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ECONOMIC MODELS AND *CETERIS NORMALIBUS* LAWS¹

ABSTRACT

This paper focuses on the nature of economic laws. Rather than conceptualizing such laws in *ceteris paribus* terms, it claims that economic laws should be read using *ceteris normalibus* clause, namely that they are only valid in normal conditions. Two understandings of such conditions are proposed. First, economic laws are always true in appropriate theoretical models. Also, the closer a given empirical domain to the model's structure is, the higher probability that the model's insights (i.e., economic laws) are to correctly explain the workings of such a domain. Nevertheless, isomorphism between models and empirical domains is never perfect and thus economic laws only describe tendencies in economic realm. Here comes second understanding of *ceteris normalibus* laws in economics, precisely they do not describe regularities, but they refer to capacities and powers. They state what is in nature of a given factor to produce. Thus, such economic laws are normic laws. While investigating the nature of economic laws this paper also offers a brief study of the history of *ceteris paribus* clause in economics as well as it refers to an interesting debate on the nature

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¹ This research was financed by a research grant within the framework of the The National Programme for the Development of Humanities (NPRH) (grant no. 2bH 15 0266 83). I would like to thank referees for insightful comments that helped me significantly improve this paper. However, all errors that remain are my own.

of economic models and laws which is offered in D. Rodrik's 2015 book *Economics Rules*.

Keywords: philosophy of economics, models and laws in economics, *ceteris paribus*, *ceteris normalibus*, ontology of social realm.

JEL codes: B41, B10, B50

*Science, or research activity, never takes
place in a philosophical vacuum.*

T. Lawson (1997, p. 50)

INTRODUCTION

Economics is a modeling science, however, on the other hand, economists often refer to laws while accounting for real world phenomena. Therefore, it is worth investigating the interplay between models and laws. What matters also is the kind of entities models and laws are. Since “[...] models make economics a science” (Rodrik, 2015, p. 45), then acquiring knowledge about models’ characteristics can offer us important insights about the kind of science economics is. But not only models and laws matter, but the ways we apply them to study empirical worlds are also essential. If crafting models is a science of economics, then choosing the right model for particular circumstances is an art of economics. Referring to wise words by Keynes is in order here: “Economics is a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world” (Keynes, 1938/1978, pp. 296–297). Nevertheless, the focus of this paper is more on laws than the ways they are used in crafting economic policies. We are to show, however, that discussing laws without referring to models and empirical phenomena is simply impossible.

When one discusses economic laws then nearly immediately she is to consider *ceteris paribus* laws (cp-laws, henceforth). This is nothing new, since “the literal meaning of ‘*ceteris paribus*’ was dominant in theoretical economics, which is historically the most important place in science where *ceteris paribus* laws have been used” (Schurz, 2014, p. 1802). Therefore, in economics we find plenty of statements such as, for instance, “*ceteris paribus* an increase in demand leads to an increase in price” (*ibid.*); or “all else being equal, lower interest rates tend to raise equity prices” (FED, 2018). However, even being so widely used the meaning of this clause is open to debate, e.g., whether *ceteris paribus* means ‘all else being equal’ or just ‘other things being absent’ (*ceteris absentibus*) or even ‘other things being right’ (*ceteris rectis*). And more fundamentally, one may ask whether such laws describe the very meaning of statements we call laws of economics (Hardt, 2017). We are very skeptical and thus in what follows another interpretation of economic laws is offered, namely the one emerging from dispositional accounts and normality theories. Or, to put it as simple as possible, instead of

claiming that, for instance, *ceteris paribus* lowering interest rates is to lead to higher investments, one should better claim the following: *ceteris normalibus* lowering interest rates is to lead to higher investments. Such normic interpretation of *ceteris normalibus* laws will be supplemented by the one treating *ceteris normalibus* clause as just synonymous to ‘in a model’ restriction and hence, for instance, the above example with interest rates should be read as follows: only in a given model lowering interest rates is to lead to higher investments.

This paper is organized as follows. First, some comments regarding history of *ceteris paribus* clause in economics are offered. We do some history of economic thought here since we just want to better understand what *ceteris paribus* means for economists using this term. Second, in section 3, we put emphasis on cp-laws in economics. Third, in section 4, the idea of *ceteris normalibus* laws (cn-laws, henceforth), with its various interpretations, is introduced. Then, in section 5, the role of models in producing economic laws is put under scrutiny and we scrupulously use Rodrik’s (2015) accounts of models in economics. Conclusions follow.

1. HISTORY OF *CETERIS PARIBUS* CLAUSES IN ECONOMICS

Since *ceteris paribus* laws are so central to economics, we begin below by looking into the very history of cp-clauses. And only later we move forward in order to understand how such laws should be comprehended. In doing so, we refer to various ideas taken from philosophy of science that discuss cp-laws. Finally, we are to show that one cannot successfully defend the usefulness of cp-laws in economics and thus has to go beyond a vision equalizing laws to regularities. And hence our focus on capacities, natures, possibilities, and Aristotelian dynamis.

We are not to offer an in-depth study into the long past of cp-clauses but rather we would like to sketch a very brief history of cp-laws.² In doing so we are to follow historians of ideas writing histories of concepts. Generally, they can be divided into two camps. Firstly, we have intellectual histories, mentalistic ones, or broadly speaking Platonist interpretations of concepts’ past. In such an approach particular expressions (in our case ‘*ceteris paribus*’) “act as secondary manifestations of an underlying conceptual development” (Klaes and Sent 2005, p. 27). Secondly, in institutional approach to conceptual history we have a greater emphasis put on the discontinuous elements of historical developments. Therefore, we take form as given in order to trace content. So, we are to search for certain classes of words and expressions. Klaes and Sent (2005, p. 28) explain it as follows:

“In the institutional approach, a particular trajectory of conceptual development is defined in terms of the (material) continuity of a particular word or expression, rather than the (semantic) continuity of an underlying idea”.

² Readers interested in history of cp-clauses can consult, for instance, Persky (1990).

To put it clear: we claim that it is better to analyze the past in terms of its own words. Such an approach follows from German tradition of Brunner (e.g., 1939) and Koselleck (e.g., 1972a). According to Koselleck, “Concepts are thus the concentrate of several substantial meanings” (1972b/1979, p. 85). In his understanding, concepts function as condensates of historical experiences that are put into single words. Let us hence refer to what Koselleck claims in this respect:

“Sense and reference can be thought separately. However, in the case of concepts, sense and reference coincide insofar as the diversity of historical reality and historical experience enters the ambiguity of a word in such a way that it can only receive its meaning in this one word, can only be grasped by this word” (Koselleck, 1972a/1979, p. 120; translated by Klaes, 2001).

Nevertheless, concepts are always somehow ambiguous. Also, a given word may change its meaning between different historical *époques*. Therefore, as historians of economic thought we must resist the temptation to impose contemporary understandings on concepts of the past. In his reading of Koselleck’s ideas Klaes (2001) refers to F. Nietzsche’s phrase from *Genealogy of Morality* (1981, p. 820), namely that “All concepts which semiotically comprise an entire process escape definition; only that which has no history is definable”. So, we may somehow empirically draw evolving conceptual schemes of given concepts, and in this paper we are to apply this method to ‘*ceteris paribus*’. In other words, we try to trace changing meanings of *ceteris paribus*. We are however to do it in two steps. First, we show the process of institutionalization of *ceteris paribus*, namely the “process by which an individual expression achieves the status of an institution, and hence can be regarded as a Koselleckian concept” (Klaes, 2001, p. 161). And only then we are to study systematic ambiguity of *ceteris paribus*, namely its various meanings. The fact that this concept is somehow vague is obvious to many historians and philosophers of economics (see e.g., Persky, 1990; Mäki and Piimies, 1998).

In order to construct a conceptual field of ‘*ceteris paribus*’, we have to formulate a list of key words and phrases related to historical and current interpretations of ‘*ceteris paribus*’. In the next step our goal will be to study the frequencies of these sentences/words in economic literature. And only then we have to explain why some of them were on the rise in particular decades while others are now simply forgotten.

