as a regulatory ideal is not to suggest that we have it at any actual time (CP 5.557). Peirce is, in fact, a fallibilist, who regards all of our beliefs as potentially open to revision (CP 1.159–1.162). The notion of Truth does connect Peirce's conception of realism to his epistemology. Reality for Peirce is not necessarily independent of mind; for it is connected to belief. But it is independent of any of our particular opinions. Science is social. Its goal is what all *should* believe. And varieties of perspectives and beliefs are powerful sources of the doubts that drive inquiry forward. Belief establishes habit; habit is generality; and without generality there is nothing for inquiry to understand, no habits to be formed, and no basis for action or inquiry. Pragmatism for Peirce is the scientific method of fixing beliefs, and reality is the object of those beliefs (CP 5.384).

Putting this schematically, Peirce may sound like an adherent to Giere's 'hard realism', but details matter. Inquiry for Peirce starts in the contrast between belief and doubt. Surprise, the motor of inquiry, requires prior belief and doubt exists only against a background of undoubted beliefs. The necessary contrast would vanish if everything was in doubt. Practically, some beliefs are indubitable. Peirce ridicules Descartes' skeptical project:

We cannot begin with complete doubt. We must begin with all the prejudices which we actually have. . . . These prejudices are not to be dispelled by a maxim, for they are things which it does not occur to us *can* be questioned. Hence this initial skepticism will be mere self-deception, and not real doubt; and no one who follows the Cartesian method will ever be satisfied until he has formally recovered all those beliefs which in form he has given up. . . .

(CP 5.265)

Peirce's acceptance of indubitable beliefs is consistent with his fallibilism, since it is not a claim that any belief is permanently beyond doubt, but only that many beliefs are not in fact doubted and cannot be doubted by mere acts of will:

A person may, it is true, in the course of his studies, find reason to doubt what he began by believing; but in that case he doubts because he has a positive reason for it, and not on account of the Cartesian maxim. Let us not pretend to doubt in philosophy what we not doubt in our hearts.

(CP 5.265)



For Peirce, inquiry is, then, deeply perspectival, the perspective structured by our indubitable beliefs. We cannot get behind our indubitable beliefs: 'you cannot criticize what you do not doubt' (CP 2.27). And when such beliefs are used as premises in arguments, 'they cannot be more satisfactory than they are' (CP 5.376). There are no foundational truths. Peirce rejects radical empiricism as firmly as he rejects Cartesian rationalism: empiricism

proposes that we should begin by observing 'the first impressions of sense', forgetting that our very percepts are the results of cognitive elaboration. But in truth there is but one state of mind from which you can 'set out' – a state in which you are laden with an immense mass of cognition already formed, of which cannot divest yourself if you would; and who knows whether, if you could, you would not have made all knowledge impossible to yourself. ... Now that which you do not doubt, you must and do regard as infallible, absolute truth.

(CP 5.416)

The infallibility of such beliefs is local and contingent and is entirely consistent with Peirce's fallibilism. Experience may induce doubts, and shifting perspectives supplied by attempting to comprehend the competing beliefs of others may induce doubts. Our perspective truly shifts only when our hitherto indubitable beliefs become infected with doubt.

#### *A pragmatic account of perspectivism*

In Giere's account of color vision, the perspective of, say, the human color schema is defined by certain given facts about the physics of light and about the biology of the human perceptual apparatus. However, as I noted already, color vision does not supply an account of perspectivism as a feature of epistemology, but serves as an analogy through which Giere hopes to convey what he means by 'perspective' in other contexts. In his more general account, models or theories serve to define perspectives through their instrumentality in representation. So far, Giere's account is consistent with Peirce's pragmatism.

In focusing on instrumentality, however, Giere's four-place relation of representation runs the risk of personalizing the perspective supplied by the model in a manner that, from Peirce's point of view, might undermine the claim of perspectivism to be a form of realism. Representation in Giere's account is something that agent *S* does for his own purposes *P*, and whether the representation is successful is relative to the purposes of the agent. Reality and the truth of a representation may well be relativized for Peirce to purposes; it cannot be relativized to agents. Scientific inquiry for Peirce is social but not individual – even when the individuals are groups or communities. Truth about reality transcends particular people. Giere fails to emphasize that there are features of the relationship between a model or theory *X* and an aspect of the world *W* that transcend *S* and *P*. Nonetheless, it is implicit in his example of color vision, which is

explicated through a particular account of the sciences of light and vision that Giere takes as given and independent of any particular *S* or *P*.

