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TIME

WE'RE all chained to the unforgiving arrow of time. We're born, we live, and we get old. At least that's what we hope will happen. Then we die. And, if we've managed to reproduce, the existential baton is handed over to the next generation. If we're lucky and play our cards well, we can influence several generations. Most people trifle away this opportunity without ever reflecting too much on it. The thoughts of those who change the world live on. Ideas live on their own, and important ones significantly impact every person's life. Imagine life without the wheel, the ability to start a fire, electricity, the internet, or... bitcoin. Those who've understood the importance of the discovery of bitcoin find it intriguing like fire. As helpful as the wheel, as convenient as electricity, and as world-changing as the internet. A remarkable shift in how we live our lives is just around the corner. A fundamental change in the way we organize ourselves. A global social paradigm shift of unprecedented proportions. A new level of civility. An awakening. This discovery is a representation of time itself. It's connected to time in ways of which we've only begun to realize the implications. It's an emergent phenomenon, and it's happening everywhere at once. An idea whose time has come.

Bitcoin's price, that is, the value of the network, reflects this reorganization. It functions as a lagging indicator of people's understanding of the value of their time. The ever-increasing purchasing power of those who hold bitcoin is what this new paradigm is all about. As time goes by, the old systems will lose their significance. Bitcoiners will become more influential, and the pointlessness of our old ways will be more evident over time. We're living through hyperbitcoinization. It's a pretty straightforward process. The power of all the other currencies diminishes over time compared to bitcoin. Time is critical. It's as essential to bitcoin as it is to everything else in our lives. There's a deep connection between how we experience time and value things. A link between our subjective experiences and the objective reality we live in. We can't change the direction of time, but we can change our relationship with it. If we set up a long-term goal for ourselves, we can structure our lives in ways that help us pursue that goal. If we keep the goal in the forefront of our minds, our day-to-day struggle becomes pleasurable. The Schwarzenegger way. Every push-up, every exam we pass, and every penny we make can all be aimed towards the same goal. Most people understand this, but few can articulate their own ultimate goal. More importantly, they don't realize they can figure out a long-term plan during their journey. Hence, they fail. Exercising your body and sharpening your mind will help you regardless of your goal. Becoming more wealthy helps too. Wealth is the sum total of your efforts minus expenditures. What you own, at any moment, is the only hand you can play in the market. Now imagine that someone could dilute the value of your work unilaterally. That they could do so by the push of a button, without your consent or vote? What would society look like? Would people think of long- or short-term goals in such a society? Could they even afford to think long-term?

Your wealth is the sum total of your efforts and expenditures, and you are the sum total of your experiences. Good and bad ones. Dreary, unfulfilling segments of your life also play a part in who you are. They teach you what to avoid and how being unproductive can impact your reality. Your mind evolved over millennia to fit into a group, so naturally, you compare your life to the lives of others. But, don't underestimate the uniqueness of your life. The longer you live, the more unique your personal journey becomes. The more unique skill-sets you acquire, the more valuable you become to others. The basic principles of the free market are still present everywhere. The division of labor works in your favor. Regardless of what political system you live in, your uniqueness determines your value to others. This is true not only for humans but also for technologies, ideas, assets, and everything else. Originality, or scarcity, is crucial to how valuable something is. Availability and demand determine the prices of everything. Make sure you're in short supply. This is as effective as being in high demand. You decide the value of your time. No one else can do it for you. How valuable something is, is a product of the human mind. When more than one mind craves something, that thing generates a price. But whether that price is worth paying or not is for the buyer to decide. Abundant resources don't have prices. Air, for instance, is almost always free. Scarce things are costly. And nothing in the world has a more limited supply than your time on this Earth. It diminishes with every tick of the clock. Your time on this planet becomes even more limited with every word of this you read.

Now think of order and chaos, or entropy. Entropy and time are inexorably linked. The second law of thermodynamics describes the irreversibility of natural processes. Increased entropy is the very thing that distinguishes the future from the past. Entropy gives the

unforgiving arrow of time its direction. In this sense, bitcoin adoption functions as a shield against entropy. A way to give humanity more time, if you will. At least on a macro scale. We'll get back to all these concepts later in this book. But for now, try to imagine how much time you have left on this Earth. Try to make a rough estimate. You have a lot of seconds left, but not that many years. Your focus during those seconds will determine the outcome of those years to a large extent. Choose wisely how you spend your days. They're not coming back. Think. Error correct. Enjoy. The time you have on this planet is scarce. So is the total number of bitcoins that will ever exist. This feature alone makes bitcoin the perfect trading tool. Every tool that mankind ever invented saves someone time somewhere. That's the ultimate purpose of tools and technologies. Time-saving is progress. We emancipate ourselves from the drudgery of whatever hamster's wheel we're in by freeing up time. Bitcoins are scarce for all coming generations also, so they can free up time for everyone, forever. Finally, we have a fair way of cooperating with each other. A way to find order in a chaotic world. A signal in the noise. A tool that enables global free trade without interventionism. A set of rules that no one can tamper with. Most people have no idea how powerful this is, but they will learn. Patience is key here. If you own bitcoin, you can afford to be patient.