What should be the key for choosing our list of phrases serving as interpretations of *ceteris paribus*? Here we can just start by referring to A. Marshall’s propositions regarding the usage of *ceteris paribus*, so let us cite two passages from his *Principles of Economics*, i.e.:

“It is sometimes said that the laws of economics are ‘hypothetical’. Of course, like every other science, it undertakes to study the effects which will be produced by certain causes, not absolutely, but subject to the con-

dition that other things are equal, and that the causes are able to work out their effects undisturbed. Almost every scientific doctrine, when carefully and formally stated, will be found to contain some proviso to the effect that other things are equal: the action of the causes in question is supposed to be isolated; certain effects are attributed to them, but only on the hypothesis that no cause is permitted to enter except those distinctly allowed for” (Marshall, 1920/2013, p. 30).

“Corresponding to the substantive ‘law’ is the adjective ‘legal’. But this term is used only in connection with ‘law’ in the sense of an ordinance of government; not in connection with ‘law’ the sense of a statement of relation between cause and effect. The adjective used for this purpose is derived from ‘norma’, a term which is nearly equivalent to ‘law’ and might perhaps with advantage be substituted for it in scientific discussions. And following our definition of an economic law, we may say that the course of action which may be expected under certain conditions from the members of an industrial group is the normal action of the members of that group relatively to those conditions” (*ibid.*, p. 28).

The very first above citation refers to constancy of causes and the second one to normality of factors influencing what we try to explain. So, we have *ceteris paribus* and *ceteris normalibus* clauses. Also, Marshall’s ‘other things being equal’ can give rise to *ceteris absentibus* assumptions. Cn-clauses mean that a given statement, e.g., when you rise cost of money, then you are to have less investments, is only true in normal conditions. One interpretation of such conditions may be to say that the above statement about money and investments is only true in a particular economic model. In the table below we therefore propose some words and sentences related to the three above proposed understandings of *ceteris paribus* conditions.

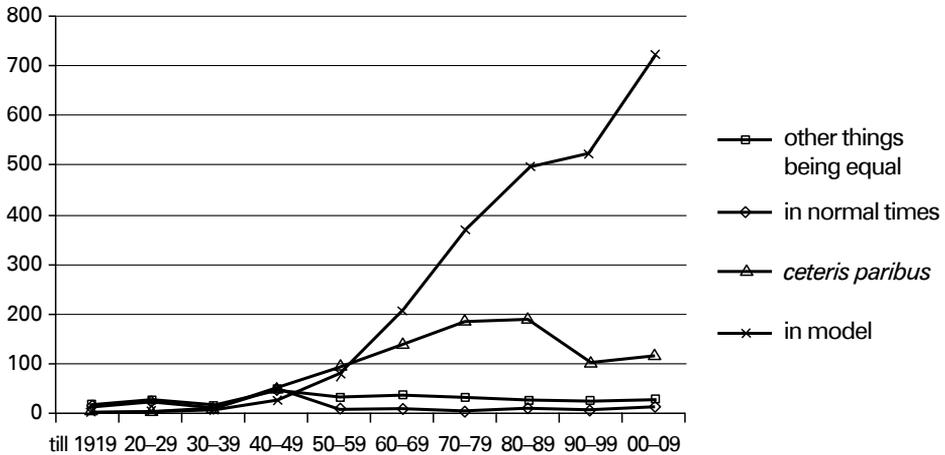
Table 1. Conceptual field of *ceteris paribus* and number of papers in “The American Economic Review” a given phrase appears (till 2009)

<i>Ceteris paribus</i> (983)	<i>Ceteris absentibus</i> (0)	<i>Ceteris normalibus</i> (0)
other things being equal (285) other things being constant (3)	being absent (14)	in normal conditions (3) in normal circumstances (13) in normal times (177) being normal (4) natural setting (18) in natural conditions (3) in model (including in a/the model) (3023) model conditions (6)

Source: own research.

Now our task should be to check to what extent the above presented sentences forming the conceptual field of *ceteris paribus* are present in economic literature in different decades. Here, for the sake of simplicity, we just put emphasis on papers from “The American Economic Review”. This particular journal can serve as a good proxy of what economics is (cf. Anderson et al., 1986)³. In our sample we include all papers from “The AER”, containing the ones from its *Papers and Proceedings* section as well as books’ reviews. Also, we consult the *Oxford English Dictionary* for meanings of words and their changes. In the very first step we put in the brackets in the above table number of papers in “The AER” a given phrase appears. Next, we are interested in how fast a given phrase proliferates in economics. We show it below, but we restrict our presentation only to sentences with the highest number of appearances.

Figure 1. Number of papers in “The AER” consisting of elements from the conceptual field of *ceteris paribus*



Source: own research.

We have a number of insightful observations. First, we did not notice any appearances of *ceteris absentibus* and *ceteris normalibus* clauses as such. However,

³ Historians of economics often look into discipline’s most prestigious journals in order to discover important patters in development of economics. “The AER” is the official journal of the American Economic Association. Nevertheless, it is important to know that its place in the profession has changed substantially. First, as Backhouse (1998) claims, now papers from this journal have much greater prestige than in the 20’s or the 30’s. They play a crucial role in economists’ promotion procedures. What can be simply difficult to imagine now, the editor of “The AER” in the 20’s was always afraid of not having enough good material for publication. Second, before the Second World War economists used to publish their work in many general, non-economic journals (e.g., “The Annals of the American Academy”). Third, from the 30’s on some more technical journals started to emerge, e.g., “Econometrica” (in 1933) and “Review of Economic Studies” (also in 1933). And fourth, now we have many journals in economics specializing in particular areas of economic research. Nonetheless, “The AER” can still serve as a credible measure of what economists do and what methods they use.

we have a growing number of papers consisting at least one occurrence of *ceteris paribus*. And, as Mäki and Piimies (1998) claim, *ceteris paribus* may mean also *ceteris normalibus* and *ceteris absentibus*. So, what *ceteris paribus* means in its various usages? The best way to answer this very question is to investigate the reasons for an explosion in its use starting in the 40's (8 appearances in the 30's; 52 in the 40's, and 92 in the 50's) and then a relative stagnation in the 80's and next a sudden drop in the 90's followed by a relative stagnation at the very beginning of the new century. Knowing that correlation does not equal causation it is however interesting to know with what kind of changes *ceteris paribus* proliferation is correlated. Even from the above graph it is clear that an upsurge in the number of papers consisting *ceteris paribus* was accompanied by a similar rise in a number of papers containing 'in model' sentences (4 appearances in the 30's; 23 in the 40's, and 76 in the 50's).⁴ Thus, maybe *ceteris paribus* just meant 'in model' at least in the three mentioned decades? Before answering this question, it is worth offering some insights on why such an upsurge in references to models in economic theories occurred in the 40's and the 50's.

It is first of all worth noticing that the above-mentioned years witnessed a profound change in method and language of economics. Blaug explains it in the following way:

“The metamorphosis of economics in the late 1940s and 1950s is aptly called a ‘formalist revolution’ because it was marked, not just by a preference, but by an absolute preference for the form of an economic argument over its content. This frequently, but not necessarily, implied reliance on mathematical modeling because its ultimate objective was to emulate the notorious turn-of-the-century Hilbert program in mathematics by achieving the complete axiomatization of economic theories” (Blaug, 2003, p. 145; emphasis added).

So, mathematics entered economics and transformed it into a modeling science. Such a development was strongly supported by publication of P. Samuelson's *Foundations* (1947) as well as by the works of K. Arrow, R. Debreu, J. Neumann, O. Morgenstern, J. Hicks, and many others. Formalism in economics in the 40' and the 50's was generally understood as “a methodological requirement to set up any theory as a formal system” (Kesting, Vilks, 2004, p. 286), namely as a particular model but how models and theories relate to one another? Here we have two general approaches. First, according to the syntactic view of theories, a model is an interpretation of a given calculus, e.g., the billiard balls are a model of the kinetic theory of gases.⁵ Supporters of such an approach treat models as being useless to science (e.g., Carnap, 1938). Second, we have the semantic view of theories which “declares that we should dispense with a formal calculus altogether and view a theory as a family of

⁴ Including 'in the model' and 'in a model'.

