ABSTRACT. It has not been sufficiently considered in philosophical discussions of ceteris paribus (CP) laws that distinct kinds of CP-laws exist in science with rather different meanings. I distinguish between (1.) comparative CP-laws and (2.) exclusive CP-laws. There exist also mixed CP-laws, which contain a comparative and an exclusive CP-clause. Exclusive CP-laws may be either (2.1) definite, (2.2) indefinite or (2.3) normic. While CP-laws of kind (2.1) and (2.2) exhibit deductivistic behaviour, CP-laws of kind (2.3) require a probabilistic or non-monotonic reconstruction. CP-laws of kind (1) may be both deductivistic or probabilistic. All these kinds of CP-laws have empirical content by which they are testable, except CP-laws of kind (2.2) which are almost vacuous. Typically, CP-laws of kind (1) express invariant correlations, CP-laws of kind (2.1) express closed system laws of physical sciences, and CP-laws of kind (2.3) express normic laws of non-physical sciences based on evolution-theoretic stability properties.

1. INTRODUCTION: COMPARATIVE VERSUS EXCLUSIVE CETERIS PARIBUS LAWS

Philosophers of the last decades have repeatedly pointed out that most law statements, especially those in the non-physical sciences, do not express strict (i.e., universal and exceptionless) laws. Rather, they express so-called ceteris paribus laws, in short CP-laws. The scientific ‘dignity’ of CP-laws, however, is a controversial matter. In this paper I will try to show that “ceteris paribus” is a deeply ambiguous notion. It is better to differentiate the possible meanings before starting the attempt of explication. First of all, one should distinguish between two (families of) conceptions of CP-law: comparative versus exclusive.

The comparative sense of CP-clauses derives from the literal meaning of “ceteris paribus” as “the others being equal”. A comparative CP-law makes an assertion about functional properties, henceforth called parameters. It claims that the increase (or decrease) of one parameter, say f(x), leads to an increase (or decrease) of another parameter, say g(x), provided that all other (unknown) parameters describing the states of the underlying system(s) remain the same. Thus, a comparative CP-clause does not exclude the presence of other ‘disturbing’ factors, but merely
requires that they are kept constant. More precisely, a comparative CP-law compares the states of two systems of an underlying application class, one state where the parameter \( f \) has not been increased, and another state where the parameter \( f \) has been increased – and it requires both states to agree on all parameters which are causally independent from \( f \) (i.e., not affected by \( f \)). In particular, the quantitative parameters being compared may be the probabilities of some qualitative properties (expressed by predicates). Here are three examples:

(1) Ceteris paribus, an increase of gas temperature leads to a (proportional) increase of gas volume (Gay-Lussac’s gas law).

(2) Ceteris paribus, increase of rain leads to an increase in growth of vegetation.

(3) Ceteris paribus, (an increase of) alcoholization of the driver leads to an increased probability of a car accident.

While in (1) a quantitative relation between the increases is known (the relation of proportionality), in (2) only an ordinal relation between the increases is predicted (i.e., increase leads to increase). Finally, (3) is an example of a probabilistic comparative CP-law, where the consequent parameter \( g \) expresses a probability increase.

In the philosophical debate, however, CP-laws have usually been understood in the different exclusive sense. An exclusive CP-law asserts that a certain state or event-type expressed by a (possibly complex) predicate \( Ax \) leads to another state or event-type \( Cx \) provided disturbing influences are absent. \( Ax \) is called the antecedent and \( Cx \) the consequent predicate. Thus, an exclusive CP-clause does not merely require keeping all other causally interfering factors constant; it rather excludes the presence of causally interfering factors. In agreement with this exclusive understanding, Cartwright has remarked that “the literal translation is ‘other things being equal’; but it would be more apt to read ‘ceteris paribus’ as ‘other things being right’ ” (1983, p. 45). Joseph (1980, p. 777) has spoken of “ceteris absentibus” clauses, and Hempel (1988, p. 29) calls exclusive CP-clauses “Provisos” (“... provided disturbing factors are absent”). Consider the following examples of exclusive CP-laws – (4) comes from physics and (5, 6) from psychology:

(4) Ceteris paribus, planets have elliptical orbits (Lakatos op. cit.).
(5) Ceteris paribus, people's actions are goal-oriented, in the sense that if person x wants A and believes B to be an optimal means for achieving A, then x will attempt to do B (Fodor, 1991; Dray 1957, pp. 132ff).

(6) Ceteris paribus, frustration leads to aggression (Schurz 1995).

In (4), the CP-clause requires that other (non-negligible) forces on the planet except that of the sun are – not merely constant but – absent. Likewise, the CP-clause of (5) requires any factors causing irrational behavior to be absent. Note that (5) governs various special CP-laws, such as "CP people who want water try to get water" (Fodor 1991, p. 28). In (6), finally, the CP-clause excludes interfering factors of both psychological sort (e.g., depression) and physical sort (e.g., the influence of drugs).

The distinction between comparative and exclusive CP-laws is not disjoint. There are CP-laws which have both comparative and exclusive character, as in the following example from theoretical economy:

(7) Ceteris paribus, an increase of demand leads to an increase of prices.

Not only must the compared economies agree in remainder factors; various interferes (such as political price regulations) must be excluded. We call these CP-laws mixed and treat them as (implicitly) governed by a comparative and an exclusive CP-clause; all what we say in the following about comparative and exclusive CP-clauses transfers to mixed CP-laws. The fact that comparatively formulated CP-laws are often mixed in character may explain why, historically, the two kinds of CP-laws have usually been conflated.

One may object to our distinction that some exclusive CP-laws can be reformulated in a comparative form, by interpreting events as changes in the values of certain parameters (cf. Gadenne 1984, p. 43f). In this way, the frustration-aggression law (6) may be reformulated as follows:

(6*) Ceteris paribus, an increase of frustration leads to an increase of aggression.

But this reformulation does not at all diminish the difference. (6*) is still an exclusive CP-law, because interfering factors such as influences of certain drugs are not merely required to be constant, but must be absent. Otherwise, an increase of frustration will not lead to an increase of aggression. Generally speaking, if a CP-law "CP, if Ax then Cx" is truly
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