Pierce runs the opposite risk of failing adequately to note that individual perspective is relevant to action and constraining. We agree with Peirce that Figures 10.1 and 10.2 are the same figures only if (1) we take the perspective of a reader visually above the plane of the figure and (2) we assume that, for any purpose in question, a rotation is irrelevant. Neither need be the case. Consider, for example, that the figures are diagrams as seen from above of the placement of columns for which the minimum distances between any of the points (columns) is slightly greater than the diameter of a bowling ball. Imagine a figure standing below the bottom of one of the figures, whose purpose is to roll a ball through the field of columns without striking any of them. For such a bowler, the perspective (the rotation of the figure) matters vitally: his goal is achievable if Figure 10.1 provides an accurate representation, but not if Figure 10.2 does. To return to one of Peirce's earlier examples, tunes in different keys are in fact sometimes different in respects relevant to particular musicians and audiences and their purposes.

A successful perspectival realism needs to make sense of the transcendence of the relationship between model or theory and the aspect of the world it represents, on the one hand, without giving up on the irreducibly perspectival nature of knowledge, on the other. Maps and mapmaking provide relevant lessons.<sup>11</sup>

Figures 10.1 and 10.2 can be regarded as maps of the field of columns. The map does display the field as an octagon, but this is not how the field looks from the bowler's perspective. The map helps the bowler to understand his constraints, but only by taking a perspective (a bird's-eye view) that is not open to him immediately. It is precisely from this perspective that Figures 10.1 and 10.2 can be regarded as not different according to the pragmatic maxim, since they convey the same information provided that the bowler can orient himself relative to the map – that is, provided that he can implicitly or explicitly place the marker 'you are here' on the map that corresponds to his actual situation on the ground. The transcendence of the map from personal perspective rests in its ability to represent a set of possible perspectives from a perspective more general than those faced by the bowler.

To construct a map, we may actually occupy a more general perspective. A surveying party may make measurements from a mountaintop on which to base the map. The mountaintop still provides a constrained perspective, although it may be unconstrained relative to the perspectives of any people on the plain below.

Another way to construct a map is not to occupy a higher or more general perspective, but to construct it virtually – that is, find a projection that unifies the ground level perspectives from a point of view not open to those on the ground. The bird's-eye view is possible even if there are no birds. This is, in fact, the manner in which maps have been constructed historically. The combination of a variety of limited terrestrial perspectives were combined long ago to construct maps on globes, to project a perspective that was not physically possible before the advent of manned and unmanned satellites. Relative to the space of humanly possible perspectives, the view that one had of the world through the instrumentality of a globe before the twentieth century was a view from nowhere.

The reality represented by a map, the reality that encourages Peirce to treat Figures 10.1 and 10.2 as pragmatically indistinguishable, resides in the fact that the map represents a set of constraints that binds together and generalize (with respect to persons and purposes) a set of admissible perspectives and allows us to account for the way the world looks from those different perspectives. To acknowledge such transcendence is not to accept the scientific realist's notion of a final unique representation, what Paul Teller (2001) calls the 'Perfect Model Model.' A final Representation of Reality, like Truth, is at best a regulatory ideal, not a theory or model that is even conceptually possible. Nancy Cartwright (1999) may be correct that the world is irreducibly 'dappled'; Teller may be correct that apparently incompatible perspectives on apparently the same entities are irreconcilable; nevertheless, the power that comes from finding a common perspective makes the effort worthwhile. That there is no view from nowhere does not imply that we should give up looking for a higher place to stand.

#### 4 Econometrics in perspective

There is a fundamental complementarity between perspectivism and Peircian pragmatism. Perspectivism emphasizes the variety of points of view that one might take on reality. Pragmatism emphasizes the process of inquiry and, within it, the relationship of different perspectives. Representations of their mutual constraints, as for instance in a map from a virtual perspective, is part of putting the realism into perspectival realism. Econometricians may have sensed this complementarity. Haavelmo (1944: 12) for example, argues that econometricians 'try to construct systems of relationships to *copy reality as they see it from the point of view of a careful, but still passive, observer*' (*italic emphasis in the original; bold emphasis added*). In any case, the pragmatic version of perspectival realism helps to resolve the initial tension in econometric methodology between the apparent anti-realism in the notion that the entities 'represented' in econometric models exist only through the free construction of models in the minds of the econometrician and the apparent realism in the idea that a successful model must mimic reality.