⁵ To put it more precisely one has to reinterpret the terms in mathematical calculus of kinetic theory of gases and make them refer to billiard balls.

models” (Frigg and Hartman, 2018). It seems that in the very first years of the formalist revolution economists’ practice can be described by the syntactic view of theories. For instance, Debreu (1959, x) claims the following: “It [...] makes possible immediate extensions of the analysis without modification of the theory by simple reinterpretation of concepts” (emphasis added) and Alchian (1955, p. 942) offers the following remark: “Fisher’s theory is a model for deriving propositions about how the economic system operates”. Thus, a given economic theory after reinterpretation serves as a model of a particular economic realm. So no one should wonder why formalism in economics is so much connected to references to models.

Is it now right to claim that also *ceteris paribus* in the years of the formalistic revolution meant just ‘in model’? Let us thus look into some sentences from “The AER” in the 50’s containing such expressions, i.e.:

“Although the use of *ceteris paribus* assumptions is thus necessary and useful part of analytic method, it must be admitted that it can, in certain circumstances, limit the application of the theory to such a degree that no meaningful empirical analysis can be made. When the concepts of value theory are defined in such a manner that they are observable only in very special circumstances, the error term may be so large that empirical testing can only be inconclusive [...]” (Ruggles, 1954, pp. 145–146; emphasis added).

“[...] we cannot in full logical consistency draw up a demand curve for investment by varying only the rate of interest (holding all other prices in the impound of *ceteris paribus*)” (emphasis added); and in the footnote to this sentence he adds: “This is exactly analogous to the distinction between the Marshallian partial equilibrium demand and the Walrasian general equilibrium demand discussed by M. Friedman (1949). In the present context the partial analysis curve misses the essence of capital theory, the relationship between interest rates and the price structure” (Alchian, 1955, p. 942).

“*Ceteris paribus*, an «economic unit» will ordinarily purchase and hold a larger quantity of a durable good for future use, the lower is its current price in relation to the prices of other assets. Hence, the durable good demand curve of a single economic unity will normally slope downwards from left to right [...]” (Clower, 1954, p. 65; italics in original; emphasis added).

The last citation from Clower (1954) clearly links *ceteris paribus* with normality assumption. Also, later in his text reference is made to a very specific model, namely a graph presenting shapes of demand and supply curves.⁶ But what

⁶ Graphs are generally seen as illustrations of models but since “[...] geometry is a branch of mathematics” (Samuelson, 1952, p. 59, while discussing the relative merits of algebra and geometry in economics) we may simplify a bit and treat graphs as models.

about our two preceding citations? Let us start with the one from Ruggles. Here we have a very clear reference to what philosophers of science describe as Hempel paradox, namely that cp-laws are either false (because disturbing factors occur) or they are trivially true (if they are understood as purely analytical statements being true only in models, precisely special theoretical worlds constructed in such ways as to satisfy these laws). Ruggles' "very special circumstances" may be treated as a clear reference to model conditions and his remark about inconclusiveness of empirical testing as his acknowledgment of general problems with empirical testing of cp-sentences. Now, what Alchian's "holding all other prices in the impound of *ceteris paribus*" means? Here he does not simply claim that all other prices are constant (*ceteris paribus*) but that they are "in the impound of *ceteris paribus*" and it makes an important difference, since "in the impound" may be read as *in a place* where prices do not change, and if such a place is empirically impossible then it should be a theoretical one, namely a model.

Although the above analysis suggests that cp-laws are just laws referring to particular models (i.e., to normal/model conditions), it is not legitimate to generalize and claim that all cp-clauses in economics during the first stage of formalistic revolution had such characteristics. Many authors used cp-restrictions in informal ways not referring to any special models or graphs. In the same vein, many papers while pointing out to normal conditions did it in informal ways, namely by restricting a domain of a given theory to non-extraordinary times. Coming back to cp-laws, it should be stressed that even those using them were conscious that there is a problem of applying cp-laws in empirical domains. How, then, empirical usefulness of cp-laws may be defended? We try to answer this question in the section below.

2. UNDERSTANDING *CETERIS PARIBUS* LAWS IN ECONOMICS

History of science knows many attempts at defending cp-laws. Let us just refer to the two most popular ones. First, the method of completers may be used, precisely one has to add the missing conditions into the antecedent of the law statement and thus the aim is to have a strict law. Second, cp-laws may be understood as statements about tendencies. Even intuitively it is rather obvious that listing all factors that are claimed to be constant in antecedents of cp-laws is simply impossible and thus the method of completers is not very useful in defending such laws.⁷ Now what about tendencies? Here, for instance, saying that *ceteris paribus* lower interest rates should lead to higher investments may be reformulated in such a way: lower interest rates should produce a tendency for investments to rise. Such interpretation of economic laws, including cp-ones, has a long

⁷ For more philosophical arguments, see e.g., Reutlinger et al. (2017).

history in economics. It was John S. Mill who strongly supported it. He claims, for instance, the following:

“With regard to exceptions; in any tolerably advanced science there is properly no such thing as an exception. What is thought to be an exception to a principle is always some other and distinct principle cutting into the former: some other force which impinges against the first force and deflects it from its direction. There are not a law and an exception to that law—the law acting in ninety-nine cases, and the exception in one. There are two laws, each possibly acting in the whole hundred cases, and bringing about a common effect by their conjunct operation. [...] Thus if it were stated to be a law of nature, that all heavy bodies fall to the ground, it would probably be said that the resistance of the atmosphere, which prevents a balloon from falling, constitutes the balloon as an exception to that pretended law of nature. But the real law is that all heavy bodies tend to fall [...]” (Mill, 1836/2008, p. 56; emphasis added).

So, one can still claim that there is a tendency of X to produce Y even though in a given case X gave rise to Z . As Mill put it: “All laws of causation, in consequence of their liability to be counteracted, require to be stated in words affirmative of tendencies only, and not of actual results” (Mill, 1843, p. 523). Reiss (2013, p. 93) adds that “A tendency claim is a claim about a regularity that would hold if disturbing factors were absent”. Speaking less formally one can say that *generally* X produces Y but *in particular* circumstances it may not be the case. So, we can now introduce notions of types as generic causal facts and tokens as singular causal facts. According to Cartwright (1989), for instance, in traditional Humean interpretation tokens are true in virtue of types; and types are regularities. On the other hand, in structural account of causation types are first and tokens only later, as it is in Hume’s theories, however, now contrary to Hume, types are understood as causal structures. Cartwright proposes even a further depart from Hume and for her tokens are crucial and thus her support for singular causation. We are to come back to Cartwright in the next section. But now let us comment on whether probabilistic approach to causation somehow solves the problem of how tokens and types are interrelated. In his seminal book on causation in macroeconomics K. Hoover offers such a formalization:

“[...] an advocate of a probabilistic account might hold that a (token-)causes b , when a occurs and b occurs and A (type-)causes B . By “type A causes type B ”, probabilistic accounts mean $P(B=b|A=a) \neq P(B=b)$ ” (Hoover, 2001, p. 72).

But what if one has a occurring but she is not seeing b ? According to the above Hoover’s claim it is not problematic since failure of tokens to illustrate the relationship at the level of types does not threaten the causal relation at the generic level. Nevertheless, taking type level causation as primary and token level

as secondary leads us to some counterintuitive cases. Take, for instance, the following one due to D. Rosen and cited by Suppes (1970, p. 41):

“[...] suppose a golfer makes a shot that hits a limb of a tree close to the green and is thereby deflected directly into the hole, for a spectacular birdie. If we know something about Mr. [sic] Jones’ golf we can estimate the probability of his making a birdie on this particular hole. The probability will be low, but the seemingly disturbing thing is that if we estimate the conditional probability of his making a birdie, given that the ball hit the branch, we would ordinarily estimate the probability as being still lower. Yet when we see the event happen, we recognize immediately that hitting the branch in exactly the way it did was essential to the ball’s going into the cup”.

