

## **The FED knows the financial sun revolves around the financial earth**

By James Rickards, The Daily Reckoning, 12 June 2015

The vast majority of the people working at the US Federal Reserve are not uneducated.

They're *miseducated*. They are very smart people who have worked very hard to learn the wrong things. They've learned things that don't exist in reality.

Let me back that up, because that's a big statement. When I lecture on complexity or on finance in general, I include a digression on the history of science first.

### **Paradigm shift**

There's a case study laid out in a book by Thomas Kuhn called *The Structure of Scientific Revolutions*. Kuhn coined the phrase 'paradigm shift'.

I'm sure you've heard this phrase a million times. It's often misused, or it's used as a cliché. Maybe somebody wears brown shoes instead of black shoes and a person says, 'There's been a paradigm shift,' when all that has really happened is somebody changed their shoes.

The way Thomas Kuhn intended it is that the paradigm is bigger than the model. We construct a model of reality as a tool kit for whatever kind of analysis we're doing. Your paradigm is the way you see the world — the big picture that forms the model that supposedly corresponds to the reality.

### **This was science — because it was obvious**

For about 1,500 years, from the first century A.D. to the 16th century A.D., all the smartest people in the world — or anybody who thought about it — believed that the sun revolved around the earth.

It was called the geocentric view. The church believed it, but you don't have to blame the church. This was science — because it was obvious. You woke up in the morning and the sun was over there and then it moved across the sky. Then it went down over there and then you went to bed. The next day it came up over there again. Clearly, the sun was revolving around the earth; that was very obvious.

Observers came up with a model that explained that the earth is the centre of the universe, and that the sun, planets, moon and stars revolved around the earth.

They modelled concentric circles of the sun, moon, planet, and stars all revolving around the earth, which was then thought to be the centre of the universe.

This was science for 1,500 years. People modelled it and wrote equations explaining it.

It wasn't mythology. They could write scientific equations to know what planet was going to be where on what day. Mathematicians, scientists and astronomers were doing this for 1,500 years.

What happened, however, was, by the late 15th century, scientific data started to improve. This was around the time of Galileo and telescopes.

### **The data was coming in at odds with the model**

Scientists and astronomers started to notice that the planets weren't exactly where the model said they were supposed to be. The data was coming in at odds with the model.

As a scientist, what you're supposed to do at that point is question the model. But that's not what they did.

What they did was embellish the model to account for the anomalies. They said,

*'Well, there are big circles which are called cycles. But if the planet's off the cycle a little bit, then there must be what we can call an "epicycle", or a little circle. So it's doing a big loop, but while it's doing that it's also doing these little anticlockwise loops.'*

And they kept embellishing it. They wrote new equations for all of this. It is all well documented.

### **Finally, Copernicus came along**

Finally, Copernicus came along and said, *Maybe the earth is not the centre of the universe; maybe the sun is the centre of at least the solar system. And maybe the planets — including the earth — revolve around the sun.'*

Then Kepler came along and said, 'And maybe the orbits are not circular, maybe they're elliptical.'

And after him came Tycho Brahe who used his telescope to take observations.

By the end of the 16th century, Copernicus, Brahe, and Kepler had created a new model. It's the heliocentric model, in which the sun is the centre of the solar system and the planets and the moon revolve around it in elliptical orbits.

### **It works - that's the model**

And guess what? It works. That's the model.

That's an example of how, for 1,500 years, all the smartest people in the world, using very good maths, physics and astronomy, were completely wrong.

### **History repeating**

The men and women at the US Federal Reserve and IMF have 170 IQs and advanced PhDs. But what good is all of that brainpower if you've got the paradigm wrong?

They're using equilibrium models, normally distributed risk, mean reversion, Monte Carlo simulations and other things that are the financial equivalent of thinking that the sun revolves around the earth.

The Fed is impervious to debate because everything they say makes perfect sense if markets are equilibrium systems. But they're not. They're complex.

What a small minority and I are doing is coming along saying, 'No, the sun doesn't revolve around the earth; the earth revolves around the sun.'

### **How bad science perpetuates itself**

The best model for understanding capital markets is complexity theory, physics, phase transitions, network theory, graph theory and other applied mathematics that go along with those.

Let's say you're a really smart 25-year-old, and you're trying to get a PhD in finance. Perhaps you're reading *Strategic Intelligence* or *The Daily Reckoning* and you say: 'You know, I think they're onto something. I think this complexity theory means something.'

But your professor, your PhD thesis advisor, is a 55-year-old who spent the last 40 years learning about equilibrium models. Your professor won't want to back away from it. It's very hard when you're 55 or 60 years old to say, 'Hey, everything I've been doing for the last 40 years is pretty much wrong.'

If you, the smart 25-year-old PhD student, ask your professor if you can write your thesis on complexity theory, he'll say no.

Instead of being the first student to write on complexity theory, he'll want you to be the nine-thousandth student doing some minute little tweak on the same equilibrium models that we've been doing for the last 50 years.

And you will.

### **You're not going to get a job**

Because if you're the outlier who wants to pursue the new science, you're not going to get your PhD...at least, not from a prestigious school. You won't be taken under the wing of a prominent thesis advisor or get published either. And, perhaps most importantly, you're not going to get a job.

Thus, the bright 25-year-old gives up and writes something that the professor likes instead.

That's how, even in the face of new ideas and new science, bad science perpetuates itself — all because of nostalgia.

Fortunately, the old models are eventually replaced. But it takes time.

Regards,

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*for The Daily Reckoning*