#### *Truth, approximation, and distortion*

Econometricians are reluctant to refer to models as telling the truth or capturing reality. They typically prefer such locutions as the model is 'approximately correct' or the world behaves 'as if' the model is correct. Haavelmo is typical:<sup>12</sup>

The idea behind this is, one could say, that Nature has a way of selecting joint value-systems of the 'true' variables such that these systems are as if the selection had been made by the rule defining our theoretical model.

(1944: 9)

The question is not whether probabilities exist or not, but whether – if we proceed as if they existed – we are able to make statements about real phenomena that are 'correct for practical purposes'.

(ibid.: 43)

Some philosophers of science – Teller provides a clear instance – maintain similar views:

Each such model, as a whole, fits the world as does a map, with less [than] complete accuracy. What, in such a circumstance, can we say about what in the world corresponds to predicative terms used in such a model? There is nothing in the world which corresponds with complete precision and accuracy to a predicative term, but the world is something like what it would be if it were put together with a property or quantity with just the aspects of its look-alike in the model.

(2010: 419)

The very notions of approximation, precision, accuracy, and fit require a standard against which they can be judged. Perspectival realism implies that there are no such standards except from some perspective. It is easy to forget this fundamental precept.

Giere (2006: 65) is correct that models are not the sort of things that can be true, but that they are instruments for telling the truth. The instrumentality of the model implies that their ability to convey truth can be judged only from a particular perspective. While Giere would no doubt agree in principle, he slips sometimes into perspectiveless standards of evaluation. For example, after correctly recounting the property of the Mercator projection of the globe onto a flat map that straight lines between points on the map correspond to true compass-headings, he nonetheless goes on:

Mercator's map is the one [people all over the world] know best. This is unfortunate because it presents a quite distorted picture of the geography of the Earth.

(Giere 2006: 78)

Giere goes on to point out that Mercator intended his map for a limited purpose (i.e., to point out that it is undistorted relative to his four-place relation of representation or to its perspective). Nonetheless, the idea that a map or model can be considered independently of a perspective is hard to resist. In many cases, it is connected to the vision that Teller stigmatized in his attack on the Perfect Model Model or to the vision of the complete map. Giere uses the standard of the Perfect Model in a way that seems to underwrite a perspectiveless standard of distortion:

the only way any particular model would exhibit an exact fit to the world is if it were a complete model that fits the world exactly in every respect. To

see this, suppose that we have a model that is not complete. That means that there are some things in the world not represented in the model. These unrepresented things may be expected to have some (perhaps remote) causal connections with things that *are* represented. But since these interactions are not represented in the model, the model could not be expected to be exactly correct about the things that it does represent. So only a complete model could be expected to fit the world exactly. ... [M]odels capture only limited aspects of the world, leaving many unknown interactions to prevent any significant model from being exactly correct.

(2006: 66–67)

Giere's position seems to be that to be precisely correct about anything, a model must be correct about everything. It is hard to understand how such a view can be squared with the otherwise radical perspectivism that Giere advocates.<sup>13</sup>

A similar argument (over maps) is found among the econometricians. Leamer interprets an ordinary street map with color-coded streets as making predictions 'that some roads are red and some are grey...'; although these predictions are not the useful ones (Hendry *et al.* 1990: 192). Leamer's interpretation is informed by the idea that we start conceptually with the Perfect Model. Map-making is a process of simplification: 'Beginning with a full description of the landscape, including the location of every grain of sand, we can ask which simplifications do little harm for certain classes of decisions' (Hendry *et al.* 1990: 190). Hendry adheres more closely to a perspectival view:

Coloring has nothing to do with the map per se (in the sense that the map represents the structure of the roads) because if in fact the map were incorrect, it would show, e.g., a freeway that did not exist. Such a map is a distortion of reality in an important sense, quite different from the map coloring being red.

(Hendry *et al.* 1990: 190)

The general point is that perspectival realism is consistent with the view that maps or models are not necessarily distorted. Many of the implicit standards against which claims of distortion are made are simply not relevant (or even possible) standards from the perspectives embedded in the map or model in an instrumental context. A map or model can be true – not approximately or roughly true – up to the purposes and precision claimed. We are tempted to say otherwise because we often leave standards of precision or purpose implicit. Generally, we need a distinction between *accuracy*, defined as correspondence between a claim and the world, and *precision*, defined as the fineness of measurement.