Hoover (2001) while commenting the above example stresses the fact that striking the limb lowers the chance of the birdie and at the same time it is the limb which caused the birdie. Here we see that introduction of the distinction between types and tokens helps us to cope with situations where intuitively a given factor causes something but at the same time it lowers its probability. What is also important to stress here is that we may have type causation without any instances of tokens, say lowering interest rates (type-)causes higher investments, and this very statement can be true even without any empirical cases of lower interest rates making investments higher. We can now try to reformulate cp-statements as follows: X (type-) produces Y . And to give a very simple example: diminishing interest rates (type-) produces inflation. It is somehow similar to the above Mill’s understanding of laws as statements of tendencies only. As a given tendency may be dormant and thus it is not to produce a particular (or anticipated) result, in a similar vein we may have type-causation between A and B without any manifestations of tokens a and b .

Before going further to Cartwright’s ideas placing tokens at the very first place, we have to refer firstly to Hausman’s objections to the above presented types and tokens thinking and secondly (but very briefly) to other (usually failed) attempts at understanding cp-clauses. Hausman’s claim is relatively simply stated: generic-level causation cannot be primarily since causation does not reduce to relations between variables, because they are not situated in space and time. For him, causation relates only to particular aspects of events, namely tropes as he calls them. In his own words: “*tropes* are particulars located in space and time” (Hausman, 1998, p. 26; emphasis in original), and next he adds: “Causal relations among events and explanatory relations among facts obtain in virtue of the relations that obtain among simple tropes” (*ibid.*, p. 26). In his interpretation laws of nature are not causal but they only link/relate variables or proprieties. In Hausman’s approach, according to Hoover (2001, p. 83), “Type-level causality generalizes the individual instances of token-level causality”. And token-level causality is possible because tokens are sets of tropes. Now one can try to understand *ceteris paribus* laws in the following way: X causes Y under condition that

a given trope x' of x causes y' of y . However, we have a problem here because causation between x' and y' is *done* by the existence of law of nature linking properties X' and Y' instantiated by x' and y' . It is not a very attractive way of understanding cp-laws since here laws of nature are necessary and if they do not exist, as it is claimed in Hardt (2017), then we have a problem. Here it is even difficult to give a real life example of such understanding of cp-laws in economics. What is however important is that Hausman proposed an approach denying the central role of type-level causation. How it refers to Cartwright's ideas of singular causation is analyzed in the forthcoming section.

Now let us comment on another promising way of understanding cp-laws, namely the one originating from invariance and stability theories. Here, for instance, Woodward (2000, p. 197) claims the following: "According to this alternative, whether or not a generalization can be used to explain has to do with whether it is invariant rather than with whether it is lawful [...]. Unlike lawfulness, invariance comes in degrees [...]". So, if one has the following generalization: once you cut interest rates, then you have a rise in investments; then the greater the range of values the ones present in this generalization can take, the higher degree of its lawhood. But not only variables in a given generalization matter for its stability but also the ones describing background conditions. So, interventions can be carried out with respect to these two kinds of variables. To illustrate his point Woodward gives an example from economics:

"In microeconomics, individual economic agents are often assumed to conform to the behavioral generalizations constituting rational choice theory (RCT). [...] Even if we assume, for the sake of the argument, that these generalizations are roughly accurate descriptions of the behavior of many participants in markets, it is clear that there are many changes and interventions over which the generalizations will fail to be invariant. For example, there are many pharmaceutical interventions and surgically produced changes in brain structure that will lead previously selfish agents to act in non-self-interested ways [...]. *However, economists have not generally regarded these sorts of failures of invariance as interesting or important, at least if [...] they occur relatively rarely in the population*" (Woodward, 2003, p. 263; emphasis in original).

It seems that the above Woodward's approach correctly describes research practice in economics which often comes down to formulating generalizations but the ones not excluding exceptions. However, on the other hand, we know that the majority of generalizations in economics fail not due to some "surgically produced changes" but they do not hold due to some even minor modifications in background conditions. As Reutlinger et al. (2017) comment: "By being non-strict the generalizations in the special sciences do not satisfy a condition that is traditionally associated with laws of nature, namely the condition of universality. Nonetheless being invariant for a limited range of values is enough for a proposition to play a lawlike role in the sciences". So, we come back to some

well-known problems with cp-laws, since calling them lawlike statements does not help us much.

In philosophy of science we find also a very similar approach to cp-laws as the one described above. Here I have in my mind Lange's framework referring to counterfactuals where "Some proposition L is a law iff its truth is preserved under all those counterfactual suppositions that are consistent with every physical necessity, i.e., under all physically possible counterfactual suppositions" (2009, p. 20). In economics we do not have such laws or to put it differently, laws in economics are true only in artificial worlds (models) where everything is under control and the modeler knows every "possible counterfactual suppositions". Beyond models we have only cp-laws having different degrees of lawhood. But here Lange suggests that scientists formulating cp-laws in special sciences, including economics, are not obliged to describe all interfering factors. They should however list all factors they are interested in, or to be precise, their scientific discipline put emphasis on. In his own words: "[factors] that arise sufficiently often, and can cause sufficiently great deviations from [a given generalization]" (Lange, 2002, p. 411). Interestingly, he refers here to Haavelmo's discussion on "the degree of permanence of economic laws".

A rationale for looking into the ways T. Haavelmo understood economic laws, including the ones with cp-clauses, stems from the fact that he was one of the most important figures in popularizing mathematical modeling in economics. So, in his seminal paper on *The Probability Approach in Econometrics* (1944) he offers us the following insight:

"No matter how much we try and fail, we should never be able to establish such a conclusion as 'In economic life there are no constant laws'. We shall consider a much more restricted problem, namely this: How far do the hypothetical 'laws' of economic theory in its present stage apply to such data as we get by passive observations?" (Haavelmo, 1944, p. 16).

His skepticism towards the existence of laws of nature (or constant laws) is due to his claim that laws in sciences are constructed rather than discovered. Or, to put it differently, one formulates such laws using, for instance, mathematical models and only then they are empirically tested. Therefore, the fact that in physics (contrary to economics) we *have* constant laws "means not much more and not much less than this: The natural sciences have chosen very fruitful ways of looking upon physical reality" (*ibid.*, p. 12). So, laws, including the ones in economics, are only statements that imperfectly describe empirical phenomena and hence Haavelmo's interest in treating them as cp-laws. And here his focus is on analyzing the very possibility that "simple laws in economics rests upon the assumption that we may proceed as if such natural limitations of the number of relevant factors exist" (*ibid.*, p. 24). By irrelevant factors he treats the ones having limited impact on what we are explaining as well as factors that can potentially matter but that are constant. And now we know why M. Lange in his papers on cp-laws refers to Haavelmo's observations.

Before moving further to some more detailed insights into the ways *ceteris normalibus* laws can be conceptualized, let us here just add that Haavelmo's treatment of economic models strongly supports my claim that a rise in the number of papers using *ceteris paribus* clauses in the 50's and the 60's is due to popularization of mathematical modeling in economics. Therefore, *ceteris paribus*, at least in these years, meant just "in a model". The following beginning of Haavelmo's first chapter of his *The Probability Approach in Econometrics* is illuminative in this respect:

"Theoretical models are necessary tools in our attempts to understand and 'explain' events in real life. In fact, even a simple description and classification of real phenomena would probably not be possible or feasible without viewing reality through the framework of some scheme conceived a priori. Within such theoretical models we draw conclusions of the type, 'if A is true, then B is true'. Also, we may decide whether a particular statement or a link in the theory is right or wrong, i.e., whether it does or does not violate the requirements as to inner consistency of our model. As long as we remain in the world of abstractions and simplifications there is no limit to what we might choose to prove or to disprove" (Haavelmo, 1944, p. 1).

And after offering us such important insights he referred to worth citing passage from V. Pareto:

"There is no proposition that cannot be verified under certain specific conditions. The conditions of a theorem are an integral part of the theorem and cannot be separated from it" (Pareto, 1906/2014, p. 5).

