capital in the 21st century

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the axiom of capital

Bitcoin has spurred a renaissance of thought on the question of "what is money?" Bitcoin is often linked to the Austrian school of economics without much thought as to why, but pondering this question allows for the most thoughtful justification: money is an emergent order and understanding its operation depends on appreciating irreducible uncertainty, subjective value, and methodological individualism. Often described as a logical treatment of a subject fundamentally resistant to scientific analysis, the emergence of Bitcoin and its acceptance in the market has many Austrians rightly cackling at a real-world proof of the efficacy of the school.

On which note, Mises' monumental *The Theory of Money and Credit* is essential reading for any Bitcoiner, and Menger's *On the Origins of Money* might be the single best prose answer to the preceding question. More a Bitcoiner himself than an Austrian – or at the very least a polymath – Nick Szabo's writing is essential reading not only for Bitcoiners, but for anybody struggling to understand what on earth is going on in the world. Contemporary Austrian economist Rahim Taghizadegan has indeed credited Szabo's thesis in Shelling Out as a novel contribution to the school.

That said, we do not think of Axiom as a "money business" – and nor does anybody else, for that matter. We operate in capital markets, and I have personally found it impossible in the past few months to set up a capital markets business without thinking about the nature of capital. The reader will not be surprised in the least to learn I believe there is an intimate connection to money, and hence that capital on a Bitcoin Standard is likely to be every bit as different as money, and possibly more so.

Joseph Schumpeter's critique of the nonsense of "equilibrium" as leaving no space for entrepreneurship is as much about capital as anything else. Without entrepreneurs, there is little to distinguish productive capital from mere assets: animate matter, rich with potential, from mere inanimate *stuff*. One of the many lessons of Israel Kirzner's analysis of the conceptual links between competition and entrepreneurship is to force the realization that capital is both heterogeneous and unavoidably the product of human creativity. This heterogeneity is arguably the soundest conceptual grounding, or the best formulated *axiom*, for a non-circular definition of "liquidity." The perfectly liquid capital is money, which is perfectly homogeneous. Money bears no uncertainty because it is the standard of value against which uncertain endeavors are to be measured. The role of the entrepreneur is to *embrace uncertainty* by *accumulating capital*; putting it to heterogeneous use in the creative and competitive pursuit of the satisfaction of the value of others.

So far, so simple – and so seemingly axiomatic. But if you are reading this you are most likely interested in Bitcoin, and if you have been kind enough to invest in Axiom Venture Fund I then you most certainly believe that we are still early. And so, I put it to the reader that this – or, perhaps, the consequences of this – is not at all widely understood.

There are plenty of definitions of capital out there, but my favorite definition is not at all technical and is not from an Austrian. It is that of Hernando de Soto. It is not even a "definition," per se, but more of an image. This is exactly why I like it. In the dismal science, rhetorical flourish is hard to come by – especially while remaining somewhat accurate and without spiraling into statist agitprop.

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In his fantastic *The Mystery of Capital*, de Soto calls capital, *economic potential energy*. To my mind, this helpfully emphasizes two things:

i. that work has been done, but the fruits of that work have not been realized, and;

ii. that they can be realized, with intention – with human action.

It is within our power, not as *homo economici*, but as individual thinking humans, to tap this reserve of potential energy based on what we value. It is not the preserve of the omniscient, omnipotent capital tsar who allocates all capital from a palace in the sky. Nor is Hayek obsoleted by advances in artificial intelligence, to cite exactly some such fashionable statist agitprop. It is the entrepreneur that is the motor of the world. She thinks as an individual; she acts in the moment; and she allocates at the margin.

Steve Jobs, an entrepreneur if ever there was one, once famously said,

> “*I think one of the things that really separates us from the high primates is that we're tool builders. I read a study that measured the efficiency of locomotion for various species on the planet. The condor used the least energy to move a kilometer. And humans came in with a rather unimpressive showing, about a third of the way down the list. It was not too proud a showing for the crown of creation. So, that didn't look so good. But, then somebody at Scientific American had the insight to test the efficiency of locomotion for a man on a bicycle. And a man on a bicycle, a human on a bicycle, blew the condor away, completely off the top of the charts. And that's what a computer is to me. What a computer is to me is it's the most remarkable tool that we've ever come up with, and it's the equivalent of a bicycle for our minds.*”

This is usually understood as commentary on technology, but I think it is more about capital. A less romantic framing, perhaps, than “economic potential energy,” capital is *tools*. Jobs' point is just how potent software is as a *form of capital*. But ultimately all capital magnifies the desirability of the output of some exertion of time and energy. A bicycle is one example, and a computer is another. At the risk of mixing metaphors, capital is the bicycle of labor; of time, of effort, and of the grind to produce value by hand.