To illustrate, consider the savings ratio (savings/GDP) for the United States in the post-war period. It is accurate to say that it takes a constant value of 90 percent with a precision of  $\pm 5$  percent. That we say that the savings ratio is 'not really constant' and that its constancy is only approximate can be justified only

because we appeal implicitly to a more precise standard than the one explicitly invoked. But the existence of such a standard does not make the original statement less accurate or approximately true rather than true.

Sometimes economists refer to 'stylized facts' such as the constancy of the capital-labor ratio. What 'stylized' conveys here is essentially the claim that there exists a level of precision (not explicitly stated) at which it is both accurate and useful to assert the constancy of the capital-labor ratio; while there are finer levels of precision at which it would not be accurate.

The example of the savings ratio is common, but not perfectly general. It need not be the case that our current (or indeed any foreseeable) instrumentation can generate perfectly precise measurements (CP 6.44; Giere 2006: 66). The assumption that infinite precision is the default state in judging the fit of models is another example of the lure of the Perfect Model and a denial of perspectivism. Equally, the measured entity itself may depend conceptually on the level of precision. For example, the U.S. National Ocean Service measures the perimeter of the United States adjacent to the sea either as *coastline* (12,383 miles) or as *shoreline* (88,633 miles) – the distinction resting on the length of the measuring rod employed (cf. Giere 2006: 76). It is tempting to think that the finer measurement is a more accurate approximation to a perfectly precise measurement of the perimeter. Yet, if the best model of the perimeter employs fractal geometry, no perfectly refined, finite measurement may be possible.<sup>14</sup> Precision is thus an integral part of the perspective from which the accuracy of a measurement is to be judged.

A subway map, such as the famous London Tube map, may be perfectly accurate relative to the topology of the stations – that is, it may represent all, and only, those stations that exist and may accurately represent the connections among them. There is no element of approximation in the claim that the map is a true representation from the relevant topological perspective. It is frequently urged that distortions on some dimensions are the cost of utility on other dimensions. Thus, a subway map that also tried to preserve a precise representation of the distances between stations might prove too hard to read for the purpose of a rider navigating the lines and stations. At a looser standard of precision, the map may succeed in accurately representing both the topology and the distances among stations. It is an open question, however, whether that level of precision is useful. And, as we know from the problem of projecting maps on globes to maps on flat surfaces, it may be physically impossible, at any useful level of precision, to simultaneously preserve the topology, distances, *and* the compass headings among stations (Boumans 2005: 172ff.; Giere 2006: 78–80; Peirce CWSP 4.68–4.71). We understand the reality of these constraints precisely because we have the higher order perspective of the globe from which to assess it.

### *Econometric observation and testing in practice*

The perspectival nature of econometric models is implicit in the distinction between econometrics, on the one hand, and statistics as applied to economics, on the other. Economists point to the role of prior economic theory as

providing the lens through which econometric estimates measure the strength of relationships or identify the causal connections among variables. The *identification problem* supplies the paradigm case. In the most shopworn example, observations on prices and quantities of a good can be identified as supply and demand curves, whose elasticities can be measured, only from the perspective of identifying assumptions: maintained and, at least, locally uncriticizable assumptions about the causal structure of price, quantity, and additional variables. In addition to identification and causal order, other elements of econometric modeling determine the perspective that the model brings to the data – in particular, the choice of variables and their measurement, the choice of functional form, the choice of likelihood functions (if the econometric technique is even cast in a probabilistic framework), and the standards of fit and assessment. The real meat of a perspective is often contained in these additional elements. For even though lip-service is frequently paid to the role of a priori economic theory – where the term a priori is meant to convey the indubitability of identifying assumptions – economic theory is only indubitable under such weak assumptions that it is in itself inadequate to secure econometric identification in the technical sense.

Much of the energy in econometrics is directed towards testing theories. Giere (2006: 91) sees testing as the bringing together of an observational and a theoretical perspective. He suggests that empiricism gives priority to the observational perspective. Whether or not that is true in natural sciences, economics places the priority the other way round. Peirce's fallibilism suggests that we need to be open to the possibility of coming to doubt even extremely weak (so long as not vacuous) theoretical presuppositions.