So, Haavelmo simply claims that in models "there is no limit" to our imagination; or, in other words, for every theoretical claim we can offer a model in which such a statement is to be true. Therefore, *ceteris paribus* stands for 'in a model' clause. The same is in Pareto's case where he uses the term "specific conditions" as synonymous to models. Nevertheless, the above second sentence from Pareto's citation is worth commenting on. He claims that one cannot separate "the conditions of a theorem" from a theorem as such. It should be read as a claim that a given theorem is perfectly true only in very specific circumstances, namely in "its" normal conditions.⁸

⁸ As Hardt (2017) documents it, in a rather anecdotal way this issue was nicely portrayed by Mises saying the following: "Once, during a speech which he was making at a statistical congress in Bern, Pareto spoke of 'natural economic law', whereupon [Gustav] Schmoller, who was present, said that there was no such thing. Pareto said nothing, but smiled and bowed. Afterward he asked Schmoller, through one of his neighbors, whether he knew of an inn where one could eat for nothing. The elegant Schmoller is supposed to have looked half pityingly and half disdainfully at the modestly dressed Pareto – although he was known to be well off – and to have answered that there were plenty of cheap restaurants, but one had to pay something everywhere. At which Pareto said: 'So there are natural laws of political economy'" (Mises as quoted in: Rothbard, 2006, p. 459).

Now, let us recapitulate the main findings of our study into the very meaning of *ceteris paribus* clause. It seems that the only uncontroversial way to successfully defend such laws is just to claim that a given cp-statement is only true in a model used for its “production” or, in a second case, if one has a cp-law, no matter of its origin, then one can always construct a model in which such a statement is to be true. But problems arise once we try to use cp-laws in order to describe some empirical facts. We have just shown above that various ways of understanding such claims have various problems. Thus, in what follows we are to continue our search for proper understanding of cp-laws used to describe economic real worlds.

3. *CETERIS NORMALIBUS* LAWS IN ECONOMICS

Having in mind what has been said above, one should agree that economic laws (usually stated with *ceteris paribus* clauses) can be understood as the laws always true in economic models, and hence *ceteris normalibus* is just to be conceptualized as being synonymous to “in a model” phrase. So, for instance, saying that *ceteris paribus* lower interest rates are to stimulate investments can be rephrased that lower interest rates always stimulate investments only in theoretical models where such a relation holds or, in other words, *ceteris normalibus*, lower interest rates stimulates investments. However, we have a problem once we try to describe situation, say, in a Polish economy. If our economy is to be the same as our theoretical model is, then for sure lowering interest rates is to stimulate investment. Conversely, we do not have such a perfect isomorphism between the economy and its model. So, how we should understand such claims when they are directed towards our empirical domains? We are not to repeat our insights from the preceding section but rather we are to try offering you a different and, in a sense, more metaphysically rich way of interpreting *ceteris normalibus* clause. However, such a reading is not to falsify the above presented simple claim that cn clauses can be understood as referring particular statements to models where they are true.

If we would like to describe economic realm, then we should ask how its constituting parts exist and more fundamentally a study into the nature of specific existents is needed. It is claimed here that “all features of reality can be viewed under the aspect of their being” (Lawson, 2014, p. 19). And scientific ontology can be understood as primarily interested in investigating the natures of particular existents. It differs from philosophical ontology which deals with general aspects of being.⁹ In what follows we are particularly interested in the nature of

⁹ M. Bunge, for instance, describes the difference between scientific and philosophical ontology as follows: “Ontology can be classed into general and special (or regional). *General* ontology studies all existents, whereas each *special* ontology studies one genus of thing or process physical, chemical, biological, social, etc. Thus, whereas general ontology studies the concepts of space, time, and event, the ontology of the social investigates such general sociological concepts as those of social system, social structure, and social change” (Bunge, 1999, p. 200). Our scientific ontology is an example of Bunge’s special ontology.

economic being and more generally in the very nature of economic world. Therefore, such a perspective is relatively skeptical towards deductivist mode of explanation in economics where to explain is to provide an account of how explanandum must be deduced from explanans and where initial conditions are supplemented by invocations to universal laws such as *whenever A then B*. As it is shown in Hardt (2017), economic world is not governed by such laws and hence we should not be surprised that our attempts at understanding cp-laws in economics in terms of some regularities usually fail. What we should focus on is the real domain of economic reality where such entities as the following ones are present, namely powers, mechanisms, tendencies, and structures.¹⁰ Let us refer here again to T. Lawson, one of the leading proponents of rediscovering economic ontology:

“[...] science aims at uncovering causal factors, that is, it is concerned with identifying structures, mechanisms and the tendencies they ground, which produce, govern or facilitate phenomena at a different level. And if the aim of science is to illuminate structures that govern surface phenomena then *laws or law-statements are neither empirical statements (statements about experiences) nor statements about events or their regularities (whether unqualified or subject to *ceteris paribus* restrictions), but precisely statements elucidating structures and their characteristic modes of activity*” (Lawson, 1997, p. 24; italics in original; emphasis added).

So, according to Lawson, every law-like statement in economics, including the ones with cp-clauses, do not describe regularities but rather “modes of activity” of particular economic entities. But how such “modes” should be understood? Definitely we do not have here any references to probabilities but rather to prototypical characteristics of broadly understood economic entities. Let us give the floor again to Lawson:

“[...] these or related notions [law-like statements in economics] must be conceived in terms of potentials; as potentials that may or may not be expressed, and if expressed that may or may not be actualized because of countervailing tendencies [...]. The fundamental error of orthodox theory here [...] is not its focus upon such conceptions as rationality or profit seeking *per se*, the problem is its presumption that such matters, at some level at least, are always expressed in terms of actualities rather than capacities” (*ibid.*, p. 106).

Thus, Lawson goes further than Mill in stressing that economic laws are just statements about tendencies. His claim is that there is something real beyond appearances of economic phenomena and thus one may have a given economic entity containing a capacity to act but at the same time this very power may be dormant. In such a framework, economics can be treated as a science despite the

¹⁰ The real layer of economic reality is accompanied by the empirical one (experience) and the actual one (actual events and states of affairs) (Lawson, 1997, p. 21).

fact that economic events could always have been different. We agree with N. Cartwright saying that “Our most wide-ranging scientific knowledge is not knowledge of laws but knowledge of the natures of things” (Cartwright, 1999, p. 4).¹¹ Therefore, to know is to refer to powers, capacities, natures, mechanisms, and structures. So, a given economic entity, say, an economic agent, has, for instance, a capacity to act rationally. She can still have such a capacity even without any instances of its actualization. Thus, one may say the following: it is in nature of an economic agent to act rationally. It means something different than *ceteris normalibus* statement making reference to a given model in which a particular statement is true. Here, by employing *in nature of something it is to produce something else* condition one just refers to inner composition of economic entities.¹² So, there is deep in the world and not everything is on the surface.

By referring to capacities we definitely move towards Aristotelian approach to explanation since he sees “natures as primary and behaviors, even very regular behavior, as derivative” (*ibid.*, p. 149). In *Physics* (II, 1, 192b22) Aristotle writes that the goal of investigating the way the world works is a search for “[...] the factor which initiates movement and rest within that thing in which it is itself immediately, not incidentally, present” (Aristotle, 1961, p. 23). So, we talk here about internal forces, or inner causes, of changes. Similarly, Aristotle offers us a parallel idea to the one of nature, namely capacities or *dynameis* that are “powers to do” (Crespo, 2009, p. 124). They are defined in *Metaphysics* (V, 12,

¹¹ This part of paper is heavily based on Lawson’s and Cartwright’s insights. Although they are very similar, we are conscious that one should notice also some differences, e.g., Cartwright is more sympathetic to neoclassical economics than Lawson is. She claims that laws in economics hold only in highly organized environments, or, in her own words, in nomological machines. Lawson however has some doubts whether even in model conditions a given thing’s capacity is to be always activated since “a statement of a tendency [...] is an *unconditional* statement about something non-actual and non-empirical” (Lawson, 1997, p. 23) and hence his transcendental realism (interesting comparison of Cartwright and Lawson is offered in Hoover 2002). For the sake of this paper, it is not necessary however to offer more comments on the differences between these two authors. However, if we would be pressed to choose whose ideas are closer to our way of thinking about capacities and powers, we would choose Cartwright, since our claim is that *ceteris normalibus* laws are true in economic models, or, to use Cartwright’s terms, in blueprints of nomological machines.