Capital is tools.

more things, cheaper things, new things

What does money have to do with all this? The non-answer is to say that money is the most liquid form of capital, but that is to subscribe to a circular explanation. If by “liquid” we simply mean, “the time and difficulty required to transform something into money,” then money can be transformed into money in zero time and with zero difficulty, hence it must be maximally liquid. We have both stated and proven a tautology. The fiat economists would be proud.[†]

I suggest we attempt to invert this understanding of liquidity. Instead of trying to capture how easily and quickly we can convert capital into money, what if what we meant was how easily and quickly we can convert money into capital?

Okay, why? Is this even different or am I just playing with words?

[†] Note, by the way, that a tautology cannot be an axiom, as it trivially implies all and only every other tautology as its theorems. Add one tautology to your axioms and you may as well add them all. Nothing is changed, and likely nothing is understood, either. Real axioms require some understanding of the subject matter under exploration.

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I think *it is* different because it forces us to think about what it is we really want; what we want is wealth. We want more things, cheaper things, and new things. And we want the comfort and security of knowing we will be able to produce these things far into the future. We don't want one more thing, one cheaper thing, and one new thing – and we don't even necessarily want any *things* right now. We want the *potential* to create more, cheaper, and new.

Money does none of this. Money is not wealth. Money is a claim on wealth – money is liquid; it is salable. It is the maximally efficient way of communicating the relative value of things we really want. But it is only itself valuable because all these other things it helps us value either exist in the first place, or else could exist, pending our intentional, directed effort to allocate time and energy to bringing them into existence.

Money is neither sufficient nor necessary for wealth. But capital arguably is. Real wealth *is illiquid*, and the liquidity of money is useful first and foremost because it makes it far easier and more efficient to allocate capital than otherwise.

Another way of thinking about all this is that money is time. More specifically, money is time *now*. But capital is something different: capital is the cumulative product of having decided not to consume today but to make more, cheaper, and newer the future ability to consume. Capital is *all time ever*. I do not believe it is appropriate to propose that people *should* want only to consume in the future – that is none of my business. But we can approach the same issue more subtly: if you wanted to forego consumption and maximize your potential to later consume, could you? What are your incentives either way?

To do our best to minimize the economics jargon once again, we might simply ask: what are you going to do with your time? Are you going to create or consume? And how do the characteristics of money, as the salable representation of that time, influence your decision? I sincerely believe that this is the killer app for Bitcoin: pricing capital. If there were ever a time to say that *Bitcoin Fixes This*, here it is.