Every tool and every technology saves someone time, somewhere. One could even argue that everything we assign value to saves us time. We value things because of how much time we predict they can save us. Think of it this way: you can either kill your time or let someone else waste it. There's nothing else to do with it. You're a hunter on the prowl for time to kill. If you own your time, you get the privilege of killing it. If you let others decide what to do with your time for you, you allow others to waste your time. If you want to reclaim the

driver's seat of your life, your first priority should be to prevent others from wasting your time. External forces compete to waste your time. First, nature itself destroys your time. Nature forces you to eat, sleep and seek shelter from the elements. For most of us, this means that we have to work. A lot. Then there are other people. Many want to waste your time, too. A lot of them succeed.

Successful time thieves steal time from you without you even noticing, like those in charge of issuing fiat currency. The inflation rate presented to you in mainstream media only reflects a small percentage of what's really going on. Real inflation is always proportional to the increase in the money supply. However, it always comes with a lag, and the closer you are to the money faucet, the more you benefit from this lag. Those closest to the money printers enjoy such modern wonders as negative interest rates and favorable regulations. But all goods go up in price when there's more money around. You cannot create value by pretending that there's more value in the system. Someone somewhere will have to pay the bill sooner or later. No matter what politicians say, there's no way around this.

Another way to look at time is to consider it the only natural resource worth anything. The very definition of economics is the management of scarce resources. Now imagine that you knew that you would live forever. That you were both immortal and indestructible. Imagine that you wouldn't even need to eat. In this hypothetical case, you wouldn't need to act, ever. You could always wait until tomorrow. Postpone everything indefinitely, forever. In such a reality, nothing would be of value to you. With unlimited time on your hands, you wouldn't need to value anything. If time were abundant, everything else would become abundant too. We attach value to goods and services because of the scarcity of human time. In this sense, your

time is not only your most precious possession but the only thing you can own. Time which you, yourself, command. Moments in the driver's seat. They are all you have. Bitcoin provides a perfect reflection of this since bitcoins are strictly finite too. Bitcoin is indeed the only asset that can represent the scarcity of your time. And the shortage of everyone else's too. When bitcoins are lost, they're lost forever. But the network's value remains. The fact that their supply is so limited is what makes them valuable. The fact that they're tele-portable, uncensorable, and that you can store them in your head doesn't hurt. But their real value lies in the fact that they are finite forever.

Absolute mathematical scarcity was a discovery. Not an invention. This realization is key to understanding bitcoin. The moment you realize what this implies, there's no going back. It is an epiphany. It is what "falling down the rabbit hole" means. One day, someone might suggest an "upgrade" of the protocol that proposes to increase the limit. Anything that would change bitcoin's monetary policy would be detrimental to the project. Almost every node owner knows this. This is why changes to bitcoin's monetary policy can't happen. Sure, bitcoin forks into clones of the real deal every now and then, but these copycats aren't bitcoin. They're not even close. Satoshi named the bitcoin blockchain *the timechain* in many of his notes. Calling it this is an excellent way to separate the real deal from copycats. There's the timechain, and then there are other blockchains. One matters. The others don't.

Bitcoin and time are connected. Bitcoin even has its own definition of time called *block height*. Block height is a location in the timechain defined by how many confirmed blocks precede it. The current block height of the blockchain is a measurement of its current time in existence. In fact, it is bitcoin's own way of measuring time.

Bitcoin's inner clock. Without its own way of measuring time, bitcoin wouldn't work. By now, most people ought to know that the network produces a block every ten minutes, on average. Few understand how this mechanism works and why it is crucial to bitcoin's functionality. There is no such thing as a "digital token." If you think there is, you've misunderstood what a computer does and what information is. In the digital realm, there are only ones and zeroes. Pure, binary information. When you "send" something over the internet, your computer is not "sending" anything. It copies some of the information it holds onto another computer. There's no way of sending information without copying it. Computers can't, and neither can you. If there's a thought in your head and you express it as a sentence, you haven't "sent" anything. The information about what you said is still in your head even after you've said it. The same is even more true for the digital realm. Digital copies are perfect clones of the original information. Computers allow for no loss of information whatsoever. A computer deals in ones and zeroes. Nothing else. A computer is nothing but an enormous, connected set of on/off switches. This means that you can copy everything you do on a computer over and over again as many times as you want. To me, the nature of data and how copyable it was, revealed itself during my childhood. As a kid, I learned how to write a simple program using only PRINT and GOTO on my Commodore 64. I could make the computer write infinite copies of whatever I wanted with these commands. Soon, the TV screen said, "All work and no play makes Jack a dull boy" or something similar. It felt like a profound insight. I had understood something that my parents hadn't. I had understood what "data" was. Understanding the true nature of bitcoin gives me a similar feeling. It took a long time to accept what it was. Something on the internet that wasn't copyable. At first, it sounded as outlandish as a time machine. Could this thing exist for real? I had to investigate further.