¹² Such laws are called normic laws, since a given *A* normally produces *B*, and to put it more formally $Ax \rightarrow Bx$ (for “*As* are normally *Bs*”, ‘ \rightarrow ’ is a variable-binding conditional). We do not want to offer here more formalized treatment of such laws (it is not necessary for this analysis), however, the following words by Schurz (2004, 186) are worth referring to: “The ‘normality’ of a normic law $Ax \rightarrow Bx$ is *relative* to both the antecedent predicate *Ax* and the consequent predicate *Bx*. For example, ‘birds normally can fly’ speaks about what is normal *for birds* and not about what is normal for arbitrary animals, e.g., it is normal for fishes to be able to swim but not to fly. Moreover, ‘birds normally can fly’ tells us what it means for a bird to be normal with respect to its way of locomotion, but not necessarily with respect to other property families, for example, a bird which can fly but is infertile is normal with respect to its way of locomotion but abnormal with respect its reproduction ability. This demonstrates that ‘ \rightarrow ’ is a *genuine conditional operator* which *cannot* be adequately understood either as a special ‘predicate’ “ $Ax \wedge \text{Norm}(x) \rightarrow Bx$ ”, or as an unary ‘normality-operator’ attached to an ordinary material implication “ $\text{Norm}(Ax \rightarrow Bx)$ ” (Schurz, 2004, p. 186; cf. Boruszewski in this issue of “*Studia Ekonomiczne*” for a more formalized treatment of interplays between models and theories; see also Boruszewski, 2014).

1019a, pp. 14–16) as follows: “Something is said to be a capacity [potentiality, power] when it is a starting-point of movement or change either in another thing or in a thing insofar as it other” (Aristotle, 2016, p. 83). Why it matters for economics? Simply because in economic realm we have capacities. In his discussion of Cartwright’s insights D. Hands claims the following: “[...] she argues repeatedly that real practicing scientists actually do presuppose that capacities and causal powers exist in systems they study” (2001, p. 313). In her 1989 book she is straightforward in claiming that capacities are also present in social sciences, including economics, however, the ones in economics are less *powerful* (cf. Crespo, 2009, pp. 127–128). In her own words:

“Social science is hard, but not impossible. Nor should that be surprising; natural science is exceedingly hard and it does not confront so many problems as social science – problems of complexity, of reflexivity, of lack of control. Moreover the natural sciences more or less choose the problems they will solve but the social sciences are asked to solve the problems that policy throws up” (Cartwright, 2007b, p. 42).

And referring to economics she adds:

“The natural thought about the difference between the most fundamental capacities studied in physics and the capacities studied in economics is that the economic capacities are derived whereas those of fundamental physics are basic. Economic features have the capacities they do because of some underlying social, institutional, legal and psychological arrangements that give rise to them. So the strengths of economic capacities can be changed, unlike many in physics, because the underlying structures from which they derive can be altered” (Cartwright, 2007a, p. 54).

Nevertheless, capacities in economics are real and should play an important role in explaining economic facts. If now causation can be conceptualized in terms of manifestation of power, then we should be able to explain singular events without any need for some general laws. Thus singular causation. She explains it as follows:

“The generic causal claims of science are not reports of regularities but rather ascriptions of capacities, capacities to make things happen, case by case. ‘Aspirins relieve headaches.’ This does not say that aspirins always relieve headaches, or always do so if the rest of the world is arranged in a particularly felicitous way, or that they relieve headaches most of the time, or more often than not. Rather it says that aspirins have the capacity to relieve headaches, a relatively enduring and stable capacity that may if circumstances are right reveal itself by producing a regularity, but which is just as surely seen in one good single case. The best sign that aspirins can relieve headaches is that on occasion some of them do” (Cartwright, 1989, pp. 2–3).

Now, it is obvious that while referring to inner composition of things, or capacities, then *ceteris normalibus* gains a metaphysically rich imprint. For instance, one can say that *ceteris normalibus* people self-socialize, namely that it is in the very nature of men to be with others. As Aristotle (1984, p. 37) puts it in *Politics* (I, 2, 1253a, pp. 29–30): “[...] there is in everyone by nature an impulse towards this sort of partnership”. And in the same vein A. Smith famously proclaims that humans are characterized by “the propensity to truck, barter, and exchange one thing for another” (Smith, 1994, p. 14). So, such a capacity is not derived but it is situated deeply in human nature.¹³ But, on the other hand, Cartwright is right that majority of capacities in economics are derived. It simply means that they are based on a very small number of basic ones, e.g., as the one mentioned by Smith or Millian claim that the most important principle of human nature is to acquire wealth.¹⁴ However, as Lawson claims, we may have also powers embodied in social or economic systems. He gives the following example:

“Community life, then, is organised; it is so by way of emergent collective practices and their inherent rights and obligations that structure human interaction. The result is a social totality or set of totalities. And the latter have causal powers. A motorway system for example, structured by various inter-connecting collective practices, has powers of co-ordinating that are irreducible to any of its various motoring components; and a language system has powers to facilitate communication that are irreducible to those of any individual communicator” (Lawson, 2014, p. 36; emphasis added).

Therefore, although this issue is very complicated and for sure beyond the scope of this short paper, we may albeit with some reservations refer to natures in economic domain of social reality.

After the above insights on what capacities are (ontology), it is now time to offer some comments dealing with how they are known (epistemology). And here one can rightly ask how it is possible to identify capacities if they can be present, but at the same time do not manifest themselves. So, three points are worth making here. First, we need special arrangements where capacities can show up. Second, measurement of their effects is necessary. Third, capacities can be deduced from probabilities, or, to say more precisely, probabilities can offer us hypothesis concerning capacities’ existence. All three issues are nicely analyzed

¹³ Here Smith follows clearly D. Hume’s insights concerning human natures, for instance, “It is universally acknowledged, that there is a great uniformity among the actions of men, in all nations and ages, and that human nature remains still the same, in its principles and operations” (Hume, 1748/1993, p. 55).

¹⁴ In *Utilitarianism* he writes: „If human nature is so constituted as [...] happiness is the sole end of human action [...]. It necessarily follows that it must be the criterion of morality” (Mill, 1863, p. 57).

in Cartwright's writings. So, what she proposes is to build nomological machines where we can observe capacities in action. As she puts it:

“[nomological machine] is a fixed (enough) arrangement of components, or factors, with stable (enough) capacities that in the right sort of stable (enough) environment will, with repeated operation, give rise to the kind of regular behaviour that we represent in our scientific laws [...]. Laws of nature (in this necessary regular association sense of “law”) hold only *ceteris paribus* – they hold only relative to the successful repeated operation of a nomological machine” (Cartwright, 1999, p. 50).

And here she is straightforward in treating cp-clauses as the ones refereeing to a given nomological machine, or, to normal conditions. Also, in such perfect arrangements capacities are to be active, however, once we move from ideal conditions to some real world settings these capacities are still to be present but they may not manifest themselves. Therefore, *ceteris normalibus* clause understood as the one refereeing to entities' capacities or powers. In *The Dappled World* (1999) she gives a concrete example of a theoretical model, a kind of a blueprint of nomological machine, namely the one by Hart and Moore (1991) where they try to analyze how optimal contracts between banks and entrepreneurs should look like. We are not to present this case here, but we would rather give the floor again to Cartwright studying the issue of how this model's insights should be understood.¹⁵ She says the following: “There must be a machine like the one modelled by Hart and Moore [...] to give rise to it. There are no law-like regularities without a machine to generate them. Thus, *ceteris paribus* conditions have a very special role to play in economic laws like [Corollary 1 in Hart's and Moore's model]. They describe the structure of the machine that makes the laws true” (Cartwright, 1999, p. 148). So, again she supports the view treating cp-clauses as *ceteris normalibus* ones.

