Markus Schrenk
The Metaphysics of Ceteris Paribus Laws

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INTRODUCTION

INTRODUCTION

I.
CETERIS PARIBUS LAWS

An alleged law of nature—like Newton's law of gravitation—is said to be a *ceteris paribus* law if it does not hold under certain circumstances but only 'when other things are equal'. Typical examples are: 'provided the supply remains constant, the price of a product increases with growing demand, *ceteris paribus*', 'all bodies fall with the same speed, *ceteris paribus'*, 'haemoglobin binds O_2, *ceteris paribus*'.

There is, however, an inherent tension in the notion of a *ceteris paribus* law: on the one hand, laws are said to be strict universal regularities, on the other hand, the proviso clause seems to allow for certain exceptions.

Moreover, in the current debate on *ceteris paribus* laws fervent opponents to the whole idea of law statements with proviso clauses point out that no good sense can be made of a statement like 'All Fs are Gs, *ceteris paribus*'. Such a phrase, so they say, is either tautologous like 'All Fs are Gs, unless not' or it stands for a proposition like 'All Fs which are also… are Gs' the gap of which we are unable to close.

Many of those who argue in favour of the idea of *ceteris paribus* laws, however, not only claim that a proper analysis of what the proviso clause is supposed to mean can be given but even that *all* laws are of *ceteris paribus* character.

The strong latter statement sounds somehow acceptable when restricted to the special sciences. When it is related to fundamental laws, it causes sceptical responses. That the laws of biology or psychology are open to exceptions finds more support than the view that laws of physics do not always hold. Yet, some philosophers defend even the radical view that the

basic laws of physics are *ceteris paribus* laws.

Combining the two issues—proviso clauses in law statements and the status of special sciences—we find, hence, three major positions:

(i) On one side of the spectrum we face a strong scepticism: contrary to fundamental laws which are exceptionless the *alleged* laws of the special sciences are, in fact, hedged with provisos and as such do not really count as laws. At best, they are handy *rules* which allow some sort of explanation and prediction. Consequently, no account of *ceteris paribus* laws is necessary for everything which bears such a proviso is immediately disqualified as a law. This view can *either* (i.i) be combined with a radical position concerning the special sciences which claims that they are immature *or* (i.ii) with the friendlier view that they are grown-up theories that do not need any laws because their theoretical significance is based not on the formulation of strict statements but on a different means of explanation.[1] The first, hostile approach, might be accompanied by the optimistic view (i.i+) that the undeveloped special sciences will advance and eventually formulate strict laws or it might pessimistically consider (i.i-) that these sciences will wither and will be reduced to the physical sciences. In any case, all shades of position (i) share a negative view when it comes to the possibility of *ceteris paribus* laws.

(ii) Less radical is a position which still believes that fundamental laws are strict but which differs in that it accepts the law status of the special sciences' *ceteris paribus* laws. This view has faith in the possibility of a proper account of how the proviso clauses are supposed to work.[2]

(iii) The extreme on the other side of the spectrum, i.e., the mirror image of position (i), claims that there are *ceteris paribus* laws all the way

[1] These are, for example, explanations of a causal but not lawlike type or of statistical character (cf. (Earman & Roberts 1999: 467ff), (Earman, Roberts & Smith 2002), (Woodward 2002)).

[2] For example: (Pietroski & Rey 1995), (Fodor 1991). Some of the philosophers who give accounts of how non-fundamental *ceteris paribus* laws are to be interpreted also claim that even the fundamental laws are prone to *ceteris paribus* clauses. One might, therefore, rather list them under (iii). Yet, later I will show that their beliefs regarding fundamental laws are most probably grounded in faulty assumptions.

down to the physical sciences. Proponents of this position try to offer theories of how to interpret proviso clauses for all kinds of laws, not only those from chemistry, biology, psychology, etc. but also from fundamental physics:

> *Ceteris paribus* clauses surely do plague the social sciences. That, however, does not separate them from the natural sciences, for *ceteris paribus* clauses are endemic even in our best physics. (Kincaid 1996: 64).
>
> All laws are *ceteris paribus* laws. (Footnote: I even intend to include most so-called fundamental laws of physics.) (Cartwright 1995: 155)
>
> Whatever the law says *must* happen, hold or obtain, everything else being equal. (Harré 1993: 79)
>
> Given current science, the appropriate question would seem to be whether *any* laws are strict. (Pietroski and Rey 1995: 88)
>
> The *ceteris paribus* clause is often tacitly employed even in highly developed branches of physics. (Nagel 1961: 560; fn. 8)