So now that we've established that digital tokens do not exist, how does bitcoin work? Bitcoin is a distributed spreadsheet. It is a ledger, a register that records who owns what and when. The "when" is crucial to the ledger as ownership transfers can only happen at specific moments. Remember that if time wasn't scarce, things wouldn't have value, and ownership would be pointless. If a transaction didn't have a "when" attached to it, the network wouldn't be able to verify that it wasn't a copy. In other words, someone could have spent those coins more than once.

Because of this, a ledger needs a way to timestamp each transaction it records. This poses a problem. How can a network of computers sync time? We know that syncing time is crucial for this kind of distributed ledger to work, yet using a central server to keep track of time wouldn't work. That server would be a single point of failure for the network. To be robust enough for immutability, the network would need its own timekeeping mechanism. It couldn't trust an external source. The system needs to be trustless if it is to be peer-to-peer. This is where entropy comes in. As explained above, entropy is what gives time its direction. The bitcoin network takes advantage of this fact and builds its own internal clock. How difficult the next bitcoin block is to find gets adjusted every 2016th block by the system itself. Bitcoin has an internal mechanism for adjusting the difficulty of finding blocks known as the difficulty adjustment algorithm. This algorithm ensures that the same amount of time passes between each block.

A hashing algorithm is another type of algorithm that the network uses. It converts an input data array of a specific kind, here in the form of a bitcoin block, into an output string of characters with a fixed length. A block consists of all proposed transactions plus a random number called a *nonce*. When a miner tries to find

the next bitcoin block, he tests different hashes of that block. He tries different nonces to find the next block's hash beginning with a certain number of zeroes. This particular number of zeroes gets decided by the difficulty adjustment algorithm. This might sound complicated, but think of it this way — bitcoin mining is about guessing a number. Guessing this number takes, on average, ten minutes. The greater the number of miners that try to find this number, the more difficult it becomes to do so. This is how the network keeps track of time without relying on outside third parties. It is also how the network rewards the miners who put in the most work to find the next block. The fact that they did is the Proof-of-Work that the system runs on. Because there's no way of faking a hash beginning with that many zeroes (19 at the time of writing). You have to put in the work and prove that you did. One could call this probabilistic timekeeping. Bitcoin is taking entropy and making something useful out of it. Creating order from chaos. A signal from the noise. Using real-world resources to create a numeric representation of time. Building a bridge between subjective value assignments and objective reality. Marrying praxeology and mathematics.

You're not a millionaire in terms of hours. You have way less than a million hours left to live. Let's run some numbers. Each year that passes, you spend 8760 hours. During leap years, you lose 24 more. About a third of all hours you have, you spend sleeping. If you're reading this book, you're probably an adult. Chances are high that you have less than half a million awake hours left. Only you can make those hours count. Only you can decide their value. Whenever you crave a physical *good*, ask yourself why. Will the good save you time or not? Because that is at the core of why you assign value to it. Even the purpose of a Porsche or a Gucci handbag is to save time. People buy luxury goods to signal success to others. In doing

so, they hope to save time by climbing the social hierarchies. This can help them get a better job or find a partner from a particular segment of society. The goal is status or power. A power that then can be used to free up time. In this sense, every good is a service. You buy things because of what you can do with them. Realizing the power of time reclamation is a shortcut to a more fulfilling life. That said, there are probably more efficient ways to free up time than buying Gucci bags. Physical things can act as assets or liabilities. If a physical good is desirable and scarce, chances are high that its price will rise over time. Fiat currencies are not finite. As long as new currency units can be created, they can't be. This is one of the reasons why the ratio between assets and money is high for wealthy people. Dollars and Euros lose value over time. Scarce desirable assets don't. If you don't own assets, you lose. Always. This is the main reason the super-wealthy get richer at the expense of everyone else. Remember, inflation is dilution of the value of your time. If we want to "fight poverty," we need to fight inflation. Everyone would thrive without the inflation-driven exploitation of the lower-income classes. Even the super-wealthy would be better off if they allowed others to flourish. A society devoid of time theft would be better for everyone.