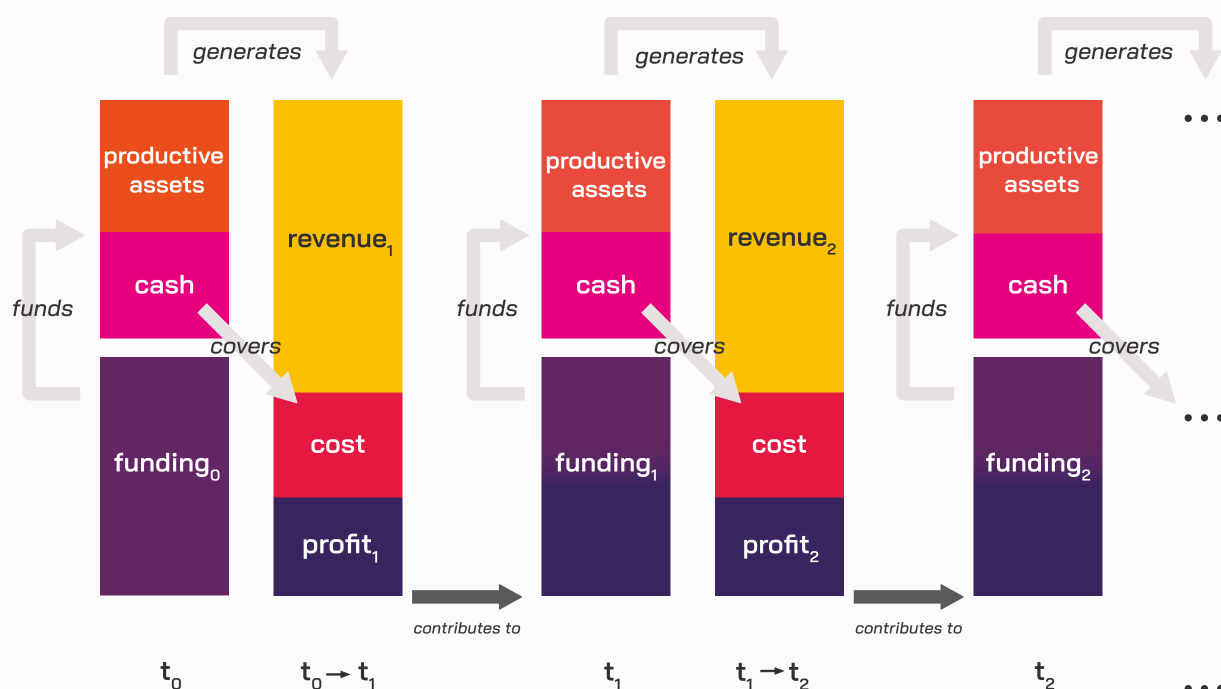
stocks and flows

But is this even broken? Can't we price capital now?

We *can*, but my goodness is it difficult! If you look at what has happened in capital markets over the last fifteen years, at least, this will become clearer and clearer.

Until very recently I worked in this world. Indeed, it was the only (adult) job I have ever had besides this one. I enjoyed it greatly and am grateful for having the opportunity to study and learn as I did. In this role, I chipped in here and there teaching the new hires the basics of financial theory. What I dreamed up to teach them I was pitching at folks who I assumed were extremely intelligent but who had no experience of economics or finance. I found that an invaluable tool to explore this was by using the concepts of *stocks* and *flows*.

Below is a cartoon version of a balance sheet and an income statement, in which I attempt to visually convey how the two evolve over time (see next page). In that pedagogical context, I was trying to explain as much from first principles as possible the difference between *returns* and what is commonly called "growth" but is really just an "increase."



All this is intended to represent the cycle of capital through a business. You get liquid, homogeneous capital (money), you transform it into illiquid, heterogeneous capital (productive assets), to create a product, keeping a little liquid to cover the costs of delivering the product; and if you profit, that means you get to go again and create even more capital, except that this time you get to fund it yourself.

In the context of financial analysis, one of the key implications I intended to communicate with this principle is that the measure of success is not that the yellow number goes up, and it's not even that the dark blue number goes up. It's that the dark blue to purple ratio stays high. Because that is the only sustainable way that the *orange* number can go up. And this is where wealth comes from. Everything else here is valuable only insofar as it lets us do this *efficiently*.

But, of course, in the world of quarterly, P&L finance, nobody cares. They want the yellow number to go up at all costs – which might be a good thing, but it might not – and in particular they want the ratio of successive yellow numbers to go up. They call this ratio "growth," even though it is really an "increase." It is a dimensionless ratio of one flow to another. A real "growth rate" has the dimensions of one over time, like the ratio of profit over a period to its funding at the start of that period, or dark blue to purple above. The reader can hopefully see that what this ratio captures is the real, causal, time-dependent process by which the ability to *produce* grows.

This misunderstanding – that we should care about short-term flows rather than long-term rates of return on stocks – I would say is basically the original sin of fiat finance and fiat economics. It is how you get the idea that, "*we need to stimulate the economy*"; it's why you might think there is nothing wrong with gutting manufacturing capabilities and energy infrastructure because services are higher margin and "scale better"; it's how you end up foaming at the mouth over "quarterly earnings," as if any meaningful investment project could take 3 months *and* as if the measure of its success would be a flow and not a stock.

It's also how you get the idea that trading jpegs is productive, or that the product of capital accumulation should be artificial scarcity rather than abundance; not more and cheaper but capped and expensive. It's how you think that if you create a simulacrum of wealth, at no cost, real wealth can somehow follow just because you have bootstrapped *an idea*. Not productive capacity: not the potential to create more, cheaper, and new; but claims on wealth that you cross your fingers somebody else will actually *work* to create. And it's how you end up with one of the greatest misallocations of capital in the history of venture capital and possibly in the history of capital markets.

Real capital is scarce – precious, even. It is, after all, accumulated time. if it is going towards something stupid and short-termist, then it isn't going towards anything intelligent and long-termist. If the money we use to decide how to allocate capital does not reflect this scarcity, we will think there is no cost to short-termism. The incentive here is not wealth, it's just profit. It is not a stock, it's just a flow. It is not to create tools, it's just to dismantle them and trade the parts for fun.

the point of profit

The reader might wonder if there is anything really wrong with that? Am I revealing a paternalistic pedantry of no clear relation to economics? *Greed Is Good,* right? What is the point of investing in the first place if it is not to profit? Isn't profit a marker – nay, *the marker* – of entrepreneurial success and sustainable economic contribution?

