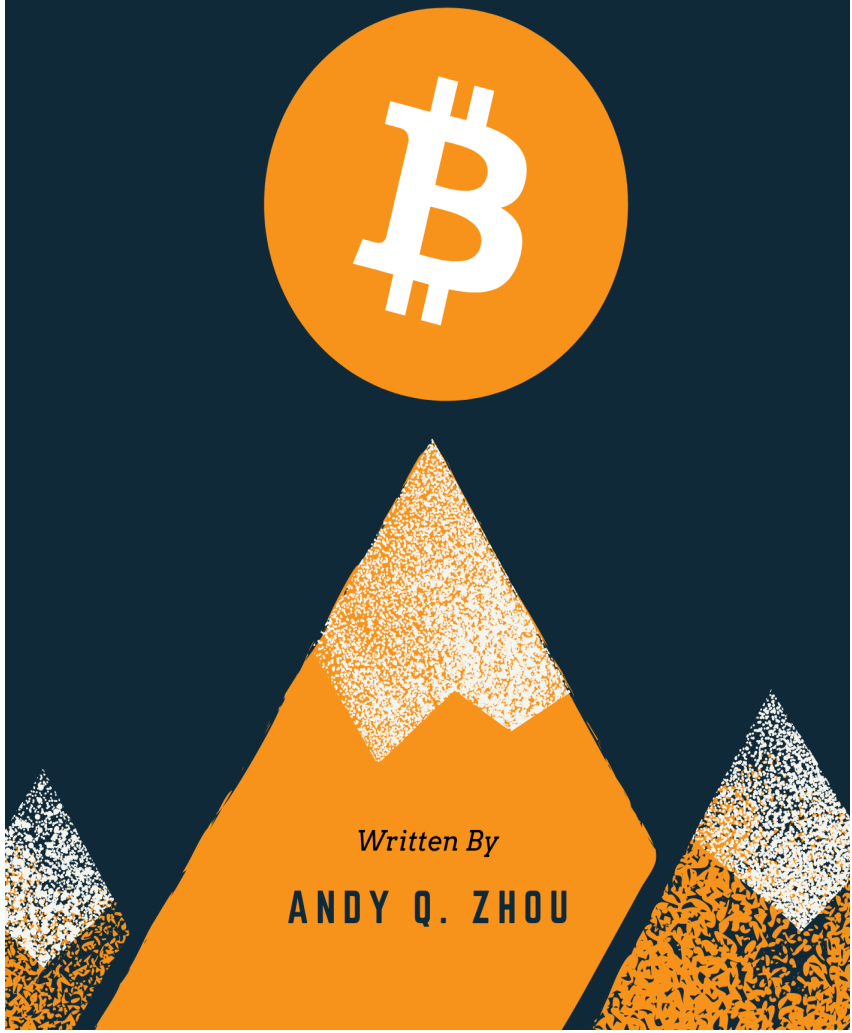
FIRST EDITION

HYPERBITCOINIZATION

a story about a revolution



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HYPERBITCOINIZATION

A STORY ABOUT A REVOLUTION

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"*Human beings have never been able to truly own anything before the invention of Bitcoin, because everything else is either centralized or confiscatable, or both.*"

—Unknown author

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INTRODUCTION

Snow, falling, like bits of confetti at a winter festival. It was 2017, around six on a chilly December morning. I waited for the train at the GO Station in Bradford, Ontario. I was not in the greatest of moods that morning. I wasn't too keen to go to work that day. It was a Friday, two days before my twenty-second birthday. I hadn't gotten enough sleep the previous night. I probably should've worn a thicker jacket. I was in the midst of my four-month internship at the Royal Bank of Canada (RBC), at an office building on the shoreline of Lake Ontario in downtown Toronto.

I snapped out of it and shook myself awake. I should be glad to have been able to get an internship at one of the most prestigious financial firms in Canada. Having been newly acquainted with the world of investing, I considered myself an ardent "equities guy." I spent countless hours of my free time researching stocks, learning how to do fundamental analysis, and trying to figure out how to build the best diversified portfolio of safe dividend stocks of businesses with stable cash flow.

It was under those circumstances that I opened the Yahoo Finance app on my phone and saw that bitcoin had hit an all-time high. I don't remember the exact price; depending on which exchange you were using at the time—and assuming your favorite crypto exchange hadn't gone down—the listed price of bitcoin would have been different anyway. However, it was somewhere just over US$19,000 per bitcoin and rapidly climbing toward US$20,000.