There are two levels. On the first, the perspective imposed by statistical presuppositions is testable relative to some pragmatically useful level of precision. For example, we frequently operate with statistical models that presuppose that unobserved random shocks are stationary and independently normally distributed. The model itself provides an instrument, from this perspective, of estimating these unobserved errors and allows us to test, up to some convention about precision, whether a subset of the statistical assumptions are met (for a detailed illustration, see Hoover *et al.* 2008). If not, a serious question is raised about whether the presupposed perspective is adequate. (Notice that we can test only a subset of the presuppositions of the statistical model. The only way to test them all would be to find a 'higher' perspective in which they were special cases. But the presuppositions of that higher perspective would not all be testable. As Peirce noticed, we cannot get behind our beliefs, except by finding a framework in which it is possible to cast doubt upon them.)

The second level is more characteristic of econometrics. Even within the perspective of a weak, but indubitable, economic theory, there may be genuine debate about how the theory ought to be specialized and strengthened for particular applications. In the face of alternative specialized theories or models, a resolution strategy is required. There are at least two sublevels within this level. First, there may be disagreement over the observational model; second, there

might be disagreement over theoretical models maintained a priori. The general approach is the same in both cases: find a common perspective. Hendry's methodology of encompassing illustrates the first sublevel – namely, how alternative observational models may be brought into a framework of resolution (Hendry 1988, 1995). The analogy to the second sublevel is straightforward.

Frequently, the antagonists in an econometric debate accept a common set of potential data, the appropriateness of some class of functional forms, likelihood functions and so forth, but differ over the independent variables in a regression equation. Each regression equation can be understood as a model presenting a particular perspective on the data. Encompassing essentially works by nesting models and, thereby, taking a more general perspective. Once models are nested, statistical testing can resolve which model – if either – is observationally adequate, again up to some pragmatic standard of precision. The options are that one model may encompass the other or that neither does. Typically, the more general model nests more alternative models than just the initial two conflicting models, so that it provides a basis for discovery as well as for testing.

There is a strong analogy between our previous account of Figures 10.1 and 10.2 and the encompassing strategy. The ground level perspectives of a bowler facing each field of columns suggest very different sets of constraints, and very different realities. Yet, an actual or virtual bird's-eye view allows us to construct models from another perspective from which we can judge whether or not the ground level perspectives of the bowlers are correct; but, more importantly, from which we can infer how things will be seen from these and *other* ground level perspectives. Encompassing is sometimes presented in an exactly analogous manner: one model encompasses another when it carries all the information of the other and, indeed, without the benefit of the other model, allows one to infer what will be estimated from the perspective of the other model.

This chapter has in some sense applied the encompassing strategy to the issue with which it began: the frequent tension in the views of typical econometricians between a constructivism that claims that econometric models are merely intellectual creations and a realism that the world constrains which models successfully represent it. In a sense, perspectival realism provides a common perspective in which the two poles of the econometricians' tension are seen to be aspects of a common reality. An important lesson though is that there can be no end to inquiry. Everything that is known is known from some perspective and the presuppositions of any perspective can be examined only from some other perspective. Science may progress by finding common perspectives, but it would be wrong to ever imagine that we have the highest or most general perspective – or even that there is a highest or most general perspective.

## Notes

- 1 This paper was written with the support of the U.S. National Science Foundation (grant no. NSF SES-1026983). Thanks to Jaakko Kuorikoski and to an anonymous referee for comments on an earlier draft.