As a final tease, I would put forward that a far better contentious proverb to employ here than Gordon Gekko's motto would be from the New Testament of the King James Bible, in which we are counselled that, *the love of money is the root of all evil*. Unfortunately, this is commonly misquoted as, *money is the root of all evil*, which does a dire disservice to the message. The two could hardly be more different. It would be a little odd for the general partner of a Bitcoin-focused financial services firm to believe that *money is the root of all evil*, and yet I have a great deal of sympathy for 1 Timothy 6:10. I think it can even be a potent tool to distinguish not the technology but the *cultures* of Bitcoin and crypto, and Bitcoin and fiat.

I believe it is completely backwards to think that the point of investing is profit. The point of profit is investing.

Money means nothing without the capital, and the products of capital, that it prices. We like to think it means "our time," which is true to an extent, but our time is not valuable in the slightest without the stocks of capital that multiply its productivity. Profit means nothing beyond the means to continue compounding capital in a truly independent manner. There is capital employed without profit, but there is no profit without capital employed. Moreover, profit is the informational signal that the way you are creating capital is valued by others. Profits are great, but *returns* are better.

To ground this more in everyday experience: if you knew your money was going to be more valuable in the future, how would you invest?

The logical approach would be to invest such that your return, while still compounding in value, would come as late as possible. You want your return as far in the future as it can be, partly because the later it comes the more value it will have compounded. But partly also because that is more efficient than constantly having to think of new projects, developing new skills, testing new markets, and so on.

This means that at a personal level, you are incentivized to develop skills as specific as possible,

crystallize the value of these skills by creating capital as heterogeneous and illiquid as possible, and spend as much time as possible thinking about deepening these skills and crystallizing this value.

But what if your money was going to be less valuable in the future? Well, all of that would be flipped. You would want your return as soon as possible and you'd want the optionality of new projects and new markets, which means you are incentivized to develop skills as general as possible and hold capital as liquid and homogeneous as possible.

This would mean you are incentivized to stay on top of everything happening in the immediate term, to trade around it, and to spend little time – or no time – focusing on the long term. Any wealth you do own or that you can create, you really ought to financialize to increase its liquidity. Better yet, you ought to financialize somebody else's wealth. *Even better still*, you ought to leverage somebody else's financialized wealth – force others to leverage to compete, misallocate more capital or even start to consume it, create more money and ensure everybody's money will be less valuable in the future – so we can start this merry-go-round all over again.

In the latter, as long as you profit, everything is fine. In fact, if you have sufficient capability to financialize, you don't even need profit *now*. You can promise endless future profits, "grow" (i.e., "increase"), sell the rights to them, and move on. Everything becomes reducible to its immediate flows. But as you gradually strip away your own and everybody else's capital – as you dismantle, trade, and consume every tool – you will find returns to be more and more elusive and, eventually, impossible. The only important question becomes, *who is holding the bag*?

Bitcoin fixes this. Bitcoin forces us to think first and foremost about the stock. It enables us to think far more clearly than we would otherwise about the potential to create more things, cheaper things, and new things. This is no mere thought experiment, it is happening around us, at a bewilderingly accelerating rate. It's happening in mining, in the Lightning Network, in Nostr right now. And in the long run? We wouldn't dare be so arrogant as to suggest what opportunities can be known. Properly incentivized, purposeful, acting humans are nothing if not creative, and Bitcoin is nothing if not an inducement to create ...

bitcoin's killer app

Whilst it is technically correct to say, "Bitcoin mining secures the network," I find this explanation to be dry. We might channel my earlier articulated appreciation of de Soto and observe there is a difference between a definition that is technically accurate and one that is rhetorically effective. The hash rate, after all, is a flow. I would argue a more imaginative conception of the global network of Bitcoin miners is as a distributed network of capital – a stock, and a tool – that earns a return which is contingent on energy efficiency, and so which incentivizes *more energy, cheaper energy,* and *new energy*.

More energy because Bitcoin pays for waste and for load balancing. This creates extra profit – not to be cackled over by fat cat executives but to be reinvested in heterogeneous capital to utilize yet more wasted energy and increase productive output. Cheaper energy because this reinvestment will enable efficiency gains, supplementing the returns of energy infrastructure, and will in turn lead to deflation as it is absorbed by the market. And new energy because Bitcoin makes it possible to exploit stranded resources with only an internet connection instead of costly transmission infrastructure.