As a finance student at the University of Waterloo well-versed in the history of every market bubble—from the Dutch tulip crisis to the 2007–9 Great Recession, I denounced Bitcoin as the biggest bubble and

Ponzi scheme I had ever seen. I was fully convinced of every argument against Bitcoin at the time. Bitcoin is not only a bubble but also used by criminals. It uses up too much energy and contributes to climate change; it is magic internet money that kids use to gamble with. I was the biggest nonbeliever in Bitcoin (and, by extension, cryptocurrency in general) you could have ever hoped to meet. My skepticism of Bitcoin was further validated, as its price crashed back down to around US$3,000 less than a year later, in mid-2018. In my youthful arrogance, I bragged to my friends and family that I was right about Bitcoin. I held firm my opinion that US$3,000 was still a ridiculous price to pay for something that was headed to zero. I wrote Bitcoin off as one for the history books. The party was over: Bitcoin would join tulips and shares of the South Sea Company in the dustbin of history.

Except this party didn't end. Quietly, in the background, the party went on, block after block after block, until it became a full-on revolution—a revolution of the entirety of our monetary system. It wasn't until years later—amid the fallout of the biggest pandemic in a century, gripping news headlines during all of 2020 and beyond—when a previously little-known software company called MicroStrategy allocated their entire balance sheet to bitcoin, that I took a second look.

The decision from MicroStrategy was absolutely mind-boggling to me at the time. The business had been doing fine before they decided to buy a single bitcoin. The business was still making more cash than it had spent, and its revenue was growing at low single-digit percentages. It wasn't the world's biggest company, but it seemed like a crazy bet to sink a large part of the company's balance sheet into bitcoin. I was ready to once again write off MicroStrategy and its eccentric CEO, Michael Saylor, as just another crazy gambler, akin to eighteen-year-old novice investors

who fund their Robinhood investment accounts with their minimum-wage salaries hoping to strike it rich.

It was at this moment, hot off the news of MicroStrategy's first bitcoin purchase, that a friend prompted me to delve a little deeper. I had met this friend at the University of Waterloo and bonded with him through our mutual love of investing. This friend was the opposite of someone whom I would consider a gambler. Like me, he was also an "equities guy" who focused on long-term fundamental analysis and fervently subscribed to Warren Buffett's way of value investing, which heavily emphasizes investing only in companies with unjustifiably low stock prices relative to their intrinsic worth, based on the value of goods and services that a company produces. Therefore, it came as an absolute shock to me when he announced that he was buying bitcoin heavily in August 2020. It was at that point that I legitimately considered the possibility that I could be wrong. Perhaps I had missed something about the Bitcoin narrative. Perhaps I had, like many times in my high school days, skipped out on doing my homework again. I decided to really sit down and analyze Bitcoin from its first principles and find out why so many people I regarded highly as experts in the finance world were willing to convert their hard-earned, so-called "real money" to bitcoin.

As a result of my research, I became a "Bitcoiner." I "took the orange pill," the phrase commonly used to describe becoming a new Bitcoin convert. Subsequently I, like many others, decided at that point to allocate the majority of my net worth to bitcoin. If you're thinking this sounds like an insane idea, the version of me from just a few years ago would not disagree with you. To my new acquaintances, old friends, and the old me, this was indeed an insane idea.

But is it really such a crazy idea? If a stubborn "equities guy" like me can be convinced, perhaps so can you. This book is meant to share the journey that I went through that convinced me that Bitcoin will succeed. This is a story about a revolution unfolding right in front of us—and if you were to stop and listen, you would hear the hum of a million cyber hornets powered by hope.

Chapter 1:
The History of Money

THE ROMANS AND THE COINS

Imagine you were a government official and tax policy administrator for the Roman Empire during the peak of its power, in the days of Emperor Trajan in 117 CE. Your empire's territory spans what is now Portugal to the mouth of the Euphrates. It is your department's job to determine how much tax each citizen should pay. You need to closely document how many houses, sheep, cows, gold, and bushels of wheat, among many other assets, that each taxpayer has. This is obviously a monumental task just by itself, but then you remember that you must also oversee a case this afternoon involving a dispute between two men, Flavius and Cassius. Flavius claims that ten years ago, Cassius had sold him the piece of land he has been living on and farming for the past ten years. Cassius claims that Flavius is lying and that he had merely leased him the land for ten years. Now that the lease is finally due, Cassius has come to repossess the land that Flavius is refusing to vacate.

