What Economics Says About the Existence of Time

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2023-01-02.17:45 EST Mon
https://youtu.be/7L0oFeV0AeI&lc=UgwwL-xBcCjoce1HG9l4AaABAg

A comment on the YouTube *Closer to Truth* post:
Craig Callender - Setting Time Aright (January 1, 2023)
https://youtu.be/7L0oFeV0AeI

To address adequately the issue of whether time exists, an analogy in a different topic helps. The analogy begins this way: One of the odd issues encountered when scheduling an international trip is that money can vary in value. Variable exchange rates mean that products in some countries end up cheaper for you not because their economies are inherently better than where you live but because varying exchange rates make your own money more valuable there.

I might then decide that an opportunity for easy wealth exists in this system. I *define* my money in my local economy — my residence, to be more specific — to be at least an order of magnitude more valuable than anyone else's. It is, after all, my residence and thus my economy, with which I can do as I please. Suddenly I am ten times richer!

Or am I? Is there a flaw in my strategy?

Never mind that for now, let's switch to physics for a change of pace. I wish to time travel, so I use special relativity to change the orientation of my "foliation" or view of space in the universe. Accelerating to 99.5% of lightspeed, my definition of space shifts to a sharp angle, and a large swath of the future becomes part of my definition of space. In the opposite direction, a large swath of what was the past also becomes part of my space. I have freed myself of the usual constraints of time in my travels!

Or am I? Is there a flaw in my strategy?

Both examples explore the difference between local interpretations and some broader preexisting consensus. I can declare myself as rich as I want, and there's nothing wrong with that as long as my prices apply only to my residence. However, the instant I go out into the broader world, others see what I've done as nothing more than a private reinterpretation of reality. Not one of the world's economies responded to or is even aware of my change in interpretation of wealth. In principle, I could convince the rest of the world otherwise, but it would require time and resources I do not have.

Similarly, by accelerating myself to 99.5% of lightspeed, I create a new definition of space and time, but I have made only *my* definition of space and time. It does not change the photons headed my way from the broader universe, only how I *interpret* those photons. If I travel into the more expansive universe, others see what I've done as nothing more than a private reinterpretation of reality. The vast majority of the universe does not know or care about my change in interpretation of space and time. In principle, I could convince the rest of the universe otherwise, but it would require time and resources I do not have.

To put this another way, the flaw in dismissing time via block universe arguments is that they disregard Einstein's most sacred rule: Information cannot travel faster than light. It is, alas, a bit of carelessness that even Einstein fell into since, at least implicitly and like Mach, he assumed definitions of space and time to be universal and all-encompassing.

The sadder and simpler truth is that an accelerated object *never* overturns or even significantly impacts the universe's consensus of cause, effect, and past historical events. Accelerating to 99.5% of light speed gives us a new interpretation of data coming in from that broader universe, but that is all it is: A different way of interpreting photons. A much cheaper way to achieve the same effect is to use computer technology to build a Poincaré symmetries simulator that takes those photons and gives us new interpretations.

It is not the existence of multiple universe-spanning definitions of space and time that prevents paradoxes. If anything, that kind of thinking is the source of many contradictions. The deeper problem is that we like to think of space as a concept that exists in isolation. That is, despite the profound insight of Minkowski had that space and time are one, we never honestly believe it. Our xyzt notation directly reflects this deeply classical bias.

Thus a star 10 lightyears away may seem only a meter away if we have the resources to accelerate to a high enough speed. However, after we cross that puny meter of distance, the star we find is 10 years older than before we crossed that meter. This aging is an example of an age gradient, an unavoidable consequence of distances measured in length and duration. The proper distance to the star was always 10 light years times 10 years. You can approach one or the other as a limit, but never both simultaneously. Such area-like distance-duration units — Lorentz areas — better capture the relativistic invariance of the universe, though they do have the amusing property of squaring traditional distance units. At a human scale, a distance of 0.3 meters — one foot — becomes 0.3 m·ns using Lorentz areas, but a height of a 1.5 m person becomes 25 times that, or 7.5 m·ns.

Is time real? Yes, very much so.

It's also grainy, clock-based, and dependent on the binding forces of the Standard Model. It operates not on some block or multiverse but on a single universe in which change is entirely real, and the future is unavoidably unknown. Granted, it is a universe in which our human concept of length-only separations can never provide an accurate description. Our neural systems are optimized to make maximum use of the lovely stabilities that exist in our local solar and planetary-surface environments. These stabilities, in turn, create the illusion of purely space-like separations extremely useful for survival.

A new path is needed. Treating time as a mystically smooth math-only continuum adds only noise that confuses the details of how Standard Model matter creates it in nature.

[2023-01-02.17.45 EST Mon]

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