The Lightning Network may be explained in equally dry terms of "solving Bitcoin's scalability." And once again, this is not incorrect, but neither is it exciting. It is once again affirming that this has a technical purpose and is more than just a toy. But it is a purpose that focuses on flows rather than stocks. Instead, we might consider it a distributed network of heterogenous capital allocation that generates a return contingent on enabling payment efficiency. The consequence is *more payments, cheaper payments, and new payments.*

More payments because fiat payment rails have counterparty risk, jurisdictional firewalls, and lower bounds on economically rational transferable value – all of which are absent in the Lightning Network. Cheaper payments because the network is robust, antifragile, and decentralized, and every node operates as a kind of cellularly automatous market maker in liquidity, meaning routing is competitive and gross costs are driven down, as opposed to the network as a whole seeking to profit maximize by holding costs up. And new payments because all of this enables such innovations as "payment streaming" – very small payments at very short intervals so as to proxy a continuous flow – and programmable exchange – APIs for exchanging proprietary computational resources directly for bearer value in an automated manner rather than at the manual behest of a human.

Nostr has often been characterized as a "twitter alternative." This is accurate enough in terms of the first use case to gain any major traction. But it is woefully unimaginative in terms of how widely Nostr could come to be utilized. Instead, we might consider it a distributed means of harnessing the Lightning Network to align the subjective economic valuation of data with the physical cost of the infrastructure facilitating its broadcast. The consequence is *more communications, cheaper communications, and new communications.*

More communications because the user experience of traditional online communication networks is subject to the design considerations of their operators, whereas the free and open-source nature of the Nostr protocol is such that anybody can build a client or integrate the protocol into an app to create whatever experience they want. Cheaper communications because, via Lightning, the signal of value is directly and bidirectionally expressed in the act of communicating between sender, router, and receiver. Building services on Nostr is significantly cheaper than any prior alternative because the network is open and can be tapped into without first building a network effect, and its supporting infrastructure, from scratch. And from the users' perspective, while legacy social networks are superficially "free," the adage of, "*if the service is free, the product is you*," is healthily absent in Nostr, enabling the ability to *be paid* for valuable contribution as well as to pay for what is valued, in a disintermediated fashion. And new communications because Nostr doesn't rely on any centralized entity capable of shutting down politically inconvenient content.

Let us contrast these heterogeneous, illiquid tools to what we have become used to under fiat. We get worse things and more expensive things, and although it is true that we get more things, one has to wonder what *kind of thing* such an intense pressure to consume drives us to produce more of. I'm not convinced it is worth it. If the source of "more" is pulling forward value from the future that we have no intention of repaying and allocating time towards this activity and away from experiments in the realm of the cheaper and the new, then it is not something I am inclined to celebrate. If the value we believe we have concocted is merely a securitization that makes more liquid a representation of the illiquid, but *does not make anything illiquid*, it is not something I am inclined to support. The farmer can always boost consumption be eating seed rather than planting it, or by selling that which he has not

yet produced. One can always consume more if one is willing to consume capital. But I'd rather we create it.

This is what we would expect to flourish from real capital accumulation. The potential for more things, cheaper things, and newer things that we can rely on if needed, but which we don't need to consume. Of course, we still have scarce time with which to decide what kind of capital to create, and so the price of capital is critically important as well. I believe that the price of capital is Bitcoin's killer app. Bitcoin fixes this.

I think there is a plausible argument that this is *axiomatically true*. Capital is the weave in the fabric of economic life. If Bitcoin fixes capital, then Bitcoin truly does fix everything. Is this our axiom? For all x, Bitcoin fixes x? Is this the mystery of capital?

Sure, but we can go further still. Bitcoin is not an end, but a means. Like all capital, it is a tool to serve humans, and to enable human flourishing. Above even its effect on capital we must hold at the front of our minds its effect on people. A tool does not wield itself. Nor does a business spontaneously emerge. A skilled technician wields a tool and an entrepreneur builds a business. To echo Kirzner, this is a perfectly competitive market. All it takes is an idea and the will to pursue it. Brains and guts. And so, we can echo de Soto once more as well, jettison technical jargon one final time, and end on a rhetorical flourish. We can trim our axiom even further and ask more simply: is Bitcoin not *for all*?

Yes, it is. All we need now are the tools to get there.

Let's create them.

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Allen Farrington, July 2023