This case is quite the messy ordeal. Both men claim that they had signed a contract ten years ago, and that if we could only locate it, we can see who is right. Except there is only the small problem of finding that document. If the parchment had not degraded beyond legibility, it should be located somewhere in the Royal Library among hundreds of thousands of other documents. You sigh deeply. Microsoft Excel has not yet been invented, and neither has Vitamin Water. You know you're going to have to spend a very long and less-than-enjoyable time trying to locate that document.

Before you can even send an unpaid intern to begin the search for the document in the Royal Library, a courier arrives from the Royal Mint with a note. The troops need to be paid next week, but the Royal Treasury is running low on silver and gold. Both precious metals are

needed to mint new coins, which the troops rely on as payment for their services. You know you have some cheaper metals lying around, like iron and copper. If you were to mix those metals into the coins, you could make more coins with the same amount of gold and silver. You indulge in this fantasy for just a moment, but in the end, you conclude that it is a crazy plan. Diluting the silver or gold content in coins is theft of wealth of the highest order and would subject you to severe punishment if caught. Surely no government official would ever think this was a good idea—not the ones today or the ones in the future.

While thinking about what to do regarding the paying of the troops, one of the commanders stationed in a conflict-ridden region of Germania requests that the Royal Treasury supply him with some additional gold coinage on top of what he needs to pay his troops. He says he had "tried his hand at diplomacy for once" with the Germans, but unfortunately, the Germans had refused to accept any verbal or paper promises and demanded to be paid in coins made from gold. The Royal Mint's coins, despite bearing the name and portrait of the emperor, are accepted among pretty much all Germanic tribes in that region, even among those who are hostile to the empire.

Clearly, this job is not easy, and you need a moment to think. If only there were a way to send money across vast distances almost instantaneously, perhaps using some type of ledger system that is also immutable, so that it can't be manipulated after a transaction has occurred. Ideally, the money that exists on this ledger system can be used to keep track of all the transactions automatically and resolve disputes, but also at the same time share a lot of the good qualities of gold, such as having a scarce supply and being nonsovereign (so that it can be used to pay people even if they don't recognize your government). It would also be nice if

that currency were hard to counterfeit, as that has been a persistent problem since you took office, despite your having imposed the death penalty on anyone caught counterfeiting coins. Lastly, unlike gold, it would be of great benefit if that ideal type of money were a little bit more divisible than gold. Gold is nice if you needed to pay someone for a month's worth of work, but it is difficult to use if you just wanted to buy a cup of wine or a jar of *garum* for use in tonight's supper. You ponder all these questions, but nothing quite fits all these requirements. Surely you've asked for too much, and nothing would be able to fulfill *all* those requirements... right?

* * *

Why did the Roman Empire fall? If you're one of the few people who had paid attention in your high school world history class, the answer that most likely comes to mind is that Rome fell to a barbarian invasion. While that was ultimately what pushed Rome over the edge, most historians agree that Rome had been in decline for well over a century before Odoacer deposed Romulus Augustulus and proclaimed himself ruler of Italy in 476 CE. So, naturally, the question of why the Roman Empire fell needs a more nuanced answer that considers what had led to Rome's decline in the centuries before 476 CE.

One particularly interesting theory is the idea that Rome fell due to its inability to handle large amounts of data, which led to systemic problems in its economy, which led to the empire's decline and eventual collapse.

When Rome reached its greatest extent in 117 CE, the empire spanned more than five million square kilometers. Although later empires have occupied much larger areas, given the technology that was

available to the Romans and the fact that Rome controlled a much larger proportion of the world's population at the time than other significant empires have since, you can see how data management, tax collection, and implementing monetary policy were huge problems.