Before moving further one reservation is in order here. Understanding *ceteris normalibus* clauses in a metaphysically rich manner does not mean that they cannot be just treated as somehow synonymous to claiming that our laws hold only in model conditions. Such an understanding of cn clauses does not require us to refer to capacities and powers. Or, to put it as simply as possible, cn restriction may be synonymous to ‘in a model’ condition. Therefore, we have two possible treatments of cn conditions with the one quite Aristotelian in nature.¹⁶

Now, after the above philosophically rich analyses of *ceteris normalibus* laws we would like to offer our readers a kind of a more popular treatment of such

¹⁵ This Cartwright's case-study is put under scrutiny in Hardt (2017, p. 117).

¹⁶ It is also possible to use *ceteris normalibus* in a quite informal way as a clause simply meaning that our generalizations are to hold in non-exceptional times. However, assessing whether times are non-exceptional is made by checking how far from normal conditions we are and thus again even here we come back to normality assumptions.

statements. Therefore, in the following brief section we are still to focus on *ceteris normalibus* laws but we will use insight's from D. Rodrik's book *Economics Rules: The Rights and Wrongs of the Dismal Science* (2015) and an interesting debate on his book among philosophers of economics. Such insights should nicely support our treatment of economic laws.

4. THE ROLE OF MODELS IN PRODUCING (*CETERIS NORMALIBUS*) ECONOMIC LAWS

In discussing the role models play in producing our knowledge about the economic world it is useful not only to use some philosophical insights but also to look into the way practicing economists treat models. Here, as A. Rubinstein claims, D. Rodrik's 2015 book "can serve as an ideal platform for discussing what economics can and should accomplish" (Rodrik, 2015, p. 162). Let us start by referring to three points from Rodrik's work, i.e.:

"[...] models enable the accumulation of knowledge, by expanding the set of plausible explanations for, and our understanding of, a variety of social phenomena. In this way, economic science advances as a library would expand: by adding to its collection" (*ibid.*, p. 46).

"Models are never true: but there is truth in models" (*ibid.*, p. 44).

"In economics, context is all. What is true of one setting need not be true of another" (*ibid.*, p. 164).

So, according to Rodrik, once you have a given context, then you need an appropriate model. And since we have an unlimited number of different contexts, then the more models you have, the higher probability that you are to find a right model is. So, there is no such thing as *the* model, but always it is *a* model (*ibid.*, p. 43). Therefore, we do not have unconditionally true models, but models can be only relatively true, namely they can be true in virtue of a context one is to use them in. Such a vision of economic models is perfectly in line with the following one: "The fact that a model turns out not to work under certain circumstances does not count as a refutation of the model but only as a failed test of its applicability in a given domain" (Guala, 2005, p. 220). Thus, "[...] the closer a given empirical domain to the model's structure is, the higher probability that the model's insights are to correctly explain the workings of such a domain" (Hardt, 2017, p. 152). Nevertheless, another way of understanding Rodrik's arguments is possible in which "[...] explanation requires finding and utilizing *the right set of models* for the explanatory task at hand" (Aydinonat, 2018, p. 237) and not having *the right* model. In such a reading models offer us a set of explanations and only later we empirically verify their plausibility. Although the above two

ways of treating Rodrik's insights are different, they merge in one important aspect, namely in both models produce claims about empirical world that are always true in models generating them but only partially true once referred to domains beyond the models.¹⁷

Having said the above, we should ask a very simple and fundamental question: what are ingredients of models? As models can be viewed as pragmatically and ontologically constrained representations, we can state the following:

“Agent *A*
uses object *M* as
a representative of some target system *R*
for purpose *P*,
addressing audience *E*,
prompting genuine issues of resemblance to arise;
and applies commentary *C* to identify and align these components”
(Mäki, 2009, p. 32).

Economists usually put emphasis on *M* rather than on conditions for using a particular model in a given context. Therefore, economists disregard models' commentaries. They are good in producing models but they are often unable to rightly select an appropriate one. As Rodrik comments “Freshly minted PhDs come out of graduate school with a large inventory of models but virtually no formal training – no course work, no assignments, no problem sets – in how one chooses among them” (Rodrik, 2015, pp. 83–84). It reminds us strong words from The American Economic Association's 1991 Commission on the state of graduate education in economics in the USA, namely that “[...] graduate programs may be turning out a generation with too many *idiot savants* skilled in technique but innocent of real economic issues” (Krueger, 1991, pp. 1044–1045; italics in original). In other words, they even do not know that models once referred to empirical domains need commentaries. Also, it is misleading to treat models' descriptions as commentaries.

The absence of commentaries in economic models leads economists to overconfidence in the statements they offer in public debates and theories they produce. Therefore, they often seem to claim that their models can be used regardless of the context. Or, in other words, they do not inform the public that a given claim is only true in a particular model but once referred to the outside model world it is usually not perfectly correct. Believing in universality of economic laws (or theories) is just a form of scientific fundamentalism. Here it is again worth to give a floor to N. Cartwright stating the following:

“Return to my rough division of law-like items of knowledge into two categories: (1) those that are legitimately regimented into theoretical

¹⁷ In his comments on Aydinonat's paper Rodrik (2018) writes in this context: “I would also put great weight on Occam's razor: use the least number of models as possible” (p. 278).

schemes, these generally, though not always, being facts about behaviour in highly structured, manufactured environments like a spark chamber; (2) those that are not. There is a tendency to think that all facts must belong to one grand scheme, and, moreover, that this is a scheme in which the facts in the first category have a special and privileged status. They are exemplary of the way nature is supposed to work. The others must be made to conform to them. This is the kind of fundamentalist doctrine that I think we must resist” (Cartwright, 1994, p. 316; emphasis added).

Fundamentalism, by its very nature, is an unscientific doctrine. And it also did and it still is doing a lot of damage to economics and economists. As D. Colander claims in his well-known paper on the state of economics “Neoclassical economists made a fatal mistake that classical economists had avoided and had strongly warned against: They drew policy conclusions directly from their models and theory” (Colander, 2011, p. 8) and next he adds “Professional economists have been unwilling to admit that the economy is far too complex to be captured by any unified model. In private discussions among ourselves we recognize this complexity, but we don’t add the appropriate warning labels to our models when they are discussed in public. There, we pretend we understand more than we do” (*ibid.*, p. 20). In his comments regarding Rodrik’s book U. Mäki writes the following: “This may result in difficulties in developing adequate model commentaries that would incorporate appropriate degrees of humility reflecting the uncertainties that are involved” (Mäki, 2018, p. 225). Coming back now to Colander’s 2009 paper, published during the Great Recession, we find even a stronger statement: “Defining away the most prevalent economic problems of modern economies and failing to communicate the limitations and assumptions of its popular models, the economics profession bears some responsibility for the financial and economic crisis” (Colander, 2009, p. 264). So, here Rodrik and Colander agree: we have more problems with the ways economic insights are used and treated than with theoretical economics as such (cf. Hardt, 2016).¹⁸

Let us now come back to our discussion on *ceteris normalibus* laws and here one may ask how does it fit with Rodrik’s insights on economics. To answer it very quickly we would just say that they correspond only partially. Or, in more

¹⁸ Such a claim is strongly supported, for instance, by B. Bernanke stressing the following: “[...] the recent financial crisis was more a failure of economic engineering and economic management than of what I have called economic science” (Bernanke, 2010, p. 3). To put it in more Keynesian terms, we do not have problems with science of economics but definitely we have problems with art of economics. To quote Keynes, “Good economists are scarce because the gift for using ‘vigilant observation’ to choose good models, although it does not require a highly specialized intellectual technique, appears to be a very rare one” (Keynes, 1938/1978, pp. 296–297). In his 2018 comments on U. Mäki’s discussion of his work he said the following referring to the above quote from Keynes: “Had I been familiar with this quote from Keynes before I wrote the book, I might have chosen not to spend the effort!” (Rodrik, 2018, p. 277). Luckily, he was not familiar.