The striking intrinsic tension within the notion of a *ceteris paribus* law is, again, this: general theories of lawhood emphasise that laws, whatever else they are, must be universal regularities. Yet, a proviso clause attached to a law statement suggests that in certain unfavourable circumstances exceptions to the law are acceptable. Advocates of (ii) and (iii) alike have to tell us how this contradiction can be resolved. Moreover, they have to tell us how some more specific problems the *ceteris paribus* clause raises can be answered (see below). Proponents of (i) are off the hook. Yet, they, too, have to give us some incentive to believe what they believe: that fundamental laws are really strict.

In the next sections I discuss some concrete difficulties an advocate of *ceteris paribus* clauses has to face. Then, I introduce strategies how to meet these challenges. The central question of my book will emerge from these discussions. Its theme will differ from the usual questions asked about *ceteris paribus* laws but I will motivate this deviation. An outline of the subsequent chapters will conclude this introduction.

II.
DIFFICULTIES WITH *CETERIS PARIBUS* LAWS

The *ceteris paribus* clause in law statements is highly problematic. Amongst the more infamous difficulties are the following (I have already mentioned some of these above):

(i) 'All Fs are Gs, *ceteris paribus*', is in danger of being tautologous or incomplete: tautologous if we specify or define the *ceteris paribus* clause by saying 'All Fs are Gs, except in those cases where Fs are not Gs'; incomplete if the *ceteris paribus* clause is thought to stand for an exclusion clause (in the antecedent of the law) of possible interferences A, B, C, etc. The problem with this variant is that we most certainly do have to leave a gap in our statement 'All Fs are Gs, unless A interferes, or B interferes, or, …' for the reason that we do not know all the interferers; not least because there might be endlessly many.

One might want to try to formulate an exclusion clause in general terms instead which covers all interferers and exceptional circumstances together. This attempt, however, has to face the difficulty that the unfavourable circumstances might well be too heterogeneous to allow for a general description other than that the law does not hold in those circumstances. Yet, the latter description leads us back to the tautologous statement from above.

Apart from these severe problems, a minor hurdle might be that the circumstances to be excluded might not fall within the scope of the science of the law in question. In ‘Birds can fly, unless they are struck by lightning’, the weather conditions are not a biological phenomenon.

To summarise, tautologous statements are empirically not very useful, since they are empirically vacuous; incomplete statements, on the other hand, fail to express a determinate content.

(ii) Apart from these semantic problems for *ceteris paribus* law statements, we face other, epistemic, difficulties: predictions might fail since *ceteris paribus* laws do not hold good in every situation. Also,

proviso laws cannot be refuted easily for the *ceteris paribus* clause could be misused as an immunisation strategy: we could claim that whenever the law does not hold the *cetera* weren't *paria*, a bad result for the sciences if we are keen on demarcation. A non-falsifiable empirical science is in danger of resembling a pseudo-science like astrology.

Note also that the confirmation of a *ceteris paribus* law aggravates the difficulty posed by the Duhem-Quine thesis, that any (alleged) empirical statement cannot be individually confirmed or refuted but rather faces the tribunal of experience together with a whole bunch of auxiliary assumptions. The additional problem is that the deduction of an observational sentence from a law is subject to probably unspecified provisos, that is, the additional assumptions are unknown (cf. Hempel 1988: 25).

(iii) Finally, *ceteris paribus* laws do not support counterfactuals as straightforwardly as strict laws do since we have to postulate that, in counterfactual circumstances, the unknown *cetera* are *paria*.

III.
VERBAL ISSUES

Before I turn to suggestions of how to deal with the problems mentioned above some linguistic remarks are in order. Quite clearly, the term '*ceteris paribus* law' is, although well established and often used in the literature, a misnomer. Meaning literally *all else being equal*, '*ceteris paribus*' is a relational term and suggests, vaguely, that unless some things, for example a particular set of actual circumstances, are equal to other things, for example an ideal set of circumstances, the law does not hold.

However, philosophers often do not mean anything like this. Rather *ceteris paribus* might stand for any of the following phrases: under normal or ideal circumstances, provided unfortunate events do not happen, provided nothing interferes. Or, minimally, it might stand for ‘but there are exceptions’. Needless to say, most of these interpretations are far from