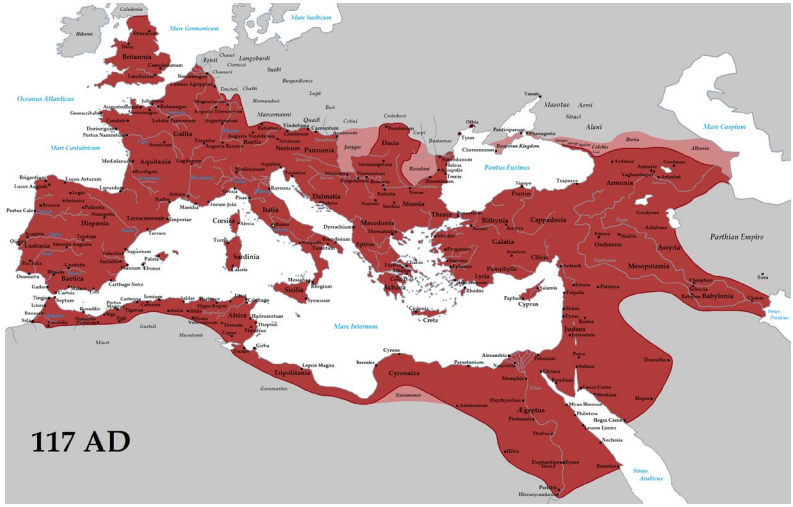

Figure 18. The farthest extent of the Roman Empire, 117 CE.

The Romans were able to stave off this problem for centuries through decentralization. The empire was carved up into provinces, and each province was administered by a governor. The governor would at most times act like a de facto emperor, keeping order in the land and levying taxes on citizens. This sometimes bit the Romans back, as troops often felt more loyalty to their local commanders or their local governors than to an emperor thousands of miles away whom they'd never met. This was sometimes exploited by governors and local commanders, who rose in revolt in attempts to seize the throne. As Rome inadvertently created a system of smaller centralized powers that acted like their own kingdoms, the central power of the empire slowly started to fade. Decentralization was a good enough method for their needs for a long time, until it wasn't.

This system really started to break down as even provinces became too big and too populous, themselves. The provinces became so difficult to manage that the speed at which data needed to travel as well as the sheer amount of data that needed to be stored exceeded what the technology at the time allowed. Bigger territories led to increased conflict, which required more troops that needed to be paid, which required more taxes, which required more administrative work, which increased the demand for data transportation and data management... you get the point.

There was also an element of economic theory that damaged Rome's monetary system over time. If everyone committed to never diluting the gold or silver content in coins, each coin paid out to each soldier, collected from a taxpayer, or used in a transaction needed someone to expend a significant amount of time and energy to acquire these scarce and valuable metals. If the treasury ran out of such metals, they would have to find a way to acquire more. What happened in practice, though, was that at some point groups of individuals in positions of power realized that if they were to reduce the amount of precious metals in each coin and substitute them with cheaper, more easily acquired metals such as iron or copper, they could make more coins and still pay their troops. They could give out the diluted, or "debased," coins to other people when they wanted to buy something, and hoard the good coins made of pure gold and silver for themselves.

In a pinch, this actually worked pretty well. However, it would only work until someone who had received the debased coins realized that they were getting cheated and refused to accept the new coins. The loss in trust of the monetary system eventually led to the Roman economy's collapse, which signaled the beginning of the end for the Roman Empire. The inability to pay troops meant that the empire was

now undefended. The inability to levy taxes meant the central authority of the government greatly diminished. The barbarian invasions were simply a symptom of larger underlying issues. It wasn't like Rome had never been invaded before; this time, though, a collapsing economy meant that there was less and less incentive for soldiers to put their lives on the line if they couldn't even reasonably expect to get compensated for their troubles.

In fact, if one examines most political crises in empires and countries both ancient and modern, one finds that, more often than not, an economic issue lies at their crux. The hyperinflation crisis in Zimbabwe in 2007, which led to the creation of the now infamous $100 trillion bill, was the result of a series of misinformed land reform policies that the Zimbabwean government had undertaken in the 1990s. The government had forcibly seized land from wealthy landowners in the country and redistributed the land to poor and inexperienced farmers, who lacked the skills or equipment needed to produce food at the same capacity.

Figure 19. The $100 trillion bill from the Reserve Bank of Zimbabwe.

Similarly, the hyperinflation crisis currently ongoing in the South American country of Venezuela occurred partly because of the country's heavy dependence on exporting oil. When oil prices crashed in late 2008,

this exacerbated the economic crisis that had already been brewing for years in the country.

A common theme runs through ancient Rome, Zimbabwe in 2007, and Venezuela today. Each fell victim to a crisis when they transitioned from "sound" money—money that is difficult to acquire more of, such as gold—to an easy monetary policy, in which the supply of money can be arbitrarily increased based on the whims of some politician or central bank. One may think that such stupid decisions as printing an arbitrarily large amount of money, which causes hyperinflation, would never occur in more developed countries like the United States or Canada. However, just take the United States' response to the COVID-19 pandemic as an example: the government took unprecedented action by passing, among many other stimulus programs, the CARES Act in March of 2020, which carries a price tag of around $2.3 trillion. This was followed by a second stimulus package in December 2020, which appropriated $900 billion in additional stimulus as part of the omnibus budget bill that year, as well as, most recently, the American Rescue Act in March 2021, which appropriated another $1.9 trillion for various stimulus needs.