- 2 Wimsatt (2007) develops similar ideas about multiple perspectives on reality.
- 3 Quoted by Giere (2006: 5).
- 4 The qualification 'on this account' acknowledges that the term 'scientific realist' is used in a variety of ways and that some philosophers, who regard themselves as scientific realists, may nonetheless not subscribe to the view that a model must be both true and complete in its representation of the world. Such philosophers have – at the least – taken a step in the direction of perspectival realism.
- 5 The locus classicus of these debates is Friedman's (1953) methodological essay, in which he denies that theories and models need 'realistic' assumptions and asserts that a model or theory is good when the world behaves 'as if' it were a true description and not when it is actually a true description. The debate over the meaning of Friedman's essay and whether it is open to a realist, rather than an instrumentalist interpretation is voluminous. See Boland (1979), Mäki (1992a, 2000, 2009b) and the references therein.
- 6 Hoover (1994a) provides a more detailed account of Peirce's pragmatism than the quick sketch offered here.
- 7 References to the *Collected Papers of Charles Sanders Peirce* are by CP and the volume number followed by a *paragraph* number after the decimal point; thus the preceding reference indicates volume 2, paragraph 242. References to the *Writings of Charles S. Peirce* are indicated by similarly by WCSP, the volume number and the *page* number after the decimal point.
- 8 See Peirce's essay 'The Fixation of Belief' (CP 5.358–5.387). Peirce recognizes scientific inquiry as only one of at least four methods of fixing belief. It is the one that he regards as most effective and stable.
- 9 Figures 10.1 and 10.2 are copied from Peirce's Figures 1 and 2 in *Collected Papers* (5.398). In the original source (*Popular Science Monthly*, January 1878), the figures are hand drawn and clearly not identical under rotation – in fact, Figure 10.1 contains 99 points and Figure 10.2 contains 96. The editors of the chronological edition of Peirce's *Writings* (WCSP 3.264) reset the figures in type but otherwise faithfully reproduced the originals. The editors of the *Collected Papers* understood that the originals were not as Peirce intended and did not illustrate his point; and they corrected them in the most obvious way. (My thanks to James Wible for providing me with a copy of the original versions of the figures.)
- 10 A late statement of Peirce's metaphysical categories is found in his *Lectures on Pragmatism* (Lectures II–IV, CP 5.41–119).
- 11 The literal and metaphorical issues surrounding maps and mapmaking feature in a number of accounts of the philosophy of science, including Peirce (WCSP 4: 68–71), Giere (2006: ch. 4); Hendry *et al.* (1990: 189–192), and Boumans (2005: ch. 6).
- 12 A referee urges that a distinction be drawn between models being approximately true and the world being 'as if' the model is correct. While clearly one could draw such a distinction, it is not being drawn either by Haavelmo or Teller, both of whom are thinking of cases in which the possible world that conforms to a model could be the actual world (the model predicts 'as if' the world is as described in the model) but is not, in fact, the actual world, so that the model is an approximation of the actual world.
- 13 That models may be true, yet less than complete, is a leading idea in the large literature on idealization (see for example, Dilworth 1992; Hamminga and de Marchi 1994; Hoover 1994b, 2010). Mäki (1992b, 1994, 2009a) takes idealization to be one of a variety of strategies of isolation that seek to model the salient features of reality, while excluding much else that is either irrelevant or less important to understanding the underlying processes.
- 14 Hoover (2001: 134–136) makes a related point that any causally relevant concept of GDP would collapse under finer and finer temporal graining.

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## 11 Conversation, realism, and inference

### Revisiting the rhetoric vs. realism dispute

*Jesús Zamora Bonilla*

But wait. Before you go, look here over at the blackboard. I've got a sweet diagram of an Edgeworth box that shows the mutual benefit from intellectual exchange. Now suppose to start with we make the assumption that both parties are self-interested...

(Deidre McCloskey 1994: 363)

#### 1 The rhetoric–realism debate: are we all rhetorical realists after all?

Though the debate about 'rhetoric' and 'realism' in economics (or in science more generally) is not now as intense as it used to be a couple of decades ago, it has undoubtedly affected, in a very intense way, the way most philosophers currently regard scientific knowledge and scientific research. I shall offer in this chapter a personal account of how I see the main concerns of this disputation. I will focus mainly on the debates between Uskali Mäki, on the one hand, and Deirdre McCloskey and Daniel Hausman, on the other, and also on how I think the tension between rhetoric and realism has influenced the understanding of science that I have been trying to elaborate during the last twenty years.

For someone who entered the field of philosophy of economics at the beginning of the nineties, the dispute about (or the quarrel between) 'rhetoric' and 'realism' was certainly one of the hottest topics. The main protagonists were Donald (later Deirdre) McCloskey and Uskali Mäki (McCloskey 1985, 1995; Mäki 1988, 1995, 2000). I was by that time profoundly immersed, on the one hand, in something like the Finnish approach to scientific rationality, in the exciting (though now dismally languishing) 'verisimilitude programme' in particular; on the other hand, in a struggle to give a significant role to the subjective views and biases of flesh-and-bone scientists in the construction of the concept of verisimilitude, I found myself, like many people in the really interesting intellectual disputations, with a painfully divided heart on this issue. To a large extent, I think this has also been the fundamental attitude of the two main participants in the debate: both McCloskey and Mäki have been constantly trying to make sense of the arguments and positions they were criticizing, and, though this unavoidably led many times to what had to appear as a