

ECONOTE BRIEFING: QUANTUM PHYSICS AND ECONOMICS

An intellectual health warning: You have been warned!

What follows is my (very) limited understanding of some tenets of Quantum Physics and Mechanics and of their possible parallels in Economics of which I know, to use Einstein's own words, "relatively" more! I have a Ph.D. in Economics from LSE, with my thesis being almost exclusively mathematical. However, I have never studied physics in my life and what follows is based on my avid reading during my recent lockdown of relevant articles on Quantum Physics in the New Scientist and the Scientific American. You may know of "the act of observation changing the observed" and of time travel. The following is my take of how these concepts have been used in Economics for decades now. One is Goodhart's Law and the other is DCF and interest rates. (Ctd. right>)

Fig.1: Charles Goodhart



If there is a link between money stock and inflation the moment money becomes a target, the link with inflation collapses. When a policy measure becomes a target, then it ceases to be a functioning measure and fails to achieve what was planned by using it. This is a kind of "act of observation which changes the observed" in the sense that the use of a tool changed the expected outcome of that use. If the tool had not been used its observed relationship with the outcome may not have changed! As for **time travel**, any financier with a simple calculator and with information of time periods, cash flows and interest rates can tell you how much USDX will be worth in T time. He will also tell you how much USDX deliverable in T time is worth now and write you a cheque for that future sum now! So finance has been sending cash flows to the future for collection and has been bringing future cash flows for collection in the present. (A.Freres, Ecognosis Advisory Ltd, afreris@ecognosisadvisory.com. 30/5/2020)

Measuring can change reality

The atom consists of particles, that is the nucleus, which itself consists of neutrons and protons, with the nucleus being orbited by electrons. Individual particles such as electrons, can behave in experiments either as bits of actual matter or as waves, such as radio waves or light. This duality of behavior can have serious consequences as to what we perceive as reality because quantum physics has shown that in an effort to understand that dual behavior, by "observing" the particles/waves, we can cause them to change behavior, particles behaving both as matter and waves. This may seem totally obscure and arcane but if the act of observation can change the observed, then what is real? Is it something which we do not see, or is it something that we do see but it is not what was before we observed it? To be strictly accurate, it is not the act of observation, putting it under a microscope, but the act of trying to measure its qualities which then can change the nature of the particle. Taking a deep breath now, a further aspect of quantum physics is that of "entanglement" whereby a pair of particles share characteristics whose information of changes can be instantly communicated between them irrespective of distance. Although the following conjecture is disputed, the speed of this communication can be faster than the speed of light implying that, on a particle level, the future could be steered and the past rewritten. Here is for you a version of time travel! **Charles Goodhart** was adviser to the BoE and professor at LSE and, behind the scenes, the "father" of the HKD peg to the USD in 1983. In 1975 he coined the phrase: **Any observed statistical regularity will tend to collapse once pressure is placed upon it for control.**

Fig.2: Time travel in Finance, present value of future cash flows

$$PV = \frac{C_1}{(1+r)^n}$$

C_1 = Cash Flow at period 1
 r = rate of return
 n = number of periods