It is not the intention of this book to delve into the politics of whether it is correct or incorrect to pass massive stimulus packages. Clearly, businesses were devasted by the pandemic, and many were on the brink of bankruptcy. However, the important fact here is that such large stimulus packages are only able to be passed due to the government's ability to create money out of thin air. In other words, it would be incredibly difficult for the United States government to allocate trillions of dollars of new spending if it had to produce this value in gold.

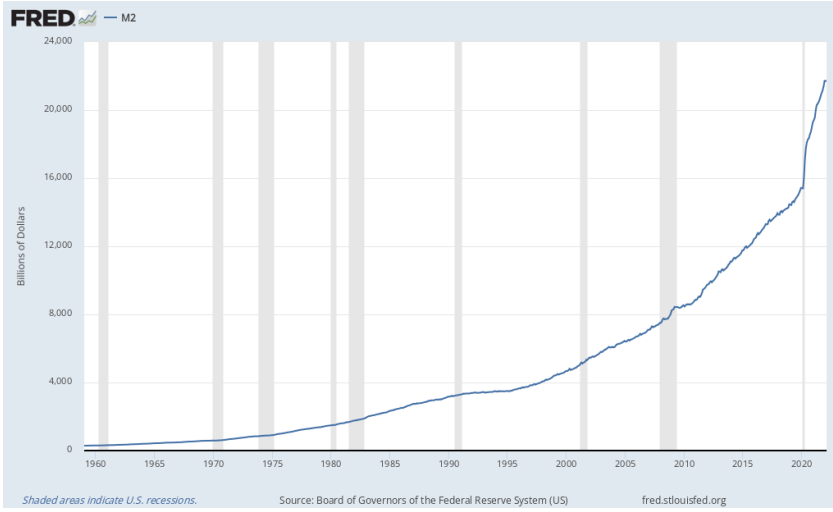

Chart 9. United States M2 money supply.

According to data from the Federal Reserve Bank of St. Louis, it is estimated that anywhere between 20 to 35 percent of all US dollars in existence was created in the year 2020. Logically speaking, it is difficult to imagine how printing massive amounts of money out of thin air and injecting it into the economy could have no negative consequences. Such actions are akin to those of the Romans, who decided to mix cheaper metals into their coins to fund government spending, thereby creating new money with minimal effort. If there were indeed no negative consequences to the arbitrary creation of new money, the government could simply hand out hundred-dollar bills to everyone they see outside every government building, and each person could retire with his or her own favorite collection of exotic cars.

Clearly, this is not possible. This is not possible because the value of the currency would continue to fall as more money gets printed. In simpler terms, you would need more dollars to buy the same things if there are more dollars that exist out in the economy chasing the same

amount of goods and services. The general increase in the prices of everyday goods (i.e., inflation) caused by money printing is effectively a tax on the poor, as the rich already own assets that tend to rise in price along with inflation, such as stocks or real estate. The poor, in contrast, have most of their wealth tied up in cash, which gets devalued by the printing of new money. This issue is further exacerbated by the fact that the people in charge of implementing monetary policy tend to be wealthy individuals who have an incentive to keep inflation high, as rising asset prices benefit them. This comes at the expense of poor people, who find it harder and harder to acquire assets.

This is not to say that the United States, or any country for that matter, is on the brink of hyperinflation. It is incredibly difficult to say or predict exactly how much money printing is too much. That said, Rome did not immediately collapse as soon as the first coin was debased but faced dire economic problems much later in time. The current easygoing money-printing policies of governments around the world seems very similar to what Rome had experienced before its decline.

The debasement of currency is like a person abusing an addictive drug. One may not die the first time one does a drug, and the first few times may even be incredibly exciting, but one must take ever larger amounts of the drug each time to get the same high. Of course, this continues until one day, the user finally goes too far.

Solving this problem is not easy, as history has proven time and again. Humans are greedy and corrupt, and these vices are especially dangerous in positions of power, where one can influence something as pivotal as the monetary system that all of us rely on each day as citizens. If only there were a way to take the human element out of money and

truly democratize the system, in such a way that we give the power of monetary policy back to the people and have it managed by an immutable, secure, decentralized, incorruptible protocol.