precise terms, Rodrik's vision agrees with the one seeing economists' claims about economic reality as only *ceteris normalibus* in a sense of being true only in particular models. So, his statement that "Models are never true: but there is truth in models" (Rodrik, 2015, p. 44) can be rephrased in the following way: Economic truths (i.e., statements about real economic systems) are only *ceteris normalibus* truths and such truths are true in particular models. However, Rodrik's treatment of economics does not support *ceteris normalibus* clauses as the ones referring to economic entities' capacities and natures. He does not refer to such metaphysically rich categories. One reason for this may be the fact that his "goal was to sketch a middle line between hardcore falsificationism (which gets us nowhere) and empirical nihilism (which presumes there is no there there)" (Rodrik, 2018, p. 278). Nevertheless, in his book we can find a claim that "At best, we can talk in terms of tendencies, context-specific regularities, and likely consequences" (Rodrik, 2015, p. 45). However, on the other hand, he somehow cannot give up his dream of finding such a model that being strongly isomorphic to its empirical target would give us specific-truths about this very target. So, he writes the following: "They [theories] are specific rather than universal theories. They aim to shed some light on particular historical episodes and do not describe general laws and tendencies" (*ibid.*, 2015, p. 115). Here we disagree since even in a very specific empirical context our theories are to be at best statements about capacities or tendencies rather than strict (although only context specific) laws. This is so because economic world is not governed by laws but by natures and powers. Or, in Lawson's words, economic world is a world of potentialities rather than actualities. However, and here we should be grateful to Rodrik, he takes us not far away from such more metaphysically rich treatment of economic realm.

Summing up what have been just said about Rodrik, it is definitely more appropriate to treat his insights as the ones supporting interpretation of economic laws in *ceteris normalibus* terms rather than in *ceteris paribus* manner. He even explicitly uses in his books sentences treated by us earlier in second section as being nearly synonymous to *ceteris normalibus* clause, for instance, "Normally, broad technological progress that increases labor productivity is expected to improve everyone's living standards" (Rodrik, 2015, p. 141), or "[...] a huge injection of money by central bank will produce inflation in normal times (*ibid.*, p. 185). Normally, or in normal times, mean here just in a particular model. However, as Cartwright observes, "[...] the literal translation [of *ceteris paribus*] is 'other things being equal'; but it would be more apt to read '*ceteris paribus*' as 'other things being right'" (Cartwright, 1983, p. 45). And for Rodrik being right means being in an appropriate model.¹⁹ So, again, we find more arguments for treating *ceteris paribus* in *ceteris normalibus* terms.

¹⁹ Cartwright's 'other things being right' statement can be called a *ceteris rectis* clause. Here we understand being right as being normal (cf. Schurz, 2014; Hardt, 2018).

5. CONCLUSIONS

The issue of what kind of statements economics laws are is of profound importance both for economics as such and economic policies based on various theoretical assumptions. Our claim in this paper is that the most appropriate way of treating economic laws is to conceptualize them in *ceteris normalibus* terms, namely as statements only true in normal circumstances. However, perfectly normal circumstances can be found only in theoretical models. Once we move beyond such models our statements degenerate into the ones about tendencies that are due to capacities present in economic entities. Therefore, for instance, a popular claim that a growth in money supply is to rise inflation should not be treated in terms of being true under assumption of all else being equal (*ceteris paribus*) but better as the one true in normal conditions (*ceteris normalibus*). And, simplifying a bit, the closer a given empirical domain to such normal conditions is, the higher *probability* that relation described by a particular law is to hold. Since such closeness or isomorphism is never perfect thus our claim that economic laws describe tendencies. Moreover, such tendencies are due to the fact that economic processes are not governed by universal laws but rather by powers, capacities, and natures. Or, in other words, economic world is the one of potentialities rather than actualities. So, referring to the above example, and again simplifying a bit, one can say that in the nature of growing money supply is to make inflation higher. However, since capacities may be dormant one may have growing money supply without expected effect in higher inflation. Yet, in such a case, it is still true that *ceteris normalibus* rising money supply makes inflation higher since “scientific knowledge is not knowledge of laws but knowledge of the natures of things” (Cartwright, 1999, p. 4). However, those denying the existence of capacities and natures can still use *cn* clauses as simply the ones restricting the validity of given statements to theoretical models. So, in a sense, we have two understandings of such a restriction: the one which is metaphysically rich, and the one denying capacities or being agnostic about their existence.

Last but not least, my reading of economic laws does not make traditional understanding of *ceteris paribus* clause obsolete in economics. Still, one may say that his generalization is only true once other factors are constant. Nevertheless, it is usually not sufficient since such constancy must be supplemented with the conditions under which a given regularity holds and thus *ceteris normalibus* clause is needed. So, to be precise, we may have mixed laws containing both *ceteris paribus* clauses and *ceteris normalibus* ones. This is precisely what Marshall proposed in his *Principle of Economics* where he offers both “the condition that other things are equal”, however, he did it only after writing that economic laws describe “the course of action which may be expected under certain conditions from the members of an industrial group is the normal action of the members of that group relatively to those conditions” (see, section 2). Thus, as Schurz (2014) conceptualizes it, we may have so-called mixed *cn-cp* laws, for instance, the fol-

lowing one: *ceteris normalibus* (for “sufficiently ideal” markets) and *ceteris paribus* (provided the other variables remain unchanged), an increase in demand leads to an increase in price.²⁰ Consequently, interpreting economic laws as only *ceteris paribus* ones is hardly correct.

And now the final point. Viewing economic laws as *ceteris normalibus* ones clearly makes us conscious that in economics we do not have universal laws and answers. What we only have are laws that are context-specific, and they refer to tendencies and capacities. They are only true without any exceptions in theoretical models. We can do nothing more here than again agree with the following Rodrik’s opinion: “Economists who remain true to their discipline, like Tirole, are necessarily humble [...]. Their responses to most questions necessarily take the form of ‘It depends’, ‘I don’t know’” (Rodrik, 2015, p. 209), and we would add that their responses are at best stated in *ceteris normalibus* terms.

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²⁰ To be precise, Schurz writes about *ceteris rectis* laws (see, footnote no 20).

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MODELE EKONOMICZNE I PRAWA *CETERIS NORMALIBUS*

STRESZCZENIE

W artykule omówiono charakter praw ekonomicznych. Zamiast rozumieć je w kategoriach *ceteris paribus*, twierdzi się, że prawa ekonomiczne powinny być opatrzone klauzulą *ceteris normalibus*, która może być rozumiana w dwojaki sposób. Po pierwsze, jako stwierdzenie, że dane prawo jest prawdziwe tylko w warunkach określonego modelu. W takiej sytuacji, im dana domena empiryczna jest bliższa strukturze modelu, tym wyższe prawdopodobieństwo, że konkluzje modelu (tj. prawa ekonomiczne) poprawnie opisują tę domenę. Jednak nigdy nie mamy do czynienia z pełnym izomorfizmem między modelami a ich domenami empirycznymi, a więc prawa ekonomiczne opisują jedynie tendencje w rzeczywistości empirycznej. Dochodzimy więc do innego rozumienia klauzuli *ceteris normalibus*: prawa nią opatrzone nie opisują regularności, ale odnoszą się do poten-

cyjności i możliwości. Określają to, czego powodowanie leży w naturze danego czynnika sprawczego. Takie prawa nazywamy prawami normalnościowymi (*normic laws*). W artykule, badając naturę praw ekonomicznych, przedstawiono również historię zastosowania klauzuli *ceteris paribus* w ekonomii. Ponadto niniejszy artykuł nawiązuje do interesującej debaty dotyczącej modeli i praw ekonomicznych, zawartej w książce D. Rodrika *Economics Rules* z 2015 roku.

Słowa kluczowe: filozofia ekonomii, modele i prawa w ekonomii, *ceteris paribus*, *ceteris normalibus*, ontologia rzeczywistości społecznej.

Klasyfikacja JEL: B41, B10, B50